



# HEPP REPORT

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HIV & HEPATITIS  
EDUCATION  
PRISON  
PROJECT

## INFECTIOUS DISEASES IN CORRECTIONS

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*HEPP Report, a forum for correctional problem solving, targets correctional physicians, nurses, administrators, outreach workers, and case managers. Published monthly and distributed by email and fax, HEPP Report provides up-to-the moment information HIV/AIDS, hepatitis, and other infectious diseases, as well as efficient ways to administer treatment in the correctional environment. Continuing Medical Education credits are provided by the Brown University Office of Continuing Medical Education. HEPP Report is distributed to all members of the Society of Correctional Physicians (SCP) within the SCP publication, CorrDocs (www.corrdocs.org).*

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### HEPATITIS B, C, AND HIV POST-EXPOSURE PROPHYLAXIS IN CORRECTIONAL SETTINGS

*By Anne S. De Groot\*, M.D., and Roland C. Merchant\*\*, M.D., M.P.H., Brown University*

Consider these real-life scenarios:

- Two HIV-infected inmates (one also infected with hepatitis B) shared injecting-drug needles with at least 104 inmates in an Australian prison.
- A male inmate was repeatedly sexually assaulted by a prisoner who was known to be HIV- and hepatitis C-infected.
- A male inmate reported having unprotected, anal receptive consensual sex with someone of unknown hepatitis and HIV status.
- A female inmate was stuck by a needle she found while cleaning a bathroom.

How should these blood or body fluid exposures be managed in the correctional setting, and what are the infections of concern? Are correctional professionals prepared to manage these exposures?

HIV transmission is believed to be a rare consequence of blood or body fluid exposures in the correctional setting. However, if transmission occurs, the consequences are permanent and potentially deadly. Likewise, hepatitis C and hepatitis B transmission can lead to lifelong illness and sometimes a shortened life expectancy. Fortunately, post-exposure interventions that might reduce the transmission risk, and thereby diminish the consequences of an exposure, do exist and appear to be effective.

Post-exposure prophylaxis (PEP) protocols that incorporate such interventions have been implemented in many settings, particularly for health care staff. However, few correctional institutions have implemented blood or body fluid post-exposure protocols for inmates exposed to bloodborne pathogens by any route (injection-drug use, consensual sex, or sexual assault). This deficit is especially noteworthy given recent calls for PEP implementation in jails and prisons.<sup>1,2</sup> Given the acceptance of PEP outside the correctional setting, adoption of PEP protocols in the correctional setting may help reduce the legal, emotional, and medical ramifications of an exposure event for this vulnerable population.

Of course, prevention of blood or body fluid exposures is preferable over post-exposure interventions since such post-hoc measures are not completely effective, are costly, and carry the potential for adverse side effects. However, not all expo-

surements can be prevented, particularly in jails and prisons. It therefore is advisable that both pre- and post-exposure bloodborne pathogen transmission preventive measures be enacted in correctional settings.

In this article we discuss the management of PEP for incarcerated individuals. Of course, the same principles also apply to the management of a post-exposure intervention for correctional staff. The risk for transmission of three common bloodborne infections - HIV, hepatitis B (HBV) and hepatitis C (HCV) - is reviewed, as well as PEP options for potential exposures to these pathogens.

### TRANSMISSION RISK

Bloodborne pathogen transmission depends upon the nature of the exposure and the infectious status of the exposure source. Prisoners are at risk for HIV, HBV, and HCV infections from sexual contacts, medical percutaneous injuries, and injecting-drug paraphernalia sharing. The transmission risk from these events is influenced by the amount of infectious material involved, the characteristics of the event, and the severity of the exposure source's illness.

The risk of infection following a given blood or body fluid exposure depends first and foremost upon the likelihood that the exposure source is infected. In the correctional setting, the likelihood of the source being infected with HIV, HBV or HCV is higher than outside the prison walls. Correctional professionals are familiar with the high prevalence of HIV, HCV, and HBV in inmate populations, ranging as high as 3% for HIV (and up to 8.5% in some state prison systems<sup>3</sup>) and 35% for HCV.<sup>4,5</sup> Data have recently been released from the Maryland AIDS Administration announcing that one in three prison inmates in Maryland is infected with HIV, syphilis, HBV, or HCV - many having more than one infection.<sup>6</sup>

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**HEPATITIS B, C, AND...**

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**TRANSMISSION ESTIMATES**

**HIV Transmission**

HIV transmission estimates vary by the type of exposure. Per-event transmission probability estimates are 0.3% - 0.4% after a percutaneous (e.g., needlestick) exposure, and 0.09% after a mucous membrane exposure.<sup>8</sup> The risk for HIV transmission per episode of intravenous needle or syringe sharing is estimated at 0.7%.<sup>7</sup> The risk for HIV transmission per episode of receptive penile-anal sexual intercourse is estimated at 0.1% - 3%, while the risk per episode of receptive vaginal intercourse is estimated at 0.1% - 0.2%. No published estimates of the risk for transmission from receptive oral exposure exist, but instances of suspected transmission have been reported.<sup>7</sup>

These estimates are approximate, and depend upon other factors, such as the stage of HIV disease of the exposure source, the presence of other sexually transmitted diseases, and effective use of antiretroviral medication with suppression of viral load.

According to Centers for Disease Control and Prevention (CDC) PEP guidelines, several factors could affect the risk of HIV transmission after exposure. The risk is increased after an exposure to a large quantity of blood from the source (e.g., a device visibly contaminated with blood, a procedure that involved a needle being placed directly in a vein or artery, a deep injury, etc.), as well as from exposure to a source with an advanced HIV infection (i.e., a high viral load).<sup>8</sup>

**HBV Transmission**

According to the CDC, the risk of HBV infection is primarily related to the degree of contact with blood and the hepatitis B e antigen (HBeAg) status of the source.<sup>8</sup> Exposures to sources harboring HBeAg confer a greater risk of HBV transmission. In studies of health care workers who sustained injuries from needles contaminated with blood positive for both HBsAg and HBeAg, the risk of developing clinical hepatitis was 22% - 31% and the risk of serologic evidence of HBV infection was 37% - 62%. In comparison, the risk of developing clinical hepatitis from a needle contaminated with HBsAg-positive, HBeAg-negative blood was 1% - 6%, while the risk of developing serologic evidence of HBV infection was 23% - 37%.<sup>8,9</sup>

The highest risk for transmission of HBV is through exposure to blood, although saliva, semen, sweat, feces, and bile may contain infectious particles. However, most body fluids contain low quantities of infectious HBV, and are therefore not efficient transmitters of infection.<sup>8</sup>

**HCV Transmission**

Although less well understood, HCV is likely

**TABLE 1: Occupational HIV PEP\*\***

Exposure type	Source infection status		
	Asymptomatic HIV infection or known low viral load (<1,500 copies/mL)	Symptomatic HIV infection, AIDS, acute seroconversion, or known high viral load	Unknown HIV status or unknown source
Percutaneous injury, less severe (e.g., solid needle or superficial injury)	2-drug PEP	3-drug PEP	2-drug PEP
Percutaneous injury, more severe (e.g. large-bore hollow needle, deep puncture)	3-drug PEP	3-drug PEP	2-drug PEP
Mucous membrane exposures and nonintact skin* exposures, small volume (i.e., a few drops)	2-drug PEP	2-drug PEP	2-drug PEP
Mucous membrane exposures and nonintact skin* exposures, large volume (i.e., major blood splash)	2-drug PEP	3-drug PEP	2-drug PEP

\*For skin exposures, follow-up is indicated only if there is evidence of compromised skin integrity (e.g., dermatitis, abrasion, or open wound).

\*\*Some state departments of health (DOH) have published alternative guidelines. Consult with your local DOH to see whether state-level guidelines exist.

Table adapted from the Centers for Disease Control and Prevention, *MMWR* 2001, Vol. 50, No. RR-11.

transmitted in the same manner as HIV and HBV.<sup>10</sup> Transmission rarely occurs from mucous membrane exposures to blood, and rarely, if at all, after percutaneous exposures to blood with needles that are not hollow bore. The risk for transmission from exposure to fluids or tissues other than HCV-infected blood has not been quantified, but is expected to be low. The average risk of anti-HCV seroconversion after an accidental percutaneous exposure to an HCV-infected source is 1.8%, with a range of 0%-7%.<sup>8</sup>

**PEP OPTIONS**

**HIV PEP**

HIV PEP involves two or three antiretroviral medications that are begun no later than 72 hours after a potential HIV exposure (within 24 hours is best) and taken for 28 days.<sup>11,12</sup> HIV PEP efficacy, although not proven through randomized, placebo-controlled trials, is suggested from clinical trials that showed a reduction of perinatal HIV prevention with antiretroviral medications use, animal studies which employed various chemoprophylactic regimens, immunologic investigations on HIV transmission mechanisms, and a multi-national observational study of health care workers demonstrating decreased HIV transmission among those who took zidovudine after a percutaneous injury.<sup>13</sup>

For more detail on the management of occupational blood exposures to HIV, see the HEPPigram on page 5.

The CDC currently only endorses HIV PEP for health care workers who have been possibly exposed to HIV at their workplace.<sup>7,8</sup> A number of other groups in the US and else-

where have created their own HIV PEP recommendations or guidelines for people who are not health care workers and have sustained so-called "nonoccupational" exposures to HIV, such as from sexual contact or injecting-drug use.<sup>2,14,15</sup> California and New York have statewide guidelines on HIV PEP after sexual assault, Massachusetts has a clinical advisory on HIV PEP, and Rhode Island has Department of Health-endorsed guidelines on HIV PEP provision after all types of potential HIV exposures.<sup>16,17,18,19</sup> New York is expected to release similar comprehensive HIV PEP guidelines soon, and the CDC is considering recommendations for nonoccupational PEP.

**HBV PEP**

The CDC recommends vaccinating any non-immune person who is potentially exposed to hepatitis B from any type of transmissible event.<sup>5,20</sup> The CDC reserves hepatitis B immunoglobulin for unvaccinated individuals, and those who failed to respond serologically to HBV vaccine who are then exposed to infectious body fluids from someone with known or suspected hepatitis B infection. Although the efficacy of HBV PEP has not been validated by randomized, blinded, placebo-controlled trials, HBV PEP experiments using vaccinations and/or immunoglobulin infusions in the perinatal and occupational settings provide strong evidence suggesting efficacy.<sup>8</sup>

Management of HBV exposure involves determining the HBV status of the source, if the source is known. Treatment of the exposed individual can be delayed for up to three days until this information is available.

*Continued on page 4*

## LETTER FROM THE EDITOR

Dear Correctional Colleagues:

### True or False?

1. Many incarcerated injection drug users (IDUs) who don't have access to drug treatment or needle exchange will continue to share needles while in jail or prison.
2. Although the "war on drugs" has led to a dramatic increase in the number of incarcerated IDUs, few of these inmates have access to drug treatment while in jail or prison.
3. Correctional officers, janitorial and medical staff, and others working in jails and prisons are regularly stuck with needles discarded by inmates who don't have access to needle exchange or drug treatment.
4. The Centers for Disease Control and Prevention endorses needle exchange as one component of an effective drug policy.
5. Many inmates will have unprotected sex while incarcerated.
6. Condoms are known to be highly effective in preventing the transmission of HIV and other sexually transmitted diseases.
7. Jails and prisons that have made condoms available to inmates have had few or no disciplinary problems associated with condom distribution and use.

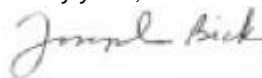
### Answers:

1: True 2: True 3: True 4: True 5: True 6: True 7: True

Because most of us who practice medicine in correctional facilities are currently prohibited from providing our patients the tools for PREP (pre-exposure prevention), it is our responsibility to be well versed in PEP (post-exposure prophylaxis) for potential bloodborne pathogen exposures. In this month's HEPP Report, Drs. Anne De Groot and Roland Merchant provide an excellent overview of this important topic. It is my hope that some day harm reduction measures will be so fully integrated into correctional health maintenance programs that the information contained in this month's main article will be mostly of historical interest.

Also this month, Dr. Chris Behrens provides the expert response to a PEP case provided by Kate Willner and Dr. Stephen Tabet. After reading this issue, you will have a better understanding of the infectious risks associated with various blood and body fluid exposures, and be familiar with the recommended management of individuals who have been exposed to blood borne pathogens.

Sincerely yours,



Joseph Bick, M.D.

### FACULTY DISCLOSURE

In accordance with the Accreditation Council for Continuing Medical Education Standards for Commercial Support, the faculty for this activity have been asked to complete Conflict of Interest Disclosure forms. Disclosures are listed at the end of articles. All of the individual medications discussed in this newsletter are approved for treatment of HIV and hepatitis unless otherwise indicated. For the treatment of HIV and hepatitis infection, many physicians opt to use combination antiretroviral therapy which is not addressed by the FDA.

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## HEPATITIS B, C, AND...

(continued from page 2)

All correctional employees should be vaccinated against HBV. The CDC also recently recommended that susceptible inmates be vaccinated as well. Vaccinating inmates in prisons has been demonstrated to be feasible and cost-saving from both the prison and community perspectives.<sup>5</sup>

### HCV PEP

The CDC does not currently recommend any form of HCV post-exposure prophylaxis following potential HCV exposures. However, if acute HCV infection is confirmed in the exposed person, recent data suggest that early treatment of the acute infection with alpha interferon may be highly effective in preventing the development of chronic HCV infection.<sup>21</sup> Therefore, individuals who are exposed to HCV should be referred to experienced clinicians who can provide updated counseling and treatment.

### PEP EXPERIENCE IN THE CORRECTIONAL SETTING

A recent article published in the Medical Journal of Australia describes a cohort study conducted in two Australian prisons involving HIV, HBV, and HCV transmission and PEP.<sup>1</sup> Two inmates infected with HIV and HCV (one of whom also had chronic HBV), and more than 100 inmates who shared needles and syringes with either of the two were followed in this study.

The two source patients (in two different prisons) informed the staff at their respective medical clinics that they had shared needles with other injecting-drug users within the previous weeks. One inmate identified his sharing partners, while the other inmate did not. Inmates in both prisons who may have shared needles with the source cases were contacted and were invited to attend the prison clinic if they had shared needles or syringes during a specified period (the period of possible contact with the source patients). One hundred and seventy inmates attended the clinic in response to the invitation, and 104 inmates were determined to be potentially exposed.

Of the 104 inmates potentially exposed to HIV, 56 had been exposed within the previous 72 hours and were therefore eligible based upon the prison's protocol for post-exposure prophylaxis (PEP). Forty-six inmates (82% of those eligible) were offered PEP, and 34 of these (74%) elected to receive it. Thirty-four men took PEP with zidovudine (AZT) and lamivudine (3TC) for an average of 18 days. Some trading of PEP drugs was reported amongst prisoners and as a result prison health staff began administering PEP as directly observed therapy (DOT). Only eight (24% of the 34) completed the full PEP course of 28 days. Among the 26 inmates who did not complete the full course of PEP, 11 did not give a reason for stopping, though

TABLE 2: HBV PEP

Vaccination and antibody response status of exposed workers*	Treatment		
	Source HBsAg positive	Source HBsAg negative	Source unknown or not available for testing
Unvaccinated	HBIG** x 1 and initiate HB vaccine series	Initiate HBV vaccine series	Initiate HBV vaccine series
Previously vaccinated, known responder***	No treatment	No treatment	No treatment
Previously vaccinated, known non-responder^	HBIG x 1 and initiate revaccination or HBIG x 2^^	No treatment	If known high risk source, treat as if source were HbsAg positive
Previously vaccinated, antibody response unknown	Test exposed person for anti-HBs^^ 1. If adequate***, no treatment is necessary 2. If inadequate^, administer HBIG x 1 and vaccine booster	No treatment	Test exposed person for anti-HBs 1. If adequate***, no treatment is necessary 2. If inadequate^, administer vaccine booster and recheck titer in 1-2 months

\*Persons who have previously been infected with HBV are immune to reinfection and do not require postexposure prophylaxis.

\*\*Hepatitis B immune globulin; dose is 0.06mL/kg intramuscularly.

\*\*\*A responder has adequate levels of serum antibody to HbsAg (i.e., anti-HBs greater than or equal to 10 IU/mL).

^A nonresponder has inadequate response to vaccination (i.e., serum anti-HBs < 10 IU/mL).

^^The option of giving one dose of HBIG and reinitiating the vaccine series is preferred for nonresponders who have not completed a second three-dose vaccine series. For persons who previously completed a second vaccine series but failed to respond, two doses of HBIG are preferred.

^^^Antibody to HBsAg

Table adapted from the Centers for Disease Control and Prevention, MMWR 2001, Vol. 50, No. RR-11.

some discontinuation occurred when the inmates were transferred or released. The authors conclude that another reason for stopping therapy may have been the use of DOT, instituted after the pill trading was discovered.

No cases of HIV infection were found at follow-up testing a year later. However, only 61% of the 104 potentially exposed prisoners received follow-up testing, and the researchers acknowledged that seroconversions might have occurred among those lost to follow-up.

Inmates susceptible to HBV infection at baseline received HBV vaccination or immunoglobulin and no new cases of HBV were detected during follow-up.

While only 29 men were susceptible to HCV infection at baseline, four (14%) of these were found to be infected with hepatitis C at follow-up testing. Researchers were reluctant to attribute these HCV seroconversions to the documented exposures due to multiple exposures and ongoing risk behaviors by the prisoners involved. Nevertheless, they concluded that their findings are consistent with the higher probability of transmitting HCV compared with HIV through sharing needles and syringes.

### CONCLUSION

Many correctional facilities have adopted PEP guidelines for the management of staff needlestick and sharp exposures. Nonoccupational PEP is a newer concept that has been implemented in community settings. As described in the report from Australia, inmates can be exposed to HIV, HCV and HBV in correctional settings. Thus, familiarity with post-exposure preventive prophylaxis is an important aspect of medical care in correctional settings, both for inmates and staff who may become exposed to HIV, HBV or HCV in the course of their work. Despite the best efforts of correctional staff, it is likely that exposures will continue to occur. The best prevention is good preparation.

### DISCLOSURES:

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**HEPPIGRAM****Management of Occupational Blood Exposure****1. Provide immediate care to the exposure site.**

- ♦ Wash wounds and skin with soap and water.
- ♦ Flush mucous membranes with water.

**2. Determine risk associated with exposure by**

- ♦ type of fluid (e.g., blood, visibly bloody fluid, other potentially infectious fluid or tissue, and concentrated virus) and
- ♦ type of exposure (i.e., percutaneous injury, mucous membrane or nonintact skin exposure, and bites resulting in blood exposure).

**3. Evaluate exposure source.**

- ♦ Assess the risk of infection using available information.
- ♦ Test known sources for HBsAg, anti-HCV, and HIV antibody (consider using rapid testing).
- ♦ For unknown sources, assess risk of exposure to HBV, HCV, or HIV infection.
- ♦ Do not test discarded needles or syringes for virus contamination.

**4. Evaluate the exposed person.**

- ♦ Assess immune status for HBV infection (i.e., by history of hepatitis B vaccination and vaccine response).

**5. Give PEP for exposures posing risk of infection transmission.**

- ♦ HBV: See Table 2 (page 4).
- ♦ HCV: PEP not recommended.
- ♦ HIV: See Table 1 (page 2).
  - ♦ Initiate PEP as soon as possible, preferably within hours of exposure.
  - ♦ Offer pregnancy testing to all women of childbearing age not known to be pregnant.
  - ♦ Seek expert consultation if viral resistance is suspected.
  - ♦ Administer PEP for four weeks if tolerated.

**6. Perform follow-up testing and provide counseling.**

- ♦ Advise exposed persons to seek medical evaluation for any acute illness occurring during follow-up.

**HBV exposures**

- ♦ Perform follow-up anti-HBs testing in persons who receive hepatitis B vaccine.
  - ♦ Test for anti-HBs 1-2 months after last dose of vaccine.
  - ♦ Anti-HBs response to vaccine cannot be ascertained if HBIG was received in the previous 3-4 months.

**HCV exposures**

- ♦ Perform baseline and follow-up testing for anti-HCV and alanine aminotransferase (ALT) 4-6 months after exposures.
- ♦ Perform HCV RNA at 4-6 weeks if earlier diagnosis of HCV infection desired.
- ♦ Confirm repeatedly reactive anti-HCV enzyme immunoassays (EIAs) with supplemental tests.

**HIV exposures**

- ♦ Perform HIV-antibody testing for at least 6 months postexposure (e.g., at baseline, 6 weeks, 3 months, and 6 months).
- ♦ Perform HIV antibody testing if illness compatible with an acute retroviral syndrome occurs.
- ♦ Advise exposed persons to use precautions to prevent secondary transmission during the follow-up period.
- ♦ Evaluate exposed persons taking PEP within 72 hours after exposure and monitor for drug toxicity for at least 2 weeks.
- ♦ Monitor patients for signs of acute retroviral syndrome. In the event that acute retroviral syndrome occurs, patients should begin immediate antiretroviral therapy.

## ASK THE EXPERT

### Case Study: Post-Exposure Prophylaxis for a Sexually Assaulted Male Inmate

Case presentation by Stephen Tabet\*, M.D., M.P.H., Assistant Professor of Medicine, University of Washington, and Director, Northwest Correctional Medicine Education Program. Case discussion by Chris Behrens\*\*, M.D., Medical Program Director, Northwest AIDS Education & Training Center, University of Washington. A collaboration with the Northwest AIDS Education and Training Center, with Stephen Tabet, M.D., and Kate Willner, trainer.

**Case:** An inmate reports being raped (anally penetrated) by another inmate and is sent to a local emergency department (ED) within two hours after the assault. The assaulted inmate denies any past or current injection drug use (IDU) or sex with men (except the assault) and recently tested negative for HIV infection; the hepatitis B virus (HBV) and hepatitis C virus (HCV) serostatus is unknown. The assailant is a previous injection drug user. He is known to have chronic HBV and HCV infection, however his HIV status is unknown.

#### Discussion: What should the emergency department physician initially do with the assaulted inmate?

The ED physician should first ensure that the assaulted inmate is medically stable. This includes ruling out ongoing bleeding or colonic perforation from the assault. Any mucosal or skin tears should be promptly irrigated in sterile fashion. A forensics examination kit can be used to collect specimens that may be required for legal evidence of the assault, but this should not delay decontamination procedures.

#### What type of testing should be done, and when?

##### Initial Tests

Initial serology testing: Baseline serum testing of the assaulted inmate for antibodies to HIV and HCV is indicated, as well as a battery of HBV tests to establish his HBV status (immune, non-immune, or chronically infected). The HBV tests should include hepatitis B surface antibody (HBsAb), hepatitis B surface antigen (HBsAg), and hepatitis B core antibody (HBcAb). These tests should be performed before HBV post-exposure prophylaxis (PEP) is administered.

**Baseline labs:** A baseline complete blood count (CBC), an electrolyte panel, and liver function tests should also be performed if the assaulted inmate is to begin antiretroviral prophylaxis against HIV.

**Cultures:** Rectal cultures should be obtained for gonorrhea and chlamydia. Testing of the source inmate or patient should be performed, if possible (consent may be required), and should include HIV antibody testing, a serum rapid plasma reagin (RPR) to screen for syphilis, and gonorrhea and chlamydia testing (by urine ligase chain reaction [LCR] testing). Any genital lesions present on the source patient should be cultured as well.

##### Follow-up Tests

**HIV:** Follow-up HIV antibody testing for the assaulted inmate is indicated if the source patient is tested and found to be infected with HIV, or if the source patient cannot be tested for HIV. Some clinicians might argue in favor of performing this follow-up testing on the assaulted inmate even if the source patient tests negative for HIV at the time of the exposure, given the theoretical possibility that the source patient could be in the "window period" of acute HIV infection prior to antibody seroconversion.

HIV antibody testing performed at six weeks, three months, and six months is a reasonable schedule for follow-up testing and is recommended for occupational percutaneous exposures to HIV.<sup>1</sup> Case reports of delayed HIV seroconversion in health care personnel who became coinfecting with HIV and HCV from percutaneous exposures<sup>2,3</sup> have prompted recommendations to consider HIV antibody testing at 12 months post-exposure in health care personnel who contract HCV from co-infected patients.<sup>4</sup> If it is established that the source patient in this case is co-infected with HCV and HIV, and the assaulted inmate contracts HCV from the exposure, it would be reasonable to apply this reasoning to the present case, and perform HIV antibody testing at 12 months as well. HIV RNA polymerase chain reaction (PCR) testing ("viral load") would be indicated only if the source patient is found to be HIV-infected and the assaulted inmate develops signs and symptoms consistent with acute HIV infection.

If the assaulted inmate initiates antiretroviral PEP for HIV, as recom-

mended below, then follow-up CBC, electrolyte panel, and liver function tests should be performed two weeks later to monitor potential medication-related toxicities.

**Hepatitis B:** If baseline HBV serologies suggest that the assaulted inmate is 1) currently not infected with hepatitis B; and 2) not immune to hepatitis B infection, then follow-up testing for hepatitis B seroconversion is indicated. Specific guidelines for this scenario are lacking, but a reasonable approach would be to test for HBsAg periodically. A recommended schedule is six weeks, twelve weeks, and six months, the same schedule that would be followed for HIV antibody testing, and as suggested by any clinical signs/symptoms of acute hepatitis.

**Hepatitis C:** Follow-up testing will be required for HCV, though sexual exposure does not appear to be an efficient mechanism for transmitting HCV. The Centers for Disease Control and Prevention (CDC) recommends testing for hepatitis C antibody four to six months following percutaneous occupational exposure, and this would be a reasonable standard to use in this case. Simultaneous alanine aminotransferase (ALT) testing can be performed, though this is a less reliable marker of HCV infection. If hepatitis C antibody seroconversion occurs, referral for further testing and medical management is indicated, which would include a HCV viral load for confirmatory testing and a discussion of treatment options if the inmate develops chronic hepatitis C infection.

#### Would you recommend PEP? Why or why not?

I would recommend PEP for HIV and HBV in this situation. Empiric treatment of possible gonorrhea and chlamydia infection should also be considered.

#### Rationale for HIV PEP

I would consider the source patient (the assailant) to be at high risk for HIV infection given he is known to be infected with both HBV and HCV, both of which share similar routes of transmission as HIV (sex and IDU). For the assaulted inmate, this type of exposure itself is very high risk: a single act of unprotected receptive anal intercourse involving an HIV-infected source patient carries a risk estimated at 1-2% for HIV transmission.<sup>5</sup> Furthermore, this case involved rape, and the violence associated with acts of rape often results in tearing of the rectal mucosa, which could be expected to further elevate the risk of HIV transmission.

#### Treatment Recommendations

I would recommend an expanded three-drug PEP regimen such as zidovudine + lamivudine + nelfinavir (AZT + 3TC + NFV). I suggest the nucleoside backbone of AZT + 3TC because AZT has demonstrated efficacy for PEP in the setting of health care workers who have sustained percutaneous needlestick injuries.<sup>6</sup> As we have no conclusive evidence regarding the efficacy of PEP for sexual exposures in humans, we can only extrapolate from what is known about PEP for occupational exposures. We add 3TC because PEP regimens generally include at least two drugs and because 3TC is generally very well tolerated. The addition of a third drug in this case, such as NFV, is a bit more controversial. We actually have no evidence that adding a third drug to a standard two-drug PEP regimen offers any added protection against HIV infection, even in the setting of an occupational

(Continued on page 7)

**CASE STUDY... (continued from page 6)**

percutaneous exposure; furthermore, adding a third agent generally adds more potential for antiretroviral medication-related toxicities.<sup>7</sup>

On the other hand, drawing from our experience in treating chronic HIV infection, we recognize that three agents may be more effective than two in suppressing HIV infection, and NFV is a relatively benign protease inhibitor whose main side effect - diarrhea - can generally be controlled with anti-diarrheal agents. Hence, I would recommend a three-drug PEP regimen, while recognizing the relative paucity of evidence to support this recommendation. Should the patient experience intolerable side effects from the NFV, discontinue this agent, and substitute either a different third agent, for example indinavir (IDV), or simply continue the basic AZT/3TC regimen without a third agent.

Ideally, the source patient would be tested for HIV infection. Should he test negative, PEP for the assaulted inmate should be discontinued. If the source patient tests positive, however, PEP should be continued for a total of 28 days, followed by periodic HIV antibody testing as outlined above.

**HBV PEP**

Because the source patient is known to have chronic hepatitis B infection, this exposure places the assaulted inmate at risk of contracting hepatitis B, unless he is already immune. However, we currently have no evidence that he is immune to hepatitis B. I would therefore recommend HBV PEP, including 1) hepatitis B immune globulin (HBIG); and 2) initiation of the HBV vaccination series. Each should be given as soon as possible (though after baseline hepatitis B serologies are drawn, as outlined above). These two injections can be administered simultaneously but they should be administered at different sites on the body. It is believed, based on evidence from postpartum neonatal prophylaxis studies to prevent vertical transmission<sup>8,9</sup> that the addition of HBV vaccination to the use of HBIG following potential exposure to HBV further reduces the risk of HBV infection. This is the same management that would be indicated for an unvaccinated health care worker who has sustained a percutaneous occupational exposure to a patient with chronic HBV infection.<sup>10</sup> If baseline hepatitis B serologies indicate that the assaulted inmate is not immune to hepatitis B infection, the vaccination series should be continued. Six to eight weeks after the last injection of this three-shot vaccination series, a surface antibody titer can be checked to see if the vaccine elicited a protective antibody response.

**HCV PEP**

There is currently no recommended post-exposure prophylaxis to prevent HCV infection. Recent data suggest that early treatment (within four months) of acute hepatitis C infection with interferon may substantially increase the likelihood of successful eradication over that historically seen with treatment of chronic hepatitis C infection.<sup>11</sup> For this reason, some clinicians might favor screening the exposed patient with HCV RNA PCR (viral load) tests periodically, e.g. on a monthly basis, and initiating interferon therapy if HCV viremia is detected. However, given the potential toxicity of interferon, the fact that a sig-

nificant minority of patients spontaneously clear HCV viremia without therapy, and the possibility that waiting for six months may not jeopardize a favorable response to treatment, other clinicians might favor simply screening six months following the exposure. More evidence is needed before definitive recommendations can be made regarding early screening and treatment of acute hepatitis C infection.

**Gonorrhea and Chlamydia PEP**

It may be appropriate to offer treatment for gonorrhea and chlamydia to the assaulted inmate, especially if physical examination of the assailant suggests the presence of either of these sexually transmitted diseases. If, however, the source patient can be tested for these infections, it would also be reasonable to defer the treatment decision until the results of these tests are known, given that follow-up care of the assaulted inmate can be guaranteed in this setting.

As the above case illustrates, the management of exposures to infectious pathogens involving considerations of PEP can be complex. Clinicians are reminded of telephone consultation services such as the National Clinicians' Post-Exposure Prophylaxis Hotline (PEPline), available 24 hours a day/7 days a week, at 1-888-HIV-4911.

**DISCLOSURES:**

\*Nothing to disclose.

\*\* Speaker's Bureau, GlaxoSmithKline.

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**PEP Phone and Internet Resources**

- **PEPline: National Clinicians' Post-exposure Prophylaxis Hotline:** 1-888-448-4911
- **CDC Guidelines on HIV, HBV, and HCV Occupational PEP:** [www.cdc.gov/mmwr/preview/mmwrhtml/rr5011a1.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5011a1.htm)
- **CDC Public Health Statement on Nonoccupational PEP:** [www.cdc.gov/mmwr/preview/mmwrhtml/00054952.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/00054952.htm)
- **National Institute for Occupational Safety and Health:** [www.cdc.gov/niosh/topics/bbp/](http://www.cdc.gov/niosh/topics/bbp/)
- **National HIV/AIDS Clinicians' Consultation Center, PEP Resources:** [www.ucsf.edu/hivcntr/resources/pep/](http://www.ucsf.edu/hivcntr/resources/pep/)

- **CDC Nonoccupational HIV PEP Registry:** [www.hivpepregistry.org](http://www.hivpepregistry.org)
- **Nonoccupational HIV PEP Guidelines for RI Health Care Practitioners (Brown University AIDS Program and the RI Department of Health):** <http://www.brown.edu/Departments/BRUNAP/npepguid>
- **NY State Occupational and Sexual Assault PEP Guidelines:** [www.hivguidelines.org/public\\_html/center/clinical-guidelines/pep\\_guidelines/pep\\_guidelines.htm](http://www.hivguidelines.org/public_html/center/clinical-guidelines/pep_guidelines/pep_guidelines.htm)

## SAVE THE DATES

### American Correctional Association Summer Conference

August 9-14, 2003

Nashville, Tennessee

Call: 800-222-5646, ext. 1922

Visit: [www.aca.org/conventions/conventions\\_2003\\_summer.htm](http://www.aca.org/conventions/conventions_2003_summer.htm)

### 3rd Annual Intensive Review in Correctional Medicine

Sponsored by the Correctional Medicine Institute (CMI), the Society for Correctional Physicians (SCP), and Johns Hopkins Univ.

September 4-6, 2003

Baltimore, Maryland

Baltimore Marriott Waterfront Hotel

Call: 410-955-2959

Email: [cmenet@jhmi.edu](mailto:cmenet@jhmi.edu)

Visit: [www.hopkinscme.org/cme/events/correc03.html](http://www.hopkinscme.org/cme/events/correc03.html)

### 43rd Interscience Conference on Antimicrobial Agents and Chemotherapy (ICAAC)

September 14-17, 2003

Chicago, Illinois

Call: 202-737-3600

Email: [icaac@asmusa.org](mailto:icaac@asmusa.org)

Visit: [www.icaac.org/ICAAC.asp](http://www.icaac.org/ICAAC.asp)

### The U.S. Conference on AIDS

Sponsored by the National Minority AIDS Council

September 18-21, 2003

New Orleans, Louisiana

Call: 202-483-6622

Visit: [www.nmac.org](http://www.nmac.org)

### HIV Minifellowship for Correctional Health Care Providers

Sponsored by the Univ. of Texas Medical Branch and HEPP Report, Brown Univ.

September 22-24, 2003

Providence, Rhode Island

Call: 409-747-8769

Email: [pwelsh@utmb.edu](mailto:pwelsh@utmb.edu)

### National Conference on Correctional Health Care

October 4-8, 2003

Austin, Texas

Call: 773-880-1460

Visit: [www.ncchc.org](http://www.ncchc.org)

### 41st Annual Meeting of Infectious Disease Society of America (IDSA)

October 9-12, 2003

San Diego, California

Call: 703-299-0200

Email: [info@idsociety.org](mailto:info@idsociety.org)

Visit: [www.idsociety.org](http://www.idsociety.org)

## INSIDE NEWS

### FDA Approves Atazanavir, First Once-Daily PI

The FDA has approved Bristol-Myers Squibb's (BMS) protease inhibitor Reyataz (atazanavir), the first once-daily protease inhibitor (PI). The once-a-day dose of two pills should be taken with food. Unlike other PIs, atazanavir (ATZ) does not appear to cause a rise in cholesterol. However, atazanavir can cause hyperbilirubinemia leading to jaundice or scleral icterus in up to 24% of patients. This abnormality disappears when patients stop taking ATZ, and, according to the FDA, does not appear to be associated with liver injury. BMS said ATZ will be available in July, but did not disclose a price, saying only that it would be competitive with other PIs. *Associated Press*, 6/20/03

### Patient History Card Available to HIV-infected Inmates

Boehringer Ingelheim Pharmaceuticals, in conjunction with several leading correctional physicians, has launched the Patient History Card, designed to help HIV-infected inmates manage and monitor their HIV care both within prison and on the outside. The card enables patients to record current medications, viral loads, CD4+ counts, weight, drug allergies, vaccinations and other information. "We designed the Patient History Card as a foldable, wallet-sized card so that HIV-positive inmates can carry it with them at all times," said David Wohl, MD, assistant professor of medicine at the University of North Carolina, who helped design the card. Patient names and the words "HIV" and "AIDS" do not appear anywhere on the cards. Cards are available free of charge to all correctional facilities in the US by calling 1-877-933-4310 ext. 9527 or 9551. *PRNewswire*, 6/12/03

### Save the Date: "Texas" Minifellowship

The annual HIV Minifellowship for Correctional Health Care Providers will be held in Providence, Rhode Island, on September 22, 23, and 24. Sponsored by the University of Texas Medical Branch and HEPP Report, the conference will feature discussions by leading correctional care providers and infectious disease specialists. Topics will include HIV epidemiology, opportunistic infections, HIV/HCV co-infection, mental health issues, guidelines for initiating and modify-

ing ARV, and ethical issues. Call 409-747-8769 or email [pwelsh@utmb.edu](mailto:pwelsh@utmb.edu) to register.

### Enfuvirtide (Fuzeon) Effective in Patients with Drug Resistance

Roche and Trimeris's new antiretroviral, Fuzeon (enfuvirtide or T-20) doubles the chances that an HIV-infected patient who has developed drug resistance can achieve undetectable levels of the virus, according to two studies published in the May 29, 2003 issue of the *New England Journal of Medicine* (NEJM). The NEJM published results from the T-20 vs. Optimized Regimen Only Study 1 (TORO 1) and T-20 vs. Optimized Regimen Only Study 2 (TORO 2). T-20 is administered via twice daily subcutaneous injections. *NEJM*, 5/29/03

### Court: NY State Did Not Improperly Deny Inmate Treatment for HCV

The appellate division of the NY State Supreme Court ruled that state prison administrators did not improperly deny an inmate treatment for hepatitis C, largely because the inmate failed to undergo the substance abuse treatment prerequisite and continued to abuse illegal drugs while in prison. While the inmate argued that refusal to supply him with treatment constituted cruel and unusual punishment, the court said that the inmate didn't prove that there was "deliberate indifference" on the part of prison officials, and that the substance abuse program was a "reasonable" prerequisite. *Associated Press*, 6/23/03

### New Antibiotic Appears Effective Against MDR TB

The antibiotic linezolid (Zyvox) may be an effective treatment for some strains of multidrug resistant (MDR) tuberculosis (TB). Linezolid was used to treat four people at New York City's Bellevue Hospital who were infected with MDR TB when all other available therapies failed to improve the patients' health. The patients took linezolid twice a day for 9-33 months, and four patients also received interferon gamma three times a week. Following treatment, there was no sign of TB in patients' sputum. The NYU physicians who presented the cases at the 99th International Conference of the American Thoracic Society in Seattle said further studies are needed to confirm their case reports. *CDC Prevention News Update*, 6/11/03

## RESOURCES

### Tuberculosis: First Revised Guidelines Issued Since 1994

[www.cdc.gov/mmwr/preview/mmwrhtml/rr5211a1.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5211a1.htm)

[www.thoracic.org/adobe/statements/treattb.pdf](http://www.thoracic.org/adobe/statements/treattb.pdf)

The American Thoracic Society, CDC, and the Infectious Diseases Society of America have released their first completely revised TB prevention, control, diagnosis and treatment guidelines since 1994. The jointly developed guidelines, first published in 1971, are intended to advise public health programs and health care providers on all aspects of the clinical and public health management of TB in low-incidence countries. The new guidelines focus on the latest aspects of therapy,

including drug administration, fixed-dose combination preparations, monitoring and managing adverse effects, and drug interaction.

### HIV Inmate Education Newsletter

CorrectHELP publishes a brief, easy-to-read newsletter with HIV information for patient/inmates four times a year, suitable for distribution in custody. For more information and to receive copies contact Ron Snyder at [ron@correcthelp.org](mailto:ron@correcthelp.org) or 323.822.3830.

**New Quality Assurance Guidelines for Testing**  
Using the OraQuick Rapid HIV-1 Antibody Test  
[www.cdc.gov/hiv/rapid\\_testing/materials/QA\\_Guidelines\\_OraQuick.pdf](http://www.cdc.gov/hiv/rapid_testing/materials/QA_Guidelines_OraQuick.pdf)

### SELF-ASSESSMENT TEST FOR CONTINUING MEDICAL EDUCATION CREDIT

Brown Medical School designates this educational activity for 1 hour in category 1 credit toward the AMA Physician's Recognition Award. To be eligible for CME credit, answer the questions below by circling the letter next to the correct answer to each of the questions. A minimum of 70% of the questions must be answered correctly. This activity is eligible for CME credit through January 31, 2004. The estimated time for completion of this activity is one hour and there is no fee for participation.

1. Following an exposure to a source known to be infected with HBV, the CDC recommends hepatitis B immunoglobulin for:
  - (a) Previously vaccinated individuals.
  - (b) Previously unvaccinated individuals.
  - (c) Those who failed to respond serologically to HBV vaccine.
  - (d) Previously vaccinated individuals and those who failed to respond serologically to HBV vaccine.
  - (e) Previously unvaccinated individuals and those who failed to respond serologically to HBV vaccine.
  
2. Per-event HIV transmission estimates after a percutaneous (e.g., needlestick) exposure are between:
  - (a) 0.01% - 0.02%
  - (b) 0.3% - 0.4%
  - (c) 3.0% - 5.0%
  - (d) 30.0% - 40.0%
  
3. HIV transmission factors depend upon:
  - (a) The amount of blood involved.
  - (b) The source's use of antiretroviral medications.
  - (c) The source's viral load.
  - (d) The type of exposure (sexual, mucous membrane, percutaneous).
  - (e) All of the above.
  
4. Exposures to body fluids (such as saliva, semen, sweat, feces and bile) can just as effectively transmit HIV, HCV and HBV as exposures to blood:
  - (a) True
  - (b) False
  
5. Following a percutaneous exposure to blood from a person known to be HCV-infected, the CDC recommends:
  - (a) Combination therapy (pegylated IFN and ribavirin) be initiated as soon as possible, preferably within 24 hours.
  - (b) Anti-HCV immunoglobulin be administered intramuscularly
  - (c) HCV vaccination be initiated
  - (d) No immediate HCV post-exposure prophylaxis be undertaken.

6. Which of the following statements is true?
  - (a) HIV post exposure prophylaxis should be administered for 21 days.
  - (b) The efficacy of HIV post exposure prophylaxis has been proven in randomized prospective placebo controlled trials.
  - (c) HIV post exposure prophylaxis probably has little benefit if begun more than 72 hours after the exposure.
  - (d) HIV post exposure prophylaxis should always include a protease inhibitor.
  - (e) HIV post exposure prophylaxis should never be given to pregnant women.

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	educational value	clarity
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