Occupational Postexposure Prophylaxis

This is a PDF version of the following document:
Module 5: Prevention of HIV
Lesson 3: Occupational Postexposure Prophylaxis

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Introduction

Background

Although exposure prevention remains the primary strategy for reducing occupationally acquired HIV, appropriate postexposure management is an important element of workplace safety. The first iteration of the U.S. Public Health Service (USPHS) recommendations advocating for the use of HIV occupational postexposure prophylaxis (PEP) dates back to 1996.[1] As more data emerged and more antiretroviral medications became available, the HIV occupational PEP guidelines were updated multiple times (Figure 1), with the most recent of these published as the 2025 HIV Occupational PEP Guidelines.[2,3,4,5,6] Occupational exposures, particularly those known to involve risk for HIV transmission, are urgent medical matters, and clinicians should be familiar with updated HIV occupational PEP guidelines. In addition, all health care facilities and clinics should have policies and procedures in place to ensure that appropriate mechanisms are available for timely management. Issues related to the management of nonoccupational exposures to HIV are addressed in the Topic Review Nonoccupational Postexposure Prophylaxis. Management of hepatitis B virus (HBV) or hepatitis C virus (HCV) is not addressed in this topic review, but recommendations are available from the Centers for Disease Control and Prevention (CDC).[7,8]

Definition of Health Care Worker/Health Care Personnel

For the purposes of initiating HIV occupational PEP, the 2025 HIV Occupational PEP Guidelines use the term health care personnel to refer to all paid and unpaid persons working in health care settings who have the potential for exposure to infectious materials, including body substances (blood, tissue, and specific body fluids), contaminated medical supplies and equipment, and contaminated environmental surfaces.[6] Health care personnel (also called health care workers) might include, but are not limited to, emergency medical service personnel, dental personnel, laboratory personnel, autopsy personnel, nurses, nursing assistants, physicians, technicians, therapists, pharmacists, students and trainees, contractual staff not employed by the health care facility, and persons not directly involved in patient care but potentially exposed to blood and body fluids (e.g., clerical, dietary, housekeeping, security, maintenance, and volunteer personnel).

History of Occupational HIV Transmission in the United States

In the United States, from 1985 to 2013, a total of 58 confirmed and 150 possible cases of occupational transmission of HIV were reported to the CDC; only one of the confirmed cases occurred after 1999 and that case involved a laboratory worker who had a needle puncture wound while working with a live HIV culture (Figure 2).[9] Of the 58 confirmed cases of occupationally acquired HIV, 49 resulted from a percutaneous cut or puncture, 5 from mucocutaneous exposure, 2 from both percutaneous and mucous membrane exposure,

and 2 were unknown.[9] In the United States, there have been no known documented cases of HIV infection acquired through an occupational exposure since 2008.[6,9]

Estimated Risk for Occupational Acquisition of HIV

- **Risk with Percutaneous Exposure**: If a health care worker has a percutaneous exposure to blood from a source person with HIV (and the health care worker does not take PEP), the estimated risk for HIV acquisition is approximately 0.2 to 0.3%.[10,11,12]
- **Risk with Mucous Membrane Exposure**: After a mucous membrane exposure to blood from a source with HIV, such as eye or mouth contact with blood, the risk is approximately 0.09%.[2]
- **Risk with Blood Contact of Nonintact Skin**: Transmission of HIV through blood contact of nonintact skin has been documented in case reports, but most experts consider this risk significantly lower than with mucous membrane exposure.
- **Factors Associated with Increased Transmission Risk**: Epidemiological studies have identified several factors associated with increased risk of HIV transmission following an occupational exposure: a larger quantity of blood from the source patient (device visibly contaminated with blood, needle recently used in an artery or vein, larger bore needle, deeper injury).[13] Note that in earlier years of the HIV epidemic, terminal AIDS was considered a surrogate marker for a high plasma HIV RNA level typically seen in late-stage AIDS. In the modern era, the source patient's recent plasma HIV RNA level would be considered to have a higher correlation with transmission risk than their stage of HIV disease or CD4 cell count.[13]

Table 1. Risk Factors Associated with HIV Transmission in Occupational Exposures

Table 1.

Risk Factors for HIV Seroconversion in Health Care Workers

Risk Factor	Adjusted Odds Ratio
Deep Injury	15.0
Visible Blood on Device	6.2
Needle in Source Vein/Artery	4.3
Postexposure Prophylaxis with Zidovudine	0.19

Source:

- Cardo DM, Culver DH, Ciesielski CA, et al. A case-control study of HIV seroconversion in health care workers after percutaneous exposure. Centers for Disease Control and Prevention Needlestick Surveillance Group. N Engl J Med. 1997;337:1485-90. [PubMed Abstract]

Rationale for HIV Occupational PEP

When an individual has a percutaneous or mucous membrane exposure to blood or potentially infectious fluid from a source person with HIV, replication of HIV first occurs in the dendritic cells of the skin and mucosa before spreading through lymphatic vessels and developing into systemic infection; this delay in the spread of HIV is thought to leave a window of opportunity for HIV PEP to prevent establishment of chronic HIV infection.

A landmark study published in 1997 provided the first convincing evidence that HIV occupational PEP significantly decreased the risk of occupational HIV acquisition following a needlestick injury.[13] In this report, investigators performed a case-control study of needlestick injuries involving health care workers and demonstrated that zidovudine PEP, which was typically taken for at least 4 weeks, reduced the risk of HIV seroconversion by 81% if implemented within 4 hours of the exposure.[13] This study, along with CDC recommendations, led to the widespread use of antiretroviral therapy for HIV occupational PEP in the late 1990s.

From the year 2000 onward, occupationally acquired HIV infection in the United States has become exceedingly rare, an observation that indirectly supports the efficacy of HIV PEP.[9] In addition, there are data supporting the use of HIV PEP based on small observational studies among human and animal transmission models.[14,15,16,17,18,19] There have been no published randomized control trials that evaluated HIV PEP for occupational exposures to HIV, and due to ethical and logistical reasons, it is unlikely that such studies will ever be performed in the future. On the basis of available data, there is a strong rationale for using HIV PEP for health care workers exposed to HIV.[2]

Risk Assessment of the Occupational Exposure Event

General Approach

First, it is important to determine whether the exposure involving the health care worker warrants HIV occupational PEP. In general, this assessment should include (1) HIV status of the source patient, (2) type of body fluid involved in the exposure, (3) nature of the exposure (percutaneous, mucous membrane, or contact with nonintact skin), and (4) timing of when the exposure occurred.[5,6] If the exposure is deemed an occupational exposure to a source patient known to have HIV, additional information should be obtained, such as the source patient's most recent plasma HIV RNA level, their current antiretroviral treatment (if any), and any history of HIV drug resistance. Further, as part of the overall exposure evaluation, the risk assessment for transmission of hepatitis B virus or hepatitis C virus should be undertaken.[7,8] Even in circumstances where a source patient's HIV, HBV, and HCV status is unknown (or unobtainable), the health care worker should still be evaluated as soon as possible to facilitate timely baseline testing and discussion of whether HIV PEP should be considered.

Determining HIV Status of Source Patient

The use of HIV PEP applies to situations in which a health care worker has experienced an exposure to blood or body fluids from a source patient with documented or suspected HIV. The HIV status of the source patient, if unknown, should promptly be determined, using an FDA approved point-of-care (rapid) HIV antigen-antibody assay, with results of the rapid test guiding whether to initiate HIV PEP.[2,6] Although FDA-approved HIV antigen-antibody point-of-care (rapid) HIV tests typically provide a determination of a source patient's HIV serostatus within 30 minutes, they are considered a preliminary test and require confirmation with a laboratory blood-based HIV antigen-antibody test. In addition, these tests may fail to detect HIV in a person who very recently acquired HIV.[20,21] If an immediate result is needed and an HIV point-of-care test is not available, occupational HIV PEP should not be delayed while waiting for the test results.[2,6] In the situation where a source patient's HIV status is initially unknown, and the health care worker starts on antiretroviral HIV PEP, discontinuation of the antiretroviral occupational HIV PEP is warranted if test results subsequently show the source patient does not have HIV.[2,6]

Source Patient in Seroconversion Window Period

A source patient with very recent acquisition of HIV can have detectable HIV RNA levels with a negative HIV antigen-antibody test result and thus theoretically transmit HIV in the setting of this seroconversion window period. When using newer recommended HIV-1/2 antigen-antibody immunoassays, the estimated time period for first detection of HIV after HIV acquisition is about 10 days with an HIV-1 RNA test, 17 days with an HIV antigen-antibody test, and 24 days with an HIV antibody test alone (Figure 3).[22] Although concerns have existed regarding the potential for a source patient with acute HIV to transmit HIV, there have been no documented occupational transmissions of HIV related to an exposure involving a source patient with very recent acquisition of HIV who was in the seroconversion window period.[6] Accordingly, administering HIV PEP in the setting of a negative HIV antigen-antibody test for the source patient is not recommended, unless the source patient is known to have signs or symptoms that strongly suggest acute HIV.[6] In addition, for source persons of unknown HIV status, routine use of HIV-1 RNA testing for diagnostic purposes is not recommended for decision-making regarding HIV PEP.[6]

Relative Risks of Infectious Body Fluids

As part of the evaluation for an occupational exposure to HIV, it is important to determine what type and quantity of body fluid from the source patient was involved in the exposure (Table 2).[2] Blood or visibly bloody fluids are considered the most potentially infectious body fluids. Other body fluids that are also considered potentially infectious, but at lower risk than blood or visibly bloody fluids include semen, vaginal fluids, and fluids found in normally sterile areas of the body (cerebrospinal, synovial, pleural, pericardial,

peritoneal, and amniotic). The risk of transmission from vomitus, feces, urine, nasal secretions, sputum, sweat, and tears is not considered potentially infectious unless they are visibly bloody.[2]

Type of Exposure

In the initial evaluation of the health care worker, it is essential to determine if the exposure involved (1) percutaneous injury, (2) mucous membrane exposure, or (3) contact with nonintact skin. The contact of blood or body fluid with intact skin does not confer any risk of HIV transmission and thus does not warrant further evaluation or postexposure management. For needlestick injuries, additional information should include if the skin of the health care worker was punctured, the type and gauge of needle involved, whether the injury sustained was deep or shallow, and if visible blood was present on the needle prior to injury.

Timing of Exposure

As part of the initial evaluation, it is extremely important to determine when the exposure took place. Health care workers with an occupational exposure to HIV should immediately seek care, since available data and recommendations suggest that HIV PEP should be started as soon as possible.[6] Most health care workers promptly seek evaluation after an occupational exposure, but certain circumstances can arise that result in a significant delay. It is particularly important to determine if the delay is longer than 72 hours from the incident, and expert consultation is recommended if that situation arises.[2,6]

Defining an At-Risk Occupational Exposure

For the purposes of initiating HIV PEP, the 2025 HIV Occupational PEP Guidelines define an at-risk exposure as contact with blood, tissue, or other potentially infectious body fluids from a person with known or suspected HIV via (1) percutaneous injury (e.g., a needlestick or cut with a sharp object), (2) mucous membrane exposure, or (3) contact with nonintact skin (e.g., exposed skin that is chapped, abraded, or affected by significant dermatitis).[2,6]

Recommended Initial Steps Following An Exposure Event

Initial Approach Following Exposure Event

Occupational exposures are an urgent medical issue and should be addressed immediately. Thus, it is extremely important that health care workers have an immediate evaluation and consultation following an exposure event that may have involved contact with blood or potentially infectious fluid from a source person with HIV.[2] Prior to any discussions regarding HIV PEP, it is essential to make sure the health care worker has adequately decontaminated the wound or mucous membranes. In addition, one of the goals of the initial evaluation is to make sure the health care worker promptly receives the first doses of antiretroviral medications for HIV PEP, if indicated. All health care facilities should have a plan in place for administering appropriate evaluation and management of a health care worker who has an occupational exposure to a bloodborne pathogen.

Wound Decontamination

All exposure events should prompt an immediate effort to decontaminate the area of the body exposed to potentially infectious fluids. If the wound involved a needlestick injury, wash the area thoroughly with soap and water (if the health care worker was wearing a glove, the glove should be removed prior to washing the wound).[2] The health care worker should not squeeze or “milk” the injury site. For a mucous membrane exposure, the health care worker should thoroughly wash and irrigate the area with a large volume of saline.[2] If the exposure involves skin (intact or nonintact), the skin should be thoroughly washed with soap and water.[2]

Timing for Initiation of Antiretroviral Therapy

Health care workers with an indication for HIV PEP should receive their first dose of antiretroviral medications as soon as possible after the exposure event, and it may be administered up to 72 hours after the exposure.[6] Animal studies have shown that HIV PEP is most effective when started as early as possible after exposure (Figure 4).[15,18] In some situations, significant delays occur, usually because the health care worker failed to initially consider the exposure event significant enough to seek evaluation. If the delay extends past 72 hours, HIV PEP is likely to be less effective, and expert consultation should be obtained.[6] In this situation, some experts may consider recommending HIV PEP, particularly in cases considered a very high risk for HIV acquisition.[6]

Recommended Antiretroviral Regimens for Occupational HIV PEP

Preferred and Alternative Regimens for HIV Occupational PEP

The 2025 HIV Occupational PEP Guidelines recommend the use of three or more antiretroviral medications for HIV occupational PEP, with the preferred regimen consisting of an integrase strand transfer inhibitor plus two nucleoside reverse transcriptase inhibitors (Table 3).[6] The preferred regimens are all once-daily oral regimens that are highly potent, safe, well-tolerated, and have a high genetic barrier to resistance. The preferred regimens are:

- Bictegravir-tenofovir alafenamide-emtricitabine (fixed-dose combination), *or*
- Dolutegravir plus tenofovir alafenamide or tenofovir DF) plus (emtricitabine or lamivudine).[6]

The preferred regimens listed above are in alphabetical order and not according to preference; there are no differences in effectiveness between these regimens. In addition, although one of the regimens is available as a single tablet regimen, the HIV PEP course completion rates are similar for these options.[23,24] The alternative regimens consist of a boosted protease inhibitor (darunavir) plus two nucleoside reverse transcriptase inhibitors tenofovir alafenamide or tenofovir DF) plus (emtricitabine or lamivudine).[6]

Health Care Personnel is Pregnant, Breastfeeding, or Has Childbearing Potential

For pregnant or breastfeeding women who require HIV occupational PEP, expert consultation is advised, though initiation of HIV occupational PEP should not be delayed.[6] The preferred regimens for HIV occupational PEP listed above are all considered safe during pregnancy. Thus, the same preferred regimens are recommended for women who are pregnant as for all other health care personnel (Table 4).[6] If an alternative regimen is used during pregnancy, there is a slight adjustment as the darunavir should only be boosted with ritonavir and both require twice-daily dosing during pregnancy.[6] Note that cobicistat-containing regimens are not recommended for use in pregnancy due to reduced plasma drug exposure of the alternative recommended anchor medications. If the healthcare worker is breastfeeding, expert consultation is advised.[6] In addition, if the health care worker is a woman with childbearing potential, darunavir boosted with ritonavir can cause significant drug interactions with oral contraceptives.[25]

Health Care Personnel has Renal or Hepatic insufficiency

For health care personnel with renal or hepatic impairment, some adjustments may be needed in the recommended occupational HIV PEP regimens (Table 5).[6]

- **Patients with Renal Insufficiency**: For health care personnel with moderate renal insufficiency (CrCl 30-49 mL/min), the major adjustment is that tenofovir DF is not part of any preferred regimen, and if used as part of an alternative regimen, tenofovir DF should be dose-reduced (adjusted to 300 mg every 48 hours).[6] For persons with severe renal insufficiency (CrCl less than 30 mL/min) who are receiving hemodialysis, the same options can be used as with moderate renal insufficiency, but use of tenofovir DF and/or lamivudine requires dose adjustment.[6] The management of persons with severe renal insufficiency who are not on dialysis is highly complicated and generally warrants expert consultation.[6]
- **Patients with Hepatic Insufficiency**: For individuals who have hepatic impairment with Child-Pugh class A or B, the same preferred and alternative nonoccupational PEP regimens can be used as recommended for persons without hepatic impairment.[6] For individuals with severe hepatic impairment (Child-Pugh class C), expert consultation should be obtained to choose an appropriate nonoccupational PEP regimen.[6]

Duration of Therapy

The 2025 HIV Occupational PEP Guidelines recommend that health care personnel who initiate antiretroviral therapy for HIV occupational PEP should complete a 28-day course.[6] Older studies involving macaques demonstrated that HIV PEP given for 28 days is more effective than 10 days, which is more effective than 3 days.[15] The pervading theory is that, in some, if not most instances, HIV occupation PEP aborts a very early HIV infection, rather than truly preventing any cell in the body from becoming infected with HIV. Thus, prompt initiation of HIV PEP is important to minimize the tissue involvement, and continuing therapy for 28 days is important to control HIV replication while allowing sufficient time for localized immune responses to clear out a very limited HIV infection.

Use of HIV PEP if the Source Person has Undetectable HIV RNA Level

If the source patient has a recent undetectable HIV RNA level, the exact risk of transmission from an occupational exposure is unknown, but it is likely very low. Nevertheless, undetectable plasma HIV RNA in the source patient does not eliminate the possibility that transmission of HIV could occur, especially with a needlestick injury. Multiple studies have shown that HIV is not transmitted sexually by individuals with HIV who have sustained undetectable plasma HIV RNA levels, but most experts believe there are inadequate data to extrapolate findings from these studies to the setting of& occupational exposure to HIV, such as with a needlestick injury. The main difference in these settings is that a needlestick injury can potentially involve transmission of whole blood cells that are latently infected with HIV, even in a person with an undetectable plasma HIV RNA level. Due to the lack of data regarding occupational transmission of HIV from a person with an undetectable plasma HIV RNA level, the 2025 HIV Occupational PEP Guidelines recommends a case-by-case determination using shared decision-making, guided by the nature of the exposure, for deciding whether that HIV occupational PEP should still be offered.[6]

Health Care Worker is Taking HIV Preexposure Prophylaxis

The effectiveness of HIV preexposure prophylaxis (PrEP) at preventing occupationally acquired HIV infection is unknown. The 2025 HIV Occupational PEP Guidelines recommend consideration of the following factors when using shared decision-making about HIV occupational PEP for a healthcare worker who is actively taking HIV PrEP:[6]

- How recent was HIV PrEP started;
- Adherence to HIV PrEP regimens and any missed HIV PrEP doses;
- Use of intermittent HIV PrEP regimens outside current CDC HIV PrEP guideline recommendations;
- Exposure to a source patient who does not have sustained viral suppression;
- Exposure to a source patient who has resistance to HIV PrEP components; and
- Potential risks and benefits of a 3-drug occupational PEP regimen as compared to a 1-2 medication HIV PrEP regimen.

Choice of PEP Regimen with Known or Suspected HIV Drug Resistance

Rare cases of documented occupational HIV PEP failure have occurred due to transmission of drug-resistant HIV from the source patient.[26,27] In the case of known or suspected resistance in the source virus to antiretroviral medications, expert consultation is strongly advised to assist in the selection of an occupational HIV PEP regimen to which the source patient's virus is likely susceptible.[6] If access to an expert is not immediately available, initiation of standard HIV occupational PEP should take place without delay; the regimen can be adjusted after initiation as additional information or advice from an expert becomes available.

Obtaining Expert Consultation for Occupational HIV PEP

The 2025 HIV Occupational PEP Guidelines recommend expert clinical consultation for HIV-related occupational exposures in the following situations:[6]

- The source patient has known or suspected HIV drug resistance
- The source patient with HIV has an undetectable HIV RNA level
- The exposure occurred to an unknown source (e.g., needle in sharps disposal container)
- The health care worker with the exposure delays the evaluation for longer than 72 hours
- The health care worker with the exposure is known or suspected to be pregnant
- The health care worker with the exposure is breastfeeding
- The health care worker is experiencing medication intolerance or toxicity
- The health care worker is taking HIV preexposure prophylaxis (PrEP)

Expert Consultation: National Clinician Consultation Center PEPline

Expert consultation for health care professionals can be obtained by calling the National Clinician Consultation Center's Post-Exposure Prophylaxis PEPline at 844-275-6222. See the website for hours of operation.

Baseline Evaluation for Health Care Personnel and Source Patient

Baseline Evaluation for Health Care Personnel

Health care personnel with an occupational exposure to HIV should have prompt counseling, baseline laboratory testing, and medical evaluation.[2,6] It is important to determine if the health care personnel has any preexisting (or significant risk of) renal disease since HIV PEP medications, specifically tenofovir DF, carry potential nephrotoxicity and requires dose adjustment if renal dysfunction is present, or consideration of alternative HIV PEP medications. The first dose of HIV PEP should be administered as soon as possible and can be given while the individual is undergoing baseline evaluation. It is important the baseline evaluation should not result in a delay in the health care worker receiving their first dose of antiretroviral therapy for HIV PEP. The recommended routine counseling and baseline laboratory testing for the health care worker exposed to a known or suspected source with HIV should include the following:

- **HIV Testing**: Point-of-care (rapid) or laboratory-based fourth-generation HIV Ag/Ab combination immunoassay. Additional baseline HIV-1 RNA nucleic acid testing (NAT) is recommended only for health care personnel exposed to HIV and who have received cabotegravir-based HIV PrEP in the prior 12 months.
- **Renal Function**: Serum creatinine
- **Hepatic Aminotransferase Levels**: Liver Aspartate transaminase (AST) and alanine transaminase (ALT).
- **Additional Testing**: Consider performing additional laboratory testing on a case-by-case basis when indicated based on the health care personnel's specific situation or other medical comorbidities. For women of childbearing potential, most experts would also perform baseline pregnancy testing so that appropriate and informed counseling could occur.

Evaluation and Management of Exposure to Other Bloodborne Pathogens

For health care personnel exposed to a source patient with HIV who has coinfection with hepatitis B virus (HBV) and/or hepatitis C virus (HCV), additional baseline testing and management considerations are needed. It is beyond the scope of this topic review to address postexposure prophylaxis for exposures to HBV and/or HCV. In this situation, we recommend using existing CDC guidelines and, if needed, obtaining expert consultation.[7,8]

Initial Counseling

Health care personnel who receive HIV PEP should be informed of possible drug interactions, drug toxicities and side effects, the need for high levels of adherence with the HIV PEP regimen, the importance of completing the entire 28-day postexposure course, and the importance of follow-up testing. Health care workers should be advised to use preventative measures (e.g., condoms) to prevent secondary transmission of HIV, until having a negative final HIV test result at week 12.[6] From a practical standpoint, counseling should not delay the patient receiving their first doses of antiretroviral medications for HIV PEP. Management of pregnant or breastfeeding health care workers who require HIV PEP should involve expert consultation for counseling regarding the risks and benefits of HIV PEP in these settings, concerns regarding potential transmission of HIV, as well as unique considerations for monitoring during the postexposure surveillance period. In addition, the guidelines note that health care personnel who seek to completely eliminate any risk of HIV transmission to their infant may want to consider interrupting breastfeeding or temporarily discarding breast milk until they have a negative final HIV test result at week 12.

Source Patient HIV Testing

If the HIV status of the source patient is unknown, point-of-care (rapid) HIV testing with an FDA-approved rapid HIV antigen-antibody test can provide a result within 30 minutes and facilitate initial decision-making for

management of the health care personnel.[6] Routine evaluation of the source patient with HIV-1 RNA testing is not recommended, but should be performed if the source patient has symptoms that are consistent with acute HIV infection. Last, in the setting of suspected acute HIV infection, it is appropriate to order an HIV antigen-antibody immunoassay and an HIV-1 RNA test.

Follow-Up of Health Care Worker After Exposure Event

Early Reevaluation

Early reevaluation of the exposed health care worker within 72 hours of exposure can provide another opportunity to answer any questions the health care personnel may have, assess tolerance with the HIV PEP antiretroviral medications, and consider any new information about the source patient that may be available.[6] Regardless of whether a health care personnel is started on HIV occupational PEP medication, reevaluation within 72 hours is recommended.[6]

Follow-Up Laboratory Testing

If HIV occupational PEP medications are used, the health care personnel should receive counseling on the importance of completing the prescribed regimen, and they should undergo monitoring for any drug toxicities, side effects, or development of acute HIV symptoms during the follow-up period. The following summarizes the recommended follow-up laboratory testing.

- **HIV Testing:** Follow-up HIV testing at 4–6 weeks postexposure is recommended only if the health care personnel exposed to HIV initiated the occupational HIV PEP more than 24 hours after a single exposure, or for those who missed any doses of HIV PEP medications. If HIV testing is performed at 4–6 weeks, it should include both a laboratory-based HIV antigen-antibody immunoassay and an HIV-1 RNA test. Final HIV testing should be performed at week 12 after exposure for all health care personnel who have an occupational exposure to HIV. The final postexposure week 12 HIV testing should consist of both a laboratory-based HIV antigen-antibody immunoassay and an HIV-1 RNA test. If the health care personnel develops a clinical illness and acute HIV is suspected, it is appropriate to order an HIV antigen-antibody immunoassay and an HIV-1 RNA test.
- **Renal Function**: Follow-up testing of serum creatinine at 4–6 weeks and at 12 weeks is indicated only if the baseline serum creatinine test was abnormal or there is a clinical indication or concern for drug toxicity (e.g., signs or symptoms of kidney injury).
- **Hepatic Aminotransferase Levels**: Follow-up AST and ALT levels at 4-6 weeks and at 12 weeks is indicated only if the baseline ALT and/or AST levels were abnormal or there is a clinical indication or concern for drug toxicity (e.g., signs or symptoms of liver injury).

Indications for Extended Follow-Up

The prior USPHS HIV Occupational PEP guidelines recommended extending HIV testing to 4–6 months in a person who acquired HCV with an occupational exposure.[2] This recommendation, however, no longer exists, primarily due to the improved sensitivity and wide availability of modern HIV antigen-antibody Immunoassays.[6] If a health care personnel was receiving long-acting injectable cabotegravir for HIV PrEP, this may delay the time to detection of HIV antibodies and/or viral load for months, requiring longer follow-up testing beyond the final HIV diagnostic test at 12 weeks after exposure.[6]

Summary Points

- Following an occupational exposure to HIV, prompt initiation of HIV PEP is an important element of workplace safety, as the use of HIV PEP markedly reduces the risk of HIV acquisition in the health care worker.
- Occupational exposures to blood or potentially infectious bodily fluids should be considered an urgent medical issue and addressed immediately.
- Antiretroviral HIV PEP medication regimens should contain three (or more) antiretroviral drugs for all occupational exposures to HIV.
- The USPHS-recommended regimens for HIV occupational PEP are (1) bictegravir-emtricitabine-tenofovir alafenamide or (2) dolutegravir plus (tenofovir alafenamide or tenofovir DF) plus (emtricitabine or lamivudine). The regimens are listed in alphabetical order and not according to preference. These regimens are recommended based on high potency, favorable side effect profile, and minimal drug interactions.
- The recommended duration for HIV occupational PEP is 28 days.
- If occupational HIV PEP is indicated, the antiretroviral regimen should be started as soon as possible and within 72 hours. If a health care worker presents 72 (or more) hours after exposure, expert consultation should be sought.
- Initial laboratory evaluation of all health care personnel exposed to HIV, regardless of whether they initiate HIV PEP, should include an HIV antigen-antibody immunoassay, HIV-1 RNA test, serum creatinine, AST, ALT, and pregnancy testing (if they have childbearing potential).
- Expert consultation should be sought for all cases involving drug-resistant HIV in the source patient and for situations that fall outside the scope of the guidelines. Expert consultation can be obtained by calling the National Clinician Consultation Center's Post-Exposure Prophylaxis PEPline at 844-275-6222.
- Follow-up and final HIV testing should be performed 12 weeks after the exposure with an HIV antigen-antibody immunoassay and an HIV-1 RNA test. Interim HIV testing at 4–6 weeks is recommended only if the health care personnel initiated PEP later than 24 hours after a single exposure or missed any doses of PEP. Interim testing should consist of HIV antigen-antibody Immunoassay and an HIV-1 RNA test.
- Follow-up renal or hepatic laboratory studies for the health care personnel are indicated only if the tests were abnormal at baseline or there are clinical indications (e.g., signs or symptoms of kidney or liver injury).

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Figures

Figure 1 Timeline for Occupational Postexposure Prophylaxis Recommendations in the United States

Abbreviations: CDC = Centers for Disease Control and Prevention; PEP = postexposure prophylaxis; INSTI= integrase strand transfer inhibitor

Illustration by David H. Spach, MD

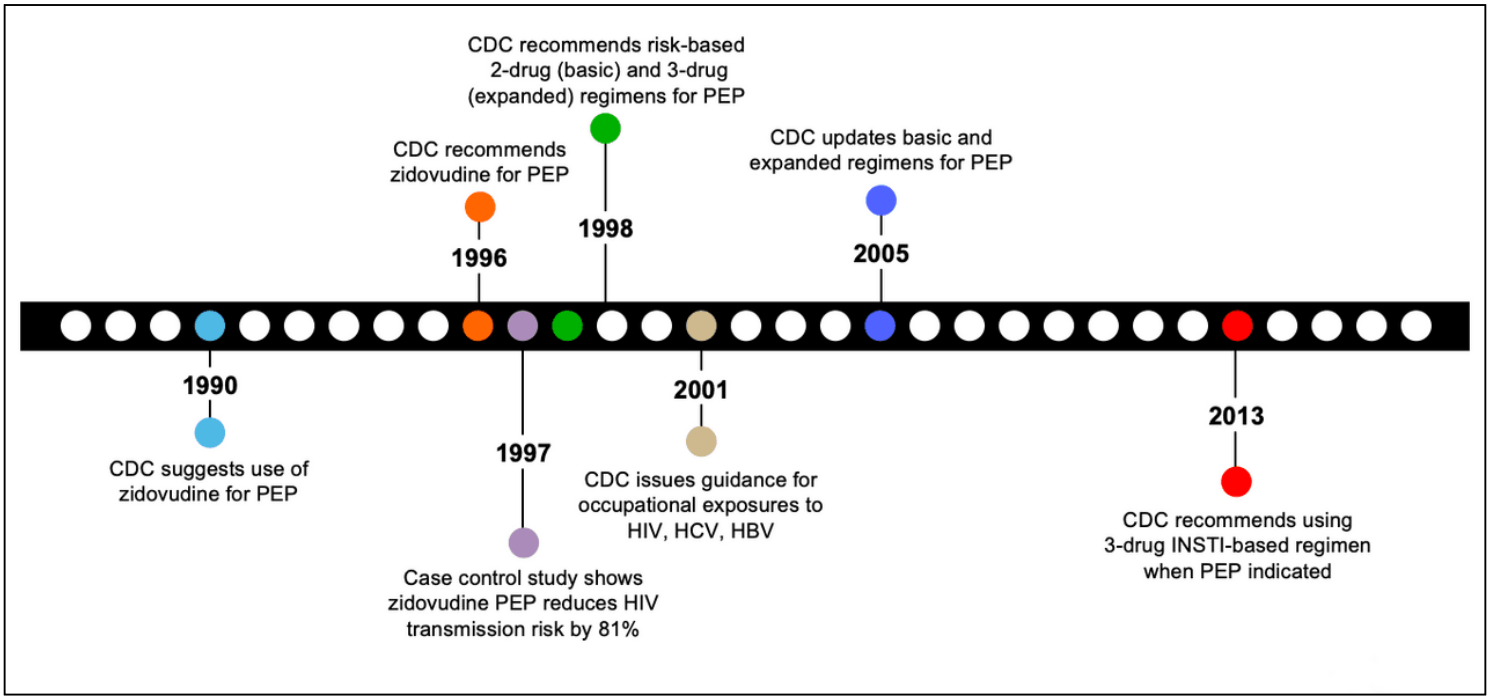

Figure 2 Confirmed Cases of Occupationally Acquired HIV in the United States, 1985-2013

Source: Joyce MP, Kuhar D, Brooks JT. Notes from the field: occupationally acquired HIV infection among health care workers - United States, 1985-2013. MMWR Morb Mortal Wkly Rep. 2015;63:1245-6.

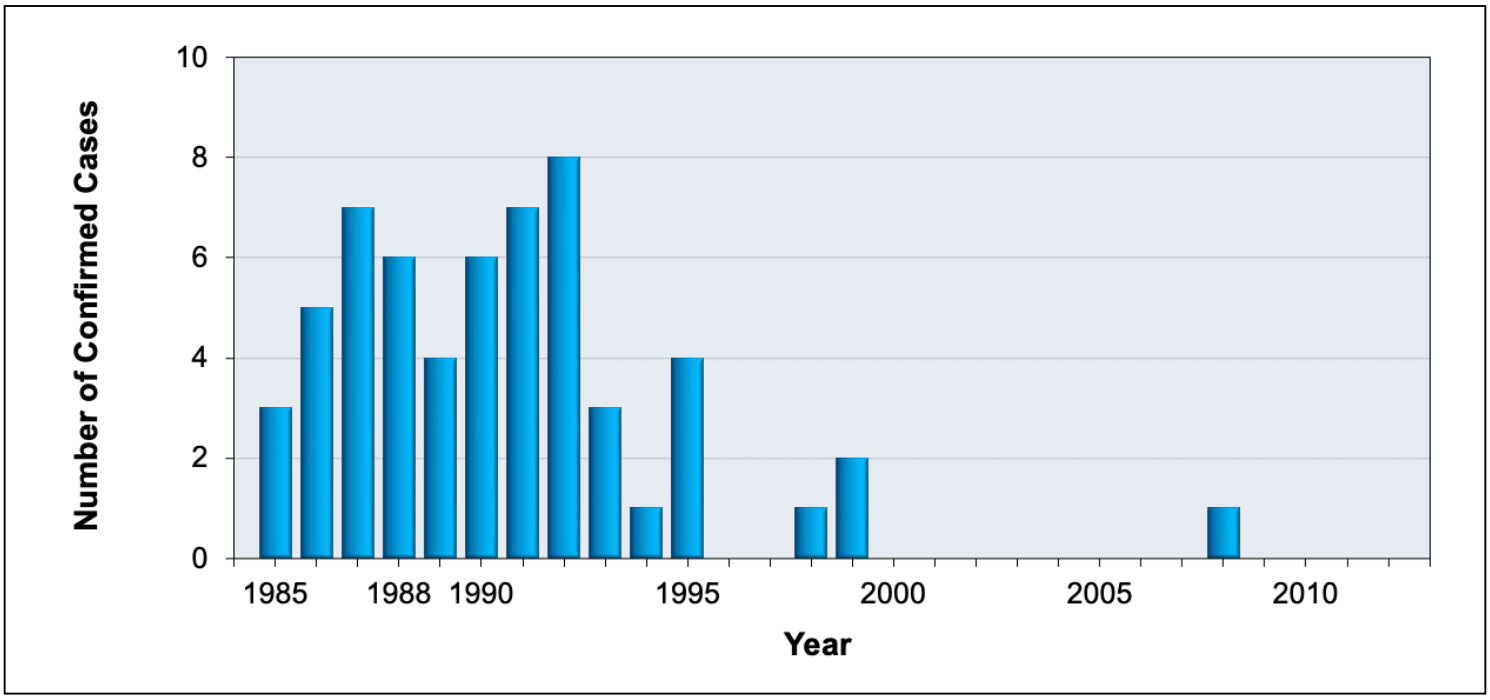

Figure 3 Timing of HIV RNA and HIV Antibodies following HIV Acquisition

Colored circles indicate the typical time for first detection of a positive test after acquisition of HIV.

Illustration by David H. Spach, MD

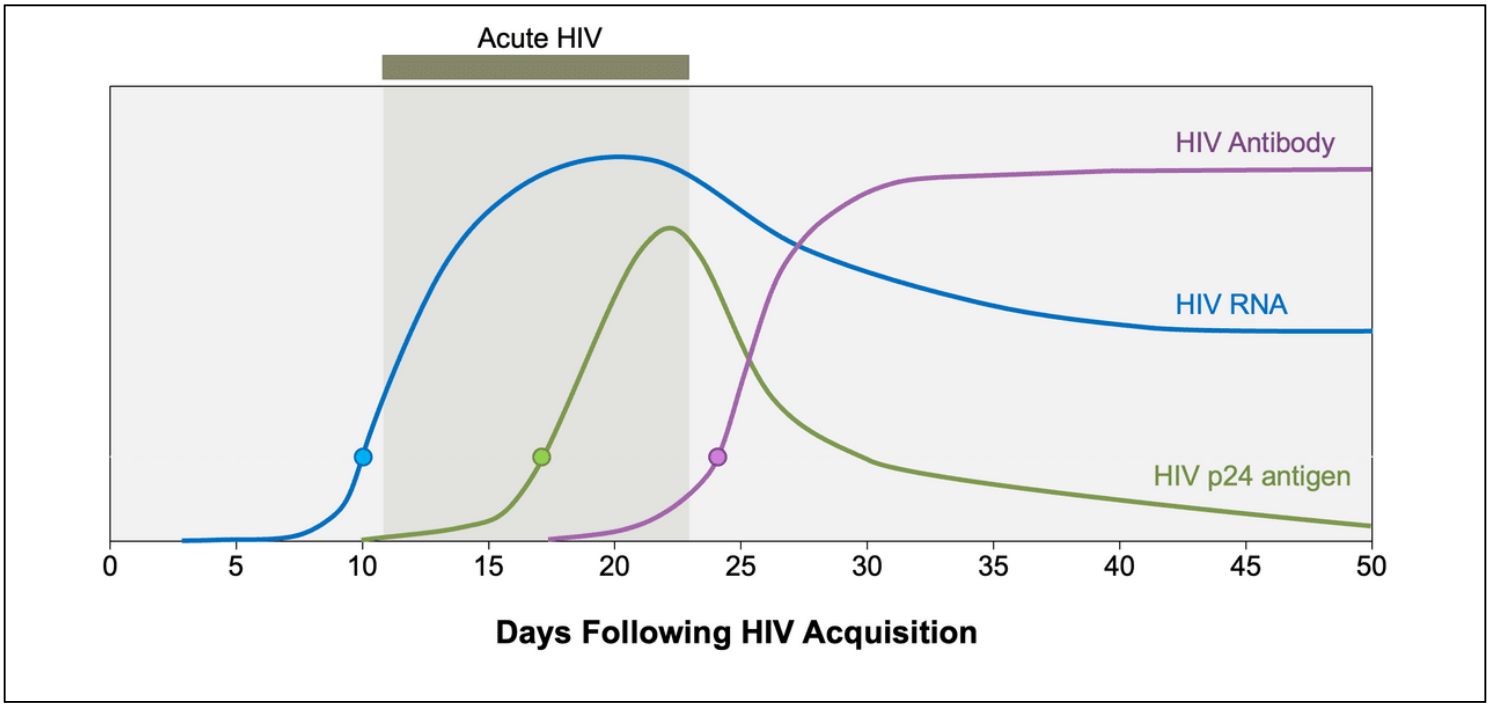

Figure 4 (Image Series) - Tenofovir PEP After SIV-1 Inoculation of Macaques (Image Series) - Figure 4 (Image Series) - Tenofovir PEP After SIV-1 Inoculation of Macaques
Image 4A: Tenofovir PEP After SIV-1 Inoculation of Macaques

Abbreviations: SIV = simian immunodeficiency virus; PEP = postexposure prophylaxis; TFV = tenofovir
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.

Source: Tsai CC, Emau P, Follis KE, et al. Effectiveness of postinoculation (R)-9-(2-phosphonylmethoxypropyl) adenine treatment for prevention of persistent simian immunodeficiency virus SIVmne infection depends critically on timing of initiation and duration of treatment. J Virol. 1998;72:4265-73.

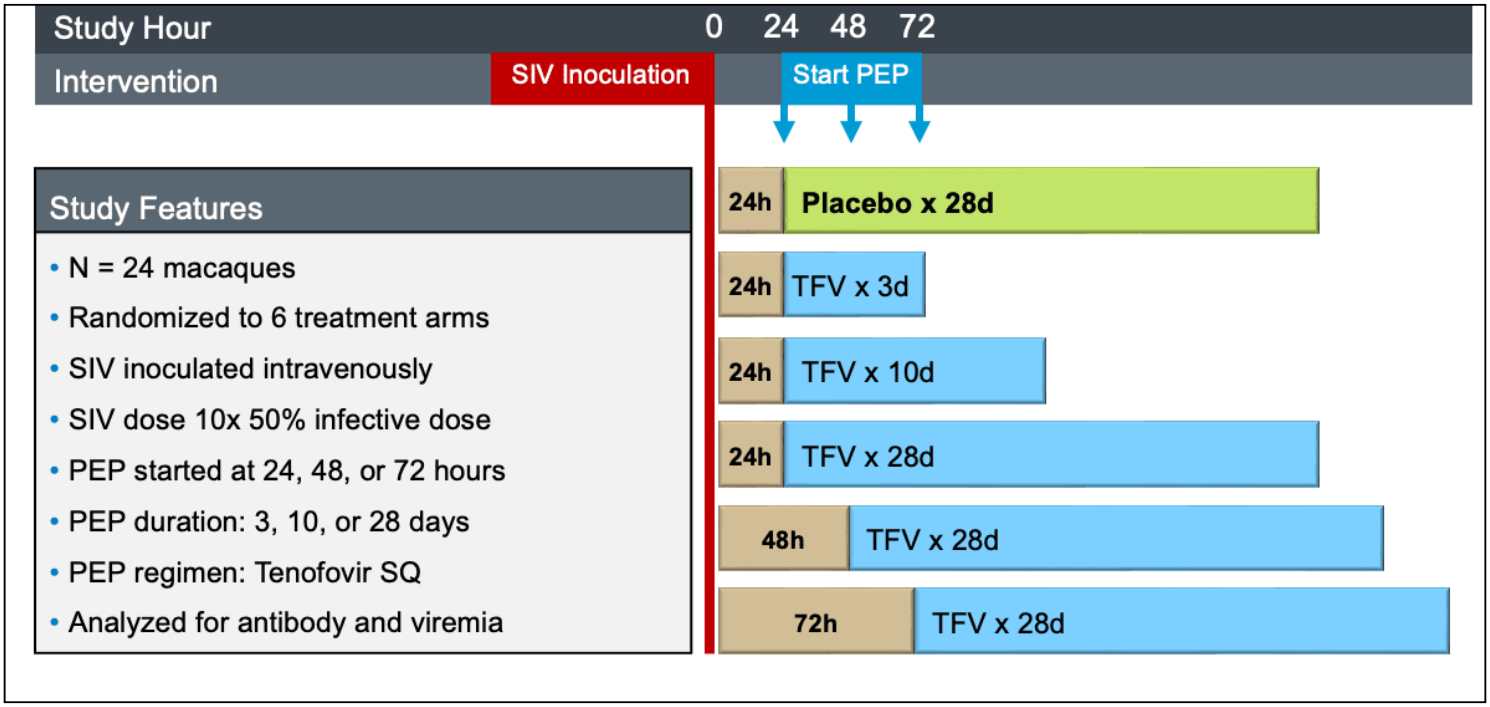

Figure 4 (Image Series) - Tenofovir PEP After SIV-1 Inoculation of Macaques
Image 4B: SIV Transmission Based on Timing of Initiation and Duration of PEP

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).

Source: Tsai CC, Emau P, Follis KE, et al. Effectiveness of postinoculation (R)-9-(2-phosphonylmethoxypropyl)adenine treatment for prevention of persistent simian immunodeficiency virus SIVmne infection depends critically on timing of initiation and duration of treatment. J Virol. 1998;72:4265-73.

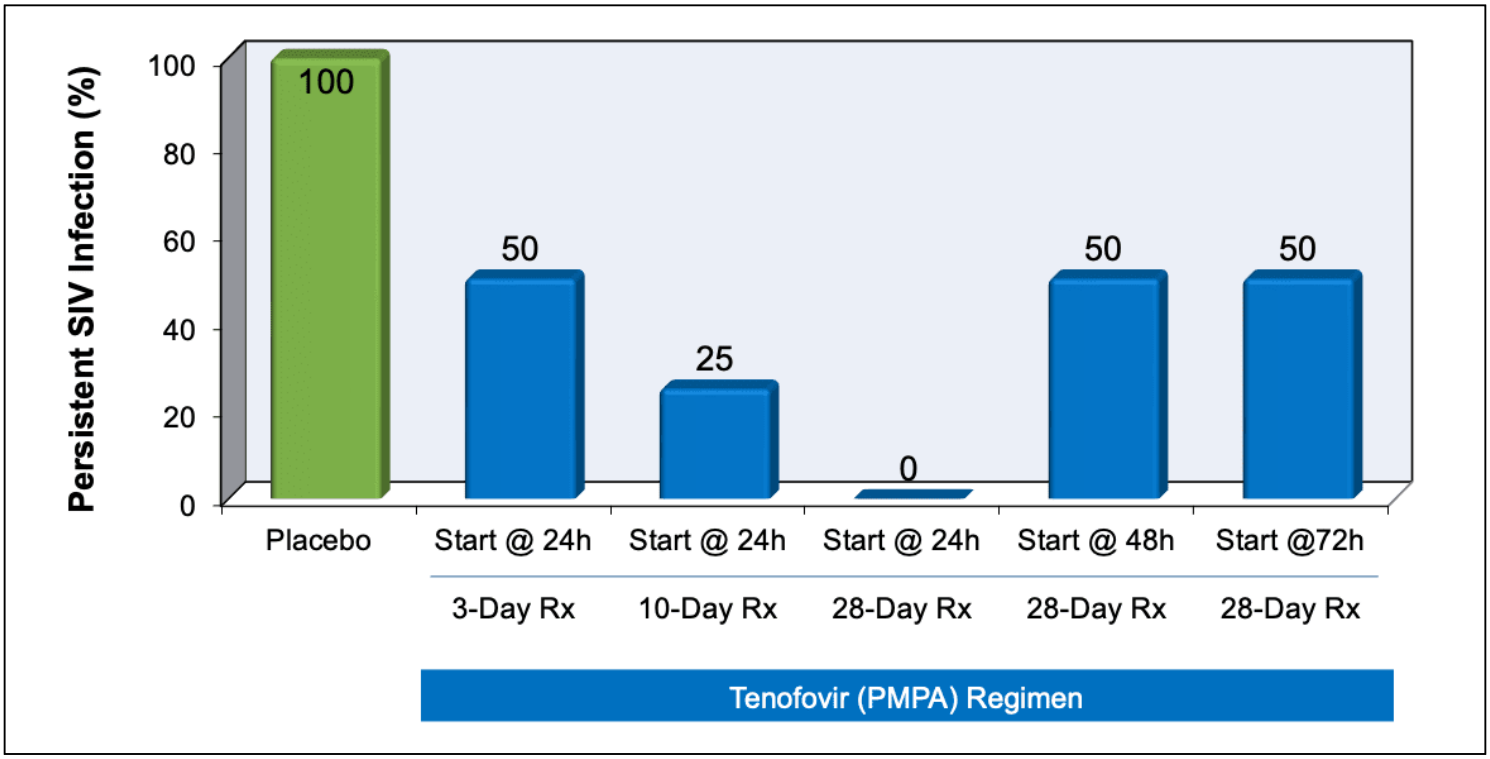

Table 1. Risk Factors Associated with HIV Transmission in Occupational Exposures

Table 1.

Risk Factors for HIV Seroconversion in Health Care Workers

Risk Factor	Adjusted Odds Ratio
Deep Injury	15.0
Visible Blood on Device	6.2
Needle in Source Vein/Artery	4.3
Postexposure Prophylaxis with Zidovudine	0.19

Source:

- Cardo DM, Culver DH, Ciesielski CA, et al. A case-control study of HIV seroconversion in health care workers after percutaneous exposure. Centers for Disease Control and Prevention Needlestick Surveillance Group. N Engl J Med. 1997;337:1485-90. [PubMed Abstract]

Table 2. Relative Risk of Fluids in Occupational Exposure to HIV

Table 2.

Relative Risk of Fluids in Occupational Exposure to HIV

Category of Infectivity	Fluid
Infectious Fluids	Blood
	Visible bloody body fl
Potentially Infectious Body Fluids	Semen and vaginal secr
	Cerebrospinal fluic
	Synovial fluid
	Pleural fluid
	Peritoneal fluid
	Pericardial fluid
	Amniotic fluid
Not considered infectious	Nasal secretions
	Saliva
	Sputum
	Vomitus
	Feces
	Urine
	Sweat and tears

*Note: although semen and vaginal secretions are known to be infectious for HIV in sexual exposures, they have not transmissions in the occupational setting.

Source:

- Kuhar DT, Henderson DK, Struble KA, et al. Updated US Public Health Service Guidelines for the Management of Occupational Exposures to Human Immunodeficiency Virus and Recommendations for Postexposure Prophylaxis. Infect Control Hosp Epidemiol. 2013;34:875-92. [PubMed Abstract]

Table 3. 2025 USPHS Guidelines for HIV Occupational Postexposure Prophylaxis Regimens

2025 USPHS Guidelines for HIV Occupational Postexposure Prophylaxis **Preferred and Alternative Regimens for HIV Occupational PEP in Adults and Adolescents***	
Health Care Personnel without Pregnancy, Renal Disease, or Hepatic Impairment	
Preferred	**Integrase Strand Transfer Inhibitor PLUS Two Nucleoside Reverse Transcriptase Inhibitors** • Bictegravir-tenofovir alafenamide-emtricitabine • Dolutegravir PLUS (tenofovir alafenamide OR tenofovir DF) PLUS (emtricitabine OR lamivudine)
Alternative	**Boosted Protease Inhibitor PLUS Two Nucleoside Reverse Transcriptase Inhibitors** • (Darunavir-cobicistat OR Darunavir and ritonavir) PLUS (tenofovir alafenamide OR tenofovir DF)
*The regimens within categories are listed in alphabetical order and not to preference.	

Source:

- Kofman AD, Struble KA, Heneine W, et al. 2025 US Public Health Service Guidelines for the Management of Occupational Exposures to Human Immunodeficiency Virus and Recommendations for Post-exposure Prophylaxis in Healthcare Settings. Infect Control Hosp Epidemiol. 2025:46:863-73 [CDC]

Table 4. 2025 USPHS Guidelines for Occupational Postexposure Prophylaxis for Pregnant Women

2025 USPHS Guidelines for HIV Occupational Postexposure Prophylaxis **Preferred and Alternative Regimens for HIV Occupational PEP in Pregnant Women***	
Pregnant Health Care Personnel (expert consultation recommended)	
Preferred	**Integrase Strand Transfer Inhibitor PLUS Two Nucleoside Reverse Transcriptase Inhibitors** • Bictegravir-tenofovir alafenamide-emtricitabine • Dolutegravir PLUS (tenofovir alafenamide OR tenofovir DF) PLUS (emtricitabine OR lamivudine)
Alternative	**Boosted Protease Inhibitor PLUS Two Nucleoside Reverse Transcriptase Inhibitors** • Darunavir and ritonavir (twice daily) PLUS (tenofovir alafenamide OR tenofovir DF) PLUS (emtric
*The regimens within categories are listed in alphabetical order and not to preference.	

Source:

- Kofman AD, Struble KA, Heneine W, et al. 2025 US Public Health Service Guidelines for the Management of Occupational Exposures to Human Immunodeficiency Virus and Recommendations for Post-exposure Prophylaxis in Healthcare Settings. Infect Control Hosp Epidemiol. 2025:46:863-73 [CDC]

Table 5. 2025 USPHS Guidelines for HIV Occupational PEP With Renal Dysfunction or Hepatic Impairment

2025 USPHS Guidelines for HIV Occupational Postexposure Prophylaxis **Initial Preferred and Alternative Regimens for HIV Occupational PEP with Renal Dysfunction or Hepatic Impairment***	
Health Care Personnel with Moderate Renal Dysfunction (CrCl 30-49 mL/min); Expert Consultation Recommended	
Preferred	**Integrase Strand Transfer Inhibitor PLUS Two Nucleoside Reverse Transcriptase Inhib** • Bictegravir-tenofovir alafenamide-emtricitabine • Dolutegravir PLUS tenofovir alafenamide PLUS (emtricitabine OR lamivudine¶)
Alternative	**Integrase Strand Transfer Inhibitor PLUS Two Nucleoside Reverse Transcriptase Inhib** • Dolutegravir PLUS dose-reduced tenofovir DF**, †† PLUS (emtricitabine OR lamivudine¶) **Boosted Protease Inhibitor PLUS Two Nucleoside Reverse Transcriptase Inhibitors** • Darunavir-cobicistat-tenofovir alafenamide-emtricitabine • Darunavir and ritonavir) PLUS (tenofovir alafenamide OR dose-reduced tenofovir DF**, ††)
Health Care Personnel with Severe Renal Dysfunction (CrCl <30 mL/min) and on Hemodialysis; Expert C	
Preferred	**Integrase Strand Transfer Inhibitor PLUS Two Nucleoside Reverse Transcriptase Inhib** • Bictegravir-tenofovir alafenamide-emtricitabine • Dolutegravir PLUS tenofovir alafenamide PLUS (emtricitabine OR dose-reduced lamivudir
Alternative	**Integrase Strand Transfer Inhibitor PLUS Two Nucleoside Reverse Transcriptase Inhib** • Dolutegravir PLUS dose-reduced tenofovir DF** PLUS (emtricitabine OR dose-reduced lam **Boosted Protease Inhibitor PLUS Two Nucleoside Reverse Transcriptase Inhibitors** • Darunavir-cobicistat-tenofovir alafenamide-emtricitabine • Darunavir and ritonavir PLUS (tenofovir alafenamide OR dose-reduced tenofovir DF**, ††) P
Health Care Personnel with Severe Renal Dysfunction (CrCl <30 mL/min, not on hemodialysis); Expert C	
Not applicable	Consult an HIV specialist or consult the NCCC PEPline at 844-275-6222
Health Care Personnel with Hepatic Impairment (Child-Pugh class A or B); Expert Consultation Recomm	
Preferred	**Integrase Strand Transfer Inhibitor PLUS Two Nucleoside Reverse Transcriptase Inhib** • Bictegravir-tenofovir alafenamide-emtricitabine • Dolutegravir PLUS (tenofovir alafenamide OR tenofovir DF) PLUS (emtricitabine OR lamiv
Alternative	**Boosted Protease Inhibitor PLUS Two Nucleoside Reverse Transcriptase Inhibitors** • (Darunavir and cobicistat OR darunavir and ritonavir) PLUS (tenofovir alafenamide OR te
Health Care Personnel with Hepatic Impairment (Child-Pugh class C); Expert Consultation Recommende	
Not applicable	Consult an HIV specialist or consult the NCCC PEPline at 844-275-6222
Abbreviations: CrCl = creatinine clearance *Regimens	

within categories are listed in alphabetical order and not to preference.
[¶]The prescribing information for lamivudine recommends dosage adjustment from 300 mg once daily to 150 mg once daily for patients with CrCl 30–49 mL/min. However, the prescribing information for multiple fixed-dose combination that contain lamivudine recommends no dose adjustment for CrCl 30–49 mL/min. Therefore, no dose adjustment is needed for lamivudine when administered as a standalone tablet or part of a fixed-dose combination tablet.
[**]Dose-reduced tenofovir DF = 300 mg

every 48 hours ††See manufacturer's package insert for dosing instructions for individual agents or consult the antiretroviral dosing recommendations in adults with renal or hepatic insufficiency	

Source:

- Kofman AD, Struble KA, Heneine W, et al. 2025 US Public Health Service Guidelines for the Management of Occupational Exposures to Human Immunodeficiency Virus and Recommendations for Post-exposure Prophylaxis in Healthcare Settings. Infect Control Hosp Epidemiol. 2025:46:863-73 [CDC]