Nonoccupational Postexposure Prophylaxis

This is a PDF version of the following document:
Module 5: Prevention of HIV
Lesson 4: Nonoccupational Postexposure Prophylaxis

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Introduction and Background

In the mid 1990s, postexposure prophylaxis (PEP) was recognized as a safe and effective intervention to prevent the acquisition of HIV for healthcare workers exposed to HIV-contaminated blood or body fluids. In contrast, the use of nonoccupational PEP for a sexual or injection drug use HIV-related exposure has been more controversial. In 1997, the Centers for Disease Control and Prevention (CDC) concluded there was insufficient evidence regarding the efficacy of nonoccupational PEP to recommend either for or against its use, but in 2005 the CDC and the Department of Health and Human Services revised its position and issued nonoccupational PEP guidelines.[1] These guidelines were recently updated by the CDC and Department of Health and Human Services as the 2016 Nonoccupational PEP Guidelines.[2]

Preferred strategies for preventing HIV acquisition include daily use of HIV preexposure prophylaxis (PrEP) as prescribed, consistent and correct use of condoms, abstinence from injection drug use (or if this is not possible, then consistent use of sterile injection equipment).[2] Nevertheless, in some instances, the need for nonoccupational PEP arises, due to condom breakage, condomless sex with a person later of unknown HIV status who has possible risk factors for HIV, sexual assault, or sharing injection equipment with a person who has HIV or has unknown HIV status. Although the 2016 Nonoccupational PEP Guidelines and the 2005 version of these guidelines clearly recommend use of antiretroviral PEP for these type of nonoccupational exposures to HIV, the actual use of nonoccupational PEP has not achieved widespread acceptance and implementation.[3] Underutilization of nonoccupational PEP has multiple causes, but in some instances, medical mistrust rooted in experiences of HIV stigma, racism, homophobia, or transgender phobia has impeded individuals from accessing these services.[4]

Clinicians should view the use of nonoccupational PEP as one of many HIV prevention options and utilize nonoccupational PEP when indicated. It is extremely important that clinicians evaluating individuals for nonoccupational PEP should recognize these individuals may be candidates to transition to PrEP at the time they complete the 28-day regime for nonoccupational PEP.[5]
Rationale for Providing Nonoccupational PEP

Due to ethical and logistical reasons, it is highly unlikely that a prospective randomized, placebo-controlled trial to evaluate nonoccupational PEP in humans will ever take place. In addition, human nonoccupational PEP studies are challenging because participants may have multiple exposures over the surveillance-testing period, making it difficult to discern the true benefit of nonoccupational PEP for a single exposure event. Thus, the rationale for providing nonoccupational PEP is based on extrapolation from use of PEP in other settings, animal studies, retrospective reviews, and observational nonoccupational PEP reports.

Extrapolation from Occupational and Perinatal PEP Data

The rationale for nonoccupational PEP is based on the efficacy of PEP following occupational exposures to HIV. Most notably, in 1997, investigators reported findings from a case-control study involving health care workers who sustained needlestick injuries from source individuals with HIV; this study demonstrated occupational PEP with oral zidovudine, taken within 4 hours by most of the participants, reduced the risk of HIV seroconversion by 81%. In addition, several important perinatal transmission trials involving mothers with HIV have established the benefit of using PEP given to the mother during labor and to the baby following birth. For example, a Ugandan study reported that administering single-dose nevirapine to mothers during labor and to their infants within 72 hours of birth reduced the perinatal HIV transmission rate from 25.1 to 13.1%. Multiple studies have also demonstrated the benefit of antepartum and intrapartum antiretroviral therapy to prevent perinatal HIV transmission, as well as the efficacy of extended antiretroviral prophylaxis for HIV-exposed infants to prevent breastfeeding transmission.

Animal Studies

The rationale for the use of antiretroviral medications for nonoccupational exposures is also partially derived from animal PEP studies. One of the earliest studies showed that tenofovir reduced the rate of seroconversion among macaques inoculated intravenously with simian immunodeficiency virus (SIV), with the greatest reduction in transmission achieved when prophylaxis was initiated as early as possible and continued for 28 days and continued for 28 days. A later study showed that tenofovir-based PEP is also effective in preventing HIV acquisition after intravaginal inoculation of female macaques with HIV-2: tenofovir prevented seroconversion in all 8 of the female macaques exposed to HIV-2 when initiated within 12 to 36 hours. A systematic review and meta-analysis of PEP using pooled data of nonhuman primates across 18 studies (mostly involving intravenous inoculation with HIV) further substantiated the efficacy of PEP when initiated as soon as possible after HIV exposure.

Nonoccupational PEP Data in Humans

Although the human studies on nonoccupational PEP are observational in nature and limited in sample size, available data involving men who have sex with men (MSM) suggest nonoccupational PEP reduces HIV transmission. In addition, a feasibility study in San Francisco demonstrated medical providers could appropriately identify and provide recommended nonoccupational PEP to persons exposed to HIV via sexual contact or through injecting drugs. In a separate San Francisco study, investigators reported HIV seroconversion among 7 of 702 (1%) persons who received nonoccupational PEP for a potential sexual or injection drug use exposures to HIV, but only 3 of the seroconversions likely represented true nonoccupational PEP “failure”. Available data from other reports of HIV transmission in persons who received nonoccupational PEP suggest that most HIV transmissions resulted from poor medication adherence, or from exposures to HIV that occurred after completing the PEP regimen. In addition, one failure occurred in a 40-year-old woman in France who started nonoccupational PEP more than 72 hours after a sexual exposure. Multiple studies involving sexual assault survivors have demonstrated very low HIV transmission rates, despite relatively low rates of adherence to nonoccupational PEP medications.
**Rationale for Nonoccupational PEP in Persons Who Inject Drugs**

New HIV infections among persons who inject drugs can occur directly from the injection drug use, or it may involve coexisting sexual activities associated with increased HIV transmission risk, such as condomless sex, sex with multiple partners, and transactional sex.[28, 29] Certain circumstances could arise whereby a person who injects drugs and normally uses safe injection practices has an HIV risk exposure. The use of nonoccupational PEP after an at-risk injection drug use exposure may have different efficacy compared with use after a sexual exposure, since the route and HIV inoculum differ in these two situations. Limited data exist regarding the practical applications or efficacy of nonoccupational PEP among persons who inject drugs. Of interest, however, one case report described a patient who inadvertently received a large-volume transfusion of blood from a person with HIV, but early initiation of PEP prevented transmission of HIV.[30] Based on this, one might extrapolate that nonoccupational PEP could be effective following injection drug use-related exposures to HIV, particularly if started early.[31] It is important that programs, including syringe services programs, that work with persons who inject drugs are aware of local resources where their clients can receive nonoccupational PEP if needed. In addition, these programs may consider directly providing services for non-occupational PEP if they have the capacity and expertise.
Evaluation for Nonoccupational PEP

Multiple factors influence the risk of HIV transmission in nonoccupational exposures to HIV. The initial evaluation of persons seeking care after potential nonoccupational exposures to HIV requires gathering information to determine whether nonoccupational PEP is indicated (Figure 3).[2] The initial evaluation, as recommended in the 2016 Nonoccupational PEP Guidelines, should address the following: (1) the baseline HIV status of the potentially exposed person, (2) information related to the source person’s HIV status, (3) details regarding the type of exposure involved, (4) timing and frequency of the exposure(s), and (5) any available information related to antiretroviral therapy taken by the source patient if they are known to have HIV.[2] In addition, the initial history intake should include the following:

- **Information on HIV Status of Person Potentially Exposed to HIV:** The first step in evaluating the exposure is to determine the baseline HIV status of the person seeking medical care. Persons with established HIV should receive long-term continuous antiretroviral therapy, not a 28-day course of nonoccupational PEP. In the setting of a nonoccupational exposure to HIV, the HIV status of the exposed person should be determined as soon as possible, although HIV testing should not necessarily delay nonoccupational PEP initiation.

- **Information Related to Source Person’s HIV Status:** As part of the initial exposure evaluation, it is also important to determine whether the source person has HIV (or, if the status of the source is unknown, assess their risk factors for HIV, if possible). Often, the HIV status of the source person is not known (and not attainable). The 2016 Nonoccupational PEP Guidelines recommend using nonoccupational PEP when the source person is known to have HIV infection; if the HIV status of the source person is not known, the recommendation is to evaluate on a case-by-case basis, ideally in consultation with an expert.[2] In this situation, if the exposure warrants postexposure prophylaxis, but HIV status on the source person is not attainable, most experts would recommend initiating and completing a 28-day course of nonoccupational PEP. When asking about information related to the source, it is important to ask whether other recent exposures occurred with this source (and/or other sources), as recent additional HIV-related exposures could potentially confound management decisions. Nevertheless, repeated exposures do not negate the need to assess whether the most recent exposure warrants nonoccupational PEP.

- **Determination of Risk Related to Exposure:** The other key element of the initial nonoccupational PEP evaluation is to determine whether the exposure confers actual risk for HIV transmission (Table 1).[2,31] Nonoccupational PEP should only be used in the setting of “substantial risk for HIV acquisition”, defined as contact involving an area of the body known to be associated with HIV acquisition (vagina, rectum, eye, mouth or other mucous membranes, non-intact skin, or percutaneous needlestick injuries) with an infectious body fluid (e.g. blood, semen, vaginal secretions, rectal secretions, breast milk, or any other body fluid visibly contaminated with blood). The risk of HIV transmission associated with nonoccupational exposures varies considerably by the type of sexual exposure, with receptive anal intercourse conveying the highest sexual risk.[2,31,32,33,34] Similarly, mucosal disruption in either the source person or the exposed person (as might occur with traumatic intercourse including sexual assault, or in the presence of ulcerative genital disease) increases risk of sexual HIV transmission: correct and consistent condom use markedly lowers the risk of transmission (Table 2).[31]

- **Timing of Risk Exposure:** It is important to determine the timing of exposure in persons seeking nonoccupational PEP. Available data suggest that PEP may not be effective if initiated beyond 72 hours after the exposure. Furthermore, PEP may not be the optimal long-term HIV prevention method for individuals who engage in activities involving frequent, recurrent HIV exposures, such as sex with an HIV-serodifferent sex partner without consistently using condoms or regularly sharing needles or equipment with injecting partners; these individuals should receive intensive risk reduction counseling and may instead be better suited for PrEP.[2] In these situations, the risk reduction strategy should also include an emphasis for the partner with HIV to be taking antiretroviral therapy and maintain suppressed HIV RNA levels.

- **Source Person Antiretroviral Treatment Information:** If a source person is known to have HIV
and takes antiretroviral medications, the medical provider should determine what medication the source takes, the most recent HIV RNA levels, and if the source person has developed resistance to any antiretroviral medications. The risk of HIV transmission is higher if the source person has advanced HIV disease or high HIV RNA levels.[35] Multiple studies which have been published after the release of the 2016 Nonoccupational PEP Guidelines have consistently shown that persons with HIV who take antiretroviral therapy maintain plasma HIV RNA levels less than 200 copies/mL do not transmit HIV sexually to their partners.[36,37] Similar studies have not been published related to HIV transmission through nonsterile drug injection.[37]
Indications for Initiating Nonoccupational PEP

Based on the 2016 Nonoccupational PEP Guidelines, if the following criteria are met, a 28-day course of antiretroviral medications for nonoccupational PEP is recommended:[2]

- A person has had a nonoccupational exposure to blood, genital secretions, or other potentially infectious body fluids from a person known to be infected with HIV (if the HIV status of the source person is unknown, the recommendation is to evaluate on a case-by-case basis, ideally in consultation with an expert), and
- The exposure represents a substantial risk for HIV transmission, and
- The person seeks care within 72 hours of exposure

Note: Administering nonoccupational PEP with the goal of transitioning to PrEP can be considered beyond the 72-hour window in cases where multiple recent exposures to HIV have occurred more than 72 hours prior, but the most recent exposure occurred within the 72-hour window. For persons who may have become pregnant as a result of the sexual exposures, it is important to perform baseline HIV testing prior to initiating nonoccupational PEP and to repeat HIV testing prior of transitioning to PrEP.

Challenges When Evaluating Whether to Initiate Nonoccupational PEP

A number of challenges may arise during the initial evaluation of persons for nonoccupational PEP after sexual and other nonoccupational exposures that complicate decisions regarding whether to initiate antiretroviral medications for nonoccupational PEP.

- With some exposures, the person seeking help may not actually know the HIV status (or any other information) of the source person.
- Individuals often present for care more than 72 hours after the exposure.
- The exposure that brings the person in for medical attention may not consist of an isolated event, but instead may be among multiple recent potential HIV exposure events; if this is the case, it is still necessary to assess the need for nonoccupational PEP for any significant exposures occurring within the last 72 hours.
- Certain sexual exposure events may involve concomitant exposures to other sexually transmitted pathogens, or hepatitis viruses with injection drug use (or percutaneous needlestick) exposures.
- Some nonoccupational PEP cases involve persons recently sexually assaulted, which can involve additional medicolegal concerns and complications.[6,38]
- From a practical perspective, insurers may not cover the cost of the 28-day course of nonoccupational PEP, or they may only partially cover the cost. In addition, some facilities or pharmacies may not have the recommended PEP medications on-hand, and it may take a couple of days to order in.

Recommendation if Source Person Has an Undetectable HIV RNA Level

Multiple studies have shown that persons with HIV who consistently maintain undetectable serum HIV RNA levels do not sexually transmit HIV, even with condomless sex.[39,40,41] These studies led to the concept of undetectable equals untransmittable, which is commonly referred to as “U=U”.[36] The widespread support of the U=U concept occurred after the publication of the 2016 Nonoccupational PEP Guidelines. As might be expected, the 2016 Nonoccupational PEP Guidelines do not specifically address whether to initiate nonoccupational PEP if the exposure involves a source person with a recent undetectable HIV RNA level.[2] Thus, at the present time, there are no clear recommendations regarding use of nonoccupational PEP following sexual exposures to source persons with HIV who have consistently suppressed HIV RNA levels, but many experts would base their recommendation on the reliability of the information and documentation of persistently suppressed HIV RNA levels in the source persons with HIV. This issue will need to be addressed in future nonoccupational PEP guidelines.
**Recommendation if Person Exposed to HIV is Taking HIV PrEP**

Persons who are taking HIV preexposure prophylaxis (PrEP) with daily tenofovir DF-emtricitabine or tenofovir alafenamide-emtricitabine as prescribed do not need nonoccupational PEP following an exposure to HIV.[5] If, however, an individual is receiving PrEP, but is not consistently taking PrEP as prescribed, nonoccupational PEP might be indicated following an HIV exposure.[5] In this situation of sporadic PrEP use, the decision to initiate nonoccupational PEP should be made on a case-by-case basis, and ideally with the help of expert clinical consultation.
Recommended Therapy for Nonoccupational PEP

Preferred and Alternative Antiretroviral Regimens

The 2016 Nonoccupational PEP Guidelines recommend using a three-drug antiretroviral combination regimen given for 28 days in all cases when nonoccupational PEP is indicated.[2]

- **Preferred Nonoccupational PEP Regimen**: The preferred nonoccupational PEP regimen for adults (and adolescents age 13 years and older) who have a baseline creatinine clearance of at least 60 mL/min consists of the fixed dose combination of tenofovir DF-emtricitabine combined with either raltegravir or dolutegravir (Table 3).[2]

- **Alternative Nonoccupational PEP Regimen**: The recommended alternative regimen is darunavir boosted with ritonavir plus tenofovir DF-emtricitabine.[2] For women of child-bearing age, note that darunavir boosted with ritonavir can potentially cause significant drug interactions with oral contraceptives, resulting in reduced levels of ethinyl estradiol and norethindrone.[42]

- **Nonoccupational PEP Regimen for Persons with Renal Insufficiency**: For adults and adolescents who have a baseline creatinine clearance less than 60 mL/min, the preferred and alternative regimens listed above should be modified by replacing tenofovir DF-emtricitabine with zidovudine and lamivudine; in this situation, the fixed-dose combination zidovudine-lamivudine should not be given so that doses of zidovudine and lamivudine can be adjusted individually based on renal impairment.[43]

Medications Not Recommended

There are several antiretroviral medications that are used as a component of treatment regimens for persons with established HIV, but are not recommended for use in nonoccupational PEP. Special considerations for medications to avoid in pregnancy is discussed below in the section Nonoccupational PEP in Special Populations.

- **Abacavir**: The nucleoside reverse transcriptase inhibitor (NRTI) abacavir, which is commonly used to treat HIV infection, is not recommended for nonoccupational PEP because of the risk of developing a potentially fatal abacavir hypersensitivity reaction. Although HLA-B*5701 testing can be performed and predict those at risk to develop the hypersensitivity reaction, it may take several days for results to return and thus abacavir should not be used as part of the initial PEP regimen. It is possible, however, that a switch to abacavir while taking a nonoccupational PEP regimen could be indicated, assuming HLA-B*5701 testing is negative and there is a strong reason to consider a medication switch, such as renal insufficiency or intolerance to tenofovir DF.

- **Tenofovir alafenamide**: Many commonly used antiretroviral regimens used to treat persons with established HIV have tenofovir alafenamide as a component of the regimen. For treatment of HIV, For nonoccupational PEP, however, the use of any regimen that contains tenofovir alafenamide is not recommended, primarily due to lack of data with the use of tenofovir alafenamide -containing regimens for PEP. Further, the advantages of using tenofovir alafenamide over tenofovir DF-emtricitabine when used for long-term treatment of persons with HIV (lower rates of nephrotoxicity and osteopenia) are not generally relevant when only prescribing a short 28-day regimen for nonoccupational PEP.

- **Nevirapine**: The non-nucleoside reverse transcriptase (NNRTI) nevirapine is now rarely used to treat HIV. The use of nevirapine for nonoccupational PEP is strongly contraindicated since the use of nevirapine in occupational PEP was associated with a significant risk of life-threatening hepatotoxicity.[44]

Nonoccupational PEP Medication Studies

The following summarizes major studies involving more contemporary three-drug antiretroviral regimens for
Dolutegravir plus Tenofovir DF-Emtricitabine (Sydney Study): In an open-label, single-arm study, investigators from Sydney, Australia, investigators enrolled 100 men who have sex with men (MSM) to receive dolutegravir plus tenofovir DF-emtricitabine for 28 days for nonoccupational PEP; the regimen was well tolerated, adherence levels were very high (98%), completion rates (90%) were high, and no HIV seroconversions occurred; elevations in alanine aminotransferase occurred in 22% of the participants, but none developed clinical hepatitis.[45]

Elvitegravir-Cobicistat-Tenofovir DF-Emtricitabine (Fenway Health Study): In an open-label, single-arm study, investigators from Fenway Health Clinic in Boston, Massachusetts enrolled adults (98% men) to receive the fixed-dose single tablet elvitegravir-cobicistat-tenofovir DF-emtricitabine for 28 days for nonoccupational PEP.[46] The 28-day nonoccupational PEP regimen was completed as prescribed by 71% of the participants and the regimen was moderately well tolerated, with the most common adverse effects reported as gastrointestinal discomfort (42%), diarrhea (38%), nausea/vomiting (28%), and fatigue (28%).[46] At the day 90 follow-up visit, none had HIV seroconversion.[46]

Raltegravir plus Tenofovir DF-Emtricitabine (Fenway Health Study): The Fenway Health Clinic also reported their experience with a 28-day course of the three-drug regimen raltegravir plus tenofovir DF-emtricitabine as nonoccupational PEP in 100 adult men, most of whom were men who have sex with men (MSM); this regimen was completed as prescribed by 57% of the participants and was relatively well tolerated, with nausea/vomiting (27%) and diarrhea (21%) the most common reported side effects.[47] Among the 85 men who were able to undergo evaluation at 3 months, none had acquired HIV.[47]

Raltegravir plus Tenofovir DF-Emtricitabine (Sydney Study): Investigators from Sydney, Australia performed an open-label, prospective study that enrolled 86 MSM to receive a 28-day course of raltegravir plus tenofovir DF-emtricitabine for nonoccupational PEP; the regimen was well tolerated, adherence levels were high (89%), completion rates were very high (92%), and no HIV seroconversions occurred.[48] In this study, investigators also enrolled 34 men to receive the two-drug regimen tenofovir DF-emtricitabine and no HIV seroconversions occurred in this group as well.[48]

Rilpivirine-Tenofovir DF-Emtricitabine (Sydney Study): Investigators from Sydney, Australia performed an open-label, single-arm, prospective study that enrolled 100 adult MSM to receive a 28-day course of the fixed-dose tablet rilpivirine-tenofovir DF-emtricitabine for nonoccupational PEP; the regimen was well tolerated, adherence rates were very high (98%), completion rates very high (92%), and no HIV seroconversions had occurred among the 70 men who had completed the 12-week follow-up visit.[49] The most commonly reported adverse effects were fatigue (34%) and nausea (23%).

Duration of Therapy

The 2016 Nonoccupational PEP Guidelines recommend individuals who initiate antiretroviral therapy for nonoccupational PEP should complete a 28-day course.[2] Studies involving macaques have shown that PEP given for 28 days is more effective than 10 days, which is more effective than 3 days.[12] In addition, available data and experience with occupational postexposure prophylaxis support the use of a 28-day regimen.[7,50] From a conceptual standpoint, it is believed that PEP, in some instances, halts a very early and limited HIV infection, rather than truly preventing any cell in the body from becoming infected with HIV. Thus, early initiation of nonoccupational PEP, when combined with a 28-day duration of therapy, is believed adequate to minimize tissue involvement and contain any local HIV replication while allowing sufficient time for localized immune responses to clear out the limited HIV infection.

Consideration of HIV Resistance in Source Person

If medical information is available regarding a source person known to have HIV, the choice of
nonoccupational PEP regimen should take into account the source person's antiretroviral medication history, most recent HIV RNA levels, and prior resistance testing results. In the event the source person has possible or known antiretroviral drug resistance, expert consultation should be obtained to determine the optimal nonoccupational PEP regimen for the exposed individual.
**Expert Consultation for Nonoccupational PEP**

**Indications for Obtaining Expert Consultation**

The 2016 Nonoccupational PEP Guidelines provide recommendations for scenarios that warrant expert consultation for nonoccupational PEP related to nonoccupational HIV exposure events.[2] Expert consultation is recommended in any of the following situations:

- The health care worker has limited experience with prescribing antiretroviral medications, or
- The individual exposed to HIV is pregnant or breastfeeding, or
- The exposure event involves a child or adolescent, or
- The individual needing nonoccupational PEP has renal dysfunction, or
- The source person has known or suspected antiretroviral resistance.

**PEPline Expert Consultation**

Expert consultation for these issues and any other guidance on nonoccupational PEP can be obtained by calling the National Clinician Consultation Center’s Post-Exposure Prophylaxis PEPline at 888-448-4911; this service is for health care professionals.
Laboratory Testing for Source and Exposed Persons

The 2016 Nonoccupational PEP Guidelines provide recommendations for baseline laboratory studies (for the source and the person exposed to HIV), as well as a schedule of follow-up laboratory tests for monitoring the person exposed to HIV (Table 4). Initial HIV testing of the individual exposed to HIV should consist of an HIV-1/2 antigen-antibody immunoassay, or HIV antibody testing if the HIV-1/2 antigen-antibody immunoassay is not available. Oral point-of-care HIV tests are not recommended, primarily due to their poor sensitivity in diagnosing acute or very recent HIV infection. Although it is very important to confirm the negative HIV status of the individual presenting for nonoccupational PEP, most experts do not advocate ordering an HIV RNA level (on the exposed person) unless they have signs or symptoms that suggest an acute HIV infection. In addition, persons undergoing evaluation for nonoccupational PEP should be instructed about the signs and symptoms associated with acute HIV infection and asked to return for evaluation if these occur during or after nonoccupational PEP.

Baseline Laboratory Evaluation

The baseline laboratory evaluation should include the following tests for the individual exposed to HIV:

- HIV-1/2 antigen-antibody immunoassay (or HIV antibody testing if the HIV-1/2 antigen-antibody immunoassay is not available)
- Serologic testing for hepatitis B virus (HBV) and hepatitis C virus (HCV)
- Testing for sexually transmitted infections, including serologic testing for syphilis and site-specific screening for chlamydia and gonorrhea
- Pregnancy test and emergency contraception, if indicated
- Serum creatinine (for calculating estimated creatinine clearance)
- Hepatic aminotransferase levels

Follow-Up Laboratory Studies

The 2016 Nonoccupational PEP Guidelines recommend the following laboratory tests for all persons who seek care for nonoccupational PEP:

- **HIV Testing**: Follow-up HIV testing at 4 to 6 weeks and at 3 months after exposure to determine if HIV transmission has occurred. Ideally, the HIV-1/2 antigen-antibody immunoassay should be used, but HIV antibody testing is acceptable if the HIV-1/2 antigen-antibody immunoassay is not available. If the exposed person acquires HCV as a result of the original exposure, an additional HIV test should be conducted at 6 months after the exposure.
- **HCV Testing**: Follow-up HCV antibody testing for susceptible exposed persons is recommended at baseline and at 6 months, but not at 4 to 6 weeks or 3 months.
- **HBV Testing**: For exposed persons not immune to HBV at baseline, providers should ascertain HBV status of the source if possible and administer HBV postexposure prophylaxis as indicated. For exposed persons not immune to HBV at baseline, follow-up testing should be conducted at 6 months and should include hepatitis B surface antigen, hepatitis B surface antibody, and hepatitis B core antibody.
- **Pregnancy Testing**: Repeat pregnancy testing should be performed at the follow-up visit (4 to 6 weeks after exposure) if the person is of reproductive age, not using effective contraception, and had vaginal exposure to semen.
- **Serum Creatinine**: Repeat serum creatinine should be checked at the 4 to 6 week follow-up visit. Some experts will also evaluate the serum creatinine at week 2 of treatment with nonoccupational PEP, especially if the person taking nonoccupational PEP has any risk of developing renal complications.
- **Hepatic Aminotransferase Levels**: Repeat hepatic aminotransferase levels should be checked at the 4 to 6 week follow-up visit.
• **Testing for Sexually Transmitted Infections**: Testing for chlamydia and gonorrhea should be performed at the follow-up visit unless presumptive treatment for these sexually transmitted infections was provided at baseline, or if indicated based on active genitourinary symptoms at the follow-up visit.
Nonoccupational PEP in Special Populations and Circumstances

The 2016 Nonoccupational PEP Guidelines identify additional considerations for certain special populations as outlined below.[2]

Pregnant People and People of Childbearing Potential

Both of the preferred regimens—tenofovir DF-emtricitabine plus either raltegravir or dolutegravir—are considered safe to use during pregnancy and by persons of childbearing potential.[51] The following summarizes the rationale for not using the following three antiretroviral medications for nonoccupational PEP in pregnant persons:

- **Didanosine plus Stavudine**: The combination of didanosine and stavudine should not be used in anyone due to the risk of pancreatitis and lactic acidosis and mitochondrial toxicity; these risks are enhanced during pregnancy.[52,53]
- **Indinavir**: The protease inhibitor indinavir should be avoided during pregnancy due to the risk of nephrolithiasis and substantially decreased plasma concentration.[54]
- **Nevirapine**: The medication nevirapine should never be used for PEP, regardless of pregnancy status, due to risk of severe hepatotoxicity in persons who have a high CD4 cell count; this risk is enhanced during pregnancy.[55] Furthermore, because the efficacy of hormonal contraception can be altered by some antiretroviral medications, women using such methods should be advised to use a secondary form of contraception (i.e. barrier methods) while taking nonoccupational PEP.

Breastfeeding

Specific information is not provided in the 2016 Nonoccupational PEP Guidelines guidelines regarding use of antiretroviral regimens for nonoccupational PEP in people who are breastfeeding.[2] Expert consultation should be obtained for these cases.

Children and Adolescents

In many pediatric/adolescent nonoccupational PEP cases, expert consultation will be necessary. In the 2016 Nonoccupational PEP Guidelines, the preferred regimen for children aged 4 weeks to less than 2 years of age is zidovudine and lamivudine plus either raltegravir or lopinavir-ritonavir, with all medications given orally and dose-adjusted for age and weight. For children aged 2 to 12 years, the preferred regimen is tenofovir DF plus emtricitabine plus raltegravir (dosed according to age and weight).[2] For children age 13 and older with normal renal function, the adult and adolescent preferred and alternative nonoccupational PEP regimens can be used.[2] Following the release of the 2016 Nonoccupational PEP Guidelines, dolutegravir, which is a preferred medication for adult nonoccupational PEP, was subsequently approved for use in children who weigh at least 30 kg; at this time there are no formal recommendations to use dolutegravir for nonoccupational PEP in children.

Sexual Assault Survivors

Survivors of sexual assault may be less likely to seek timely care for nonoccupational PEP and may require additional support, clinical follow-up, and adherence counseling. Testing and treatment for other sexually transmitted infections, emergency contraception evaluation, and supportive counseling are also highly recommended in cases of sexual assault.

Individuals in Correctional Settings

The 2016 Nonoccupational PEP Guidelines recommend that correctional facilities establish HIV prevention...
programs. Elements should include confidential and voluntary HIV testing, risk reduction services, and nonoccupational PEP protocols. The Federal Bureau of Prisons published a clinical practice guideline based on the 2005 CDC Nonoccupational PEP guidelines and recommends that each facility develop its own protocol, but the CDC recommends that the most updated guidelines be used whenever possible.[2]

HIV Postexposure Prophylaxis in Mass Casualty Events

In response to concerns for a potential mass casualty event within the United States, the Centers for Disease Control and Prevention convened a working group to address management of blood-borne pathogen exposure in persons who are injured in bombings and other mass-casualty events, as well as for emergency responders in these catastrophic events. This particular situation does not fall neatly under the guidelines for either occupational or nonoccupational PEP. Accordingly, a separate document was published in 2008, which specifically addresses postexposure prophylaxis for HIV, HBV, HCV, and tetanus in the setting of mass casualties.[56] Postexposure prophylaxis for HIV is not routinely indicated for persons exposed to blood or tissue in bombings or mass-casualty events. In certain situations, however, nonoccupational PEP might be indicated if the risk for HIV exposure was determined to be high, such as with bombing of a research facility that has blood specimens obtained from persons with HIV, or culture vials growing HIV. If postexposure prophylaxis is indicated, the same principles of timing, laboratory testing, and antiretroviral medication selection should apply.
Initial Medication Prescription and Follow-up after Evaluation

Initial Medication Prescription and Timely Follow-Up

The 2016 Nonoccupational PEP Guidelines recommend that medical providers should consider giving an initial prescription for 3 to 7 days of antiretroviral medication (i.e. a starter pack) or provide a prescription for an entire 28-day course. Ideally, at the initial visit, the facility would supply the starter pack medication or the full 28-day supply of medication, both to minimize any delay in receiving the first dose and to address any barriers that could prohibit the patient from filling the prescription. In addition, prior to leaving the facility, the person evaluated for nonoccupational PEP should have an early follow-up visit scheduled to assess adherence to nonoccupational PEP, monitor for toxicity, and provide any additional counseling or education that might be needed.[2] If the individual receives only a 3- to 7-day supply of antiretroviral medication, coordination of timely follow-up is essential to ensure they do not run out of medication.

Challenges to Follow-Up

One study reported significant patient attrition between initial emergency department visit for nonoccupational PEP and first follow-up clinic appointment.[38] Only about half of nonoccupational PEP patients attended their follow-up appointment, and less than a quarter of those initially started on nonoccupational PEP completed the full 28-day regimen.[38] Older age and self-pay status predicted lower rates of follow-up and poor adherence; women were less likely than men to complete the full course of nonoccupational PEP.

HIV Prevention Counseling

Patients who are evaluated for nonoccupational PEP should receive HIV prevention counseling. This includes counseling on risk-reduction behaviors (e.g. using a barrier method with sex partners, not sharing equipment used to inject drugs) and referral to local community resources, if available. At follow-up visits, health care providers should assess for ongoing risk activities, provide additional counseling, and connect patients with services as needed, including assessment for initiation of PrEP.
Transitioning to Preexposure Prophylaxis

Preexposure Prophylaxis (PrEP)

Multiple studies conducted in recent years have demonstrated that use of PrEP protects against HIV in persons at risk of acquiring HIV, including heterosexual individuals,[57,58,59,60] MSM and transgender women,[58,61,62,63] and persons who inject drugs.[64] These studies show that PrEP is a feasible and effective HIV prevention strategy. In July 2012, the FDA approved tenofovir DF-emtricitabine for use as PrEP in individuals with ongoing high risk of HIV acquisition. In October 2019 tenofovir alafenamide-emtricitabine was FDA-approved for PrEP in at-risk adults and adolescents weighing at least 35 kg to reduce the risk of HIV infection from sexual acquisition, excluding individuals at risk from receptive vaginal sex. The PrEP Clinical Practice Guideline recommend that individuals with frequent and multiple exposures to HIV should not be managed with repeated courses of nonoccupational PEP, but instead strongly considered for PrEP.[5]

Transitioning from Nonoccupational PEP to PrEP

Many individuals who present for nonoccupational PEP following a sexual or injection drug use exposure may be excellent candidates for PrEP, particularly if they report ongoing activities associated with increased risk for HIV acquisition. The PrEP Clinical Practice Guideline recommends that persons receiving a 28-day course of nonoccupational PEP should be evaluated for transitioning to PrEP if (1) they have repeatedly sought nonoccupational PEP, and/or (2) they have frequent, recurrent exposures to HIV that would require sequential or near-continuous courses of nonoccupational PEP.[5]

Persons taking nonoccupational PEP who are deemed appropriate candidates to receive PrEP can immediately transition to PrEP after completing the 28-day course of nonoccupational PEP.[5] The transition from nonoccupational PEP to PrEP should occur without a gap, but prior to the transition, documentation of HIV-negative status should be obtained, preferably with an HIV-1/2 antigen-antibody test.[5] To practically achieve a transition without allowing a gap, the recommended 4- to 6-week follow-up HIV testing should be performed several days earlier than normal (several days prior to the end of the 28-day course of nonoccupational PEP). The approach of immediate transition will diminish the risk of HIV acquisition among individuals who have significant ongoing risk.

Expert Consultation for Transitioning from PEP to PrEP

Clinicians with questions about PrEP can call the National Clinician Consultation Center’s Pre-Exposure Prophylaxis PrEPline at 855-448-7737 for expert consultation.
Concerns with Nonoccupational Postexposure Prophylaxis

Toxicity of Antiretroviral Therapy

Initial concerns about severe side effects and pharmacological toxicities in otherwise healthy persons have been ameliorated by the use of less toxic, well-tolerated antiretroviral agents.\[65]\n
Use of Nonoccupational PEP and Drug Resistance Mutations

Selection of drug-resistant HIV can theoretically result from the use of nonoccupational PEP if the exposed person acquires HIV as a result of the exposure. Nevertheless, the development of HIV drug resistance during receipt of nonoccupational PEP is highly unlikely because few individuals receiving nonoccupational PEP will develop HIV infection and emergence of new resistant strains would be uncommon following a 28-day course of a potent three-drug antiretroviral nonoccupational PEP regimen. Nonoccupational PEP should not be withheld due to theoretical concerns about the potential selection of drug-resistant HIV.

Use of Nonoccupational PEP and Changes in Sexual Activities

Some clinicians have expressed concern that availability of nonoccupational PEP could theoretically result in a change in sexual activity that could increase risk for acquiring HIV.\[3]\ Multiple studies involving MSM have shown that sexual risk activity does not significantly change among individuals who receive nonoccupational PEP.\[17,66,67]\ In one study in San Francisco, 72% of nonoccupational PEP recipients reported a decrease in sexual risk behavior over the next 12 months, 13% reported no change, and 14% reported an increase in sexual risk behavior; in that study, 17% of participants requested a repeat course of nonoccupational PEP within the following year.\[66]\ In a separate study, investigators reported that 12% of individuals requested a second course of nonoccupational PEP within 6 months of the initial nonoccupational PEP course.\[17]\ In a study that specifically examined whether the knowledge of nonoccupational PEP availability would lead to an increase in risk behavior, there was no difference in risk behavior among men who have sex with men exclusively and who knew about nonoccupational PEP versus those who had never heard of it.\[67]\ Taken together, the available data suggest that receipt of nonoccupational PEP (consisting of both antiretroviral prophylaxis and counseling) does not increase HIV risk behaviors nor has it been linked to an increase in HIV prevalence. Of note, no studies have been published that have examined changes in injection drug use patterns among persons who inject drugs who have received a course of nonoccupational PEP.
Summary Points

- Nonoccupational PEP represents an important tool in the portfolio of HIV prevention interventions and strategies, but remains an underutilized strategy.
- As a whole, there is a body of data that supports use of nonoccupational PEP and indicates it may reduce the risk of HIV infection after nonoccupational exposures to HIV.
- The use of antiretroviral medications for nonoccupational PEP is recommended for HIV-negative persons following an exposure that has a substantial risk for HIV acquisition, if started within 72 hours of the exposure.
- A 28-day course of three-drug antiretroviral medications is recommended for nonoccupational PEP.
- The preferred nonoccupational PEP regimen for adult and adolescents aged 13 years and older who have a baseline creatinine clearance of at least 60 mL/min consists of the fixed-dose combination of tenofovir DF-emtricitabine plus either raltegravir or dolutegravir.
- The person with a nonoccupational exposure to HIV should have baseline laboratory studies that include HIV testing, screening for sexually transmitted infections, serum creatinine, aspartate aminotransferase (AST) and alanine aminotransferase (ALT) levels, testing for viral hepatitis, and a pregnancy test (if indicated). Follow-up testing for these laboratory studies should also be performed.
- Expert consultation should be sought for all situations that fall outside the scope of the guidelines, including situations when exposure to drug-resistant HIV has occurred. Consultation can be obtained through local expertise (if available) or by calling the National Clinician Consultation Center’s Post-Exposure Prophylaxis Hotline (PEPline) at 888-448-4911.
- All persons seeking care for nonoccupational PEP should have follow-up HIV testing at 4 to 6 weeks and again at 3 months to determine if HIV infection has occurred. The HIV-1/2 antigen-antibody immunoassay is preferred for HIV testing. Additional HIV testing should be conducted at 6 months if the exposure resulted in HCV transmission.
- Nonoccupational PEP has not been linked to high rates of adverse side effects, selection of drug-resistant HIV, or increases in activities that are associated with higher risk for acquiring sexually transmitted infections, including HIV.
- Most individuals who seek nonoccupational PEP should be evaluated as potential candidates to receive PrEP following completion of nonoccupational PEP. The transition from occupational PEP to PrEP, if warranted, should occur without a gap.
Citations


47. Mayer KH, Mimiaga MJ, Gelman M, Grasso C. Raltegravir, tenofovir DF, and emtricitabine for postexposure prophylaxis to prevent the sexual transmission of HIV: safety, tolerability, and


References


- Broz D, Wejnert C, Pham HT, et al. HIV infection and risk, prevention, and testing behaviors among
[PubMed Abstract] -

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Figures

Figure 1 Tenofovir for Postexposure Prophylaxis following SIV-1 Inoculation of Macaques

In this study, investigators inoculated 24 macaques with simian immunodeficiency virus (SIV) and then instituted various postexposure prophylaxis regimens with tenofovir (PMPA), which is (R)-9-(2-phosphonylmethoxypropyl)adenine.

Figure 2 SIV Transmission Based on Timing of Initiation and Duration of PEP

Among animals that received placebo, all became infected with simian immunodeficiency virus (SIV). The most effective tenofovir prevention regimen consisted of early initiation of tenofovir (at 24 hours) and long duration of postexposure prophylaxis (28 days).

Figure 3 Algorithm for Evaluation and Treatment of possible nonoccupational HIV exposures


Substantial Risk for HIV Acquisition

**Exposure of**
Vagina, rectum, eye, mouth or other mucous membrane, nonintact skin, or percutaneous contact

**With**
Blood, semen, vaginal secretions, rectal secretions, breast milk, or any body fluid that is visibly contaminated with blood

**When**
The source is known to be HIV-positive

Negligible Risk for HIV Acquisition

**Exposure of**
Vagina, rectum, eye, mouth or other mucous membrane, intact or nonintact skin, or percutaneous contact

**With**
Urine, nasal secretions, saliva, sweat, or tears if not visibly contaminated with blood

**Regardless**
Of the known or suspected HIV status of the source
<table>
<thead>
<tr>
<th>Exposure Type</th>
<th>Rate for HIV Acquisition per 10,000 Exposures</th>
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</thead>
<tbody>
<tr>
<td><strong>Parenteral</strong></td>
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<tr>
<td>Blood transfusion</td>
<td>9,250</td>
</tr>
<tr>
<td>Needle sharing during injection drug use</td>
<td>63</td>
</tr>
<tr>
<td>Percutaneous (needlestick)</td>
<td>23</td>
</tr>
<tr>
<td><strong>Sexual</strong></td>
<td></td>
</tr>
<tr>
<td>Receptive anal intercourse</td>
<td>138</td>
</tr>
<tr>
<td>Insertive anal intercourse</td>
<td>11</td>
</tr>
<tr>
<td>Receptive penile-vaginal intercourse</td>
<td>8</td>
</tr>
<tr>
<td>Insertive penile-vaginal intercourse</td>
<td>4</td>
</tr>
<tr>
<td>Receptive oral intercourse</td>
<td>Low</td>
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<tr>
<td>Insertive oral intercourse</td>
<td>Low</td>
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<td><strong>Other</strong></td>
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<tr>
<td>Biting</td>
<td>Negligible</td>
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<tr>
<td>Spitting</td>
<td>Negligible</td>
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<tr>
<td>Throwing body fluids (including semen or saliva)</td>
<td>Negligible</td>
</tr>
<tr>
<td>Sharing sex toys</td>
<td>Negligible</td>
</tr>
</tbody>
</table>

*Factors that may increase the risk of HIV transmission include sexually transmitted diseases, acute and late-stage HIV infection, and high viral load. Factors that may decrease the risk include condom use, male circumcision, antiretroviral treatment, and preexposure prophylaxis (PrEP). None of these factors are accounted for in the estimates presented in the table.

^HIV transmission through these exposure routes is technically possible but unlikely and not well documented.

Source:

### Relative Risks of Factors that Alter Per-Act HIV Transmission Risk for Sexual Exposures*

<table>
<thead>
<tr>
<th>Cofactor</th>
<th>Relative Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factors that Increase Transmission Probability</strong></td>
<td></td>
</tr>
<tr>
<td>High plasma viral load (log_{10} copies/mL)</td>
<td>2.89</td>
</tr>
<tr>
<td>Genital ulcer disease</td>
<td>2.65</td>
</tr>
<tr>
<td>Acute versus asymptomatic stage of disease</td>
<td>7.25</td>
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<tr>
<td>Late versus asymptomatic stage of disease</td>
<td>5.81</td>
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<tr>
<td><strong>Factors that Decrease Transmission Probability</strong></td>
<td></td>
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<tr>
<td>Use of antiretroviral medications by HIV-infected partner</td>
<td></td>
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<tr>
<td>Early versus delayed treatment</td>
<td>0.04</td>
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<tr>
<td>Received treatment versus no treatment</td>
<td>0.08</td>
</tr>
<tr>
<td>Preexposure Prophylaxis of HIV-uninfected partner</td>
<td></td>
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<tr>
<td>Among heterosexual couples</td>
<td>0.29</td>
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<tr>
<td>Among men who have sex with men</td>
<td>0.56</td>
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<tr>
<td>Among injection drug users</td>
<td>0.52</td>
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<tr>
<td>Condom use</td>
<td>0.20</td>
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<tr>
<td><strong>Male Circumcision (heterosexual partners)</strong></td>
<td></td>
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<tr>
<td>HIV-uninfected partner is male</td>
<td>0.50</td>
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<tr>
<td>HIV-uninfected partner is female</td>
<td>0.80</td>
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<tr>
<td><strong>Male circumcision (men who have sex with men)</strong></td>
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<tr>
<td>Insertive partner is HIV-uninfected partner</td>
<td>0.27</td>
</tr>
<tr>
<td>Receptive partner is HIV-uninfected</td>
<td>1.2</td>
</tr>
</tbody>
</table>

*For a detailed description of data and factors used to generate estimates, see original table in article referenced below.

Source:

### 2016 CDC and HHS Guidelines for Nonoccupational Exposure to HIV

#### Preferred and Alternative 28-Day Regimens for Nonoccupational PEP\(^a,b\)

<table>
<thead>
<tr>
<th>Adults and adolescents aged (\geq 13) years with normal renal function (creatinine clearance (\geq 60) mL/min), including pregnant women</th>
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<tbody>
<tr>
<td><strong>Preferred Regimens:</strong></td>
</tr>
<tr>
<td>• Raltegravir (400 mg twice daily) plus tenofovir DF-emtricitabine (300-200 mg once daily)</td>
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<tr>
<td>• Dolutegravir (50 mg once daily) plus tenofovir DF-emtricitabine (300-200 mg once daily)</td>
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<tr>
<td><strong>Alternative Regimen:</strong></td>
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<tr>
<td>• Darunavir (800 mg once daily) plus ritonavir (100 mg once daily) plus tenofovir DF-emtricitabine (300-200 mg once daily)</td>
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</table>

<table>
<thead>
<tr>
<th>Adults and adolescents aged (\geq 13) years with renal dysfunction (creatinine clearance (\leq 59) mL/min)(^+)</th>
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<tbody>
<tr>
<td><strong>Preferred Regimens:</strong></td>
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<tr>
<td>• Raltegravir (400 mg twice daily) plus zidovudine (dose adjusted) plus lamivudine (dose adjusted)</td>
</tr>
<tr>
<td>• Dolutegravir (50 mg once daily) plus zidovudine (dose adjusted) plus lamivudine (dose adjusted)</td>
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<tr>
<td><strong>Alternative Regimen:</strong></td>
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<tr>
<td>• Darunavir (800 mg once daily) plus ritonavir (100 mg once daily) plus zidovudine (dose adjusted) plus lamivudine (dose adjusted)</td>
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</table>

\(^a\)These recommendations do not reflect current Food and Drug Administration-approved labeling for antiretroviral medications listed in this table.

\(^b\)Ritonavir is used in clinical practice as a pharmacokinetic enhancer to increase the trough concentration and prolong the half-life of darunavir, lopinavir, and other protease inhibitors. Ritonavir is not counted as a drug directly active against HIV in the above “3-drug” regimens.

\(^+\)The dose adjustments for zidovudine and lamivudine are made based on degree of renal function.

**Source:**

<table>
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<tr>
<th>Test</th>
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<td>testing if Ag/Ab test unavailable)(^a)</td>
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<td>hepatitis B surface antibody (anti-HBs)</td>
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<td>Syphilis serology(^a)</td>
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<tr>
<td>Baseline</td>
<td>Baseline</td>
<td>4-6 Weeks after exposure</td>
<td>3 Months after exposure</td>
<td>6 months after exposure</td>
<td>For all persons considered for or prescribed nPEP for any exposure</td>
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</tbody>
</table>

Abbreviations: Ag/Ab, antigen/antibody combination test; HIV, human immunodeficiency virus; nPEP, nonoccupational postexposure prophylaxis; tenofovir DF, tenofovir disoproxil fumarate.

a Any positive or indeterminate HIV antibody test should undergo confirmatory testing of HIV status.
b Only if hepatitis C infection was acquired during the original exposure; delayed HIV seroconversion has been seen in persons who simultaneously acquire HIV and hepatitis C infection.
c If exposed person susceptible to hepatitis B at baseline.
d If exposed person susceptible to hepatitis C at baseline.
e If determined to be infected with syphilis and treated, should undergo serologic syphilis testing 6 months after treatment.
f Testing for chlamydia and gonorrhea should be performed using nucleic acid amplification tests. For patients diagnosed with a chlamydia or gonorrhea infection, retesting 3 months after treatment is recommended.
- For men reporting insertive vaginal, anal, or oral sex, a urine specimen should be tested for chlamydia and gonorrhea.
- For women reporting receptive vaginal sex, a vaginal (preferred) or endocervical swab or urine specimen should be tested for chlamydia and gonorrhea.
- For men and women reporting receptive anal sex, a rectal swab specimen should be tested for chlamydia and gonorrhea.
- For men and women reporting receptive oral sex, an oropharyngeal swab should be tested for gonorrhea.
g If not provided presumptive treatment at baseline, or if symptomatic at follow-up visit.
h If woman of reproductive age, not using effective contraception, and with vaginal exposure to semen.
i eCrCl = estimated creatinine clearance calculated by the Cockcroft-Gault formula; eCrClCG = [(140 − age) x ideal body weight] ÷ (serum creatinine x 72) (x 0.85 for females).
j At first visit where determined to have HIV infection.

Source:
