



Post-Exposure Prophylaxis (PEP)

What is post-exposure prophylaxis?

- Post-exposure prophylaxis (PEP) is a biomedical HIV prevention intervention that involves HIV-negative individuals taking anti-retroviral medication after potential exposure to HIV through blood, semen, rectal or vaginal fluids, or breast milk.^{1,2}
- PEP has been used to reduce HIV transmission from many routes of exposure, including
 - Occupational exposures (eg, needle stick injuries, scalpel cut injuries)^{3,4}
 - Sexual exposures (eg, unprotected sex, condom failure, sexual assault)^{2,5-7}
 - Percutaneous exposure from injection drug use^{2,7}
 - Neonates exposed to HIV through breast milk or during birth^{2,8}

What is the biological plausibility behind the use of PEP?

- Taking anti-retroviral medications immediately after exposure to HIV may reduce the viral replication of HIV, which could interrupt or lower the risk of HIV transmission to HIV-negative individuals recently exposed to HIV.¹

What is the evidence suggesting PEP's effectiveness?

- Animal studies and observational (non-experimental) studies suggest that PEP can reduce HIV transmission.^{2,4,6,8} There are no experimental (randomized controlled) trials on PEP;⁵ a randomized-control trial would require the inclusion of a comparison arm of participants who are not provided PEP. Given that previous

studies suggest that PEP works, this would withhold a potentially viable intervention from those in great need, and hence would be considered unethical.

- PEP is believed to be most effective when it is administered as soon as possible, up to 72 hours after exposure, and continuing for a course of 28 days.⁸
- PEP does not completely eliminate the risk of HIV transmission; failure of PEP to prevent HIV infections has been documented.⁹ Missing substantial doses of anti-retroviral medication has been linked to PEP's failure to reduce HIV transmission.¹⁰

What are the recommendations for non-occupational PEP?

- Since 2005, the US Centers for Disease Control and Prevention (CDC) has recommended the use of PEP to prevent HIV transmission after sexual exposure, injection drug use exposure, or other non-occupational exposures under the following settings: when there is “substantial risk for HIV exposure” (eg, rectal, vaginal, percutaneous exposure to body fluids) from a source who is known to be HIV positive, and within 72 hours of exposure.²
- The CDC recommends a case-by-case evaluation for the use of PEP in the following scenarios:
 - When the HIV status of the possible exposure source is unknown
 - When more than 72 hours have passed since exposure

In case-by-case situations, the CDC recommends that clinicians and patients consider the risks and benefits associated with PEP use. In settings where more tolerable and safer anti-retrovirals are available, clinicians may recommend that the potential benefits of PEP outweigh the possible risks and side effects from the medications.²

- The CDC does not recommend use of PEP in cases where there is no substantial risk for HIV exposure (eg, exposure from saliva or sweat).²
- For those receiving PEP, HIV prevention counseling is also recommended to reduce behaviors that could lead to future exposure to HIV, and to avoid possible forward transmission in the event that PEP fails and the person becomes HIV positive.^{2,11} Adherence counseling is also encouraged to maximize medication compliance and reduce PEP failure.⁹
- Those receiving PEP should also be followed over the duration of their PEP regimens, monitored after PEP use with laboratory safety evaluations (liver enzymes, creatinine levels, etc), and tested for HIV, sexually transmitted diseases, and hepatitis B and C.²

What are other considerations for PEP as an HIV prevention strategy?

- Awareness of PEP use, particularly for non-occupational exposures, among men who have sex with men (MSM) remains limited, even in high-income countries:
 - Among a sample of MSM in New York City, a majority of whom had unprotected sex, only 36% were aware of PEP.¹²
 - In the EXPLORE study of over 4000 MSM across the United States, only 47.5% were aware of PEP.¹³
- There are concerns that availability of PEP may mediate risk-taking behaviors and offset the potential benefits of the intervention. However, data from observational studies among those who have received non-occupational PEP do not support these concerns; sexual risk behaviors do not appear to increase significantly after PEP use.¹³⁻¹⁵
- Data on the cost-effectiveness of non-occupational PEP are mixed. PEP is believed to be a “cost-effective complement to existing HIV-prevention efforts” in many metropolitan areas in the United States.¹⁶ However, in Australia, non-occupational PEP is seen as cost-effective only among those who have engaged in unprotected receptive anal sex, but not in other non-occupational exposures.¹⁷

What do recent data on access and knowledge of PEP among MSM tell us?

From June through August 2010, the Global Forum on MSM and HIV (MSMGF) conducted a global study on access to and knowledge of HIV prevention strategies—including PEP—among more than 5000 gay men and other MSM.¹⁸ The responses to self-reported questions on access, knowledge, and desire to learn about PEP are listed below, including overall responses and responses stratified by region and age group.

Access to PEP

- Overall, a modest proportion of respondents (18%) reported having easy access to PEP in their communities.
 - **By region**, Australia had the highest proportion of participants who reported easy access to PEP (56%), followed by Europe (38%), and North America (27%). Asia/Pacific (8%) had the lowest proportion of participants reporting easy access to PEP, followed by Central/South America and the Caribbean (10%), Africa (15%), and the Middle East (18%).
 - **By age group**, MSM under 25 years old had the lowest proportion of participants that reported easy access to PEP in their communities (8%), followed by the 25–40-year-old age group (14%); the age group with the highest proportion of MSM who reported easy access to PEP was MSM over 40 (26%).

Knowledge and Desire to Learn About PEP

- Overall, only 21% of respondents rated their knowledge of PEP as an HIV prevention intervention as “very knowledgeable.” Many participants (44%) rated their knowledge of PEP as “not knowledgeable at all.” Overall, 89% of participants agreed (67% strongly agreed, 22% somewhat agreed) that they would “like to learn more about male PEP to prevent transmission of HIV among gay men/MSM.”
 - **By region**, Europe had the highest proportion of participants who reported being “very knowledgeable” about PEP (56%), followed by Australia (41%) and North America (40%). Asia/Pacific

ic had the lowest proportion of participants who reported being “very knowledgeable” about PEP (7%), followed by Central/South America and the Caribbean (21%), the Middle East (29%), and Africa (30%). The desire to learn about PEP to prevent HIV transmission among MSM was highest among participants from Central/South America and the Caribbean—where 86% of participants “strongly agreed” that they would like to learn more about PEP—followed by Asia/Pacific (79%), Africa (76%), and the Middle East (69%). Interest was lowest among men from Europe (29% “strongly agreed”), followed by men from Australia (30%) and men from North America (48%).

- **By age**, a small proportion of MSM below 25 (10%) rated being “very knowledgeable” about PEP compared to MSM between 25 and 40 years of age (14%) and MSM above 40 (28%). MSM below 25 expressed the strongest desire to learn about PEP as an HIV prevention strategy (78% “strongly agreed” that they would like to learn more about PEP), followed by the 25–40-year-old group (74%) and those 41 years old and older (54%).

Conclusions

PEP can be effective at reducing HIV transmission, if begun within 72 hours of exposure to HIV and used consistently over the course of 4 weeks. While the most effective method for HIV prevention is avoiding exposure, PEP can be beneficial when exposure has already occurred or potentially occurred. PEP has been recommended for sexual exposures and other non-occupational exposures by the CDC since 2005.

Awareness remains a major hurdle, as many MSM are not aware of PEP as an HIV intervention, even in settings where it is available for non-occupational exposures. Yet despite very modest rates of access, there is considerable interest in learning more about the use of PEP as an HIV prevention strategy for MSM. It is imperative to inform gay men and other MSM about all existing HIV prevention strategies, including PEP, and the scale-up of these interventions should be accelerated.

In keeping with rights-based principles of health, HIV-negative individuals exposed to HIV should be informed about PEP as an option to prevent HIV transmission and should be given access to PEP if they desire to use it. Individuals offered PEP should be made aware of the limitations of PEP, including the possibility of failure to prevent HIV transmission, and potential adverse events.

REFERENCES

- 1 Tolle MA, Schwarzwald HL. Postexposure prophylaxis against human immunodeficiency virus. *Am Fam Physician*. Jul 15 2010;82(2):161-166.
- 2 Smith DK, Grohskopf LA, Black RJ, et al. Antiretroviral postexposure prophylaxis after sexual, injection-drug use, or other nonoccupational exposure to HIV in the United States: recommendations from the U.S. Department of Health and Human Services. *MMWR Recomm Rep*. Jan 21 2005;54(RR-2):1-20.
- 3 Young TN, Arens FJ, Kennedy GE, Laurie JW, Rutherford G. Antiretroviral post-exposure prophylaxis (PEP) for occupational HIV exposure. *Cochrane Database Syst Rev*. 2007(1):CD002835.
- 4 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*. Nov 20 1997;337(21):1485-1490.
- 5 Bryant J, Baxter L, Hird S. Non-occupational postexposure prophylaxis for HIV: a systematic review. *Health Technol Assess*. Feb 2009;13(14):iii, ix-x, 1-60.
- 6 Shoptaw S, Rotheram-Fuller E, Landovitz RJ, et al. Non-occupational post exposure prophylaxis as a biobehavioral HIV-prevention intervention. *AIDS Care*. Mar 2008;20(3):376-381.
- 7 Kahn JO, Martin JN, Roland ME, et al. Feasibility of postexposure prophylaxis (PEP) against human immunodeficiency virus infection after sexual or injection drug use exposure: the San Francisco PEP Study. *J Infect Dis*. Mar 1 2001;183(5):707-714.
- 8 Taha TE, Li Q, Hoover DR, et al. Postexposure prophylaxis of breastfeeding HIV-exposed infants with antiretroviral drugs to age 14 weeks: updated efficacy results of the PEPI-Malawi trial. *J Acquir Immune Defic Syndr*. Aug 1 2011;57(4):319-325.
- 9 Roland ME, Neilands TB, Krone MR, et al. Seroconversion following nonoccupational postexposure prophylaxis against HIV. *Clin Infect Dis*. Nov 15 2005;41(10):1507-1513.
- 10 Cohen MS, Kashuba AD, Gay C. HIV antiretroviral postexposure prophylaxis: a cautionary note. *Clin Infect Dis*. Nov 15 2005;41(10):1514-1516.
- 11 Roland ME, Neilands TB, Krone MR, et al. A randomized noninferiority trial of standard versus enhanced risk reduction and adherence counseling for individuals receiving post-exposure prophylaxis following sexual exposures to HIV. *Clin Infect Dis*. Jul 1 2011;53(1):76-83.
- 12 Mehta SA, Silvera R, Bernstein K, Holzman RS, Aberg JA, Daskalakis DC. Awareness of post-exposure HIV prophylaxis in high-risk men who have sex with men in New York City. *Sex Transm Infect*. Jun 2011;87(4):344-348.
- 13 Donnell D, Mimiaga MJ, Mayer K, Chesney M, Koblin B, Coates T. Use of non-occupational post-exposure prophylaxis does not lead to an increase in high risk sex behaviors in men who have sex with men participating in the EXPLORE trial. *AIDS Behav*. Oct 2010;14(5):1182-1189.
- 14 Martin JN, Roland ME, Neilands TB, et al. Use of postexposure prophylaxis against HIV infection following sexual exposure does not lead to increases in high-risk behavior. *AIDS*. Mar 26

- 2004;18(5):787-792.
- 15 Schechter M, do Lago RF, Mendelsohn AB, Moreira RI, Moulton LH, Harrison LH. Behavioral impact, acceptability, and HIV incidence among homosexual men with access to postexposure chemoprophylaxis for HIV. *J Acquir Immune Defic Syndr*. Apr 15 2004;35(5):519-525.
- 16 Pinkerton SD, Martin JN, Roland ME, Katz MH, Coates TJ, Kahn JO. Cost-effectiveness of HIV postexposure prophylaxis following sexual or injection drug exposure in 96 metropolitan areas in the United States. *AIDS*. Oct 21 2004;18(15):2065-2073.
- 17 Guinot D, Ho MT, Poynten IM, et al. Cost-effectiveness of HIV nonoccupational post-exposure prophylaxis in Australia. *HIV Med*. Apr 2009;10(4):199-208.
- 18 Wilson P, Santos GM, Hebert P, Ayala G. *Access to HIV Prevention Services and Attitudes about Emerging Strategies: A Global Survey of Men Who Have Sex with Men (MSM) and their Health Care Providers*. Oakland, CA: The Global Forum on MSM and HIV (MSMGF); July, 2011.