

Factsheet How effective is post-exposure prophylaxis (PEP)?

Key points

- Randomised studies of PEP have not been done, but experience suggests it is effective in preventing HIV infection.
- PEP is most effective when it is started soon after exposure to HIV, when doses are not missed and when people complete the 28-day course.
- The most common cause of HIV infection in people who take PEP is ongoing risk behaviour.



Post-exposure prophylaxis (PEP) is a four-week course of medication that may block HIV infection after exposure to the virus. You can read an overview of PEP [here](#). PEP should not be confused with [pre-exposure prophylaxis \(PrEP\)](#), which involves taking medicine on an ongoing basis, *before* possible exposure to HIV.

The most accurate way to test the efficacy of PEP would be to conduct randomised trials comparing people taking PEP with people not taking PEP. However, this has never been considered to be ethically acceptable as it would involve denying people who have been exposed to HIV a treatment that was expected to be effective. As a result, almost all the evidence on the effectiveness of PEP in humans comes from observational studies, which provide a less robust form of evidence. However, these studies indicate that PEP is highly effective.

In 2016, the Centers for Disease Control and Prevention (CDC) in the United States reviewed six observational studies of PEP use by gay, bisexual and other men who have sex with men. The six studies, from the United States, Australia, the Netherlands and Brazil had been published since 2004.

Of the 1535 men who took PEP, 1487 remained HIV negative and 48 men acquired HIV. However, the details of the transmissions that did occur are important.

- In 40 cases, HIV infection was attributed to ongoing risk behaviour after completing PEP. Among these 40 are 35 cases in which seroconversion occurred more than six months after starting PEP. These HIV transmissions are unlikely to be due to a failure of

PEP.

- 8 cases are considered to represent potential PEP failures. This equates to 5.2 transmissions per 1000 PEP users (0.5%).

Even among these eight cases it is not certain that PEP failed. In three cases, very few details of the cases were recorded by researchers. Another four were diagnosed with HIV between three and six months after starting PEP, but no information on their sexual behaviour after finishing PEP was reported – it is possible that they acquired HIV due to further risky sex after completing PEP. One case might be due to a strain of HIV that was resistant to a drug included in the man's PEP regimen.

The CDC identified a further 15 studies in other populations, including adults, adolescents and children. They may have been exposed to HIV through consensual sex, sexual assault, injecting drug use or needlestick injuries, depending on the individual study.

Of the 2209 people who took PEP, 2190 remained HIV negative and 19 were diagnosed with HIV.

- In 18 cases, HIV acquisition could be explained by factors such as poor adherence or ongoing risk behaviour.
- One case was attributed to PEP failure. This relates to a woman who began PEP within four hours of being sexually assaulted and completed the 28-day course, but seroconverted to HIV six weeks after starting PEP.

PEP is also used by healthcare workers, after needlestick injuries. The first evidence of PEP efficacy came from [a case-control study in 1997](#) which showed an 81% reduction in the odds of HIV transmission among healthcare workers who received zidovudine as PEP. [Whereas there were 57 confirmed HIV infections](#) among American healthcare workers believed to be due to occupational exposure between 1985 and 1999, there was only one further case between 2000 and 2013. The reduction in infections was attributed to the greater use of PEP as well as effective treatment of people with HIV and staff training to prevent injuries.

These data are corroborated by animal studies. [A meta-analysis, published in 2015](#), reviewed 16 studies in which one group of primates were exposed to HIV or SIV and then given PEP, with another group exposed but receiving no treatment. The risk of infection was 89% lower among animals given PEP compared with those that did not receive PEP.

In summary, decades of experience has shown PEP to be associated with a substantial reduction in HIV acquisition following condomless sex and needlestick injuries. Where there have been HIV infections in people receiving PEP, these are primarily related to:

- Not starting PEP promptly
- Missing doses of PEP or not finishing the 28-day course
- A viral strain that is resistant to drugs used in PEP
- Use of antiretroviral drugs which have sub-optimal penetration of the genital tract (these drugs are no longer recommended)
- Having unprotected sex, with further exposure to HIV, while taking PEP.

References

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Cardo DM et al. *A Case–Control Study of HIV Seroconversion in Health Care Workers after Percutaneous Exposure.* New England Journal of Medicine 337:1485–1490, 1997.

Joyce MP et al. *Notes from the field: occupationally acquired HIV infection among health care workers - United States, 1985–2013.* Morbidity and Mortality Weekly Report 63(53):1245–1246, 2015.

Irvine C et al. *Efficacy of HIV Postexposure Prophylaxis: Systematic Review and Meta-analysis of Nonhuman Primate Studies.* Clinical Infectious Diseases 60: S165–S169, 2015.

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