

# Current Report—HIV

## Occupational Exposure to HIV: New Recommendations for Treating Health Care Workers

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Occupational exposure to the human immunodeficiency virus (HIV) and other blood-borne pathogens can be a frightening and dangerous part of the work of health care providers. Adherence to universal precautions markedly diminishes these dangers, yet accidents continue to occur, sometimes despite due care and caution.

Just as forethought and preparation are fundamental to providing care for the victim of a serious automobile accident or a sudden myocardial infarction, careful planning is essential in managing accidental exposures to blood-borne pathogens. Systems and protocols for dealing with these crises form the foundation of excellent supportive care for our health care colleagues. Conversely, the lack of a professional and supportive approach can add new problems to an already serious situation.

A key component of an overall plan to respond to occupational HIV exposures is a standardized approach to chemoprophylaxis after needle-stick or other injuries. New Public Health Service guidelines offer specific treatment recommendations to prevent occupational HIV transmission.<sup>1</sup> These recommendations, in combination with hepatitis B prophylaxis<sup>2,3</sup> and guidelines for support and counseling of exposed health care workers,<sup>4</sup> can be of enormous importance at those unexpected times of crisis when accidents occur. This Current Report—HIV describes how to assess the risk of specific occupational injuries, re-

views guidelines for postexposure prophylaxis and follow-up testing, and updates our suggestions for support and chemoprophylaxis for the exposed health care worker.<sup>4,5</sup>

### Immediate Treatment

Wounds and contaminated skin must be washed immediately with soap and water. Splashes to the eyes, mouth, or nose should be rinsed with water or saline for 10 to 15 minutes. The exposure should be reported promptly so the degree of risk can be assessed, management options discussed, and (when appropriate) treatment initiated as soon as possible.

### Assessment of Risk

To assess the risk of HIV infection after an occupational exposure, information about the nature of the injury, the type of body fluid involved, and the health status of the source patient must be obtained. These factors influence the concentration of virus to which the health care worker might have been exposed. Blood is always considered to be infectious. Potentially infectious body fluids include semen, vaginal secretions, and cerebrospinal, synovial, pleural, peritoneal, pericardial, and amniotic fluids. Other body fluids, such as saliva and urine, are not thought to carry a risk for HIV unless they are visibly bloody.

The average risk of HIV transmission from a percutaneous injury from an HIV-positive source patient is estimated at 0.3 percent (1/300). Some needle-stick injuries are associated with a risk of less than 0.3 percent; other injuries involving larger blood volume or higher HIV titers carry substantially higher risks. A recent retrospective seroconversion study<sup>6</sup> described factors that were associated with greater risk: (1) obvious blood was noted on the device, (2) deep injuries were sustained, (3) the device had been used in a vein or artery, or (4) the source patient had end-stage ac-

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**Table 1. Provisional Public Health Service Recommendations for Chemoprophylaxis After Occupational Exposure to HIV, by Type of Exposure and Source Material—1996.**

Type of Exposure	Source Material	Antiretroviral Prophylaxis	Antiretroviral Regimen
Percutaneous	Blood		
	Highest risk	Recommend	ZDV plus 3TC plus IDV
	Increased risk	Recommend	ZDV plus 3TC ± IDV
	No increased risk	Offer	ZDV plus 3TC
	Fluid containing visible blood, other potentially infectious fluid (see text), or tissue	Offer	ZDV plus 3TC
	Other body fluid (eg, urine)	Not offer	
Mucous membrane	Blood	Offer	ZDV plus 3TC ± IDV
	Fluid containing visible blood, other potentially infectious fluid (see text), or tissue	Offer	ZDV ± 3TC
	Other body fluid (eg, urine)	Not offer	
Skin, increased risk	Blood	Offer	ZDV plus 3TC ± IDV
	Fluid containing visible blood, other potentially, infectious fluid (see text), or tissue		ZDV + 3TC
	Other body fluid (eg, urine)	Not offer	

ZDV = zidovudine; 3TC = lamivudine; IDV = indinavir.  
From MMWR.<sup>1</sup>

quired immunodeficiency syndrome (AIDS), defined as a patient who died from AIDS-related causes within 60 days. Exposure to blood from end-stage AIDS patients presumably carries a higher risk of HIV transmission because these patients have higher plasma viremia levels. This study, however, did not measure HIV viremia in source patients. The risk of HIV transmission from exposure on mucous membranes or broken skin is generally much lower.

In the new Public Health Service guidelines for postexposure prophylaxis, blood exposures are stratified according to their presumed risk for HIV transmission. Highest-risk exposures have both a large volume of blood (eg, a deep injury with a large-diameter hollow needle containing the source patient's blood) and blood containing a presumed high titer of HIV (eg, source patient with acute retroviral illness or end-stage AIDS). These injuries have a substantially greater than 0.3 percent risk of HIV transmission. Increased risk exposures are those with either a large volume of blood or blood with a high titer of HIV. No increased risk is defined as exposures with neither a large volume of blood nor blood with a high titer of HIV (eg, solid-suture-needle injury

for source patient with asymptomatic HIV infection); these exposures presumably have a risk of HIV transmission approaching 0.3 percent.

### Source Patient Testing

If the source patient's HIV status is unknown, someone other than the exposed health care worker should assess risk factors for HIV, provide counseling, and encourage testing for HIV and hepatitis. Laws regarding testing the source patient vary from state to state; we recommend that all patients receive appropriate counseling and give informed consent before any HIV test is performed.

### Chemoprophylaxis Against HIV

Zidovudine (ZDV) chemoprophylaxis has been found to decrease the risk of HIV transmission resulting from a percutaneous injury by almost 80 percent.<sup>6</sup> Given the potential effectiveness of this therapy, the Public Health Service now recommends postexposure chemoprophylaxis for most high-risk or increased-risk exposures.

Depending upon the risk of HIV transmission,<sup>1,7</sup> the health care worker should be advised whether treatment is recommended, offered, or should not be offered (Table 1). Chemoprophyl-

laxis is recommended when there is substantial risk of HIV transmission. Health care workers should receive treatment unless they refuse. If chemoprophylaxis is offered, the health care worker and the counselor must weigh the potential medical and psychologic benefits of therapy against potential adverse drug toxicities and concerns. Chemoprophylaxis is not offered when the risk of HIV transmission is considered to be negligible.

Treatment should begin as soon as possible after the exposure, ideally within 1 hour. Some experts have suggested that for high-risk exposures initiating therapy even beyond 24 to 36 hours should be considered. Therapy with the drugs listed in Table 2 should be continued for 4 weeks. Treatment started late, while likely to be less effective at preventing HIV infection, might attenuate the course of already established HIV disease. Health care workers who are undecided about chemoprophylaxis should be encouraged to start therapy immediately and continue until they have had time to consider their options. When the source patient might be HIV infected but the HIV status is unknown, advice should be predicated upon the assumption of HIV positivity; therapy can be initiated and later discontinued if the source patient is seronegative for HIV.

The recommendations for chemoprophylaxis are for combined zidovudine plus lamivudine (3TC) therapy, adding indinavir therapy in special circumstances. Although these drug combinations have not been evaluated for postexposure chemoprophylaxis, they might provide more benefit than zidovudine prophylaxis alone. The ra-

tionale for combining lamivudine with zidovudine therapies is that this combination provides good laboratory evidence of antiviral effect and might also protect against the acquisition of ZDV-resistant virus. Lamivudine also has activity against hepatitis B virus. When the source patient has received extensive treatment with ZDV or lamivudine or both, many experts recommend adding or substituting other antiretroviral agents such as didanosine, zalcitabine, or stavudine. Preliminary studies suggest strong antiretroviral effects by adding protease-inhibitor therapy to other antiretroviral therapies. Consequently, for high-risk exposures or for any exposure in which the source patient has had extensive antiretroviral treatment and the transmission of resistant virus is a major concern, a protease inhibitor can be added to the regimen. Indinavir is the most suitable choice, as it has fewer drug interactions than zidovudine and obtains better serum concentrations than saquinavir.

### HIV Testing and Prophylaxis Against Hepatitis B

Baseline testing of the health care worker for HIV antibodies should be performed immediately with the enzyme-linked immunosorbent assay. Repeat testing at 6 and 12 weeks and 6 months after exposure is required to determine whether the health care worker has become infected. Western blot or other confirmatory tests are required if the screening antibody test is positive. Polymerase chain reaction (PCR) testing and p24 antigen determination offer no additional reliable information.

After an occupational exposure, concern natu-

**Table 2. Medications Recommended for Chemoprophylaxis.**

Medication	Recommended Dosages	Common Adverse Reactions	Common Drug Interactions
Zidovudine (ZDV, Retrovir)	200 mg tid for 4 weeks	Anemia, neutropenia, headaches, nausea	Carefully monitor patients taking other medications toxic to bone marrow
plus			
Lamivudine (3TC, Eпивir)	150 mg bid for 4 weeks	Headaches, nausea	None
in special circum- stances, add			
Indinavir (Crixivan)	800 mg q8h without food for 4 weeks	Asymptomatic hyperbilirubinemia, nephrolithiasis (hydration with 1.5 L/d recommended)	Should not be administered with terfenadine, astemizole, cisapride, triazolam, and midazolam

rally focuses on HIV. Hepatitis B, however, is more infectious by percutaneous injuries than is HIV. Health care workers who are actively involved in patient care should already have received hepatitis B immunization. Some health care workers, unfortunately, have not been immunized, and others do not have serologic evidence of an adequate and sustained immunologic response to hepatitis B or to hepatitis B vaccination. Hepatitis B hyperimmune globulin and recombinant hepatitis B vaccination are recommended for health care workers who do not have evidence of adequate immunity.

### **A Comprehensive Plan for Health Care Workers and Health Care Institutions**

Personal counseling and emotional support are essential to helping the health care worker deal with the stress of the situation. Health care workers who do not receive adequate support can suffer ongoing isolation and trauma. Ideally, counseling is performed by professionals skilled in counseling as well as knowledgeable about HIV transmission.<sup>7</sup> The family implications of possible infection need to be considered and discussed. In addition to receiving personal support, the health care worker should receive counseling about safer sex practices, avoiding pregnancy, and discontinuing breast-feeding until the possibility of HIV infection has been excluded.

Every hospital, clinic, and physician's office must be prepared for occupational exposure emergencies. Ongoing health care worker education about preventing and treating occupational injuries is critical. Equipment and work conditions should be assessed periodically, and problem solving with co-workers around known workplace hazards should be encouraged. Key individuals need to be trained to provide counseling, help the exposed health care worker make difficult decisions about treatment, prescribe and monitor therapy, and provide follow-up testing. These individuals should be available whenever health care workers are working, 24 hours a day if

necessary. Drugs must be available for immediate use. Protocols should be in place for source patient counseling and testing, including mechanisms to protect the confidentiality of the source patient. A documentation system that can protect the confidentiality of the health care worker while meeting worker's compensation requirements is also required. A plan for ongoing counseling, treatment, and support must also be in place.

Additional advice and help is available from some regional, state, and local resources. Our HIV Telephone Consultation Service (Warmline) in the University of California, San Francisco, Department of Family and Community Medicine at San Francisco General Hospital can be consulted during weekdays at 1-800-933-3413. All health care institutions, however, should develop additional comprehensive strategies to address these emergencies around the clock.

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