

Condoms for the prevention of HIV transmission

Summary

Condoms are physical barriers that can reduce the risk of a sexual exposure to HIV because they are made of materials that do not allow HIV to pass through them. This makes condoms a highly effective strategy to reduce the risk of HIV transmission when used consistently and correctly. They are much less protective if used inconsistently and/or incorrectly. Condoms also provide protection from other sexually transmitted infections (STIs).

What types of condoms are available to prevent HIV transmission?

Two types of condoms are available to prevent the sexual transmission of HIV:

The **external condom**, also known as the male condom, is a sheath made from polyurethane, latex or polyisoprene, which covers the penis during sexual intercourse. There are many types and brands of external condoms available.

The **internal condom**, also known as the female condom, is a pouch made of polyurethane or nitrile. The internal condom was designed for vaginal sex but can also be used for anal sex. The pouch is open at one end and closed at the other, with a flexible ring at both ends. The ring at the closed end is inserted into the vagina or anus to hold the condom in place. The ring at the open end of the pouch remains outside of the vagina or anus.

How do condoms help prevent the sexual transmission of HIV?

Condoms help prevent transmission by reducing the risk of an exposure to HIV during sex.

Laboratory studies show that the materials used to make most condoms (such as latex, nitrile, polyurethane and polyisoprene) do not let HIV pass through them. Condoms act as a barrier to HIV infection by preventing the vagina,

FACT SHEET

Published
2018

CONTACT US

by telephone
1-800-263-1638
416-203-7122

by fax
416-203-8284

by e-mail
info@catie.ca

by mail
555 Richmond Street West
Suite 505, Box 1104
Toronto ON M5V 3B1

penis, rectum and mouth from being exposed to bodily fluids (such as semen, vaginal fluid and rectal fluid) that can contain HIV.

Some condoms are made from a thin membrane of sheep intestine, and are also known as lambskin condoms. These condoms can be used to help prevent pregnancy but since HIV can pass through them, *they should not be used as an HIV prevention strategy.*

How effective are condoms at preventing the sexual transmission of HIV?

Condoms are a highly effective strategy to help prevent the sexual transmission of HIV when used consistently and correctly. Condoms have been well studied in laboratory tests and it has been determined that condoms are impermeable to HIV, meaning that HIV cannot pass through them.

Condoms can fail to prevent an exposure to HIV if they break, slip or leak during sex. These types of mechanical condom failure are relatively rare, with studies estimating that external condoms fail between 0.4% and 6.5% of the time, and that internal condoms fail between 0.1% and 5.6% of the time.

In studies of condom breakage, slippage and leakage, it was not possible to know how many participants were actually using condoms correctly. However, research suggests that rates of condom failure decrease with more frequent condom use and more experiences of previous failure. This evidence all points to the conclusion that over time people learn to use condoms correctly and this reduces failure rates. However, failure is never reduced to zero, even for experienced condom users who use condoms consistently and correctly.

When condom effectiveness is tested in serodiscordant couples (where one partner is HIV positive and the other is HIV negative), condom effectiveness can range considerably. This is because condoms are not always used consistently and correctly in real life. Observational studies of condom effectiveness have looked at the rates of HIV transmission among couples who reported always using condoms compared to couples who

said they never use condoms. Subsequent analyses (meta-analyses) of many studies in heterosexual couples have estimated that the effectiveness of consistent condom use ranges between 69% and 94%. Similar results (70% to 91% effectiveness) have been observed in studies of gay, bisexual and other men who have sex with men (gbMSM). This wide range of estimates may have to do with the number of studies included and the different ways in which researchers have conducted the analyses. For example, in the most recent meta-analysis that found 91% effectiveness among gbMSM, four studies were included and the researchers looked at how effective condoms are per number of partners instead of per sex act. The authors suggest this type of analysis creates a more accurate estimate of condom effectiveness. No similar data exist for the effectiveness of internal condoms at reducing the risk of HIV transmission through vaginal or anal sex; however, because they are also made of material that does not let HIV pass through, and they have low rates of failure, they are likely to be of similar effectiveness.

The effectiveness of condoms is most likely higher than the above estimates, when used consistently and correctly, because there are three limitations to these observational studies:

- These studies did not ask people about whether they were using condoms correctly. We know that incorrect use can cause condoms to break, slip or leak, allowing HIV to enter the body.
- These studies relied on self-report of consistent condom use. Self-reports can be an unreliable way of measuring behaviours that may be considered socially undesirable such as sex without a condom. Couples may not have used a condom for every sex act, despite reporting consistent use.
- In observational studies, couples are not randomly assigned to use condoms or not. Without randomization, the two groups (those that used condoms consistently and those that did not) may be different in other ways that may contribute to a lower level of effectiveness.

Why is it important to use condoms correctly and what does correct use entail?

It is important to use condoms correctly because incorrect use can cause a condom to break, slip or leak during sex. This can compromise condom effectiveness by allowing vulnerable body parts to come into contact with fluids containing HIV. Other types of incorrect use can also increase the risk of HIV transmission, such as putting a condom on too late or removing the condom too early.

To minimize the risk of condom failure and maximize the effectiveness of condoms, correct use includes:

- Finding an external condom with the right fit and feel (not too small or large).
- Storing condoms at room temperature and regularly replacing condoms that are kept in a wallet, purse or pocket.
- Checking the expiry date and discarding expired condoms.
- Making sure the packaging is not damaged, and carefully opening the package without using sharp objects.
- Using a new condom for every act of vaginal or anal sex.
- Using a new condom with every sex partner and when sharing sex toys.
- Using a condom for the entire act of sex, from start to finish.
- Putting the condom on and taking it off correctly.

The correct way to put on and take off an external condom is to:

- Carefully open the packaging so the condom does not tear.
- Ensure the condom is placed on the penis the right way round.
- Pull back the foreskin of an uncircumcised penis.

- Squeeze the tip of the condom (to remove air and leave space for semen to collect) and unroll it on to the erect penis, all the way to the base of the penis.
- Apply sufficient and appropriate lubrication (only water- or silicone-based lubricants should be used with latex condoms; saliva should not be used as lubrication).
- Immediately after sex, hold on to the condom while pulling the penis out of the vagina or anus.
- Carefully pull the condom from the penis only when there is no contact with the partner's body and take care that no semen spills out.
- Safely dispose of the condom.

The correct way to put on and remove an internal condom is to:

- Carefully open the packaging so the condom does not tear.
- Put lubricant on the outside of the closed end.
- Squeeze together the sides of the inner ring at the closed end of the condom and insert into the vagina or anus.
- Push the inner ring into the vagina or anus as far as it will go, with the outer ring lying outside the vagina or anus.
- If the outer ring is pushed inside the vagina or anus during sex, stop and put it back in the right place.
- Make sure the penis enters the condom and does not go between the condom and the wall of the vagina or rectum.
- Immediately after sex, slightly twist and pull the end of the condom to remove it, taking care not to spill any semen in the vagina or rectum.
- Safely dispose of the condom.

What are the advantages and disadvantages of condoms?

Condoms have several advantages compared to other HIV prevention strategies. Some examples are:

- Condoms are a highly effective strategy to help prevent HIV transmission.
- Condoms reduce the risk of other STIs, such as gonorrhea, chlamydia, herpes and syphilis.
- Condoms are inexpensive and readily available.
- Condoms do not require medical intervention or follow-up.
- Condoms can reduce the risk of unintended pregnancy.

Condoms have several disadvantages and this can make it difficult for people to use them consistently and correctly. Some examples are:

- There are many ways in which condoms can be used incorrectly.
- Condom use can be difficult to negotiate with a sex partner.
- Condoms need to be available at the time of sex.
- Condoms can make it difficult for some people to maintain an erection.
- Condoms can be uncomfortable and can decrease sexual pleasure and intimacy.
- When condoms are used for HIV prevention they do not allow conception.

Resources

CATIE statement on the use of condoms to prevent the sexual transmission of HIV

External condoms and lube for safer sex

Internal condoms and lube for safer sex

References

Conant M, Hardy D, Sernatinger J, et al. Condoms prevent transmission of AIDS-associated retrovirus. *Journal of the American Medical Association*. 1986;255(13):1706.

Judson F, Ehret J, Bodin G, et al. In vitro evaluations of condoms with and without nonoxynol 9 as physical and chemical barriers against Chlamydia trachomatis, herpes simplex virus type 2, and human immunodeficiency virus. *Sexually Transmitted Diseases*. 1989;16(2):51–56.

Reitmeijer C, Krebs J, Feorino P, Judson F. Condoms as physical and chemical barriers against human immunodeficiency virus. *Journal of the American Medical Association*. 1988;259(12):1851–1853.

Van de Perre P, Jacobs D, Sprecher-Goldberger S. The latex condom, an efficient barrier against sexual transmission of AIDS-related viruses. *AIDS*. 1987;1(1):49–52.

Drew W, Blair M, Miner R, Conant M. Evaluation of the virus permeability of a new condom for women. *Sexually Transmitted Diseases*. 1990;17(2):110–112.

U.S. Food and Drug Administration. *Summary of safety and effectiveness data: FC2 female condom*. Available from: http://www.accessdata.fda.gov/cdrh_docs/pdf8/P080002b.pdf

SSL Americas. *Durex synthetic polyisoprene male condom Pre-market Notification 510(k) Summary*. Available from: http://www.accessdata.fda.gov/cdrh_docs/pdf7/K072169.pdf

Ansell Healthcare Products LLC. *Lifestyles lubricated polyisoprene latex male condom Pre-market Notification 510(k) Summary*. Available from: http://www.accessdata.fda.gov/cdrh_docs/pdf7/K070800.pdf

Sanders SA, Yarber WL, Kaufman EL, et al. Condom use errors and problems: a global view. *Sexual Health*. 2012 Feb 17;9(1):81–95.

Crosby R, Bounse S. Condom effectiveness: where are we now? *Sexual Health*. 2012 Mar;9(1):10–17.

Crosby RA. State of condom use in HIV prevention science and practice. *Current HIV/AIDS Report*. 2013 Mar;10(1):59–64.

Weller SC. A meta-analysis of condom effectiveness in reducing sexually transmitted HIV. *Social Science & Medicine*. 1993;36(12):1635–1644.

Davis K, Weller SC. The effectiveness of condoms in reducing heterosexual transmission of HIV. *Family Planning Perspectives*. 1999;31(6):272–279.

Pinkerton S, Abramson P. Effectiveness of condoms in preventing HIV transmission. *Social Science & Medicine*. 1997;44(9):1303–1312.

Weller SC, Davis-Beatty K. Condom effectiveness in reducing heterosexual HIV transmission. *Cochrane Database of Systematic Reviews*. 2002. Available from: <http://doi.wiley.com/10.1002/14651858.CD003255>.

Giannou FK, Tsiara CG, Nikolopoulos GK, et al. Condom effectiveness in reducing heterosexual HIV transmission: a systematic review and meta-analysis of studies on HIV serodiscordant couples. *Expert Review of Pharmacoeconomics and Outcomes Research*. 2016 Aug;16(4):489–499.

Smith DK, Herbst JH, Zhang X, Rose CE. Condom Effectiveness for HIV Prevention by Consistency of Use among Men Who Have Sex with Men (MSM) in the U.S. *Journal of Acquired Immune Deficiency Syndromes*. 2015;68(3):337–344.

Johnson WD, O'Leary A, Flores SA. Per-partner condom effectiveness against HIV for men who have sex with men. *AIDS*. 2018 Jul;32(11):1499–1505.

French PP, Latka M, Gollub EL, et al. Use-effectiveness of the female versus male condom in preventing sexually transmitted disease in women. *Sexually Transmitted Disease*. 2003 May; 30(5):433–439.

Gallo MF, Kilbourne-Brook M, Coffey PS. A review of the effectiveness and acceptability of the female condom for dual protection. *Sexual Health*. 2012 Mar;9(1):18–26.

Renzi C, Tabet SR, Stucky JA, et al. Safety and acceptability of the Reality condom for anal sex among men who have sex with men. *AIDS*. 2003 Mar 28;17(5):727–731.

Kelvin EA, Mantell JE, Candelario N, et al. Off-label use of the female condom for anal intercourse among men in New York city. *American Journal of Public Health*. 2011 December; 101(12):2241–2244.

Kelvin EA, Smith RA, Mantell JE, et al. Adding the female condom to the public health agenda on prevention of HIV and other sexually transmitted infections among men and women during anal intercourse. *American Journal of Public Health*. 2009 June; 99(6):985–987.

Author(s): Arkell C, Harrigan M

Disclaimer

Decisions about particular medical treatments should always be made in consultation with a qualified medical practitioner knowledgeable about HIV- and hepatitis C-related illness and the treatments in question.

CATIE provides information resources to help people living with HIV and/or hepatitis C who wish to manage their own health care in partnership with their care providers. Information accessed through or published or provided by CATIE, however, is not to be considered medical advice. We do not recommend or advocate particular treatments and we urge users to consult as broad a range of sources as possible. We strongly urge users to consult with a qualified medical practitioner prior to undertaking any decision, use or action of a medical nature.

CATIE endeavours to provide the most up-to-date and accurate information at the time of publication. However, information changes and users are encouraged to consult as broad a range of sources as possible. Users relying on this information do so entirely at their own risk. Neither CATIE, nor any of its partners, funders, employees, directors, officers or volunteers may be held liable for damages of any kind that may result from the use or misuse of any such information. The views expressed herein or in any article or publication accessed or published or provided by CATIE do not necessarily reflect the policies or opinions of CATIE nor the views of its partners and funders.

Permission to reproduce

This document is copyrighted. It may be reprinted and distributed in its entirety for non-commercial purposes without prior permission, but permission must be obtained to edit its content. The following credit must appear on any reprint: *This information was provided by the Canadian AIDS Treatment Information Exchange (CATIE). For more information, contact CATIE at 1-800-263-1638.*

Production of this document has been made possible through a financial contribution from the Public Health Agency of Canada. The views expressed herein do not necessarily represent the views of the Public Health Agency of Canada.

CATIE Ordering Centre No: ATI-50221
(aussi disponible en français, ATI-50222)

CATIE fact sheets are available for free at www.catie.ca

CONTACT US

by telephone

1-800-263-1638
416-203-7122

by fax

416-203-8284

by e-mail

info@catie.ca

by mail

555 Richmond Street West
Suite 505, Box 1104
Toronto ON M5V 3B1



Canada's source for
HIV and hepatitis C
information