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An HIV Information Site & HIV Educational Resource Site (HIS & HERS)

An Overview of HIV Transmission

or, How does someone get infected with HIV?

I. Unprotected sexual intercourse. Unprotected sexual intercourse refers to two or more people having sex without the use of condoms or without using safer forms of sexual intercourse such as mutual masturbation. If condoms are not used or they do not work due to breakage or leakage, then virus that is contained in the semen (male cum) or female vaginal fluids or rectal secretions or oral secretions may infect the other partner. Having sex is the most common way that HIV can be transmitted. Since there is no way to look at someone and know if a partner has HIV infection, every time a person has sex without condoms or other protection, that person risks getting HIV as well as other sexually transmitted diseases. Oral sex is thought to be less risky, but because people are having more oral sex, the risk of getting HIV from that route is also rising. Basically unless one uses condoms or sexual techniques that do not involve the exchange of secretions at all, one is at risk for a chronic HIV infection. In 2003, approximately 1 million people became newly infected globally, and approximately 40,000 became infected in the U.S. Over 90% of these infections were through sex. If someone is exposed through sexual intercourse inadvertently, that person should seek immediate care at a good healthcare facility. In extremely risky situations the possibly exposed person may be offered antiviral medicines to decrease the chance of infection. The consistent use of condoms for all types of sexual intercourse that might result in the exchange of body fluids (oral, vaginal, and anal sex) is the best way to prevent transmission of HIV and many other sexually transmitted diseases (see **Table 1**.) Remember, your refusal for sexual intercourse without condoms is a way of showing how much you care for your partner and yourself.

Consider the following practical suggestions to prevent sexual transmission of HIV or other STDs:

1. Discuss your HIV status with any partners and inquire about theirs.
2. Abstain from sex with casual partners who are less likely to be forthright about their status.
3. Avoid the use of alcohol and drugs in the setting of sexual intercourse. Alcohol and drugs may lower your defenses and put you at the mercy of someone who does not care that STDS including HIV might be passed between partners. If you do drink alcohol or use drugs, use only the smallest amount if sexual intercourse might take place.
4. Avoid forms of sexual intercourse that make you defenseless to your partner (for example, handcuffs, tied up, etc.).
5. Avoid sexual intercourse with more than one partner at a time. Multiple simultaneous partners subject you to much more risk of STDs and HIV.
6. In anticipation of possible condom breakage, make sure you plan on having several condoms on hand for every instance of sexual intercourse.
7. If you are ridiculed for insisting on condom usage, tell that person that your concern shows how much respect you have for your sex partners.

8. Consider carrying condoms with you in your vehicle in a small Styrofoam container that will provide some insulation from temperature highs and lows. Even a couple of Styrofoam coffee cups with a tight lid might provide enough protection. If you don't use those stored condoms in a month or so, throw them away and replace them just in case some spoilage has occurred.
9. If you are on a date and sexual intercourse is possible but you do not have condoms, insist that you stop at a store on the way to where sex will take place and purchase several condoms. Don't forget to get some water-based lubricant if that is necessary.
10. If the exchange of possibly infectious body fluids (especially blood or semen) takes place or may have taken place, both partners should seek immediate care at a healthcare facility or emergency department that has expertise in handling HIV exposure and preventative medications.
11. Check condom expiration dates and discard them when they are older than that date. Good condoms are not cheap, but this practice is cheaper than a lifetime HIV infection or just one trip to an Emergency Department for a STD.
12. Follow directions for condom use and application carefully.

II. Intravenous drug use with sharing of syringes/needles. Intravenous drugs are drugs that are usually not prescribed that are injected directly into veins. The drugs that are injected are usually heroin or cocaine, but almost any type of pill or liquid medicine can be injected. The drugs themselves do not cause HIV infection unless they are contaminated with blood from someone else. It is the act of sharing needles which occurs in the setting of intravenous drug use that puts everyone that shares at risk for HIV. Anytime a syringe is used, the syringe is contaminated with blood from the person that used it. If the syringe is then re-used, that small amount of possibly HIV-infected blood that is left in the syringe can infect the second, third, fourth, etc., users of the syringe with HIV. This mode of transmission can be eliminated by never sharing needles. In some parts of the US and other parts of the world, clean syringes and needles are supplied to intravenous drug users in exchange for their used syringes and needles. Another way to prevent transmission through syringes and needles is to pump a dilute solution of bleach in and out of the syringe before it is reused by the next person. The dilute bleach solution kills HIV and other infections that can be in blood (for example, hepatitis B and C). It should be noted that in some poorer areas of the world, syringes and needles are reused to save money. This practice has resulted in outbreaks of HIV and hepatitis.

Practical suggestions to prevent transmission through IV drug use includes the following:

1. Never share syringes or needles ("works") AT ALL EVER!
2. Obtain fresh syringes at a drugstore if possible or through needle exchange programs.
3. If you must reuse a syringe that someone else has used or even one that you have used before, rinse the needle and the syringe out with a dilute bleach solution before each use.
4. Dispose of used syringes and needles properly so that children or barefoot pedestrians will not get pricked and/or exposed.

III. Blood transfusion with HIV-infected blood. Since 1984 the U.S. blood supply has been screened for HIV infection so that getting HIV from a blood transfusion is very rare. Occasionally however someone that is newly infected with HIV donates blood, and the usual test ("HIV ELISA or antibody test") to look for HIV in the donated blood does not pick the HIV up. Within the last few years an additional test ("P24 antigen") is now done to pick this type of early HIV infection up. Only

extremely rarely does HIV-infected blood make it through this double testing. Another safeguard to the blood supply is that persons with high risk for HIV infection (e.g., gay men, hemophiliacs, etc.) are barred from donating blood or other organs. Unfortunately as the epidemic spreads out, there are more and more persons with HIV infection that do not fit in the groups that are currently prohibited from donating. Despite this, the blood supply in the U.S. is extremely safe. Nevertheless one should never accept a blood transfusion unless it is recommended strongly by an experienced healthcare provider. The group of people that were hardest hit by blood products were hemophiliacs. Hemophiliacs lack substances in their blood that promote clotting. Without clotting substances, the blood is very thin, and hemophiliacs bleed very easily internally and externally from bumps or cuts. Hemophiliacs frequently receive clotting substance injections that have been collected and concentrated from many, many blood donors. If one of the blood donors had HIV, then all the persons that received concentrate from that donor become infected with HIV. Currently blood concentrates are also very safe due to the double testing and donor screening that is mentioned above.

IV. Transmission from infected mother to child. The exact way that mothers with HIV infection give HIV to their new babies is not fully understood. However, since mother and child share blood and other tissues and the birth process itself can involve a fair amount of bleeding, babies that are newly born can be infected by their mother. Also breast milk has a lot of white blood cells in it, and white blood cells can harbor HIV; therefore, babies who are breast fed by HIV infected mothers can become infected in this way. It is now proven that by treating the mother during the months before she gives birth or at least at the time of birth with antiviral drugs, infection of the newborn baby can be prevented in almost all cases. Since this type of treatment of pregnant HIV-infected women has become standard practice in the U.S., there are now practically no children infected at birth by their mothers. HIV-infected mothers are also advised to not breast feed their babies. Unfortunately there are many parts of the world where mother-to-child infections are still common due to lack of medicines or healthcare providers and facilities. Also breastfeeding is still important in some areas of the world where healthy, inexpensive artificial feeding formulas for babies are not available.

Practical ways to prevent transmission from mother to child include the following:

1. If you are pregnant, get testing for HIV infection if you have not already been tested.
2. If you are pregnant, seek prenatal (before birth) medical care as soon as possible and stick with it.
3. If you are HIV positive and you have a new child, do not breastfeed.
4. Encourage all of your pregnant relatives and friends to seek HIV testing and prenatal (before birth) evaluation and treatment.

V. Healthcare worker exposure to body fluids of patients with HIV infection. Healthcare workers are persons that work in medical offices or hospitals. Doctors, dentists, nurses, lab technicians, blood drawers, physical therapists, and even housekeepers and laundry workers in healthcare facilities can be exposed to blood or other human tissues that may be infected with HIV at their place of employment. Usually the exposure is the result of needle pricks, but exposure can also result from scalpels, splashes of fluids, or even coughs that expel phlegm or sputum onto the worker. Many of these exposures are due to errors made by the healthcare worker, but sometimes these exposures are unavoidable. It has been estimated that approximately 1 in 10,000 of such exposures results in infection. The exact type of exposure is important in figuring out how likely the healthcare worker will get HIV infection. Infection is more likely if (1) the healthcare worker is stuck with a hollow

needle that contains the patient's blood and/or (2) the patient's blood has a large amount of virus ("high viral load"). Exposure which involve splashes, other fluids besides blood (urine, stool, etc.), or patients which have a undetectable viral load are much less serious. If the exposure is deemed serious, the healthcare worker is treated immediately with an expert selection of potent antiviral medicines to decrease the probability of infection. In many cases healthcare workers are exposed to blood from a patient who is not known to have HIV. However, since pretty much anyone has at least some chance of having HIV, blood is drawn from the patient to better determine what the risks are to the healthcare worker, and the exposed healthcare worker may be treated while the test is in progress.

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