The connections between HIV and other sexually transmitted diseases (STDs) are important both for HIV and STD prevention, especially since STD infection increases the likelihood of HIV transmission by two to five times. One way of uncovering these relationships is to look at the way “risk” is conceptualized and how this conception affects the way people perceive HIV and other STDs.

“Risk,” one of the most commonly used terms in HIV and STD prevention, is loaded with multiple meanings. When these different meanings are mixed in the context of HIV prevention, subtle but important miscommunication can impede counseling about safer behaviors.

A person’s conception of risk is related to his or her perception of three aspects of the epidemiology of disease:

- The chance of his or her exposure to an infectious agent, such as HIV or gonorrhea;
- The chance of actually becoming infected after being exposed;
- The chance and the nature of severe consequences as a result of being infected.

This article proposes that when client risk is addressed during counseling in the context of these three components, discussions about the adoption of safer behaviors can become more specific and meaningful to clients.

Behavioral Science and the Concept of Risk

Extensive research has demonstrated that several factors are associated with successful behavior change, including awareness of the health threat, costs and benefits of change, availability of social support to encourage the change, interpersonal issues, environmental or structural forces, and perceptions of susceptibility, severity, and self-efficacy (an individual’s belief that he or she can achieve change). While no single factor has been shown to consistently induce behavior change, most behavioral science models—for example, the Health Belief Model, AIDS Risk Reduction Model, and the Transtheoretical Model—either explicitly or implicitly acknowledge the importance of “perceived susceptibility” as a motivator of or a precursor to “problem recognition” of current unsafe behavior.

For some people, “threat” embodies aspects of both susceptibility and severity, and may be closely linked to fear, a subjective response to the personal, social, and economic consequences of having a disease. While a moderate level of fear may help motivate a desire for or commitment to safer behaviors, high levels of anxiety may impede adoption of safer behaviors. Fear may lead a person to overestimate his or her chances for infection, especially when chances for infection are not distinguished from consequences of infection.

On the other hand, according to Neil Weinstein, people often underestimate their susceptibility to disease, especially when comparing their own chances with those of their peers and when the “risk” seems distant to them. For these reasons, it is important for providers to help a client determine what he or she means by “risk” and how this conceptualization of risk affects the client’s desire or willingness to change behavior. To facilitate this determination, it makes sense to examine risk in terms of three dimensions: the probability of disease exposure, the probability of infection actually occurring, and the subsequent consequences of infection. Surveying the range of STDs, including HIV, helps to understand how these aspects of risk vary for a particular disease and compare across diseases.

Probability of Exposure

The probability of meeting a potential
Editorial: Revisiting STDs
Robert Marks, Editor

Over the past few years, rates of sexually transmitted diseases such as syphilis, gonorrhea, and chlamydia have jumped along with rates of HIV infection. During the same period, the UCSF AIDS Health Project has piloted STD services at anonymous HIV antibody test sites, reporting overwhelming acceptance of chlamydia and pharyngeal gonorrhea screening and treatment among HIV test clients.

Deconstructing Risk
These developments suggested to us that it was a good time to revisit a topic that we covered in 1999. We asked Paul Gibson to revise two articles that we published in June of that year to reflect changes in both HIV and STD epidemics.

It remains true four-and-a-half years later that research supports a strong connection between other sexually transmitted diseases and HIV, particularly in terms of the likelihood that ulcerative STDs will increase the risk of HIV transmission. It also remains true that the relationship between HIV and STDs provides a good lens through which to view the concept of “risk.”

Gibson deconstructs risk into three components—probability of exposure, probability of infection, and severity of consequences. He asserts that people who are infected with an STD is directly related to the number of people infected with that STD in a given population, the characteristics of a person’s particular socio-sexual network, the number of sexual partners a person has, and the frequency with which he or she has sex. Based on the latest official estimates, the five most common STDs in the United States are genital herpes simplex virus (HSV), human papillomaviruses (HPV), trichomoniasis, chlamydia, and gonorrhea. The total number of people infected with these five STDs approaches 80 million, in contrast to the 900,000 people estimated to be infected with HIV.

The chance of meeting a person with herpes within the general population in the United States is quite high: about 25 percent of adult Americans over the age of 12 is infected with genital herpes (about 80 percent have oral herpes). However, for less prevalent STDs, certain populations in specific geographical areas have higher or lower rates. For example, the chance of meeting a person with syphilis within the general population is quite low. But the probability of encountering a sex partner with syphilis is higher among poor people in the rural southern U.S. states, regardless of the gender or sexual orientation of partners, and among men who have sex with men in several urban centers including Chicago, Los Angeles, New York, Seattle, and San Francisco.

The chances of meeting a person infected with HIV or another STD can depend on situational factors and upon characteristics of a person’s socio-sexual or drug-using network or both. For example, in California the number of infectious syphilis cases among men who have sex with men increased 16-fold between 1999 and 2002. About two-thirds of these men reported that they were coinfected with HIV. Many of these co-infected men reported having multiple sex partners and using methamphetamines, Viagra, ecstasy or other “party” drugs during sex. Many also reported having met partners at bathhouses, bars, clubs, and resorts—with the Internet increasingly mentioned over the course of the study as a means of meeting partners.

Probability of Infection
If a potential sex partner has an STD, the probability of becoming infected is related to four major factors: the relative transmissibility of the STD organism; the duration of infection, symptoms, or both; the frequency of sexual exposures with infected partners; and the uninfected partner’s susceptibility or resistance to infection. The first factor, the relative transmissibility of an STD, depends upon several

References
A total of 80 million people in the United States have at least one of the five most common STDs: genital herpes, human papillomaviruses, trichomoniais, chlamydia, and gonorrhea.

Variables. Among these are: the specific STD organism and sometimes the stage of disease (for example, herpes is more transmissible when there are open sores, and HIV is more transmissible if viral load is high); type of sex (anal, vaginal, or oral); and the specific role during sex (insertive or receptive).

While it is impossible to calculate the probability of transmission for a given individual, experts have estimated the efficiency of transmission for some STDs. For example, the likelihood of transmitting gonorrhea during vaginal intercourse ranges from 20 percent to 80 percent for female-to-male transmission and from 50 percent to 70 percent for male-to-female transmission.6 The chance of infection for syphilis is about 30 percent with each sexual exposure to syphilis sores.7 In general, herpes, HPV, trichomoniais, gonorrhea, chlamydia, and syphilis are the most highly transmissible STDs. Further, some STDs (herpes, HPV, and syphilis) do not need blood or sexual fluids for transmission to occur.

The efficiency of transmission may also vary by type of sexual activity. Most STDs are efficiently transmitted through unprotected vaginal and anal sex, particularly receptive vaginal and anal sex. It is also well known that the likelihood of HIV transmission is much lower for unprotected fellatio than for unprotected vaginal or anal sex. Herpes, syphilis, and gonorrhea, however, are relatively easy to transmit through unprotected fellatio for both the insertive and receptive partners.

The second factor affecting probability of infection is the duration of infection, of symptoms, or of both. Incurable infections such as HIV or herpes are transmissible for life, although infectiousness may vary over time. In contrast, the primary syphilis lesion may last for only one to six weeks, during which transmission is most efficient. Gonorrhea and chlamydia infections may persist for weeks prior to treatment. The fact that most STDs can be transmitted in the absence of symptoms complicates this calculation. Asymptomatic transmission is common for chlamydia, genital herpes, gonorrhea, HIV, and HPV. While syphilis is usually transmitted in the presence of lesions, syphilis lesions are usually painless and may go unnoticed if they are located in areas that are difficult to see. Asking clients, “How would you know if your sex partner was infected with an STD?” may prompt discussion of some of these issues.

The third factor influencing probability of infection is the frequency of sexual exposures with infected partners: the more sexual exposures with infected partners, the greater the probability of infection. It is also important to discuss the number of different sexual partners with clients, since the larger this number, the greater the possibility of coming into contact with a partner infected with HIV or another STD.

The fourth factor influencing probability of infection is the uninfected partner’s susceptibility or resistance to infection, which varies by physiological determinants—such as an individual’s genetic, immunological, and anatomical make-up—which are beyond the scope of counseling, the extent to which someone is exposed to infected blood or other fluids, the use of barrier protection, and other factors such as age.8 Exposure to blood is more likely to occur during anal sex, rough sex, and sex during menstruation. Inflammation of skin or membranes, a common symptom of many STDs, increases the chances for HIV infection by two to five times.

Consistent use of barriers such as male or female condoms can block most STD infections, however, few people use condoms all the time for all kinds of sex with all sex partners and barrier protection during oral sex is especially uncommon. Finally, while condoms are effective against STDs such as HIV, chlamydia, gonorrhea, and trichomoniais, they are less effective against genital herpes, HPV, and syphilis, which can be transmitted through direct contact with infected skin or tissue.

Client decisions about condom use may be influenced by assumptions about condom efficacy against STDs, the infection status of sex partners, and the type of sexual behavior. It may be helpful for counselors to ask clients, “When do you use condoms?” “With which sex partners are you more likely to think about using condoms—and why?” and “For which kinds of sex would you be more likely to use condoms?”

Given these four factors, the possible


scenarios for an individual's sexual exposures are enormous and impossible to quantify. Discussing client perceptions about the chances of exposure and chances of infection for STDs and for HIV, however, can enhance an individual's understanding of his or her sexual practices within a context of general probabilities. A counselor might ask a client to consider how likely it is that he or she might meet someone infected with HIV (or another specific STD) among the people with whom they are likely to have sex. Depending on the client’s answer, the counselor might then offer background information on what factors might increase chances of exposure to, and infection by, specific STDs.

**Relative Consequences of STD Infections**

The consequences of infection with HIV and other STDs range from relatively benign to extremely severe. However, perception of consequences is subjective. The conventional view is that curable bacterial or protozoan STD infections are less severe than are incurable, life-long, viral infections. However, the fact that chlamydia, gonorrhea, herpes, syphilis, and trichomoniasis all increase chances of HIV infection by two to five times must be taken into account when considering severity. (Likewise, HIV-positive individuals who also have an STD are much more likely to transmit HIV through sexual contact.)

HIV disease, with its high fatality rate—even in the context of advances in antiviral treatment—and extreme effect on physical and mental health, clearly deserves its rank as the STD with the most severe consequences. For some people, the threat of these consequences far outweighs the relatively low chance of infection in terms of motivating safer behaviors. Yet, counselors often unintentionally downplay or fail to address the severe consequences of many other STDs, missing the opportunity to reveal additional motivations for safer behaviors, particularly for women who suffer the brunt of severe STD consequences.

For example, certain strains of HPV cause cervical and anal cancer. Chlamydia and gonorrhea may lead to pelvic inflammatory disease, infertility, and ectopic pregnancy. While these two bacterial diseases can be successfully treated, many people fail to seek treatment because they are asymptomatic and unaware of the infection. Hepatitis B can cause liver failure, syphilis in pregnant women can cause stillbirth, and herpes in recently infected pregnant women can cause neonatal encephalitis. Finally, for those unfortunate few who suffer frequent painful and

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**Clearinghouse: STDs and HIV**

**References**


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unsightly herpes outbreaks, these consequences can feel significant.

Susceptibility and Consequences

When discussing sexual risk with clients, it is important for counselors to help clients understand that many STDs are more prevalent and infectious than HIV. For HIV-negative clients, expanding the discussion about perceived susceptibility and consequences to include STDs other than HIV may provide a broader context from which to view potentially harmful outcomes of unsafe sex practices. For those clients who correctly or incorrectly assess their chances of HIV infection as “low,” a discussion regarding the “greater” chance for exposure to other STDs—and their sometimes severe consequences—may stimulate a reassessment of current behaviors. Asking a client, “What do you think are your chances of getting an STD like syphilis or gonorrhea—and then maybe getting HIV—given your current sexual practices?” might help the client reframe his or her perception of current sexual practices.

HIV-positive clients who become infected with an STD often have STD symptoms that are more severe than those of HIV-negative people who become infected with the same STD. For example, hepatitis C, which may be sexually transmitted, is more likely to progress to end-stage liver disease and cirrhosis in HIV-positive individuals than in HIV-negative ones. STD infection also increases the chance that an HIV-positive individual will transmit HIV to others. To assist a client in examining consequences, a counselor might ask, “How would it affect you to get HPV or gonorrhea in addition to HIV?” “How would that affect your sex partners?”

Conclusion

The “susceptibility/severity framework” outlined here can facilitate discussions of HIV and other STDs together, and place HIV in a larger context of sexually transmitted infections. To approach this topic, counselors and educators may ask specific questions about susceptibility, as suggested by David Ronis. For example: “How likely are you to meet sexual (or drug-using) partners who are STD (or HIV) infected?” “If you continue your present behavior, how likely are you to be exposed to an STD (or HIV)?” For assessing perceived severity, a counselor might ask: “How serious would the consequences of an STD (or HIV) infection be for you?” “If you were infected with an STD (or HIV), how likely would it be that you would suffer any of the serious consequences?”

Ronis suggests that questions be conditionally phrased, representing both the use and lack of use of precautionary behavior. For example, a counselor might ask, “If you continue your present behavior, how likely are you to get infected with an STD?” “If you start using condoms [or stop sharing needles and works], how likely are you to get infected with HIV?” Counselors and educators can be better prepared for this sort of discussion by learning about local STD trends, the probability of exposure and infection, and the severity and consequences of the most common STDs. They should also be prepared to refer clients who acknowledge STD risk to medical providers or local STD clinics.

The word “risk” may mean one thing to a client and quite another to a counselor. The framework presented here is aimed at helping both arrive at a mutual understanding that captures the word’s many different meanings.


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See also references cited in articles in this issue.
An Overview of Sexually Transmitted Disease
Paul Gibson, MS, MPH

There were more than 15 million new cases of sexually transmitted disease in the United States in 2002. Because many STDs increase susceptibility to HIV and can cause serious complications, it is important for HIV education and counseling to address the challenges for STD exposure, infection, and consequences with sexually active clients and to refer clients for STD evaluation and treatment when appropriate. There are more than 20 diseases that can be transmitted sexually. Based on estimated numbers of people currently infected and the significance of potential adverse outcomes, eight of these, including HIV disease, are considered “major” STDs. The following is a brief summary in order of prevalence of the seven major STDs other than HIV.

Genital Herpes

Genital herpes is caused by herpes simplex virus type 2 (HSV-2), and less commonly, herpes simplex virus type 1 (HSV-1). HSV-2 is the most common STD in the United States, infecting about one of every four sexually active people with approximately one million new infections each year. While genital herpes is treatable, there is no cure for it, and herpes is believed to be a lifetime infection. Herpes is highly transmissible through penile-anal, penile-vaginal, and oral-genital sex when blisters or sores are present. Experts now believe that herpes is often transmitted in the absence of sores or blisters when the virus still can be shed from the original site of infection.

Genital herpes can cause periodic outbreaks of painful blisters and sores on and around the anus, in and around the vaginal area, on the penis and surrounding skin, and on the mouth or lips. These symptoms occur at the site of infection, and periodic outbreaks occur with less frequency over time. The majority of people infected with herpes are not aware they are infected and may have very mild or atypical symptoms. In rare cases, HSV-1 and HSV-2 can be passed during birth and have severe consequences for newborns. Herpes sores increase susceptibility to HIV infection by three to six times. Several different types of tests, including a blood test for antibodies, can be used to diagnose herpes infections. Symptoms of genital herpes can be reduced with oral antiviral medications.

Genital Warts (Human Papillomaviruses)

At least 20 million people in the United States are infected with one or more of the approximately 30 types of sexually transmitted human papillomaviruses (HPV), with about five million new infections annually. Until recently HPV was considered a life-long infection, however, new research suggests that the immune systems of most people will eliminate HPV infection within a year or two. HPV is not commonly transmitted through oral-genital sex. Most HPV transmission occurs asymptomatically, and more than 90 percent of HPV infections are thought to be invisible to the naked eye.

HPV types are divided into low risk and high risk based on their association with anogenital cancer. Low-risk types cause visible genital warts. Although warts can be removed, the underlying HPV infection often remains infectious. Genital warts can be diagnosed based on visual inspection and treated by freezing or with topical creams. High-risk types of HPV cause cervical and anal cancer. Pap smears can detect cervical abnormalities and cancer, and women should discuss with their health care providers getting routine Pap smears. A test for high-risk HPV types may be used in conjunction with Pap smears.

Trichomoniasis

Trichomoniasis is caused by Trichomonas vaginalis, a protozoan infecting three to six million people each year. Trichomonas organisms are highly infectious through penile-vaginal sex. When men are infected by trichomonas, however, they generally do not develop symptoms of disease. Women frequently experience uncomfortable vaginal irritation and itching, vaginal discharge, and burning during urinai-

References
tion. The most serious effect of trichomoni- asis is a two- to four-fold increase in sus- ceptibility to HIV infection. Trichomoni- asis is usually diagnosed using a simple microscope test and is curable with oral medication.

Chlamydia

The bacterium, Chlamydia trachomatis infects between three million and five million people each year, with the largest proportion of cases occurring in people under age 25. Many cases go undetected because chlamydia frequently causes no signs or symptoms. Chlamydia is highly infectious through penile-vaginal and penile-anal sex, with the urethra, cervix, and rectum serving as the most common sites of infection. Transmission through fellatio is possible for both partners, but chlamydia is not commonly diagnosed in the throat.

When chlamydia does cause symptoms, women may experience vaginal discharge, abnormal vaginal bleeding (spotting), or burning during urination. If untreated, chlamydia can cause serious problems, including pelvic inflammatory disease (PID), which can lead to potentially fatal tubal (ectopic) pregnancies and infertility. Men can develop urethral discharge or burning during urination, and if untreated, infection may progress to the testicles causing inflammation of the epididymis. Pregnant women can pass chlamydia to their babies, resulting in eye infections when born. Untreated chlamydia infection may progress to the testicles causing inflammation of the epididymis. Pregnant women can pass chlamydia to their babies, resulting in eye infections when born.

Hepatitis B

Nearly 400,000 people in the United States are chronically infected with the hepatitis B virus (HBV), with about 200,000 new cases each year, approximately 50 percent of which are sexually transmitted. The majority of infections are cleared by immune responses, however, 5 percent to 10 percent become chronic, lifelong infections. HBV is relatively easy to transmit through penile-anal and penile-vaginal sex; there is little data on oral transmission of HBV. HBV infections are usually asymptomatic, but acute infection can be debilitating and sometimes fatal.

Most chronic carriers eventually develop life-threatening liver failure through cirrhosis or cancer after 20 or more years of infection. Blood tests detect hepatitis B infections. Newer medications are now available for treatment of HBV, and there is an effective HBV vaccine.

Syphilis

Syphilis, caused by the bacterium Treponema pallidum, is completely curable and preventable. Syphilis is currently on the increase after a 20-year decline in the United States, with about 32,000 cases diagnosed each year, many of which are among men who have sex with men, about half of whom are coinfected with HIV. Syphilis is highly infectious in its primary stage through penile-anal sex and penile-vaginal sex when there is contact with a syphilis sore (chancre) or lesion. Syphilis can be transmitted through all forms of oral sex. It can also be passed from an infected pregnant mother to her fetus.

Syphilis is a systemic infection, potentially affecting every organ system in the body. The primary stage typically causes a painless sore at the site of infection that resolves without treatment. Subsequent illness may manifest as fatigue, rash, or oral lesions. Various types of tests, including an antibody test, can diagnose syphilis. Syphilis is usually easily cured with specific antibiotics. Syphilis lesions increase an infected person’s susceptibility to HIV by three to five times. People with multiple sex partners and pregnant women should ask their health care providers about testing for syphilis.
Recent Reports

Interactions between HIV and Other STDs
Rottingen JA, Cameron DW, Garnett GP. A systematic review of the epidemiologic interactions between classic sexually transmitted diseases and HIV. Sexually Transmitted Diseases. 2001; 28(10): 579–597. (Imperial College, London; University of Oslo; and University of Ottawa.)

The strongest finding about the interactions between HIV and other sexually transmitted diseases is that genital ulcerative STDs are more likely than nonulcerative diseases to increase susceptibility to HIV in both women and men, according to a comprehensive review of the literature. Researchers reviewed and performed meta-analysis on 30 longitudinal studies published between 1998 and 2000, including a comprehensive review of the literature published earlier than 1998.

Genital ulcerative diseases such as herpes, syphilis, and chancroid together increase the susceptibility to HIV, with a 1.6 times higher effect in men than in women. Many studies, however, are flawed by their failure to examine current lesions. Nonulcerative diseases such as gonorrhea, chlamydia, and trichomiasis also increase susceptibility to HIV in both men and women but these STDs have approximately 60 percent of the effect of ulcerative diseases. Very few studies have investigated the effects of specific nonulcerative diseases on men.

The data also suggest that STDs increase HIV infectiousness in men, but are equivocal about the effects of STDs on HIV infectiousness in women. There is little firm evidence for an effect of STDs on HIV progression, and a lack of data on the effects of HIV infection on STD transmission.

Future studies should allow for: frequent STD sampling during the study, since STDs are transient; separation of data by direction, since male susceptibility seems to increase more than female susceptibility; and measurement of possible confounders such as sexual behavior.

Herpes among HIV Repeat Testers

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