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From: *John* Leonard

Date: December 7, 1992

Re: Condom Effectiveness Report

Enclosed is your copy of the much awaited Condom Effective-
ness Report. Thanks to all of you for your input and
feedback on this project. Special thanks to Miriam, Beth,
Ellen, and Karen Hartfield for your contributions.

The reports are being distributed as follows:
In the Seattle school district they will be distributed in
early January to middle school and high school health,
family life, and HIV teachers, and nursing staff.

In King County school districts outside Seattle, the reports
will be mailed in mid-December along with a letter detailing
local health department resources supporting quality HIV
education in the schools. They will go to district health
coordinators and to each secondary school principal with
instructions to distribute within the building to health and
HIV teachers, counselors and nurses.

The State Office of the Superintendent of Public Instruction
is planning a large mailing to Washington school districts
in late December/early January that will include the Condom
Effectiveness Report as well as other updates on HIV related
issues. This mailing will be sent to district health
coordinators, curriculum directors, school nurses, and
secondary school HIV teachers (excluding King County).

In addition, APP will mail to Regional AIDS Nets, health
department staff, selected Seattle area AIDS organizations,
and to our Speakers' Bureau and InfoGram mailing lists.
Additional copies may be requested from us by calling (206)
296-4999.

FOCUS ON SCHOOL HEALTH

Special Report on Condom Effectiveness

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VOLUME 3

As the AIDS epidemic continues to spread, a growing number of communities and school districts are searching for better ways to educate young people about this disease and how to prevent it. Many districts are re-examining their HIV/AIDS curricula and considering such strategies as enhanced abstinence education, communication/decision making lessons, explicit condom instruction, and condom accessibility. In the context of these debates, a common question often arises: **"Just how effective are condoms?"**

This special report was prepared by the Seattle-King County Department of Public Health to address this important issue. The findings published here are based on an extensive review of the scientific literature on condom effectiveness and on the consensus of an expert panel of scientists in the field of STD/AIDS, convened in Seattle in June 1992.¹

Teens At Risk

There is little debate over the question of whether teens today are at risk for HIV and other sexually transmitted diseases. Here are some facts:

- In a 1990 survey of U.S. high school youth, 54% reported ever having had sexual intercourse.² By age 20, 69% of adolescent females and 86% of adolescent males are sexually active.³
- One in ten girls age 15 to 19 becomes pregnant each year.⁴
- Three million U.S. teens are infected with a sexually transmitted disease (STD) each year.³ In Washington state, 61% of all gonorrhea and 78% of chlamydia is reported in people between the ages of 10 and 24.⁵
- Adolescent females are more susceptible to STDs than adults because of the anatomy and physiology of the adolescent cervix. The exposed thin mucosa of the cervix increases the likelihood of infection after exposure.⁶
- Nineteen per cent of people with AIDS are between the ages of 20 and 29. Because it can take 10 years or longer for persons with HIV to develop AIDS, we know that a substantial number of people with AIDS today contracted the virus in their teens.⁷
- In the past two years alone, the number of young adults (age 13 to 24) diagnosed with AIDS in the U.S. has increased 77%.³

How Condoms Work

STD transmission occurs when bacteria, viruses and other disease-causing organisms pass from one person to another. Studies have shown that latex condoms provide an impermeable barrier to STD organisms. Condoms protect the wearer by preventing direct contact between the penis and cervical, vaginal, or rectal secretions or sores. Condoms protect the partner from exposure to infected semen, discharge, or penile sores.

Condoms are most effective in preventing STDs that are transmitted through body fluids (e.g. HIV, gonorrhea, chlamydia). They are somewhat less effective against STDs that are transmitted through skin-to-skin contact (e.g. herpes, genital warts) because the condom may not cover the affected area.

How Effective Are Condoms?

Laboratory and Clinical Evidence

Hundreds of laboratory and clinical studies have been conducted on condoms. Laboratory studies, employing a variety of testing methods including mechanical simulation of intercourse, show that STD viruses and bacteria cannot pass through latex condoms.^{8, 9} However, some "natural skin" condoms have been found to have tiny pores which can allow passage of certain STD organisms including HIV and hepatitis B virus.⁸

In addition to laboratory tests, many clinical studies of sexually active people have shown that condoms provide protection against STDs. In ten recent studies involving HIV infected persons and their partners (a total of 1,908 participants) 9% of those who did not use condoms became infected with HIV, compared to 1% of those reporting condom use.¹⁰ It is important to note that condom users in several of these studies reported inconsistent or incorrect use.

Breakage and Leakage

In fact, the Centers for Disease Control reports that "most data suggest that nonuse, inconsistent use, and incorrect use—not condom breakage or leakage—are usually responsible for infections and unwanted pregnancies."¹¹ Studies indicate that the most common forms of incorrect usage include: failure to put the condom on *before* the start of sexual activity; the use of oil-based lubricants (which rapidly weaken latex); and tearing the condom with fingernails or jewelry.¹¹ A review of 16 studies of condom users found the average reported breakage during vaginal use was 3.2% and anal use 4.7%.^{12, 13, 14}

Leakage of fluid through pinhole-sized manufacturing defects in latex condoms *can* occur, but appears to be rare. The federal Food and Drug Administration (FDA) sets quality control standards and regulates all condoms sold in the United States. The FDA tests sample batches and those which fail at a rate of more than 0.004 may not be sold in the U.S.¹³

Condom Failure and STD Infection

Condom failure (i.e. breakage, leakage) does not always lead to disease transmission. Studies report that breaks often occur before ejaculation or when the condom is being put on or taken off.¹⁴ Thus, body fluids are not exchanged. When breaks occur on the sides or near the base of the condom, fluid exchange is much less likely than breaks at the tip. Even when breakage does result in fluid exchange, infection does not necessarily take place. The risk of contracting HIV from having sexual intercourse with an infected person *without* using a condom has been estimated to be between one in 10 and one in 1000.¹⁵ The chances of HIV infection after a condom break have not been studied, but would likely be even smaller.

Correct Condom Use

The evidence is clear that latex condoms are highly effective in preventing transmission of HIV and other STDs. Studies indicate that effectiveness increases with the users' knowledge and experience.¹⁶ The following rules for proper condom use can help reduce the small risk of condom failure.

1. A condom must be used **every time** a couple has sexual intercourse.
A condom can't protect if it's not used.
2. **Latex** (rubber) condoms are best. They are better than "natural skin" condoms which may have tiny holes that can allow some organisms to pass through. However, natural skin condoms are better than no condom at all.
3. Condoms must be opened and handled **carefully**. People should never use a condom in a damaged package or one that is past its expiration date (some condom packages show the date of manufacture instead of the expiration date; don't use a condom more than 3 years past its manufacture date). Condoms should not be kept in hot or sunny places like wallets or glove compartments; they age more quickly there.
4. The condom must be put on from the **very beginning** of sex, after erection, but **before intercourse**.
5. The condom should be placed against the head of the erect penis, leaving some space at the tip to collect semen (a dab of water-based lubricant inside the tip will increase sensitivity). It is important to pinch the tip of the condom and unroll it all the way down to the base of the penis (with the foreskin pulled back if uncircumcised).
6. Plenty of **water-based lubricant** should be used on the outside of the condom to reduce the friction that can cause breakage during intercourse. Water-based lubricants include K-Y Jelly, Replense, and Today brand personal lubricant. It's wise to use lubricant, even if the condom is "prelubricated."

Never use an oil-based lubricant with a latex condom. Lubricants like Vaseline, hand lotion, and mineral oil are oil-based and can eat through latex within minutes, allowing organisms to pass through a condom.
7. **Immediately** after ejaculation, the penis must be withdrawn while still erect, holding the base of the condom to prevent its slipping off or spilling semen. After removal, the condom should be disposed of in the garbage, *not* the toilet.
8. It's a good idea to wash the hands and genitals after intercourse.

Condom Education And The Law

HIV/AIDS education, required in the 5th through 12th grades by Washington State law, must emphasize that "the risk of being infected with HIV can be virtually eliminated by not engaging in sexual intercourse and by not using illegal intravenous drugs."¹⁷ Clearly, abstinence is the safest and the best protection.

Curricula must also teach that "proper use of a latex condom and not sharing needles or other injection equipment will greatly reduce the possibility of transmission."¹⁷ It is critical to provide both messages accurately, and to assure balance in teaching about the certain protection of abstinence and the effective risk reduction of condom use.

A Note On Dental Dams

Although oral-vaginal and oral-anal contact are not considered "high risk" for HIV transmission, these practices have been shown to transmit disease.¹⁸ A dental dam is a flat piece of latex that can be used as a barrier during these sexual activities. Dental dams (also called "latex dams") are available in some clinics and also can be made by cutting the tip off a condom and cutting it up the side. Dental dams are not regulated by the FDA for quality control and their effectiveness in STD prevention has not been studied. Latex dams, however, may be useful in reducing the transmission of disease.

Summary

Scientific studies have clearly demonstrated the effectiveness of condoms in preventing HIV and other STDs. Latex condoms are greater than 90% effective and with consistent and correct use, effectiveness rates are even higher.¹⁶ It is true that condoms do not provide 100% protection, but neither do seat belts, smoke alarms, or vaccinations. Guarantees of perfect protection are not necessary in order to recommend any lifesaving device or public health strategy.

For these reasons, condoms are strongly recommended for HIV/STD risk reduction for teens who do not abstain. Among the many authorities which make this recommendation are the United States Department of Health and Human Services—Centers for Disease Control, the American Academy of Pediatrics, the Washington State Medical Association, the Washington Governor's Advisory Council on HIV/AIDS, the Washington State Department of Health—Division of HIV/AIDS and STDs, and the Seattle-King County Department of Public Health.

References

1. The expert panel members included: Dr. Sharon Baker, Research Assistant Professor, University of Washington School of Social Work; Dr. Michael Free, Vice President, Program for Appropriate Technology in Health; Dr. Hunter Handsfield, Professor of Medicine, University of Washington and Director of Sexually Transmitted Disease Control, Seattle-King County Department of Public Health; Dr. Vivian Hanson, Senior Staff Physician, Family Planning Program, Seattle-King County Department of Public Health; Dr. King Holmes, Professor of Medicine, University of Washington; Dr. Joan Kreiss, Associate Professor of Epidemiology, University of Washington; and Dr. Robert Wood, Associate Professor of Medicine, University of Washington and Director of AIDS Control, Seattle-King County Department of Public Health.
2. U.S. Centers for Disease Control. "Sexual Behavior Among High School Students - United States, 1990" *Morbidity and Mortality Weekly Report*, January 3, 1992, Vol. 40, Nos. 51 and 52.
3. United States House of Representatives, Select Committee on Children, Youth and Families. "A Decade of Denial: Teens and AIDS in America" 1992.
4. Hatcher, R. et al., *Contraceptive Technology 1990-92*. Irvington Publishers, New York, NY, 1990.
5. Washington State Department of Health, Office of STD Services. "Report of Cases/Percent by Report Source/Age" July 13, 1992.
6. Holmes, K. K. et al., *Sexually Transmitted Diseases*. McGraw Hill, New York, 1990. p. 81.
7. U.S. Department of Health and Human Services, Centers for Disease Control, *HIV/AIDS Surveillance—Second Quarter Edition*, July 1992.
8. Lytle CD, et al. "Virus leakage through natural membrane condoms" (meeting abstract). Fifth International Conference on AIDS, Montreal, Quebec, June, 1989.

Minuk GY, et al. "Condoms and the prevention of AIDS" (letter). *Journal of the American Medical Association*, 256:11, 1443; 1986.

Van de Perre P, et al, "The latex condom, an efficient barrier against sexual transmission of AIDS-related viruses." *AIDS*, 1:1, 49-52; May, 1987.
9. Blair M, Drew WL, "Condom model for evaluating HIV transmission." (Unpublished) 1988.

Conant M, et al. "Condoms prevent transmission of AIDS-associated retrovirus" (Letter). *Journal of American Medical Association*, 255:13, 1706; April 1986.

Conant M, et al. "Herpes simplex virus transmission: condom studies." *Sexually Transmitted Disease*, 11:2, 94-5; April 1984.

Eglin RP, "Nonoxynol-9 pessaries and condoms prevent transmission of HIV in vitro." *British Journal of Sexual Medicine*, 237-238; July 1988.

Goldstein AS, et al., "Permeability of stressed latex and silicone gloves and condoms to HIV" (meeting abstract). Fourth International Conference on AIDS, Stockholm, Sweden, June 1988.

Herman, W. et al., "A simulated physiologic test of latex condoms" (meeting abstract p. 136). Fifth International conference on AIDS, Montreal, Quebec, June 1989.
- Judson FN, 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*, 16:2, 51-6; April 1989.
- Katznelson S, et al., "Efficacy of the condom as a barrier to the transmission of cytomegalovirus." *The Journal of Infectious Diseases*, 150:1, 155-7; July 1984.
- Kisn LS, et al., "An ancient method and a modern scourge: the condom as a barrier against herpes." *Journal of the American Academy of Dermatology*, 9:5, 767-70; November 1983.
- Minuk GY, et al., "Condoms and hepatitis B virus infection" (letter). *Annals of Internal Medicine*, 104:4, 584; April 1986.
- Rietmeijer CAM, et al., "Condoms as physical and chemical barriers against human immunodeficiency virus." *Journal of the American Medical Association*, 259:12, 1851-3; March 1988.
- Scesney SM, et al., "Impermeability of condoms to HIV and inactivation of HIV by the spermicide nonoxynol-9." (Unpublished) 1987.
- Voeller B, et al., "Testing HIV leakage through condoms" (unpublished). Presented at the Fourth International Conference on AIDS, Stockholm, Sweden, June 1988.
10. European Study Group on Heterosexual Transmission of HIV, "Comparison of female to male and male to female transmission of HIV in 563 stable couples". *British Medical Journal*, 304:809, 1992.

Fischl MA., et al., "Evaluation of heterosexual partners, children, and household contacts of adults with AIDS." *Journal of the American Medical Association*, 257:640, 1987.

Laurian Y., et al., "HIV infection in sexual partners of HIV-seropositive patients with hemophilia" (letter). *New England Journal of Medicine*, 320:183, 1989.

Perroni L., et al., "Transmission of HIV infection in heterosexual partners of HIV+ drug addicts." Presented at 5th International conference on AIDS, Montreal, 1989.

Chiodo F., et al., "Risk Factors in heterosexual transmission of HIV." Presented at 6th International conference on AIDS, Montreal, 1990.

Darrow WW, "Condom use and use-effectiveness in high-risk populations." *Condoms in the Prevention of STD*, p15. December 1989.

U.S. Centers for Disease Control. "Antibody to HIV in female prostitutes." *Morbidity and Mortality Weekly Report*, 36:157, 1987.

Roumelioutou A., et al., "Effectiveness of condom use in prevention of HIV infection in prostitutes." *The Lancet*, 2:1249, 1988.

Quinn TC., et al., "HIV infection among patients attending clinics for STD's." *New England Journal of Medicine*, 318:197, 1988.

Smiley ML., et al., "Transmission of HIV to sexual partners of hemophiliacs." *American Journal of Hematology*, 28:27, 1988.
11. Stone, K., Peterson, H. "Condom Bibliography" *STD Interchange*, April, 1992.

References- continued

12. Albert R., et al., "Condom use and breakage among women in a municipal hospital family planning clinic." *Contraception*, 43:167, 1991.
- Trussell D., et al., "Condom slippage and breakage rates." *Family Planning Perspectives*, 24:20, 1992.
- Trussell D., et al., "Condom performance during vaginal intercourse: comparison of Trojan-Enz and Tactylon condoms". *Contraception*, 45:11, 1992.
- Steiner M., et al., "Study to determine the correlation between condom breakage in human use and laboratory test results". *Family Health International*, Research Triangle Park, NC, Dec 1991.
- Hatcher R., et al., "The truth about condoms". *SIECUS Report*, 17:2, Nov-Dec 1992.
- Golombok S., et al., "Condom failure among homosexual men". *AIDS* 404, 1989.
- Ross M, "Problems associated with condom use in homosexual men". *American Journal of Public Health*, 77:877, 1987.
- Van Griensven G., et al., "Failure rate on condoms during anogenital intercourse in homosexual men". *Genitourinary Medicine*, 64:344, 1988.
- Tindall B., et al., "Sexual practices and condom use in a cohort of homosexual men in relation to HIV status". *Medical Journal of Australia*, 151:318, 1989.
- Cohn D., et al., "Condom usage for anal intercourse in a longitudinal cohort of gay and bisexual men". Presented at 4th International conference on AIDS, Stockholm, 1988.
- Wigersma L and Ond R. "Safety and acceptability of condoms for use by homosexual men as a prophylactic against transmission of HIV during anogenital sexual intercourse". *British Medical Journal*, 295, 6590-94, 1987.
- Gotzsche P and Hording M. "Condoms to prevent HIV transmission do not imply truly safe sex". *Scandinavian Journal of Infectious Diseases*. 20:2, 233, 198.
- U.S. Centers for Disease Control., "Heterosexual behaviors and factors that influence condom use among patients attending an STD clinic". *MMWR*, 39:685, 1990.
13. Consumers Union. "Can You Rely on Condoms? *Consumer Reports*, March 1989, p. 136.
14. Piedrahita, C. et al. "Latex Condom Breakage Study, Barbados and St. Lucia condom lot, site. Family Health International (FHI). Research Triangle Park, NC, September 1990 (unpublished).
- Richters, J. et al.. "Low Condom Breakage Rate in Commercial Sex" *Lancet* 1988; 5: 2-5.
15. Liskin. L. et al."Condoms—Now More Than Ever" *Population Reports Series H*, No. 8, September 1990.
16. Hatcher, R., Hughes, M. "The Truth About Condoms" *SIECUS Report* 17 (2): 1-9. November-December 1988.
- Mishell, D. Jr. "Contraception" *New England Journal of Medicine* Vol. 320, No. 12, p.779.
17. Washington State Department of Health, Office on HIV/AIDS. "Curriculum Review for Medical Accuracy."
18. Corey, L., Holmes K.K. "Sexual Transmission of Hepatitis A in Homosexual Men: Incidence and Mechanism. *New England Journal Of Medicine*, 1980; 302:35-438.
- Spitzer, P., Weiner, N. "Transmission of HIV Infection From a Woman to a Man by Oral Sex" *New England Journal of Medicine* 1989; 320: 251.
- Monzon, O, Capellan, J. "Female to Female transmission of HIV." *Lancet* 1987; 2:40-1.