Needle Stick Injury

RISK

The risk of exposure to blood and bloodborne disease is slightly greater for health care personnel (HCP). An exposure to infected blood, tissue or other infectious body fluids can occur by:

- Being stuck by a needle or cut with a sharp object.
- Contact with mucous membranes or skin that is not intact because it is:
  - Chapped.
  - Worn away by scraping.
  - Inflamed.

Risk of infection from exposure to blood varies for specific diseases:

- If the source patient is both Hepatitis B surface antigen (HBsAg) and Hepatitis B e antigen (HBeAg) positive, the risk of Hepatitis B virus (HBV) transmission is highest and varies between 23% and up to 62%.
- If the source patient has Hepatitis C (HCV), the risk of HCV transmission is approximately 1.8% (range 0%-7%).
- If the source patient has HIV infection, the risk of HIV is about 0.3%.

The risk of infection following mucous membrane exposure to any of these diseases is likely lower than the risk stated above for exposure to blood.

In general, the risk of infection appears to be higher with:

- Exposure to a large quantity of blood or other infected fluid.
- Prolonged or extensive exposure.
- Exposure to the blood of a patient with an advanced disease or with a high viral load.
- A deep injury.
- An injury with a hollow-bore, blood-filled needle.

PREVENTION

Preventing exposures to disease is the first priority. All HCP should be familiar with standard precautions:

- Washing hands often and before and after patient care.
- Using Personal Protective Equipment (PPE) when appropriate. This includes:
  - Gloves.
  - Gowns.
  - Boots.
  - Shoe covers.
  - Eyewear.
  - Masks.
- Wearing gloves when any kind of venous or arterial access is being done.
- Using sharp edges and needles with caution:
  - Disposing of used sharps in puncture proof receptacles.
  - Not recapping needles.
- Using safety devices if available.

POST EXPOSURE PROPHYLAXIS (PEP)

Step 1: Treat Exposure Site

- Use soap and water to wash exposed areas as soon as possible.
- Flush exposed mucous membranes with water.
- Flush exposed eyes with water or saline solution.
- DO NOT apply caustic agents or inject antiseptics or disinfectants into the wound.

Step 2: Report and Document:

- Date and time of exposure.
- Details of the incident (how it occurred, exposure site, type and brand of device).
- Details of the exposure (type and amount of fluid or material, severity).
- Details about the exposure source:
  - Whether source material contained HIV, HBV or HCV.
  - If source patient was HIV-infected, the stage of disease (CD4 count, HIV viral load, history of HIV therapy and history antiretroviral resistance).
- Counseling, post exposure management and follow-up.

Step 3: Evaluate the Exposure
The exposure should be evaluated for the potential to transmit HBV, HCV or HIV based on the type of body substance involved, the route and severity of exposure.

- Significant exposure to any of the following may pose a risk:
  - Blood, semen or vaginal secretions.
  - Cerebrospinal, synovial, pleural, peritoneal, pericardial or amniotic fluid.
- Body fluids that do NOT pose a risk (unless blood can be seen in them) include:
  - Urine, saliva, sputum, stool, vomit, nasal discharge, tears or sweat.
- Other factors to evaluate:
  - Infection status of source patient. If the source patient is HBsAg positive, consider testing for HBeAg. If the source patient is HCV positive, consider measuring HCV viral load. If the source patient is HIV antibody positive, consider obtaining HIV viral load, resistance testing and evaluating clinical status of patient.
  - Susceptibility of the HCP that was exposed. This includes if the HCP has had a hepatitis B vaccine and vaccine response status. Other factors to consider are HBV, HCV and HIV antibody status-baseline testing for HBsAb, anti-HCV and HIV antibody.

Step 4: Evaluate the Exposure Source
When source patient is known:

- Test patient for HBsAg, HCV antibody and HIV antibody (do a rapid HIV test if available).
  - If the source patient is NOT infected, baseline testing or further follow-up of the HCP is not necessary.
  - Follow state or country regulations about informed consent and confidentiality.

When source patient is NOT known:

- Evaluate the likelihood of high risk exposure, such as:
  - A high community infection rate.
  - Caring for a large number of patients with HBV, HIV or HCV.
  - Caring for a large number of at-risk patients.

Step 5: Disease-Specific PEP Management
Baseline testing of the exposed HCP should be performed for all exposures.

HEPATITIS B EXPOSURES

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

RECOMMENDED PEP FOR EXPOSURE TO HBV

Vaccination Status of Exposed HCP	Source is HBsAg Positive	Source is HBsAg Negative	Source Unknown or Not Available for Testing
Unvaccinated.	HBIG* x 1 and initiate HBV vaccine series.	Initiate HBV vaccine series.	Initiate HBV vaccine series.
Known responder[1].	No treatment.	No treatment.	No treatment.

Known non-responder[2].	HBIG x 1 and initiate revaccination or HBIG x 2.	No treatment and consider revaccination.	If known high risk source, treat as if HBsAg positive.
Antibody response unknown.	Test exposed HCP for anti-HBs.** If adequate,[1] no treatment is necessary. If inadequate,[2] administer HBIG x 1 and vaccine booster.	No treatment.	Test exposed HCP for anti-HBs.** If adequate,[1] no treatment is necessary. If inadequate,[2] administer vaccine booster and recheck titer in 1 - 2 months.

*Hepatitis B immune globulin (HBIG). Dose is 0.06 mL/kg intramuscularly within 7 days of exposure.
[1] A responder/person with adequate titer has anti-HBs > 10 mIU/mL.
[2] A nonresponder/person with inadequate titer has anti-HBs < 10 mIU/mL.
**Antibody to HBsAg (anti-HBs).

HBV EXPOSURE FOLLOW-UP:

- Test for anti-HBs, 1 - 2 months after last dose of vaccine. Anti-HBs cannot be ascertained if HBIG is given within 6 - 8 weeks.
- The exposed HCP should:
  - Refrain from donating blood, plasma, organs, tissue, or semen.
  - Practice safe sex.
  - Not share personal hygiene materials.
  - Abstain from risk behaviors.
  - Seek mental health counseling as needed.

HCV EXPOSURES

Currently there are no recommendations for HCV PEP.
HCV Exposure Follow-up:

- Repeat test for anti-HCV and ALT at least 4 - 6 months after exposure. If anti-HCV positive, confirm diagnosis with supplemental tests AND test for HCV RNA at 4 - 6 weeks for earlier diagnosis.
- The exposed HCP should:
  - Refrain from donating blood, plasma, organs, tissue or semen.
  - Seek mental health counseling as needed.

Guidelines do not recommend changes in sexual activity, pregnancy, breastfeeding or professional activities.

HIV EXPOSURES

The United States Public Health Service published guidelines in 2005 for occupational exposures to HIV and recommendations for PEP. These guidelines can be viewed and downloaded at:

http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5409a1.htm

HIV Exposure Follow-up

- Repeat HIV-antibody testing at 6 weeks, 3 months and 6 months post exposure.
- If illness is compatible with acute retroviral syndrome, perform HIV viral load.
- Extended follow-up (12 months) is recommended for all HCP who become infected with HCV following an exposure to a source infected with HIV **and** HCV.
- If PEP is given, the HCP should be monitored for drug toxicity. CBC, creatinine, and liver enzyme tests (AST, ALT, alkaline phosphatase) should be repeated at 2 weeks.
  - For those receiving a protease inhibitor, monitor for hypoglycemia.
  - If receiving indinavir (IDV) or tenofovir (TDF), tests should include urinalysis.

- The exposed HCP should:
  - Refrain from donating blood, plasma, organs, tissue or semen.
  - Practice safe sex.
  - Avoid breastfeeding and use methods to prevent pregnancy.
  - Not share personal hygiene materials.
  - Abstain from risk behaviors.
  - Seek mental health counseling as needed.
- The HCP should watch for the symptoms of acute retroviral syndrome (flu-like syndrome) and have additional testing at the onset of symptoms.
- If any PEP is given, the HCP should watch for side effects and learn how to minimize the effects.

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