

Updated U.S. Public Health Service Guidelines for the Management of Occupational Exposures to HBV, HCV, and HIV and Recommendations for Postexposure Prophylaxis

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<http://www.cdc.gov/mmwr/PDF/rr/rr5011.pdf>



Reasons for Updating the PHS Guideline

- Availability of new antiretroviral drugs
- Emergence of HIV drug resistance
- Overuse of PEP for low or no risk exposures
- Consolidation of HBV, HCV, and HIV exposure management in a single document

Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), and Human Immunodeficiency Virus (HIV)

- Bloodborne viruses
- Can produce chronic infection
- Transmissible in healthcare settings

Risk of Bloodborne Virus Transmission after Occupational Percutaneous Exposure

<u>Source</u>	<u>Risk</u>
HBV	
HBeAg +	22.0-30.0%
HBeAg -	1.0-6.0%
HCV	1.8%
HIV	0.3%

Elements of Postexposure Management

- Wound management
- Exposure reporting
- Assessment of infection risk
 - Type and severity of exposure
 - Tissue/fluid involved
 - Bloodborne infection status of source person
- Appropriate treatment, follow-up, and counseling

Postexposure Management: Assessment of Infection Risk

- Type of exposure
 - percutaneous
 - mucous membrane
 - non-intact skin
 - bites resulting in blood exposure
- Body substance
 - blood
 - bloody fluid
 - potentially infectious fluid or tissue
- Source person
 - For source unknown, assess epidemiologic and clinical evidence
 - For known source, infection status (for HBV, HCV, and HIV)

Postexposure Management: Unknown or Untestable Source

- Consider information about exposure
 - Where/under what circumstances
 - Prevalence of HBV, HCV, or HIV in the exposure setting
- Testing of needles/other sharps not recommended
 - Unknown reliability/interpretation of findings
 - Handling of sharp instruments hazardous

Postexposure Management: Evaluating the Source

- Perform testing if source's infection status unknown
- Test as soon as possible
- Obtain informed consent in accordance with state and local laws
- Maintain confidentiality of source's information
- Consult laboratory for most appropriate test to expedite obtaining results

Postexposure Management: Evaluating the Source

- Test for hepatitis B surface antigen (HBsAg)
- Perform EIA for anti-HCV; confirm repeatedly reactive results by supplemental test (RIBA or HCV PCR)
- Anti-HIV by EIA - consider rapid test if EIA test results take >24-48 hours
- Confirming reactive results not necessary for exposure management
- Direct virus assays not recommended

Occupational HBV Exposures

Postexposure Management: Baseline HBV Testing of Exposed* Person

- Test for anti-HBs if person vaccinated, but vaccine response unknown
- Baseline testing not necessary if exposed person not vaccinated or vaccine response known (and adequate, i.e., $\geq 10\text{mIU/ml}$)

* Source HBsAg positive or status unknown

Recommended Postexposure Management: PEP for Exposure to HBV

Vaccination and antibody status of **exposed person**

Treatment when **source** is **HBsAg positive**

Unvaccinated

HBIGx1 and hepatitis B vaccine

Previously vaccinated

Known responder

No treatment

Known nonresponder

HBIGx1 and initiate re-vaccination or HBIGx2

Antibody response unknown

Test exposed person for anti-HBs
1. If adequate, no treatment
2. If inadequate, HBIG x 1 and vaccine booster

Recommended Postexposure Management: PEP for Exposure to HBV

Vaccination and antibody status of **exposed person**

Treatment when **source is not tested or status unknown**

Unvaccinated

Give hepatitis B vaccine

Previously vaccinated

Known responder

No treatment

Known nonresponder

If known high-risk source, treat as if source were HBsAg positive

Antibody response unknown

Test exposed person for anti-HBs
1. If adequate, no treatment
2. If inadequate, vaccine booster and recheck titer in 1-2 mos

Postexposure Management: Follow-up HBV Testing of Exposed Person

- Perform follow-up anti-HBs testing in healthcare personnel who receive hepatitis B vaccine
 - Test for anti-HBs 1-2 months after last dose
 - Cannot ascertain anti-HBs response to vaccine if HBIG received in the previous 3-4 months

Postexposure Management: HBV Postexposure Counseling

- Refrain from donating blood, plasma, organs, tissue, or semen.
- No need to:
 - modify sexual practices/avoid pregnancy
 - take special precautions to prevent secondary transmission
 - modify patient care responsibilities
- If acute HBV infection develops, evaluate according to published recommendations

Occupational HCV Exposures

Postexposure Management: Baseline HCV Testing of Exposed Person

- Test exposed person for anti-HCV and ALT if exposed to HCV-positive source
- If source not infected, baseline testing not necessary

Postexposure Prophylaxis for HCV

Not recommended after exposure

- Immunoglobulin not effective
- No data on use of antivirals (e.g., interferon)
- Antivirals may be effective only for established infection

Postexposure Management: Follow-up of HCV-Exposed Personnel

- Anti-HCV and ALT testing 4-6 months postexposure
- HCV-RNA testing at 4-6 weeks postexposure for earlier diagnosis of HCV infection
- Confirm anti-HCV EIA-positive results with supplemental test (e.g., RIBA)
- No guidelines for therapy during acute infection
 - Refer to specialist for management of infection

Postexposure Management: HCV Postexposure Counseling

- Refrain from donating blood, plasma, organs, tissue, or semen.
- No need to:
 - modify sexual practices/avoid pregnancy
 - take special precautions to prevent secondary transmission
 - modify patient care responsibilities

Occupational HIV Exposures

U.S. Healthcare Personnel with Documented and Possible Occupationally Acquired AIDS/HIV Infection, by Occupation, June 2001*

<u>Occupation</u>	<u>Documented Transmission (No.)</u>	<u>Possible Transmission (No.)</u>
Dental worker, including dentist	----	6
Embalmer/morgue technician	1	2
Emergency medical technician/paramedic	----	12
Health aide/attendant	1	15
Housekeeper/maintenance worker	2	13
Laboratory technician, clinical	16	17
Laboratory technician, nonclinical	3	----
Nurse	24	34
Physician, nonsurgical	6	12
Physician , surgical	----	6
Respiratory therapist	1	2
Technician, dialysis	1	3
Technician, surgical	2	2
Technician/therapist, other than above	----	9
Other healthcare occupations	----	4
Total	57	137

* <http://www.cdc.gov/hiv/pubs/facts.htm#Transmission>



Average Risk of HIV Infection, by Exposure Route

- Percutaneous 0.3%
- Mucous membrane 0.09%
- Non-intact skin <0.1%

Postexposure Management: Baseline HIV Testing of Exposed Person

- EIA standard test
- Direct virus assays not recommended
 - p24 antigen
 - PCR for HIV RNA

HIV PEP

- If indicated, start PEP ASAP after exposure
 - Hours, not days
 - Treat exposures as urgent medical concerns
- Interval after which PEP no longer likely effective in humans is unknown
 - Consider initiating PEP days/weeks after an increased risk exposure, if warranted
- Give PEP for 28 days

Re-evaluation of HIV-Exposed Person

Consider re-evaluation of exposed person within 72 hours

- Additional information about the source person may become available
- Stop PEP if source person is HIV negative

Important Concepts about HIV PEP

- Which and how many agents to use for PEP largely empiric decision
- Professional judgement based on local knowledge and experience in treating HIV recommended
- Regimens tolerable to the exposed person ideal
- Balance risk of transmission against risk of adverse effects of PEP

Postexposure Management: HIV PEP Basic Regimen

Basic Regimen

Zidovudine (ZDV): 200 mg tid (300 mg PO bid)
Lamivudine (3TC): 150 mg bid

Alternate Basic Regimens

Didanosine (ddI): 200 mg bid (125 mg bid if <60 kg)
Stavudine (d4T): 40 mg bid (30 mg bid if <60 kg)

Stavudine (d4T): 40 mg bid (30 mg bid if <60 kg)
Lamivudine (3TC): 150 mg bid

Postexposure Management: HIV PEP Expanded Regimen

Expanded Regimen

Basic regimen plus one of the following:

Indinavir (IDV): 800 mg q8h

Nelfinavir (NFV): 750 mg tid or 1250 mg bid

Efavirenz (EFV): 600 mg daily

Abacavir (ABC): 300 mg bid

Recommended HIV PEP for Percutaneous Injuries

Infection Status of Source

Exposure Type	HIV positive, class 1	HIV positive, class 2	HIV status unknown
Less Severe	Recommend basic PEP	Recommend expanded PEP	Generally, no PEP
More Severe	Recommend expanded PEP	Recommend expanded PEP	Generally, no PEP

Class 1: Asymptomatic or known low viral load

Class 2: Symptomatic, AIDS, or known high viral load



Recommended HIV PEP for Mucous Membrane and Non-Intact Skin Exposures

Infection Status of Source

Exposure Type	HIV positive, class 1	HIV positive, class 2	HIV status unknown
Small Volume (e.g., few drops)	Recommend basic PEP	Recommend basic PEP	Generally, no PEP
Large Volume (e.g., major blood splash)	Recommend basic PEP	Recommend expanded PEP	Generally, no PEP

Class 1: Asymptomatic or known low viral load

Class 2: Symptomatic, AIDS, or known high viral load



Situations Where PEP is Rarely, if ever, Warranted

- Intact skin contact with blood and potentially infectious body fluids
- Exposure to unknown source in settings where HIV prevalence is low
- Low-risk exposure to unknown source

Situations for Which Expert Consultation for HIV PEP is Advised

- Resistance of the source virus to antiretroviral agents
- Known or suspected pregnancy in exposed person
- Toxicity of the initial PEP regimen

Resistance to Antiretroviral Agents: Implications for PEP

- Resistance to antiretroviral drugs reported
- Transmission of resistant virus reported
- Relevance of exposure to resistant virus not understood
- Patients take many drugs; difficult to know to which drug virus is resistant
- Cross-resistance within drug classes

Resistance to Antiretroviral Agents: Implications for PEP (contd.)

- Recommend selecting as HIV PEP drugs to which source person's virus unlikely to be resistant
- Testing of source person's virus for resistance at time of exposure not recommended

→ **EXPERT CONSULTATION ADVISED**

HIV PEP Considerations in Pregnant Exposed Women

- General principles
 - Pregnancy alone not a contraindication for PEP
 - Exposed person should make informed decision about PEP
- Choosing regimen more complex in pregnancy
 - May exacerbate physiologic changes in pregnancy
 - Short/long-term effects on fetus/newborn unknown
 - Most data are on zidovudine
 - Some drugs contraindicated during pregnancy

HIV PEP During Pregnancy

- Efavirenz NOT recommended - possible teratogenicity
- Cases of fatal lactic acidosis reported in pregnant women treated with d4T and ddI
- Avoid using indinavir shortly before delivery because of hyperbilirubinemia

Primary Toxicities and Side Effects: Basic Regimens

- Reverse transcriptase inhibitors (i.e., zidovudine (ZDV), lamivudine(3TC), didanosine (ddI), and stavudine (d4T))
- Gastrointestinal upset (nausea, diarrhea) common
- 3TC and ddi -pancreatitis (rare)
- ZDV/3TC
 - Toxicity about the same as ZDV alone
- ddi and d4T - neuropathy

Toxicities and Side Effects: Expanded HIV PEP Regimens

- All protease inhibitors
 - Inhibit metabolism of non-sedating antihistamines and other hepatically metabolized drugs
 - Increase diabetes-related problems
- Indinavir
 - May cause nausea, abdominal pain, nephrolithiasis
- Nelfinavir
 - Accelerates clearance of certain drugs, e.g. oral contraceptives
 - May cause diarrhea, nausea, abdominal pain, weakness, rash

Toxicities and Side Effects: Expanded Regimens (cont.)

- Efavirenz
 - Rash
 - Nervous system problems (e.g., dizziness, insomnia)
- Abacavir
 - Nausea, diarrhea, anorexia, abdominal pain, fatigue, headache, insomnia
 - Hypersensitivity reactions

Postexposure Management: Follow-up HIV Testing of Exposed Person

- If source HIV positive, test at 6 weeks, 3 months, 6 months
 - EIA standard test
 - direct virus assays not recommended
- Extending follow-up to 12 months
 - Recommended for HCP who become infected with HCV following exposure to co-infected source
 - Optional in other situations

Postexposure Management: Monitoring for PEP Toxicity

- Tests at baseline and 2 weeks after starting PEP:
 - Complete blood count
 - Renal and hepatic profiles
- Follow-up testing if taking protease inhibitor
 - Monitor for hypoglycemia
 - Monitor for crystalluria, hematuria, hemolytic anemia, and hepatitis if on indinavir
- Modify regimen if toxicity noted

→ **EXPERT CONSULTATION ADVISED**

Postexposure Management: HIV Postexposure Counseling

- Side effects of PEP drugs
- Signs and symptoms of acute HIV infection
 - fever
 - rash
 - flu-like illness
- Prevention of secondary transmission
 - sexual abstinence or condom use
 - no blood/tissue donation
- Transmission and PEP drug risks if breastfeeding

No work restriction indicated

Conclusion

- Occupational exposure management is complex
- Prevention is best
 - HBV infection largely preventable through immunization
 - Avoiding occupational blood exposures, especially percutaneous injuries

Sources of Additional Information

- Division of Healthcare Quality Promotion
Phone: 800-893-0485
Homepage: <http://www.cdc.gov/ncidod/hip/>
- Hepatitis Hotline
Phone: 888-443-7232
Homepage: <http://www.cdc.gov/hepatitis>
- National Clinicians' Post-Exposure Prophylaxis Hotline (PEPline)
Phone: 1-888-HIV-4911
Homepage: <http://pepline.ucsf.edu/pepline>
- Needlestick!
Homepage: <http://www.needlestick.mednet.ucla.edu>