

## Condoms and Sexually Transmitted Diseases

In June 2000, the National Institutes of Health, in collaboration with the U.S. Centers for Disease Control and Prevention, the U.S. Food and Drug Administration and the U.S. Agency for International Development convened a workshop to evaluate the published evidence establishing the effectiveness of male latex condoms in preventing sexually transmitted diseases (STDs), including the human immunodeficiency virus (HIV).

Recommendations concerning the male latex condom and the prevention of STDs, including human immunodeficiency virus (HIV), are based on information about how different STDs are transmitted, the physical properties of condoms, the anatomic coverage or protection that condoms provide, and epidemiologic studies of condom use and STD risk.

The surest way to avoid transmission of sexually transmitted diseases is to abstain from sexual intercourse, or to be in a long-term mutually monogamous relationship with a partner who has been tested and you know is uninfected.

For persons whose sexual behaviors place them at risk for STDs, correct and consistent use of the male latex condom can reduce the risk of STD transmission. However, no protective method is 100 percent effective, and condom use cannot guarantee absolute protection against any STD. Furthermore, condoms lubricated with spermicides are no more effective than other lubricated condoms in protecting against the transmission of HIV and other STDs. In order to achieve the protective effect of condoms, they must be used correctly and consistently. Incorrect use can lead to condom slippage or breakage, thus diminishing their protective effect. Inconsistent use (e.g., failure to use condoms with every act of intercourse) can lead to STD transmission because transmission can occur with a single act of intercourse.

While condom use has been associated with a lower risk of cervical cancer, the use of condoms should not be a substitute for routine screening with Pap smears to detect and prevent cervical cancer.

## Sexually Transmitted Diseases, Including HIV

There are two primary ways that STDs can be transmitted.

- Discharge diseases (HIV, as well as gonorrhea, chlamydia and trichomoniasis) transmitted when infected semen or vaginal fluids contact mucosal surfaces such as the male urethra, the vagina or cervix.
- Genital ulcer diseases (genital herpes, syphilis and chancroid and human papillomavirus) transmitted through contact with infected skin or mucosal surfaces.

**Laboratory studies** have demonstrated that latex condoms provide an essentially impermeable barrier to particles the size of STD pathogens.

**Theoretical basis for protection.** Condoms can be expected to provide different levels of protection for various sexually transmitted diseases, depending on differences in how the diseases are transmitted.

Because condoms block the discharge of semen or protect the male urethra against exposure to vaginal secretions, a greater level of protection is provided for the discharge diseases. A lesser degree of protection is provided for the genital ulcer diseases or HPV because these infections may be transmitted by exposure to areas (e.g., infected skin or mucosal surfaces) that are not covered or protected by the condom.

**Epidemiologic studies** seek to measure the protective effect of condoms by comparing rates of STDs between condom users and nonusers in real-life settings. Developing such measures of condom effectiveness is challenging.

Most epidemiologic studies of STDs, (other than HIV), are characterized by methodological limitations, and thus, the results across them vary widely — ranging from demonstrating no protection to demonstrating substantial protection associated with condom use. This inconclusiveness of epidemiologic data about condom effectiveness indicates that more research is needed — not that latex condoms do not work.

HIV however, (unlike other STDs studies) have employed more rigorous methods that have consistently demonstrated that condom use is a highly effective means of preventing HIV transmission.

Another type of epidemiologic study involves examination of STD rates in populations rather than individuals. Such studies have demonstrated that when condom use increases within population groups, rates of STDs decline in these groups. Other studies have examined the relationship between condom use and the complications of sexually transmitted infections. For example, condom use has been associated with a decreased risk of cervical cancer — an HPV associated disease.

The following includes specific information for HIV, discharge diseases, genital ulcer diseases and human papillomavirus, including information on laboratory studies, the theoretical basis for protection and epidemiologic studies.

### HIV / AIDS

Acquired Immunodeficiency Syndrome (AIDS) is, by far, the most deadly sexually transmitted disease, and considerably more scientific evidence exists regarding condom effectiveness for prevention of HIV infection than for other STDs. The body of research on the effectiveness of latex condoms in preventing sexual transmission of HIV is both comprehensive and conclusive. In fact, the ability of latex condoms to prevent transmission of HIV has been scientifically established in "real-life" studies of sexually active couples as well as in laboratory studies.

**Laboratory studies** have demonstrated that latex condoms provide an essentially impermeable barrier to particles the size of STD pathogens.

**Theoretical basis for protection.** Latex condoms cover the penis and provide an effective barrier to exposure to secretions such as semen and vaginal fluids, blocking the pathway of sexual transmission of HIV infection.

**Epidemiologic studies** that are conducted in real-life settings, where one partner is infected with HIV and the other partner is not, demonstrate conclusively that

the consistent use of latex condoms provides a high degree of protection.

### **Discharge Diseases, Including Gonorrhea, Chlamydia and Trichomoniasis**

Gonorrhea, chlamydia and trichomoniasis are termed discharge diseases because they are sexually transmitted by genital secretions, such as semen or vaginal fluids. HIV also is transmitted by genital secretions.

**Laboratory studies** have demonstrated that latex condoms provide an essentially impermeable barrier to particles the size of STD pathogens.

**Theoretical basis for protection.** The physical properties of latex condoms protect against discharge diseases such as gonorrhea, chlamydia and trichomoniasis, by providing a barrier to the genital secretions that transmit STD-causing organisms.

**Epidemiologic studies** that compare infection rates among condom users and nonusers provide evidence that latex condoms can protect against the transmission of chlamydia, gonorrhea and trichomoniasis. However, some other epidemiologic studies show little or no protection against these infections. Many of the available epidemiologic studies were not designed or conducted in ways that allow for accurate measurement of condom effectiveness against the discharge diseases. More research is needed to assess the degree of protection latex condoms provide for discharge diseases, other than HIV.

### **Genital Ulcer Diseases and Human Papillomavirus**

Genital ulcer diseases include genital herpes, syphilis and chancroid. These diseases are transmitted primarily through "skin-to-skin" contact from sores/ulcers or infected skin that looks normal. HPV infections are transmitted through contact with infected genital skin or mucosal surfaces/fluids. Genital ulcer diseases and HPV infection can occur in male or female genital areas that are, or are not, covered (protected by the condom).

**Laboratory studies** have demonstrated that latex condoms provide an essentially impermeable barrier to particles the size of STD pathogens.

**Theoretical basis for protection.** Protection against genital ulcer diseases and HPV depends on the site of the sore/ulcer or infection. Latex condoms can only protect against transmission when the ulcers or infections are in genital areas that are covered or protected by the condom. Thus, consistent and correct use of latex condoms would be expected to protect against transmission of genital ulcer diseases and HPV in some, but not all, instances.

**Epidemiologic studies** that compare infection rates among condom users and nonusers provide evidence that latex condoms can protect against the transmission of syphilis and genital herpes. However, some other epidemiologic studies show little or no protection. Many of the available epidemiologic studies were not designed or conducted in ways that allow for accurate measurement of condom effectiveness against the genital ulcer diseases. No conclusive studies have specifically addressed the transmission of chancroid and condom use, although several studies have documented a reduced risk of genital ulcers in settings where chancroid is a leading cause of genital ulcers. More research is needed to assess the degree of protection latex condoms provide for the genital ulcer diseases.

While some epidemiologic studies have demonstrated lower rates of HPV infection among condom users, most have not. It is particularly difficult to study the relationship between condom use and HPV infection because HPV infection is often intermittently detectable and because it is difficult to assess the frequency of either existing or new infections. Many of the available epidemiologic studies were not designed or conducted in ways that allow for accurate measurement of condom effectiveness against HPV infection.

A number of studies, however, do show an association between condom use and a reduced risk of HPV-associated diseases, including genital warts, cervical dysplasia and cervical cancer. The reason for lower rates of cervical cancer among condom users observed in some studies is unknown. HPV infection

is believed to be required, but not by itself sufficient, for cervical cancer to occur. Co-infections with other STDs may be a factor in increasing the likelihood that HPV infection will lead to cervical cancer. More research is needed to assess the degree of protection latex condoms provide for both HPV infection and HPV-associated disease, such as cervical cancer.

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