

Management of Occupational Exposures to HBV, HCV, and HIV (reviewed 12/8/05)

This summary is based on the recently updated CDC HIV PEP guidelines from 9/30/05 and CDC guidelines regarding PEP for HBV and HCV from 6/29/01. The recommendations can be found at:

<http://aidsinfo.nih.gov/Guidelines/GuidelineDetail.aspx?MenuItem=Guidelines&Search=Off&GuidelineID=10&ClassID=3>

There also is a 24 hour national PEP hotline at 1-888-448-4911.

I General Information regarding Transmission

HBV, HCV, and HIV are the primary infectious agents that can be transmitted via exposure to bodily fluids. In addition to percutaneous injury, contact of mucous membranes or non-intact skin with blood, fluids containing blood, tissue or other potentially infectious bodily fluids pose an infectious risk. Potentially infectious bodily fluids include semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, peritoneal fluid, pericardial fluid and amniotic fluid. Feces, nasal secretions, saliva, sputum, sweat, tears, urine, and vomitus are not considered infectious unless they contain blood.

II Occupational Exposure to Hepatitis B

The risk of clinical hepatitis from needlesticks from an HbeAg+ source is 22-31%. The risk of contracting clinical hepatitis from a needlestick involving a HbSag+, eAg- source is 1-6%. Post-exposure prophylaxis including HBIG and the HBV vaccine is believed to be 85-95% effective. HBV vaccine or HBIG alone are thought to be 70-75% effective. CDC recommendations for management of occupational exposure to HBV are found in table 1.

III Occupational Exposure to Hepatitis C

The risk of HCV transmission from a percutaneous exposure is approximately 1.8%. HCV is rarely transmitted from mucous membrane exposure to blood (both documented cases have been when the source patient was HIV/HCV co-infected), and never has been documented following a blood exposure to intact or non-intact skin. There is no known PEP to HCV exposure. However, a 2001 NEJM study found that treatment of patients with acute HCV with interferon alpha-2b led to resolution of HCV viremia in 98% of patients. [Jaekel, NEJM 345:1452-1457]

The CDC recommends follow-up testing for an exposure to HCV with anti-HCV antibody testing at 4-6 months. A positive antibody test should prompt an HCV viral load and LFTs. If the HCV antibody is positive and both the HCV viral RNA and liver enzymes are normal, a confirmatory RIBA test should be done.

At Madison Clinic, after a percutaneous or a mucous membrane exposure when the source patient is HCV/HIV coinfectd, we recommend an HCV antibody at 6 and 12 weeks and an HCV RNA and an ALT at 6 weeks in addition to the testing schedule recommended by the CDC as detailed in the previous paragraph.

IV Occupational Exposure to HIV

The risk of acquiring HIV through a percutaneous exposure to HIV is approximately 0.3% and after a mucous membrane exposure to blood the risk is approximately 0.09%. The risk of acquiring HIV percutaneously is associated with deeper injuries, visibly bloody devices, and more advanced disease (likely due to a higher viral load) in the source patient. A retrospective case-control study demonstrated that PEP with AZT for 4 weeks was associated with an 81% reduction in transmission of HIV. In that study approximately 70% of patients received AZT within 4 hours of the exposure. It is not known how long after an exposure PEP becomes ineffective. From animal studies, within 24-48 hours SIV was detected in regional lymph nodes following mucosal exposure and virus was detectable in the blood at 5 days following inoculation. The guidelines for HIV PEP following a percutaneous exposure are found in table 2. The recommendations for mucous membrane or non-intact skin exposure are found in table 3.

With a lower risk of transmission for HIV, a two drug PEP regimen is recommended. After higher risk exposures an expanded regimen is recommended. Some experts believe that if an exposure is sufficiently high risk to justify therapy, a basic regimen is never warranted. PEP is always prescribed for 4 weeks.

The 2005 guidelines recommended AZT/3TC (or FTC), D4T/3TC (or FTC) and TDF/FTC (or 3TC) as preferred 2 drug combinations with the addition of lopinavir/ritonavir (kaletra) when the expanded regimen is indicated. Lopinavir/ritonavir has many significant drug interactions and the exposed patient's medication list should be carefully reviewed prior to prescribing PEP. Atazanavir, fosamprenavir, ritonavir-boosted saquinavir, ritonavir-boosted indinavir, and efavirenz are all considered acceptable alternatives to lopinavir/ritonavir as the third drug in the expanded regimen. Of note, efavirenz is contra-indicated in pregnancy due to its teratogenicity.

If available, it is appropriate to use the resistance profile and treatment history of the source patient to choose the most effective post-exposure prophylaxis regimen.

At HMC, there is a protocol to be followed for lab monitoring of toxicity while on ARVs. These standing orders should be included in the initial paperwork for PEP patients. Employee health (731-3081) can be a great help in accessing labs from the source patient as well as the exposed person and should be called if any questions arise. (The labs are sometimes difficult to access via ORCA.) Refer to the PEP document in 'protocols' on this webpage for more details on the protocol for PEP.

V Note on Dosing of Antiretrovirals for the Inexperienced HIV Provider:

lopinavir/RTV (Kaletra) - 2 tablets (400mg/100mg) po twice daily
emtricitibine/tenofovir (Truvada) - 1 tablet (200mg/300mg) po once daily
zidovudine/lamivudine (Combivir) - 1 tablet (300mg/150mg) po twice daily
efavirenz (Sustiva) - 1 tablet (600mg) at bedtime

TABLE 1. Recommended post-exposure prophylaxis for exposure to hepatitis B virus

Vaccination and antibody response status of exposed workers*	Treatment		
	Source HBsAg positive	Source HBsAg negative	Source unknown or not available for testing
Unvaccinated	HBIG [§] x 1 and initiate HB vaccine series	Initiate HB vaccine series	Initiate HB vaccine series
Previously vaccinated			
Known responder**	No treatment	No treatment	No treatment
Nonresponder [†]	HBIG x 1 and initiate revaccination source, or HBIG x 2 ^{§§}	No treatment	If known high risk treat as if source were HbsAg positive
Antibody response unknown	Test exposed person for HBs ab 1. If adequate**, no treatment is necessary 2. If inadequate [†] , administer HBIG x 1 vaccine booster	No treatment	Test exposed person for HBs ab 1. If adequate**,no treatment is necessary 2. If inadequate [†] , administer vaccine and booster and recheck titer in 1–2 months

* Persons who have previously been infected with HBV are immune to reinfection and do not require postexposure prophylaxis.

§ Hepatitis B immune globulin; dose is 0.06 mL/kg intramuscularly.

** A responder is a person with adequate levels of serum antibody to HBsAg (i.e., anti-HBs >10 mIU/mL).

† A nonresponder is a person with inadequate response to vaccination (i.e., serum anti-HBs < 10 mIU/mL).

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

†† Antibody to HBsAg.

TABLE 2. Recommended HIV post-exposure prophylaxis for percutaneous injuries

Exposure type	Infection status of source			
	HIV Positive Class 1*	HIV Positive Class 2*	Unknown source or source unavailable for testing§	HIV-Negative
Less severe¶	2 drug PEP	Expanded 3 drug PEP	Generally no PEP; consider 2 drug PEP for source w/ HIV risk factors	No PEP
More severe§§	Expanded 3 drug PEP	Expanded 3 drug PEP	Generally, no PEP; consider 2 drug PEP for source w/ HIV risk factors	No PEP

* HIV-Positive, Class 1 - asymptomatic HIV infection or known low viral load (e.g., <1,500 RNA copies/mL).
 HIV-Positive, Class 2 - symptomatic HIV infection, AIDS, acute seroconversion, or known high viral load exposures.

§ If PEP is offered and taken and the source is later determined to be HIV-negative, PEP should be discontinued
 ¶ Less severe (e.g., solid needle and superficial injury).

§§ More severe (e.g., large-bore hollow needle, deep puncture, visible blood on device, or needle used in patient's artery or vein).

TABLE 3. Recommended HIV postexposure prophylaxis for mucous membrane exposures and nonintact skin exposures**

Exposure type	Infection status of source			
	HIV Positive Class 1 *	HIV Positive Class 2 *	Unknown source or source unavailable for testing§	HIV-Negative
Small volume¶	Consider 2 drug PEP	2 drug PEP	Generally, no PEP	No PEP
Large volume¶¶	2 drug PEP	Expanded 3 drug PEP	Generally, no PEP; consider 2 drug PEP for source w/ risk factors	No PEP

* HIV-Positive, Class 1 - asymptomatic HIV infection or known low viral load (e.g., <1,500 RNA copies/mL).
 HIV-Positive, Class 2 - symptomatic HIV infection, AIDS, acute seroconversion, or known high viral load exposures.

** For skin exposures, follow-up is indicated only if there is evidence of compromised skin integrity (e.g., dermatitis, abrasion, or open wound).

¶ Small volume (i.e., a few drops).

¶¶ Large volume (i.e., major blood splash).