Body Fluid Exposure:
What To Do?

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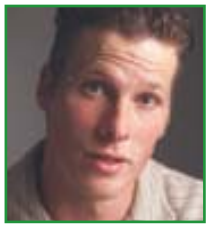
Family physicians most often assess body fluid exposures sustained through sexual contact, assaults, and bites. After a high-risk exposure, it is recommended that post-exposure prophylaxis (PEP) medications be administered as soon as possible.[1] A body fluid exposure should be regarded as an urgent medical problem in order to minimize delays in initiating PEP.

Exposure-specific and site-specific factors can lead to considerable variability in patient care. A standardized approach to body fluid exposures is recommended.

Is the exposure significant?

Significance is determined by the type of exposure and the fluid type involved (Tables 1 and 2). Because enzymes in saliva inhibit the growth of human immunodeficiency virus (HIV), an exposure to saliva is only considered significant if visible blood is present in the fluid. Body fluids other than

Rocky's Battle



Rocky, 19, was involved in a fight, during which he sustained a bite on his right arm. Several punctures from teeth are evident. Rocky's assailant was noted to have a cut lip. Rocky has completed a hepatitis B virus (HBV) vaccine series, but is not sure if followup tests were performed.

Would you recommend post-exposure prophylaxis (PEP) for human immunodeficiency virus (HIV) and HBV?

Table 1
Significant exposure types

Percutaneous:	Any puncture
Non-intact skin:	Cut, chapped, abraded, dermatitis-affected
Mucous membrane:	Eyes, mouth, nose, genital

Table 2
Fluid types

High-risk fluids

- Blood, tissue, genital, amniotic, CSF, pleural, peritoneal, pericardial, synovial, breast milk
- Any other fluids contaminated with blood
- Lab specimens containing HIV, HBV, HCV

Low-risk fluids (if not contaminated with visible blood:)

- Saliva
- Sputum
- Nasal Secretions
- Sweat
- Tears
- Urine
- Feces
- Vomitus
- Screened blood products

CSF: Cerebrospinal fluid
HIV: Human immunodeficiency virus
HBV: Hepatitis B virus
HCV: Hepatitis C virus

blood are not efficient vehicles of hepatitis B virus (HBV) transmission because they contain low quantities of HBV particles. Hepatitis C virus (HCV) is also not transmitted efficiently in saliva.

Pediatric bites are a common occurrence. Due to the lower prevalence of HIV, HBV, and HCV in children, the threshold for initiation of PEP is greater. Therefore, when dealing with children, PEP should only be considered when the source is known to be positive for HIV, HBV, or HCV.

Is the source infective?

In most cases, little information about the source is immediately available. However, a decision regarding the administration of PEP medications must still be made.

Whenever possible, the immune status (anti-HCV, HBsAg, anti-HBs, anti-HCV) of the source should be determined. Source risk factors (Table 3) are then assessed to determine if the source is a member of a population group with a higher disease prevalence. It is important to remember that a source with an identified risk factor may be in a seroconversion "window period"—when a source may test negative for a virus, but still be infective. If a source is not available to answer risk factor questions, judgement may have to be exercised as to the likelihood of the presence of risk factors.

Acute HIV syndrome should be considered in a source who presents with fever of unknown cause, or a potential immunocompromised state (*e.g,* tuberculosis). This diagnosis, which requires a high degree of suspicion, is often missed. A mononucleosis-like syndrome develops in 50% to 90% of patients within days to weeks after primary HIV infection. The symptoms include:

- fever,
- fatigue,
- rash,
- lymphadenopathy,
- headache,
- myalgias,
- diarrhea,
- nausea, and
- pharyngitis.

HIV antibody tests may not become positive until two or three weeks (sometimes months) after the infection is acquired.

Is the exposed individual susceptible?

Immune status, risk factors, and clinical symptoms should all be determined for the exposed individual in the same manner as for the source.

A patient who has received a HBV vaccine may be regarded as immune if a previous anti-hepatitis B (performed more than four weeks after the HBV immunization series was completed) was ever positive (>10 IU/L). Immunocompromised people, who should have a positive anti-HB level within the past one year, are the exception. Once a protective level has been documented, repeating anti-HB testing is not necessary and repeat boosters are not recommended. Anti-HB levels may decrease over time (30% to 50% of adults within 10 years), but an HBV exposure should induce a rapid anamnestic response. It is strongly recommended that health-care workers be vaccinated and have their anti-HB titre documented.

What is the seroconversion risk?

Seroconversion risk is the estimated, average risk based on the likelihood of the source being infective for the virus and the likelihood of

Table 3
Source risk factors

Consider the source as potentially infective if one or more risk factors are present:

HBV/HCV (window period = 3 months)

Risk factors are used to assess infection potential in the presence of a negative test result.

- Sexual or blood contact with a person who is HBV or HCV seropositive
- Intravenous/injection drug use
- Sexual partner who is an injection drug user
- "Street-connected" (lives on the street, or shares drugs with/has sex with persons living on the street)
- Sex trade worker, or someone frequently exchanging sex for drugs
- Men who have sex with men
- History of a sexually-transmitted disease
- Unhygienic tattoo or body piercing (needles used on two or more individuals without sterilization, or amateur/mobile operations)

HIV (window period = 6 months)

Risk factors are used to assess infection potential:

1) before test results are available;

2) when the source cannot be tested;

3) rarely if the source tests anti-HIV negative, but risk factors are identified in the 6 months prior to the test.

All of the risk factors for HBV and HCV, except tattoo and body piercing, plus:

- Sexual or blood contact with a person who is HIV seropositive
- Member of, or contact with a population with high prevalence
- History of hepatitis B or C

seroconversion after a single exposure (Table 4). Local prevalence rates must be taken into consideration when estimating risk.

Minor side-effects may occur in up to 70% of patients on two-drug PEP regimens.

How effective is PEP?

HIV PEP has become the standard of care. Zidovudine was shown to be 81% effective (95%, confidence interval = 43% to 94%) in reducing seroconversion after percutaneous exposures in health-care workers.[2] Perinatal studies have supported zidovudine's effectiveness. Furthermore, animal studies have demonstrated that HIV PEP is more effective when administered early after an exposure and continued for 28 days. However, the efficacy of multiple medications for HIV PEP is not known. PEP recommendations for two and three drug regimens are based on extrapolations from studies, which showed that combination therapy is superior to monotherapy in HIV-infected patients.

The efficacy of either the hepatitis B vaccine or hepatitis B immune globulin (HBIG) alone is 70% to 75%.[1] When administered in unison, efficacy increases to between 85% to 95%. However, efficacy declines when HBIG is administered more than 48 hours after an exposure.

The use of immune globulin for HCV PEP has not been shown to prevent HCV transmission. Interferon may result in a higher response rate when it is started early (within six months of exposure) in the course of HCV infection, rather than in well-established chronic hepatitis C. The inclusion of HCV in PEP protocols is intended to identify seroconverters and to encourage consideration of treatment options.

What are the associated risks?

Minor side-effects may occur in up to 70% of patients who are taking two-drug PEP regimens.[3] Serious, long-term reactions may occur with any of the antiretrovirals. Approximately one-third of patients discontinue PEP due to side-effects.

When should PEP be considered?

In order to make an informed decision, the exposed patient requires information about the estimated seroconversion risk, PEP efficacy, and the risks of the medications. Ultimately, what is considered to be a tolerable risk will vary from patient to patient. In general, PEP:

- would be recommended for seroconversion risks < 1:1,000;
- would be considered optional for risks of 1:1,000 to 1:100,000, and
- would not be indicated for risks > 1:100,000.[4]

Since most exposures are associated with low HIV seroconversion risks, the use of HIV PEP is considered optional.

In cases where HBV test results will not be available within 48 hours, it is recommended that HBIG and HBV vaccine be adminisered. If results will be available within 48 hours, HBIG and HBV vaccine administration may be delayed until the results are known. HBV immunizations for the exposed and source patients should still be considered even when PEP is not required. CME

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Followup on Rocky

Is the exposure type significant?

Yes. It is a non-intact skin injury with several punctures apparent.

Is the fluid type significant?

Yes. Saliva with visible blood.

Is the source infective?

The source is not available, thus immune status cannot be determined. No obvious risk factors are identifiable. The source is, therefore, considered a member of the "general population" group for prevalence rates.

Is the exposed individual susceptible?

Rocky does not have a protective anti-hepatitis B level documented. He has not had previous HIV or HCV tests performed.

What is the seroconversion risk?

The estimated, average risk for a non-intact skin exposure to a member of the general population is 1:>500,000 (HIV), 1:333 (HBV), and 1:6,200 (HCV).

Would you recommend PEP for HIV and HBV?

HIV PEP is not recommended. Rocky is informed of the risks and benefits and decides not to take PEP medications. Serology test results will be available within 48 hours and if Rocky's anti-HB level is not protective, HBV PEP will be recommended.

Take-home message

- PEP should only be considered when the source is known to be positive for HIV, HBV, or HCV.
- Minor side-effects may occur in up to 70% of patients on two-drug PEP regimens.
- It is strongly recommended that health-care workers be vaccinated and have their anti-hepatitis B titre documented.

Table 4

HIV Prevalence	Locale	%
General Population	Canada	0.16
Injection drug use (IDU)	Winnipeg	13.0
	Montreal	19.1
	Vancouver	29.1
Confirmed HIV +		100.0

HIV Transmisssion Risk	%	Range
Percutaneous/needlestick	0.3	0.20-0.50
Discarded needle	negligible risk	
Vaginal receptive	0.2	0.10-0.20
Mucosal (*e.g.,* eye)	0.09	0.09

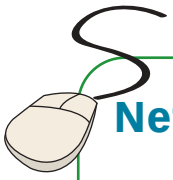
HIV seroconversion risk

Exposure	Population group	Risk
Percutaneous	General population	1:500,000
	IDU - Winnipeg	1:2,500
	confirmed HIV +	1:333
Vaginal reception	General population	1:500,000
	IDU - Winnipeg	1:4,000
	confirmed HIV +	1:500
Mucosal (*e.g.,* eye)	General population	1:700,000
	IDU - Winnipeg	1:8,500
	confirmed HIV +	1:1,100
Non-intact skin	Risk is not known: *it is likely less than mucosal*	

Prevalence=number with disease/number at risk.
Transmission risk is that associated with a single exposure to a positive source.
Seroconversion risk is the estimated average risk per episode *or* per sexual act.

References
1. U.S. Centers for Disease Control and Prevention: Updated U.S. health service guidelines for the management of occupational exposures to HBV, HCV and HIV and recommendations for post-exposure prophylaxis. MMWR 2001;50(RR-11):1-52. Available: http://www.cdc.gov/mmwr/PDF/rr/rr5011.pdf
2. Cardo DM, Culver DH, Ciesielski CA, et al: A case-control study of HIV seroconversion in health-care workers after percutaneous exposure. Centers for Disease Control and Prevention Needlestick Surveillance Group. N Engl J Med 1997; 337(21):1485-90.
3. B.C. Centre for Excellence in HIV/AIDS: HIVNET. http://cfeweb.hivnet.ubc.ca/
4. Vertesi L: Risk Assessment Stratification Protocol (RASP) to help patients decide on the use of postexposure prophylaxis for HIV exposure. CJEM 2003; 5(1):46-8.

Further references available—contact *The Canadian Journal of CME* at **cme@sta.ca**.



Net Readings

1. Centers for Disease Control and Prevention: Updated U.S. health service guidelines for the management of occupational exposures to HBV, HCV, and HIV and recommendations for PEP. *www.cdc.gov/mmwr/PDF/rr/rr5011.pdf*

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