



Occupational Exposures to Blood : What Health Care Workers should know

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Introduction

Health-care workers are at risk for occupational exposure to bloodborne pathogens, including hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV) (1). Exposures occur through needlesticks or cuts from other sharp instruments contaminated with an infected patient's blood or through contact of the eye, nose, mouth, or skin with a patient's blood. Important factors that may determine the overall risk for occupational transmission of a bloodborne pathogen include the number of infected individuals in the patient population, the chance of becoming infected after a single blood contact from an infected patient, and the type and number of blood contacts.

Most exposures do not result in infection. Following a specific exposure, the risk of infection may vary with factors such as these (2).

- The pathogen involved
- The type of exposure
- The amount of blood involved in the exposure
- The amount of virus in the patient's blood at the time of exposure

You should report exposures in order to quickly evaluate the risk of infection, get informed about treatments available to help prevent infection, monitor for side effects of treatments, and to determine if infection occurs. This may involve testing your blood and that of the source patient and offering appropriate postexposure treatment.

How can occupational exposures be prevented?

Many needlesticks and other cuts can be prevented by using safer techniques (e.g., not recapping needles by hand),

disposing of used needles in appropriate sharps disposal containers, and using medical devices with safety features designed to prevent injuries. Many exposures to the eyes, nose, mouth, or skin can be prevented by using appropriate barriers (e.g., gloves, eye and face protection, gowns) when contact with blood is expected.

IF AN EXPOSURE OCCURS

What should I do if I am exposed to the blood of a patient?

1. Immediately following an exposure to blood:
 - Wash needlesticks and cuts with soap and water
 - Flush splashes on the nose, mouth, or skin with water
 - Irrigate eyes with clean water, saline, or sterile irrigants

No scientific evidence shows that using antiseptics or squeezing the wound will reduce the risk of transmission of a bloodborne pathogen.³ Using a caustic agent such as bleach is not recommended.

2. Following any blood exposure you should:

Report the exposure to your senior. Prompt reporting is essential because, in some cases, postexposure treatment may be recommended and it should be started as soon as possible.

Discuss the possible risks of acquiring HBV, HCV, and HIV and the need for postexposure treatment for managing your exposure. You should have already received hepatitis B vaccine, which is extremely safe and effective in preventing HBV infection.

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RISK OF INFECTION AFTER EXPOSURE

What is the risk of infection after an occupational exposure?

HBV

Health-care workers who have received hepatitis B vaccine and have developed immunity to the virus are at virtually no risk for infection. For an unvaccinated person, the risk from a single needlestick or a cut exposure to HBV-infected blood ranges from 6-30% and depends on the hepatitis B e antigen (HBeAg) status of the source individual. Individuals who are both hepatitis B surface antigen (HBsAg) positive and HBeAg positive have more virus in their blood and are more likely to transmit HBV (4).

HCV

Based on limited studies, the risk for infection after a needlestick or cut exposure to HCV-infected blood is approximately 1.8%. The risk following a blood splash is unknown, but is believed to be very small; however, HCV infection from such an exposure has been reported (5).

HIV

- The average risk of HIV infection after a needlestick or cut exposure to HIV-infected blood is 0.3% (i.e., three-tenths of one percent, or about 1 in 300). Stated another way, 99.7% of needlestick/cut exposures do not lead to infection.
- The risk after exposure of the eye, nose, or mouth to HIV-infected blood is estimated to be, on average, 0.1% (1 in 1,000).
- The risk after exposure of the skin to HIV-infected blood is estimated to be less than 0.1%. A small amount of blood on intact skin probably poses no risk at all. There have been no documented cases of HIV transmission due to an exposure involving a small amount of blood on intact skin (a few drops of blood on skin for a short period of time). The risk may be higher if the skin is damaged (for example, by a recent cut) or if the contact involves a large area of skin or is prolonged (for example, being covered in blood for hours) (6).

How many health-care workers have been infected with bloodborne pathogens?

We have no such data from our country and the following indicates information largely from USA.

HBV

The annual number of occupational infections has decreased sharply since hepatitis B vaccine became available in 1982 (i.e., there has been a 90% decrease in the number of estimated cases from 1985 to 1996). Nonetheless, approximately 800 health-care workers become infected with HBV each year following an occupational exposure.

HCV

There are no exact estimates on the number of health-care workers occupationally infected with HCV. However, studies have shown that 1% of hospital health-care workers have evidence of HCV infection (about 1.8% of the U.S. population has evidence of infection). The number of these workers who may have been infected through an occupational exposure is unknown.

HIV

As of December 1998, reports of 54 documented cases and 134 possible cases of occupationally acquired HIV infection among health-care workers in the United States since reporting began in 1985 were recorded. An updated report on this issue is shown in Table 1.

Table 1 : Worldwide Occupationally acquired HIV infection: all reports, by occupation

Occupation	Documented OAH	Possible OAH	Total
Nurse/midwife*	50	62	112
Doctor/medical student	11	20	31
Surgeon	1	14	15
Dentist/dental worker	-	9	9
Clinical lab worker	17	21	38
Ambulance man/paramedic	-	10	10
Non clinical lab worker	3	3	6
Embalmer/morgue technician	-	3	3
Surgical technician and assistant	2	3	5
Dialysis technician	1	3	4
Respiratory therapist	1	2	3
Health aids/attendant/nurse aid	1	15	16
Housekeeper/porter/maintenance	2	8	10
Other/unspecified HCW	6	18	24
Total	95	191	286

*In the US, phlebotomists are classified as clinical laboratory workers, and in France, Italy and Spain nurses are usually responsible for phlebotomy

TREATMENT FOR THE EXPOSURE

Is vaccine or treatment available to prevent infections with bloodborne pathogens?

HBV

All health-care workers who have a reasonable chance of exposure to blood or body fluids should receive hepatitis B vaccine. Workers should be tested 1-2 months after the vaccine series to make sure that vaccination has provided immunity to HBV infection.

Hepatitis B immune globulin (HBIG) is effective in preventing HBV infection after an exposure. The decision to begin treatment is based on several factors, such as :

- Whether the source individual is positive for hepatitis B surface antigen.
- Whether you have been vaccinated.
- Whether the vaccine provided you immunity.

HCV

There is no vaccine against hepatitis C, and no treatment after an exposure that will prevent infection. Immune globulin is not recommended. For these reasons, following recommended infection control practices are imperative.

HIV

There is no vaccine against HIV. However, results from a small number of studies suggest that the use of zidovudine after certain occupational exposures may reduce the chance of HIV transmission.

Postexposure treatment is not recommended for all occupational exposures to HIV because most exposures do not lead to HIV infection and because the drugs used to prevent infection may have serious side effects.

Taking these drugs for exposures that pose a lower risk for infection may not be worth the risk of the side effects.

What about exposures to blood from an individual whose infection status is unknown?

HBV-HCV-HIV

If the source individual cannot be identified or tested, decisions regarding follow-up should be based on the

exposure risk and whether the source is likely to be a person who is infected with a bloodborne pathogen. Followup testing should be available to all workers who are concerned about possible infection through occupational exposure.

What specific drugs are recommended for postexposure treatment?

HBV

If you have not been vaccinated, then hepatitis B vaccination is recommended for any exposure regardless of the source person's hepatitis B status. HBIG and/or hepatitis B vaccine may be recommended depending on your immunity to hepatitis B and the source person's infection status.⁷

HCV

Currently there is no recommended postexposure treatment that will prevent HCV infection.

HIV

A 4-week course of two drugs (zidovudine and lamivudine) for most HIV exposures, or zidovudine and lamivudine plus a protease inhibitor (indinavir or nelfinavir) for exposures that may pose a greater risk for transmitting HIV (such as those involving a larger volume of blood with a larger amount of HIV or a concern about drug-resistant HIV). Differences in side effects associated with the use of these two drugs may influence which drug is selected in a specific situation. These recommendations are intended to provide guidance to clinicians and may be modified on a case-by-case basis. Determining which drugs and how many drugs to use or when to change a treatment regimen is largely a matter of judgment. Whenever possible, consulting someone with experience in the use of antiviral drugs is advised, especially if the source patient's virus is likely to be resistant to one or more recommended drugs, or if the drugs are poorly tolerated. The current recommendations for needle stick exposure and mucocutaneous exposure are shown in (Table 2) (8).

Table 2: PEP for mucus membrane and non-intact skin exposures

Exposure	Status of Source		
	Low Risk*	High Risk	Unknown
Small volume (drops)	Consider 2 drug PEP	2 drug PEP	Usually none; consider drug PEP
Large volume (major blood splash)	2 drug PEP	3 drug PEP	Usually none; consider drug PEP

*Low risk : Asymptomatic or VL <1500

High risk : Symptomatic, AIDS, Ac seroconversion, high VL

How soon after exposure to a bloodborne pathogen should treatment start?

HBV

Postexposure treatment should begin as soon as possible after exposure, preferably within 24 hours, and no later than 7 days.

HIV

Treatment should be started promptly, preferably within hours as opposed to days, after the exposure. Although animal studies suggest that treatment is not effective when started more than 24-36 hours after exposure, it is not known if this time frame is the same for humans. Starting treatment after a longer period (e.g., 1-2 weeks) may be considered for the highest risk exposures; even if HIV infection is not prevented, early treatment of initial HIV infection may lessen the severity of symptoms and delay the onset of AIDS (9).

What is known about the safety and side effects of these drugs?

HBV

Hepatitis B vaccine is very safe. There is no information that the vaccine causes any chronic illnesses. Most illnesses reported after an HBV vaccination are often related to other causes and not the vaccine. However, you should report any unusual reaction after a hepatitis B vaccination to your health-care provider.

HIV

All of the antiviral drugs for HIV have been associated with side effects. The most common side effects include upset stomach (nausea, vomiting, diarrhea), tiredness, or headache. The few serious side effects that have been reported in health-care workers using combination postexposure treatment have included kidney stones, hepatitis, and suppressed blood cell production. Protease inhibitors (indinavir and nefinavir) may interact with other medicines and cause serious side effects and should not be used in combination with certain other drugs, such as antihistamines. It is important to tell the doctor managing your exposure about any medications you are currently taking, if you need to take antiviral drugs for an HIV exposure.

Can pregnant health-care workers take the drugs recommended for postexposure treatment?

HBV

Yes. Women who are pregnant or breast-feeding can be vaccinated against HBV infection and/or get HBIG. Pregnant women who are exposed to blood should be vaccinated against HBV infection, because infection during pregnancy can cause severe illness in the mother and a chronic infection in the newborn. The vaccine does not harm the fetus.

HIV

Pregnancy should not rule out the use of postexposure treatment when it is warranted. If you are pregnant you should understand what is known and not known regarding the potential benefits and risks associated with the use of antiviral drugs in order to make an informed decision about treatment.

FOLLOW-UP AFTER AN EXPOSURE

What follow-up should be done after an exposure?

HBV

Because postexposure treatment is highly effective in preventing HBV infection, there is no routine follow-up after treatment. However, any symptoms suggesting hepatitis (e.g., yellow eyes or skin, loss of appetite, nausea, vomiting, fever, stomach or joint pain, extreme tiredness) should be reported to your doctor.

HCV

You should have an antibody test for hepatitis C virus and a liver enzyme test (SGOT/SGPT) as soon as possible after the exposure (baseline) and at 4-6 months after the exposure. Some may also recommend another test (HCV RNA) to detect HCV infection 4-6 weeks after the exposure. Report any symptoms suggesting hepatitis (mentioned above) to your doctor.

HIV

You should be tested for HIV antibody as soon as possible after exposure (baseline) and periodically for at least 6 months after the exposure (e.g., at 6 weeks, 12 weeks, and 6 months). If you take antiviral drugs for postexposure treatment, you should be checked for drug toxicity by having a complete blood count and kidney and liver function tests just before starting treatment and 2 weeks after starting treatment. You should report any sudden or severe flu-like illness that occurs during the follow-up period, especially if it involves fever, rash, muscle aches, tiredness, malaise, or swollen glands. Any of these may suggest HIV infection, drug reaction, or other medical conditions. You should contact the doctor managing your exposure if you have any questions or problems during the follow-up period.

What precautions should be taken during the follow-up period?

HBV

If you are exposed to HBV and receive postexposure treatment, it is unlikely that you will become infected and pass the infection on to others. No precautions are recommended.

HCV

Because the risk of becoming infected and passing the infection on to others after an exposure to HCV is low, no precautions are recommended.

HIV

During the follow-up period, especially the first 6-12 weeks when most infected persons are expected to show

signs of infection, you should follow recommendations for preventing transmission of HIV. These include not donating blood and not having sexual intercourse. If you choose to have sexual intercourse, using a condom consistently and correctly may reduce the risk of HIV transmission. In addition, women should consider not breast-feeding infants during the follow-up period to prevent exposing their infants to HIV in breast milk.

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