A Quick Guide to
POST-EXPOSURE PROPHYLAXIS
IN THE HEALTH CARE SETTING
PEP STEPS: A QUICK GUIDE TO POST-EXPOSURE PROPHYLAXIS
IN THE HEALTH CARE SETTING - MARCH 2014

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The risk of exposure to blood and bloodborne pathogens is slightly greater for health care personnel (HCP) than for people who do not work around blood. An exposure to infected blood, tissue, or other potentially infectious body fluids can occur by:

- Percutaneous injury (e.g., a needlestick or cut with a sharp object) - OR -
- Contact with mucous membrane or non-intact skin (e.g., skin that is chapped, abraded, or affected by dermatitis).

The risk of infection after an exposure is dependent on a number of variables, and appears to be higher with:

- Exposure to a larger quantity of blood or other infectious fluid.
- Prolonged or extensive exposure of non-intact skin or mucous membrane to blood or other infectious fluid or concentrated virus in a laboratory setting.
- Exposure to the blood of a patient in an advanced disease stage or with a higher HIV viral load.
- A deep percutaneous injury.
- A procedure wherein the sharp was in the vein or artery of an infected source patient.
- An injury with a hollow-bore, blood-filled needle.
- Limited or delayed access to post-exposure prophylaxis

After exposure, the risk of infection varies for specific bloodborne pathogens:

- **Hepatitis B virus (HBV):** If the source patient has active HBV, and the HCP does not have immunity, the risk per percutaneous injury is approximately 1% to 30%.

- **Hepatitis C virus (HCV):** If the source patient has active HCV, the risk of hepatitis C transmission is approximately 1.8% (range 0%-7%) per percutaneous injury.

- **Human Immunodeficiency Virus (HIV):** If the source patient has HIV infection, the risk of HIV transmission is approximately 0.3% after a percutaneous exposure and 0.09% after a mucous membrane exposure. The risk of HIV transmission for an exposure with non-intact skin has not been determined, and is estimated to be less than the risk after a mucous membrane exposure.
PREVENTION

Prevention is primary! HCP should be familiar with Standard Precautions:

- Wash hands frequently and thoroughly before and after patient care.
- Use Personal Protective Equipment (PPE) – gloves, gowns, boots, shoe covers, eyewear, masks, and shields – as appropriate for the patient care situation.
- Gloves must be worn when any kind of venous or arterial access is being performed.
- Use sharps with caution:
  - Plan ahead – use sharps in a safe environment with a sharps container nearby.
  - Dispose of used sharps in puncture-proof receptacles immediately after use.
  - Do not recap needles.
  - Use safety devices if available.

All HCP should be vaccinated with the hepatitis B vaccine series and should undergo testing for HBsAb response after completion of the series to document adequate protection. Employees who have not gone through the vaccination series previously should be offered the hepatitis B series through their employer at no cost.

PEP STEP 1: TREAT EXPOSURE SITE

- Use soap and water to wash areas exposed to potentially infectious fluids as soon as possible after exposure. Puncture wounds can be cleaned with an alcohol-based cleanser, chloroxylenol, or chlorhexidine.
- Flush exposed mucous membranes with water.
- Flush exposed eyes with water or saline solution.
PEP STEP 2: REPORT AND DOCUMENT

Report occupational exposures immediately; circumstances of the exposure and postexposure prophylaxis (PEP) management should be recorded in the exposed HCP’s confidential medical record.

Documentation should include:
- Date and time of exposure.
- Details of the incident: where and how the exposure occurred, exposure site(s) on HCP’s body; if related to sharp device, the type and brand of device.
- Details of the exposure: type and amount of fluid or material, severity of exposure.
- Documentation of counseling following exposure and post-exposure management plan.
- Details about the exposure source:
  - If the source patient is known or unknown.
  - If the source patient is known to be infected with HIV, HBV, or HCV.
  - If the source patient is HIV-infected, determine stage of disease, HIV viral load, history of antiretroviral therapy (ART), and antiretroviral resistance information as available.
- Details about the exposed HCP:
  - Hepatitis B vaccination and vaccine-response status (HBsAb titer).
  - Other medical conditions that may influence choice of prophylactic agent(s) if needed.
  - Current medications and drug allergies.
  - Pregnancy status/lactation status.

PEP STEP 3: EVALUATE THE EXPOSURE

The exposure should be evaluated for potential to transmit HBV, HCV, or HIV based on the type of body substance involved, the route, severity, and frequency of exposure.

Significant exposures to any for the following may pose a risk for bloodborne pathogen transmission and require further evaluation:
- Blood
- Cerebrospinal fluid
- Peritoneal fluid
- Semen
- Synovial fluid
- Pericardial fluid
- Vaginal secretions
- Pleural fluid
- Amniotic fluid
Body fluids that do *NOT* pose a risk of bloodborne pathogen transmission unless visibly contaminated with blood include:

- Urine
- Stool
- Tears
- Saliva
- Gastric secretions or vomitus
- Sweat
- Nonpurulent sputum
- Nasal discharge

**PEP STEP 4: EVALUATE THE EXPOSURE SOURCE**

**When source patient is known:**

- Test source patient for HBsAg, HCV antibody, and HIV antibody.
  - Use a rapid HIV-antibody test. Use of 4th generation HIV antigen/antibody testing is recommended if available.
  - HIV viral load assessment for routine screening of source patients is *NOT* recommended.
  - If the source person is *NOT* infected with a bloodborne pathogen, further follow-up testing of the exposed HCP for HIV is not necessary. Follow state regulations related to informed consent and confidentiality.
- For patients who cannot be tested, consider medical diagnoses, clinical symptoms, and history of risk behaviors.

**When source patient is *NOT* known/unable to be tested immediately:**

- Evaluate the likelihood of high-risk exposure:
  - Consider the likelihood of bloodborne pathogen infections among patients in the exposure setting: What is the community infection rate? Does the clinic/hospital unit care for a large number of HIV-, HBV-, or HCV-infected or at-risk patients?
  - Is there a high suspicion for HIV infection and the patient is unable to be tested immediately?
- Do not test discarded needles for bloodborne pathogens; the reliability of these findings is not known.

**The “window period”:**

- To date, there has not been a documented case of occupational HIV transmission from a source patient with a negative HIV antibody test with risk factors for HIV acquisition.
- PEP should be considered only if the source patient has risk factors and has been determined to have symptoms consistent with acute HIV infection.
PEP STEP 5: DISEASE-SPECIFIC PEP MANAGEMENT

Baseline testing of exposed HCPs should be performed for ALL exposures.

**Considerations for post-exposure management plan:**

- **Type of exposure**
  - Percutaneous injury
  - Mucous membrane exposure
  - Non-intact skin exposure
  - Bites resulting in blood exposure to either person involved

- **Type and amount of fluid/tissue**
  - Blood
  - Fluids containing blood
  - Potentially infectious fluid or tissue
  - Direct contact with concentrated virus

- **Infection status of source patient**
  - If positive for HBsAg
  - If positive for HCV antibody, consider measuring HCV viral load
  - If positive for HIV antibody, consider obtaining HIV viral load testing and evaluating clinical status of patient

- **Susceptibility of exposed HCP**
  - Hepatitis B vaccine and vaccine response status
  - HBV, HCV, and HIV status – baseline testing for HBsAb, anti-HCV, and HIV antibody should be completed as early as possible (preferably within 72 hours)

- **Accessibility of PEP and follow-up**
  - PEP should be initiated within 2 hours of the exposure.
  - The efficacy of PEP initiation is thought to diminish after 24-36 hours following an exposure.

- **Laboratory tests used for evaluation**
  - If the fourth generation combination HIV Ag/Ab assay is used to test the source patient, HIV follow-up testing can be completed 4 months post-exposure.
HBV EXPOSURES

HBV PEP should be initiated IMMEDIATELY (preferably within 24 hours but within 7 days) according to the following table:

<table>
<thead>
<tr>
<th>Vaccination status of exposed HCP*</th>
<th>Infection status of source blood</th>
<th>Source HBsAg</th>
<th>Source unknown (or not available for testing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unvaccinated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HBIG† x 1 immediately and initiate HBV vaccine series</td>
<td>Initiate HBV vaccine series</td>
<td>Initiate HBV vaccine series</td>
<td></td>
</tr>
<tr>
<td>Previously Vaccinated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Known responder†</td>
<td>No treatment warranted.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Known nonresponder†</td>
<td>1. HBIG given immediately, ideally within 12 hours of exposure. A second dose of HBIG should be given at 4 weeks.†† 2. Initiate revaccination series, same time as HBIG, different site. 3. Continue HBV vaccination series at normal intervals.</td>
<td>No acute treatment warranted. 1. No acute treatment warranted. 2. Consider revaccination.</td>
<td>If source is known to be high risk without the ability to test, treat exposure as if HBsAg positive.</td>
</tr>
<tr>
<td>Antibody Response Unknown</td>
<td>Test exposed HCP for HBsAb** 1. If adequate, no treatment is necessary 2. If inadequate, administer HBIG x 1 and vaccine booster 3. Consider testing HCP for HBsAg</td>
<td>No treatment</td>
<td>Test exposed HCP for HBsAb**</td>
</tr>
</tbody>
</table>

2 A nonresponder has inadequate response to vaccination (i.e., anti-HBs < 10 mIU/mL).

†† The option of giving one dose of HBIG and initiating the vaccine series is preferred for nonresponders who have not completed a second 3-dose vaccine series. For persons who previously completed a vaccine series but failed to respond, 2 doses of HBIG are preferred.

** Antibody to HBsAg.

† Those previously infected with HBV are immune to reinfeciton and do not require PEP.

†† Hepatitis B immune globulin

† A responder has adequate levels of serum antibody to HBsAg (i.e., anti-HBs > 10 mIU/mL).
**HCV EXPOSURES**

At this point, there are no recommendations for HCV PEP. Immunoglobulin or antivirals are not recommended. Exposed HCP should receive appropriate counseling, serial testing, and follow-up.

<table>
<thead>
<tr>
<th>Infection status of source blood</th>
<th>Source HCV Ab Positive</th>
<th>Source HCV Ab Negative</th>
<th>Source unknown (or not available for testing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labs</td>
<td>Exposed HCP: HCV Ab, HCV RNA, ALT No PEP available.</td>
<td>HCV Ab</td>
<td>HCV Ab</td>
</tr>
<tr>
<td>Follow-up and serial testing</td>
<td>Encourage follow-up and serial testing. 4-6 weeks: repeat HCV RNA 6 months: repeat HCV Ab, HCV RNA, ALT <strong>If HCV seroconversion occurs, refer the infected patient to specialty care for management of acute HCV infection.</strong></td>
<td></td>
<td>Follow-up and serial testing for HCV Ab</td>
</tr>
</tbody>
</table>

**HIV EXPOSURES**

- HIV PEP should be started as soon as possible following a positive exposure, preferably within hours of the exposure. The optimal time to start HIV PEP is unknown, although efficacy is thought to decrease with a greater lapse of time from the exposure.
- PEP should be administered for 28 days.
- If information on the source is unknown, and the decision to start PEP is made (based on risk factors, exposure type, etc.), PEP should not be delayed.
  - Changes can be made as needed after PEP has been started.
  - The exposed HCP should be reevaluated within 72 hours as additional information about the source is obtained.
  - If source patient is found to be HIV-negative, PEP should be discontinued.
- If PEP is initiated, obtain baseline CBC, and renal and hepatic function tests at baseline and 2 weeks after PEP initiation.
DRUG SELECTION

- For all HCP exposures to known or suspected HIV-infected sources, an HIV PEP regimen should be initiated promptly and continued for 28 days.
- HCP are sometimes unable to complete PEP regimens due to side effects. Providing appropriate education about options for symptom management can improve adherence to the PEP regimen, and most side effects of ART can be easily managed.
- Drug selection decisions should be made based in part on information about the source patient including ART, response to therapy including HIV viral load, current disease stage, and available data on HIV resistance testing in the source patient. Regimens should be chosen based on tolerability, safety, and efficacy particularly if the source patient is known to have drug resistant virus.
- Delays in getting information should NOT delay initiation of PEP; modifications can be made later as needed.
- The preferred regimen for PEP includes raltegravir plus tenofovir and emtricitabine (the latter 2 may be co-formulated into 'Truvada', a fixed dose combination). This regimen is well tolerated, effective, and has minimal drug-drug interactions. This regimen can be administered in the case of a pregnant woman, although safety data in pregnancy are limited.
- When initiating an expanded regimen for exposure to HIV with known drug resistance variants, expert consultation is recommended.
### HIV PEP for Post-Exposure Prophylaxis

<table>
<thead>
<tr>
<th>Preferred HIV PEP regimen</th>
<th>raltegravir 400 mg BID + Truvada&lt;sup&gt;2&lt;/sup&gt; 1 tablet PO daily</th>
<th>Truvada (tenofovir + emtricitabine) - or - Combivir&lt;sup&gt;2&lt;/sup&gt; (zidovudine + lamivudine)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Alternative HIV PEP regimens</strong>&lt;sup&gt;1&lt;/sup&gt;</td>
<td>raltegravir</td>
<td>Truvada (tenofovir + emtricitabine) - or - Combivir&lt;sup&gt;2&lt;/sup&gt; (zidovudine + lamivudine)</td>
</tr>
<tr>
<td>(combine 1 drug from left column with pairing of nucleoside/nucleotide reverse transcriptase inhibitors from right)</td>
<td>darunavir</td>
<td>Stribild (a fixed dose combination of elvitegravir, cobicistat, tenofovir, and emtricitabine)</td>
</tr>
<tr>
<td></td>
<td>ritonavir</td>
<td></td>
</tr>
<tr>
<td></td>
<td>etravirine</td>
<td></td>
</tr>
<tr>
<td></td>
<td>rilpivirine</td>
<td></td>
</tr>
<tr>
<td><strong>Alternative antiretroviral agents</strong>&lt;sup&gt;1&lt;/sup&gt;</td>
<td>abacavir (Ziagen)</td>
<td></td>
</tr>
<tr>
<td>use only with expert consultation</td>
<td>efavirenz (Sustiva)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>enfuvirtide (Fuzeon)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>fosamprenavir (Lexiva)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>maraviroc (Selzentry)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>saquinavir (Invirase)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>stavudine (Zerit)</td>
<td></td>
</tr>
<tr>
<td><strong>Antiretroviral agents</strong>&lt;sup&gt;1&lt;/sup&gt;</td>
<td>didanosine (Videx EC)</td>
<td></td>
</tr>
<tr>
<td>not recommended for use as PEP</td>
<td>nelfinavir (Viracept)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>tipranavir (Aptivus)</td>
<td></td>
</tr>
<tr>
<td><strong>Antiretroviral agents contraindicated as PEP</strong>&lt;sup&gt;1&lt;/sup&gt;</td>
<td>nelfinavir (Viracept)</td>
<td></td>
</tr>
</tbody>
</table>

Table adapted from: The Society for Healthcare Epidemiology of America. (2013). Public Health service guidelines for the management of occupational exposures to human immunodeficiency virus and recommendations for postexposure prophylaxis. *Infection Control and Hospital Epidemiology, 34*, 9, 875-892.

<sup>1</sup>HIV PEP should be administered for 28 days as tolerated, unless new information regarding the source patient is available. If the source patient is found to be HIV negative, HIV PEP should be discontinued.

<sup>2</sup>Truvada is the single tablet combination of tenofovir DF 300 mg + emtricitabine 200 mg

<sup>3</sup>Combivir is the single tablet combination of zidovudine 300 mg + lamivudine 150 mg

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<sup>1</sup>The designation "consider PEP" indicates that PEP is optional and should be based on an individualized decision between the exposed person and the treating clinician.

<sup>2</sup>If PEP is initiated and the source is later determined to be HIV-negative, PEP should be discontinued.

<sup>3</sup>Seek expert consultation if drug resistance is a concern. Initiation of PEP should NOT be delayed pending expert consultation.
### FOLLOW-UP FOR MUCOUS MEMBRANE AND NONINTACT SKIN EXPOSURES

<table>
<thead>
<tr>
<th>Follow-up</th>
<th>Infectious Status of Source</th>
<th>HIV/ HCV infected</th>
<th>Source of Unknown HIV Status</th>
<th>Unknown Source</th>
<th>HIV Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HIV-Infected</strong></td>
<td></td>
<td>Consider PEP for positive HIV exposure (see column one if PEP is initiated).</td>
<td>Consider PEP on an individual case basis, accounting for severity of exposure</td>
<td>Consider PEP</td>
<td>No PEP warranted</td>
</tr>
<tr>
<td><strong>Follow-up testing</strong> 1. Baseline, 6 weeks, 12 weeks, 6 months 2. If the provider is using a 4th generation HIV Ab/Ag test, follow-up schedule can be altered to baseline, 6 weeks, and a final test at 4 months</td>
<td></td>
<td>1. Baseline HCV Ab, HCV RNA, ALT 2. HCV RNA at 4-6 weeks post-exposure 3. HCV antibody, HCV RNA, and ALT 4-6 months post-exposure 4. If the exposed HCP becomes infected with HCV, repeat HIV testing should be extended to 12 months</td>
<td>Baseline, 6 weeks, 12 weeks, 6 months; follow-up is determined by each institution.</td>
<td>Baseline, 6 weeks, 12 weeks, 6 months; follow-up is determined by each institution.</td>
<td>Per protocol of each institution</td>
</tr>
<tr>
<td><strong>Counseling</strong> 1. Side effects of PEP 2. Signs/symptoms of acute retroviral syndrome 3. Safer sexual precautions 4. Lactation considerations (risk of drug exposure to infant vs. risk of transmission) 5. Importance of follow-up testing</td>
<td>Importance of follow-up testing</td>
<td>Importance of follow-up testing</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PEP STEP 6: FOLLOW UP

Hepatitis-exposed HCP
• HBV exposure follow-up testing and counseling:
  □ Test for anti-HBs 1-2 months after last dose of vaccine; Anti-HBs cannot be ascertained if HBIG given within 6-8 weeks.
  □ Advise exposed HCP to refrain from donating blood, plasma, organs, tissue, or semen, and use risk-reduction methods, including latex barriers during sex, not sharing injection equipment, and abstaining from risk behaviors.
  □ Offer mental health counseling as needed.
• HCV exposure follow-up testing and counseling: Repeat test for anti-HCV and ALT at least 4-6 months post exposure; confirm repeatedly positive anti-HCV EIA results with supplemental tests.
  —AND—
  □ Test for HCV RNA at 4-6 weeks for earlier diagnosis. (Caution must be used due to occurrence of false positive results.)
  □ During follow-up period, refrain from donating blood, plasma, organs, tissue, or semen.
  □ Guidelines do not recommend changes in sexual activity, pregnancy, breastfeeding, or professional activities.
  □ Offer mental health counseling as needed.

HIV-exposed HCP
• HIV exposure follow-up testing:
  □ Repeat HIV-antibody testing at 6 weeks, 12 weeks, and 4 or 6 months post-exposure.
  □ If 4th generation HIV Ag/Ab testing is used for baseline labs, follow-up testing can be done at 6 weeks and 4 months post-exposure.
  □ If illness compatible with acute retroviral syndrome occurs, perform HIV viral load.
  □ Extended follow-up (12 months) is recommended for HCP who become infected with HCV following an exposure to a source co-infected with HIV and HCV.
  □ If PEP is given, HCP should be monitored for drug toxicity. CBC, and renal and hepatic function tests should be repeated at 2 weeks.
Counseling after HIV exposure:

- Advise exposed HCP to
  - refrain from donating blood, plasma, organs, tissue, or semen;
  - avoid breastfeeding;
  - use methods to prevent pregnancy; and
  - use risk-reduction methods, including latex barriers during sex, not sharing injection equipment, and abstaining from risk behaviors.
- Offer mental health counseling as needed.
- Counsel HCP about the signs and symptoms of acute retroviral syndrome (flu-like syndrome), and the need to come in for additional testing at the onset of symptoms.
- If PEP is given, advise regarding the importance of adherence and potential side effects and how to minimize these. Inform regarding any possible drug interactions or toxicities and the importance of monitoring for these.

SPECIAL CONSIDERATIONS

Expert consultation in providing HIV PEP is advised in the following situations: (Expert consultation resources are listed below.)

- **Delayed exposure report** (> 24-36 hours post-exposure). Note: The interval after which there is no benefit from PEP is undefined.
- **Unknown source** (e.g., needle in sharps container)
  - Decide use of PEP on a case-by-case basis.
  - Consider the severity of the exposure and epidemiological likelihood of HIV exposure.
  - Do not test needles or other sharp instruments for HIV.
- **Known or suspected pregnancy of HCP**
  - Does not preclude the use of optimal PEP regimens; special consideration should be given to the potential risks and benefits of PEP during pregnancy.
  - Do not deny PEP solely on the basis of pregnancy.
  - The Department of Health and Human Services’ Guidelines offer recommendations for preferred ART in pregnancy.
• **Resistance of the source virus to antiretroviral agents**
  - Influence of drug resistance on transmission risk is unknown.
  - If the source patient’s virus is known or suspected to be resistant to one or more of the drugs considered for the standard PEP regimen, select alternate drugs.
  - Resistance testing of the source patient’s virus at the time of exposure is not recommended.
  - Do not delay initiation of PEP while waiting for resistance testing results.

• **Toxicity of the initial PEP regimen**
  - Adverse symptoms such as nausea, diarrhea, fatigue, and headaches are common with PEP.
  - Symptoms can often be managed without changing the PEP regimen by taking the PEP regimen with meals, and prescribing antiemetic, antimotility, and/or analgesic agents.
  - Consultation should be obtained when side effects are difficult to manage: Modification of dose intervals (e.g., administering a lower dose of drug more frequently) might help alleviate symptoms.
PEP RESOURCES

National Clinicians' Post-exposure Prophylaxis Hotline (PEPline)
1-888-448-4911
http://www.nccc.ucsf.edu/about_nccc/pepline/

HIV Antiretroviral Pregnancy Registry
www.apregistry.com

Food and Drug Administration
Report unusual or severe toxicity to ART
www.fda.gov/medwatch

AIDSinfo http://aidsinfo.nih.gov

Hepatitis Info www.cdc.gov/hepatitis

HIVdent http://www.hivdent.org

This pocket guide is based on:
