CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

July 31, 1998 / Vol. 47 / No. RR-12

MMWR™

Recommendations and Reports

MORBIDITY AND MORTALITY WEEKLY REPORT

HIV Prevention Through Early Detection and Treatment of Other Sexually Transmitted Diseases — United States

Recommendations of the Advisory Committee for HIV and STD Prevention

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention (CDC)
Atlanta, Georgia 30333

The *MMWR* series of publications is published by the Epidemiology Program Office, Centers for Disease Control and Prevention (CDC), U.S. Department of Health and Human Services, Atlanta, GA 30333.

SUGGESTED CITATION

Centers for Disease Control and Prevention. HIV Prevention Through Early Detection and Treatment of Other Sexually Transmitted Diseases — United States. MMWR 1998;47(No. RR-12):[inclusive page numbers].

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Advisory Committee for HIV and STD Prevention, April 1998

The following CDC staff members prepared this report:

Michael E. St. Louis, M.D.
William C. Levine, M.D.
Judith N. Wasserheit, M.D., M.P.H.
Division of STD Prevention
Kevin M. DeCock, M.D.
Division of HIV/AIDS Prevention, Surveillance, and Epidemiology
Gary R. West, M.P.H.
David R. Holtgrave, M.D.
Division of HIV/AIDS Prevention, Intervention, Research and Support
Ronald O. Valdiserri, M.D., M.P.H.
Office of the Director
National Center for HIV, STD, and TB Prevention

HIV Prevention Through Early Detection and Treatment of Other Sexually Transmitted Diseases — United States

Recommendations of the Advisory Committee for HIV and STD Prevention

Summary

In May 1997, the Advisory Committee for HIV and STD Prevention (ACHSP) reviewed data on the relation between curable sexually transmitted diseases (STDs) and the risk for sexual transmission of human immunodeficiency virus (HIV). ACHSP considered that the evidence was strong that early detection and treatment of other STDs is an effective strategy for preventing sexually transmitted HIV infection but was concerned that this strategy has not been clearly articulated or implemented as a core strategy for HIV prevention in the United States. In the context of persistently high prevalence of STDs in many parts of the United States and with emerging evidence that the U.S. epidemic of HIV infection and acquired immunodeficiency syndrome (AIDS) increasingly is affecting population groups with the highest rates of curable STDs, ACHSP recommends the following actions:

- *Early detection and treatment of curable STDs should become a major, explicit component of comprehensive HIV prevention programs at national, state, and local levels.*
- *In areas where STDS that facilitate HIV transmission are prevalent, screening and treatment programs should be expanded.*
- *HIV and STD prevention programs in the United States, together with private and public sector partners, should take joint responsibility for implementing this strategy.*

INTRODUCTION

The Advisory Committee for HIV and STD Prevention (ACHSP) provides oversight and guidance to CDC in the prevention of human immunodeficiency virus (HIV) — the virus that causes acquired immunodeficiency syndrome (AIDS) — and other sexually transmitted diseases (STDs). On May 2, 1997, ACHSP reviewed data on the role of STD detection and treatment in the prevention of HIV infection. Based on this review, ACHSP concluded that early detection and treatment of curable STDs should be implemented more widely as an HIV prevention strategy in the United States. CDC is disseminating these ACHSP recommendations to HIV prevention community planning groups, prevention specialists, and policymakers who address HIV and STD prevention.

ACHSP also notes that early detection and treatment of STDs should be only one component of a comprehensive HIV prevention program, which also must include a

range of social, behavioral, and biomedical interventions. Furthermore, a comprehensive national program for STD prevention must address other health concerns (e.g., STD-related infertility or adverse outcomes of pregnancy), and it requires diverse activities that go beyond early STD detection and treatment. Also, these recommendations focus on the major treatable STDs — genital chlamydial infections, gonorrhea, syphilis, and chancroid — because of the strong evidence of their cofactor role in HIV transmission. Also, prevention programs and routine public health surveillance for these conditions already exist in the United States. However, several studies indicate that treating other STDs (e.g., genital herpes infections and trichomoniasis) and genital tract syndromes related to sex (e.g., bacterial vaginosis) also can help prevent HIV transmission.

BACKGROUND

Curable STDs as Cofactors for HIV Transmission

Epidemiologic Evidence

Since the beginning of the AIDS epidemic, researchers consistently have noted a strong epidemiologic association between HIV/AIDS and other STDs in developing and industrialized countries, including the United States (*1,2*). The mutually reinforcing nature of these infectious processes has been termed "epidemiological synergy" (*1*). Diverse observational studies, including cross-sectional studies and cohort studies of HIV seroconvertors, have indicated at least a twofold to fivefold increased risk for HIV infection among persons who have other STDs, including genital ulcer diseases and nonulcerative, inflammatory STDs (*3-12*). These "STD cofactor effects" were corroborated for each of the major specific genital ulcer pathogens — *Treponema pallidum* (the agent of syphilis), *Hemophilus ducreyi* (the agent of chancroid), and herpes simplex virus type 2 (HSV-2, the agent of genital herpes) — as well as for the pathogens principally responsible for nonulcerative STDs — *Neisseria gonorrhoeae*, *Chlamydia trachomatis*, and *Trichomonas vaginalis*. More recently, evidence has suggested that bacterial vaginosis, which is not strictly an STD but is related to sexual behavior, also can be linked to increased risk for HIV infection (*13*).

Biologic Mechanisms

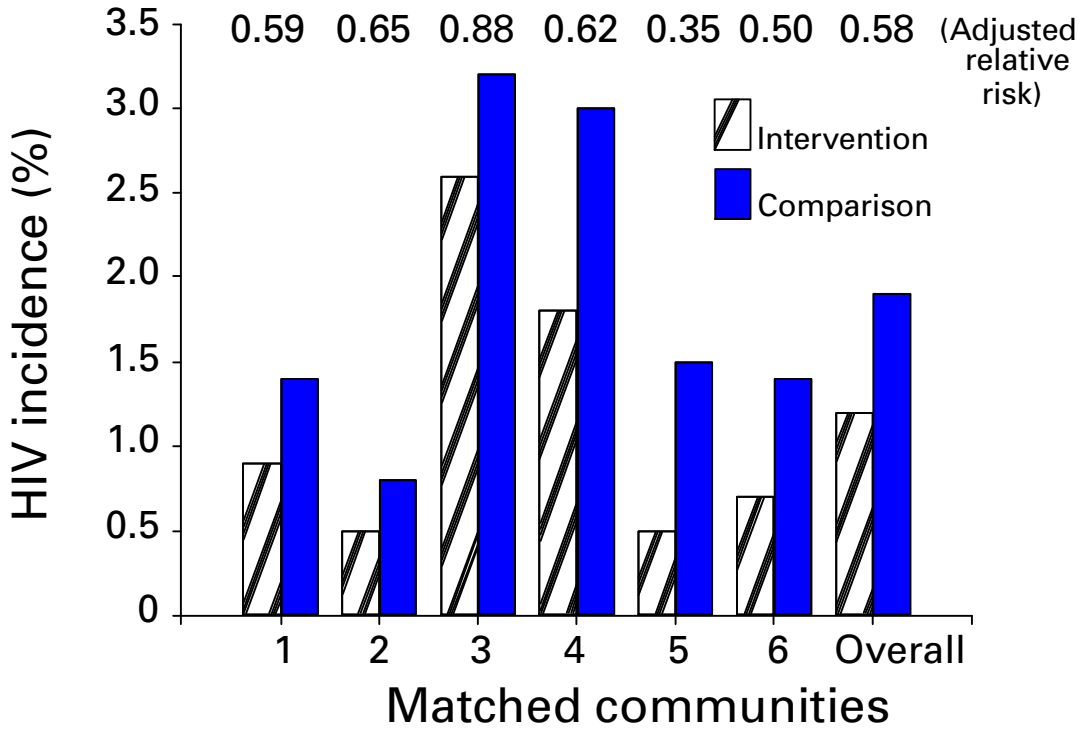
Several studies have explored potential biologic mechanisms by which other STDs can facilitate sexual transmission of HIV infection by increasing infectiousness or susceptibility. HIV is detected routinely in the exudate of genital ulcers from HIV-infected men and women (*14-17*). Ulcers bleed easily and can come in contact with vaginal, cervical, oral, urethral, and rectal mucosa during sex. In men and women, inflammatory STDs (e.g., gonococcal and chlamydial infections) appear to increase both the prevalence of HIV shedding and the HIV RNA copy number or "viral load" in genital secretions (*17-20*). Thus, these STDS are likely indicators of HIV infectiousness (*1,21*). In HIV-infected men, gonococcal infection increases shedding of HIV RNA in semen tenfold, but effective treatment of gonorrhea rapidly reduces HIV shedding to background levels (*20*). In addition, both ulcerative (e.g., herpes, syphilis, and chancroid) and nonulcerative STDs (e.g., gonorrhea and chlamydia) attract CD4+ lymphocytes to

either the ulcer surface (*22*) or the endocervix (*23*), which disrupts epithelial and mucosal barriers to infections and establishes a potential mechanism to increase a person's susceptibility to HIV infection.

Intervention Trials

To test these epidemiologic and biologic findings, two community-level, randomized controlled intervention trials have been conducted. One trial, in the Mwanza district of Tanzania, documented that continuous provision of improved STD treatment reduces the acquisition of HIV infection (*24*). In that study, providing effective drugs for STDs and training health-care providers to treat symptomatic STDs resulted in a 38% lower HIV incidence in six intervention communities compared with six matched control communities (Figure 1). This lower HIV incidence was not accompanied by changes in sexual behavior or by condom use that might confound the direct association between improved STD treatment and lowered HIV incidence. This randomized controlled trial (RCT) was the first documented intervention that successfully reduced HIV incidence at the population level. This study suggests that treatment of symptomatic STDs is an effective, community-level strategy for HIV prevention in settings and subpopulations in which HIV infection and other STDs are prevalent. Moreover, the program's cost-effectiveness of $217 (U.S.) per HIV infection averted

FIGURE 1. Randomized trial of improved sexually transmitted disease (STD) treatment to prevent human immunodeficiency virus (HIV) transmission — Mwanza, Tanzania



Source: Grosskurth H, Mosha F, Todd J, et al. Impact of improved treatment of sexually transmitted diseases on HIV infection in rural Tanzania: randomised controlled trial. Lancet 1995;346:530–6.

and $10 (U.S.) per disability-adjusted life-year (DALY) saved, compared favorably with other highly effective public health interventions (e.g., childhood vaccinations, which costs $12–$17 [U.S.] per DALY) (*25*).

The second trial took place in the Rakai District of Uganda and used an alternative approach: intermittent mass STD treatment administered in a blinded fashion every ten months (*26*), as opposed to the continuous, enhanced treatment of symptomatic STDs in Mwanza, Tanzania. Early results of the Rakai study indicate no difference in the incidence of HIV infection between intervention and control areas, despite significant reductions in curable STDs in the intervention areas (*27*).

Important differences distinguish the two studies. These differences could help the public health community assess which STD interventions are most effective in influencing HIV transmission. An important factor may be continuous efforts compared with intermittent or episodic service delivery, even when the latter is highly intensive. A second could be the stage of an HIV epidemic: at the time of the first trial, Mwanza was experiencing a relatively early HIV epidemic, with community HIV prevalence of 4%, whereas the Rakai study took place in one of the world's most mature epidemics, with a community HIV prevalence of approximately 16% (*28*). These factors and others could have contributed to the differing outcomes of these studies, and additional investigation is needed.

The results of these two intervention trials reinforce the importance of ongoing operational research to identify the strategies most effective for HIV prevention (*29*). Public health officials should assess the epidemiologic context of the HIV and STD epidemics based on the available data (i.e., epidemiologic associations, biologic mechanisms, and intervention trial results) to plan and monitor implementation of early detection and treatment of STDs to prevent HIV infection in the United States.

Other Strategies for Reducing STDs for HIV Prevention

Mathematical modeling of the biologic effects of other STDs on HIV infectiousness and susceptibility has documented that standard epidemiologic measures of effect (e.g., odds ratios or relative risks) might substantially underestimate the effect of STDs on HIV transmission (*30,31*). This underestimation occurs because standard measures do not consider the effects of STD cofactors on ongoing HIV transmission. Models suggest that STD incidence and prevalence could be critical determinants of whether sustained heterosexual HIV epidemics can persist in subpopulations with different levels of risky sexual behavior (*32*).

Modeling also suggests other findings relevant to the role of STD treatment in a comprehensive approach to HIV prevention. First, models have demonstrated a substantially greater effectiveness and cost-effectiveness when STD prevention is implemented early in an HIV epidemic, before widespread dissemination of infection (*33–36*). The greater impact of the Tanzania study (*24*) compared with the Ugandan study (*27*) appears to corroborate this prediction. Second, directing STD interventions toward persons at highest risk for acquiring and transmitting infection with HIV and other STDs will generate a greater impact on the subsequent course of an epidemic (*34, 36, 37*). Empiric evidence of these findings is available from interventions that improved STD services for female sex workers in countries where HIV transmission was strongly associated with commercial sex (*10,38*).

Intersecting Epidemics of HIV Infection and Other STDs

As discussed previously, concurrent STDs increase the transmission probability for HIV infection. In addition to this STD cofactor effect, the impact of other STDs on HIV transmission will depend on a) the magnitude of the epidemics of other STDs in the population and b) the extent to which the epidemiology of curable STDs overlaps that of HIV infection.

Magnitude of STD Epidemics in the United States

The United States has the highest rates of STDs in the industrialized world (*39*). In 1996, approximately 400,000 genital *C. trachomatis* infections were detected and reported to CDC (*40*), making this infectious disease the most commonly reported in the United States (*41*), despite continuing evidence that screening is limited even among the highest risk groups (*42,43*). Although gonorrhea incidence in the United States declined nearly 60% during 1980–1996 (*40,44*), the 1996 rate of 124/100,000 was 26 times greater than the rate in Germany (4.7) and 50 times the rate in Sweden (2.4). The total rate of syphilis in the United States in 1996 was 20.2/100,000 — 13 times higher than the rate in Germany (1.5) and 33 times higher than the rate in Sweden (0.6). Although it is not a curable STD, the prevalence of infection with HSV-2 (a chronic, persistent viral infection) actually increased by 30% during the first 15 years of the AIDS epidemic in the United States; by 1991, a total of 22% of all U.S. adults, an estimated 45 million persons, were infected with HSV-2 (*45*). This often underrecognized burden of STDs in the United States led the Institute of Medicine to issue a landmark report on STDs and their prevention in the United States (*39*). In this report, the Institute of Medicine estimated the 1994 cost of sexually transmitted HIV infection at $6.7 billion and the cost of other STDs and their immediate sequelae at $10 billion (*39*).

Against this backdrop of high overall STD rates and costs, some subpopulations experience even higher-than-average incidence and prevalence of STDs. Sexually active adolescents in most parts of the United States, regardless of race or socioeconomic status, have a point prevalence for chlamydial infection of 5%–10% (*46*). In 1996, routine notifiable disease reporting alone indicated a gonorrhea case rate of 3% for African-American women aged 15–19 years and men aged 20–24 years in the United States (*40*). Reported rates of primary and secondary syphilis in the United States are approximately fiftyfold higher among African Americans than whites (*40*). Men who have sex with men (MSM), especially young MSM, continue to have high rates of STDs (*47,48*). STD prevalence rates also are typically high among persons who use illicit drugs, including both injecting-drug users (IDU) and noninjecting-drug users. In terms of geographic variation, bacterial STD rates are higher in many large cities and sharply higher in the southeastern United States than for the country as a whole (*40,49*). Superimposed on the high prevalence of STDs overall in the United States, the higher rates within these demographic or geographic subgroups suggest that the potential for reducing STD prevalence in these groups could be especially large.

Intersecting Epidemiology of HIV Infection with Curable STDs

The potential impact of STDs in facilitating HIV transmission depends not only on the magnitude of the STD cofactor effects and the overall STD prevalence rates, but also on the extent to which other STDs are concentrated disproportionately among persons and subpopulations likely to be exposed to HIV infection. STD/HIV coinfection rates can be one indicator of this epidemiologic interaction, which heightens the potential contribution of curable STDs to the sexual transmission of HIV infection.

For example, a much higher prevalence of HIV coinfection exists among persons with any STDs than among those without STDs or a history of STDs (*1,50–52*). Consequently, interventions directed toward any person with an STD are targeted intrinsically to persons with a higher prevalence of and at higher risk for HIV infection.

Among persons with STDs, the likelihood of HIV coinfection typically is high among persons with ulcerative STDs, reflecting shared risk factors and the strong, mutually reinforcing effects of ulcerative STDs and HIV infection on ulcer persistence and HIV transmissibility (*1*). For example, a recent multicenter study of syphilis therapy in the United States documented an 18% prevalence of HIV infection among patients with early syphilis in several large cities in the United States (*53*). A study from New York (city), which has a longstanding HIV/AIDS epidemic, reported a tendency toward increasing HIV prevalence over time among genital ulcer disease patients, even in an STD clinic setting with declining overall rates of HIV infection (*50*). A newly reemerging syphilis epidemic in Baltimore was concentrated among HIV-infected persons, with HIV/syphilis coinfection rates of 18% — higher than the 3% HIV prevalence observed among other STD clinic patients (*54*). These examples reinforce the need to detect, treat, and prevent bacterial ulcerative STDs wherever they persist (*55*) or reemerge (*56*) in a community.

Although HIV coinfection rates typically are higher-than-average among persons with ulcerative STDs, the high incidence and prevalence of the major nonulcerative STDs, especially chlamydia and gonorrhea (*40*), suggests that their population-attributable risk for promoting sexual transmission of HIV infection could be even greater (*1*). Moreover, data from the Supplement to HIV/AIDS Surveillance (SHAS) project and other studies demonstrate that, despite the markedly high prevalence of HIV infection among genital ulcer disease patients, the incidence of nonulcerative STDs among HIV-infected persons could be higher than the incidence of genital ulcer disease (*57,58*).

In addition to these considerations related to persons infected with different STD pathogens, subpopulations at increased risk for HIV transmission typically have higher rates of STDs. For example, despite substantial declines since the beginning of the AIDS epidemic, MSM continue to have high rates of bacterial and other STDs (*48,59*), and outbreaks of gonorrhea continue to occur (*47*). Notably, the occurrence of other STDs continues to be an important predictor of HIV seroconversion among young MSM (*59*). Also, although parenteral exposure through contaminated injection equipment is paramount among IDUs, they are at risk for sexual HIV transmission, as well. In one study of female IDUs, for example, syphilis was identified as a prominent risk factor for acquiring new HIV infection, a finding that suggests sexual transmission could account for an underrecognized subset of new HIV infections in this group (*60*).

Recent Shifts in the HIV/AIDS Epidemic in the United States

The U.S. HIV/AIDS epidemic has evolved recently in three ways that suggest that STD cofactor effects are becoming increasingly important. First, heterosexual HIV transmission is responsible for the most rapidly increasing subset of U.S. AIDS cases, having increased both proportionately and absolutely (*61*), despite recent evidence that the epidemic is leveling off within some other subpopulations (*62*). Heterosexual HIV transmission is particularly important among women <25 years, accounting for more than half of AIDS cases in this group in 1996 (*61*). As noted previously, evidence exists for a prominent STD cofactor effect related to heterosexual HIV transmission (*1,2,24,63,64*).

Second, the most striking recent subpopulation increase in AIDS in the United States is among women, particularly young African-American women (*61,62*), among whom the prevalence of other STDs also is disproportionately high (*40*). The shift in the HIV/AIDS epidemic toward African Americans reflects, and could in part be attributable to, the long-standing disproportionate burden of other STDs in this group. It also is closely related to the increasing prevalence of heterosexual HIV transmission, which reinforces the importance of routine screening for asymptomatic STDs, because the proportion of STDs that are asymptomatic is higher among women than men.

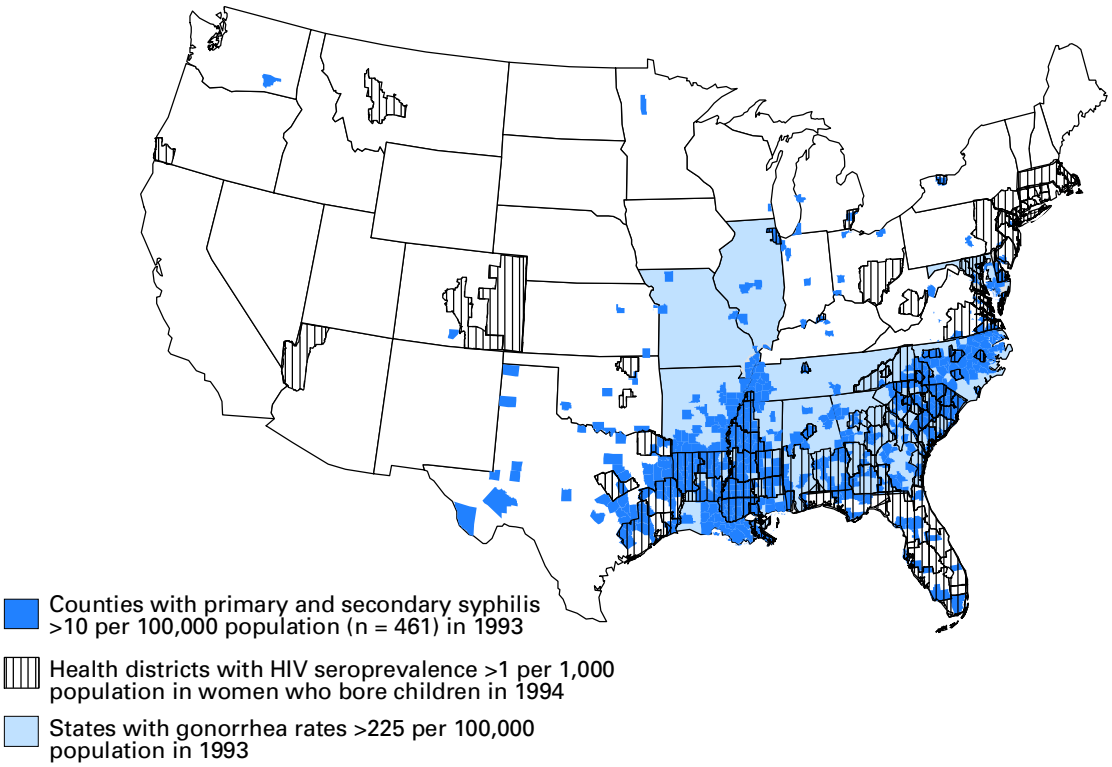
Third, an increasing proportion of all AIDS cases (*62*) and AIDS cases among young women (*61*) are being reported in the southeastern United States, a trend that reflects the geographic distribution of notifiable STDs (e.g., gonorrhea and syphilis) nationwide (Figure 2) (*40,44,49*). Like other trends, the geographic overlap between U.S. regions (e.g., the South) that have the highest STD rates and those with the most rapidly expanding epidemic of heterosexual AIDS and HIV infection (*61,64*) suggests a need to strengthen early STD detection and treatment among persons at risk for HIV infection.

Current Status of STD Clinical Services in the United States

Access to and Quality of Care in STD Clinics

Widespread availability of good-quality clinical STD services is essential to ensuring that infections are detected and treated to help reduce the risk for STD and HIV transmission (*39*). However, persons living in the United States currently have limited awareness of their need for STD services, as well as limited access to these services. Nearly one out of five persons living in the United States think that all STDs are curable, and more than half do not know that other STDs facilitate HIV transmission (*39*). Only half of local public health departments in the United States provide STD preventive services, compared with 96% that provide vaccinations (Figure 3) (*65*). Even where STD services are provided, access to care often is restricted by limited hours of operation and the lack of timely services (*66*). Nearly 40% of local health departments that provide STD services cannot see potentially infected (and infectious) new patients the same day they seek care, and 15% cannot see such patients for 3 days or more (*65*).

FIGURE 2. Health districts with the highest human immunodeficiency virus (HIV) seroprevalence among women who bore children in 1994, counties reporting the highest primary and secondary syphilis rates in 1993, and states reporting the highest gonorrhea rates in 1993 — United States



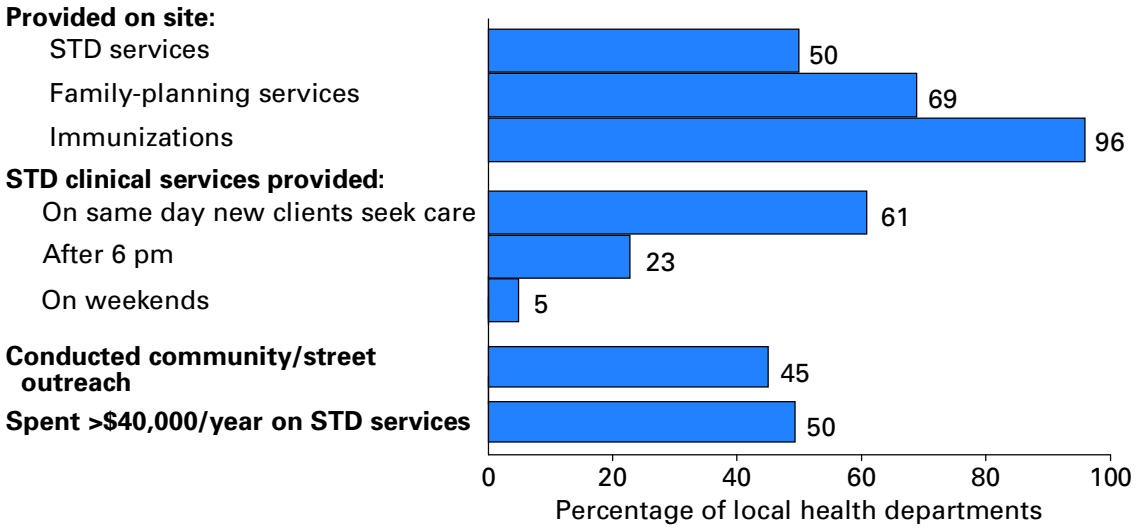
Source: St Louis ME, Wasserheit JN, Gayle HD. Janus considers the HIV pandemic—harnessing recent advances to enhance AIDS prevention [Editorial]. Am J Public Health 1997;87:10-2.

STD Services Outside Public Health Clinics

As a result of changing health-care systems in the United States, most patients with STDs, especially women, are not examined in public STD clinics. In primary-care settings, even if persons are examined by a clinician, most providers do not routinely obtain a sexual history or ask about or screen for STDs (*42,67*).

To address this problem, innovative approaches to delivering STD clinical care outside of categorical STD clinics are being explored. Integration of STD care and family-planning services within a broader reproductive health model provides efficient health care for women and has been highly successful as a primary strategy for reducing chlamydial infections in the United States (*68*). Prenatal and obstetrical-care settings also provide a venue for STD/HIV screening and prevention, while enhancing the potential for prevention of perinatal HIV transmission (*69*) and other STD-related adverse outcomes of pregnancy (*70,71*). Recognition that public-sector STD services cannot reach all persons who need them has prompted additional efforts to reach private providers (*72,73*). Specific strategies include promoting improved

FIGURE 3. Sexually transmitted disease (STD) prevention services in local health departments — United States, 1995



Source: Landry DJ, Forrest JD. Public health departments providing sexually transmitted disease services. Fam Plann Perspect 1996;28:261–6.

STD services within managed care organizations (MCOs) (*74*), which are emerging as a dominant medical-care system in much of the United States (*75*), particularly for the more disadvantaged subset of the population at higher risk for HIV infection. For example, the role of MCOs was specifically considered in the development of the Institute of Medicine report, *The Hidden Epidemic*, and MCO representatives helped develop the *1998 Guidelines for Treatment of Sexually Transmitted Diseases*, which is used to set STD practice standards in the United States (*76*). Additional efforts have been undertaken with providers who care for other critical subpopulations with high rates of STDs (e.g., adolescents) (*73*), but these efforts need to be increased substantially.

Establishing STD clinical services in nonclinical, institutional, or community settings typically is more expensive than clinic-based approaches but could yield substantial benefits if services are extended to persons at higher-than-average risk for acquiring or transmitting STDs within communities (*77,78*). New STD diagnostic methods that use urine, self-collected swabs, or other noninvasive specimens will permit direct outreach to persons who might not effectively access any formal health-service setting (*79,80*). In addition, the recent approval of rapid HIV tests and tests that use oral fluids as a specimen (*81-83*) could facilitate the widespread use of HIV testing and counseling in STD care settings, particularly nontraditional ones.

Community outreach for STD prevention is limited in many jurisdictions (Figure 3) (*65*), particularly outside dedicated STD clinics or in other venues where there are persons at higher-than-average risk for STD or HIV infection. For example, although U.S. prisons have expanded screening programs for HIV infection in recent years, STD screening and prevention remains less common (*84*). Fewer than half of U.S. jails (*85*) offer routine STD detection and treatment programs, despite their documented high yield and impact (*77,86*).

Importance of Asymptomatic Infections

An often unrecognized aspect of STDs, including bacterial STDs, is how frequently persons with these infections have no symptoms or do not recognize symptoms. Most studies of STDs are conducted in health-care settings specifically for persons who do recognize symptoms; therefore, these studies usually overestimate the proportion of infected persons who are symptomatic. Studies of STD screening in nonhealth-care settings (e.g., jails, workplaces, and communities) or health-care settings where STD treatment is not the primary function (e.g., family-planning clinics) suggest that most persons with gonorrhea or chlamydia are asymptomatic. Among women seeking contraceptive or other gynecologic services, 52% of those with gonorrhea and at least 70% of those with chlamydial infection exhibited neither symptoms nor signs of infection (*87,88*). Four population-based studies of men documented that 68%-92% of those with gonorrhea reported no symptoms (*89-92*), and one study reported that 92% with chlamydia reported no symptoms (*92*).

This common lack of symptoms for gonorrhea and chlamydia has important implications for treatment of these STDs, as well as for the way in which STD treatment can be used for HIV prevention. Providing access to treatment for persons with STD symptoms is an essential aspect of STD and HIV prevention, but most curable STDs will go unrecognized and untreated without increased efforts to detect and treat persons without symptoms. Opportunities to identify and treat asymptomatically infected persons include screening in health-care settings when persons are present for other problems (e.g., in emergency rooms or family-planning clinics, during routine or annual physical examinations, and during vaccination visits for adolescents and adults) and in nonhealth-care settings (e.g., schools and jails). Screening also can be conducted through sex-partner-notification programs.

RECOMMENDATIONS

Initial Steps to Enhance STD Detection and Treatment

Considering the data presented previously, ACHSP recommends that early detection and treatment of curable STDs that facilitate HIV transmission should be a central and explicit component of national, state, and local strategies to prevent HIV infection and AIDS. Although enhancing STD screening and treatment has always been desirable as a way to prevent the complications of STDs, current knowledge indicates it also is critical to preventing HIV infection. Any activity that decreases the incidence and prevalence of STDs in a population will decrease the prevalence of this key cofactor and should therefore decrease HIV transmission. Thus, health-care providers could prevent HIV transmission not just by treating STDs among persons with HIV infection, but also by treating and preventing STDs among any persons at risk for STDs. Other strategies to help achieve these goals are improving access to and quality of STD clinical services, expanding screening and treatment for STDs in medical settings, and establishing or expanding screening for STDs in nonmedical settings.

Initial steps for improving sexually transmitted disease (STD) detection and treatment to prevent human immunodeficiency virus (HIV) transmission

1. Assess and ensure timely access to high-quality STD clinical care for persons seeking medical services for symptoms of STDs in private and public medical-care settings.
2. Screen for asymptomatic or unrecognized STD infections in medical-care settings according to current guidelines, and expand screening as needed based on prevalence of infections detected in pilot screening efforts.
3. Establish or expand STD screening in nonmedical settings where persons at high risk for HIV infection and curable STDs are encountered and can be treated efficiently, including jails and other correctional facilities, substance abuse treatment centers, and hospital emergency departments.
4. Provide cross-training to program and management staff, including HIV prevention community planning groups, on the role of STD detection and treatment in HIV prevention.

Improving Access to and Quality of STD Clinical Services

A basic step toward implementing this strategy is to provide timely, good-quality STD clinical care to persons who recognize or suspect symptoms of STDs or who suspect they have been exposed and seek STD clinical care on their own. A major component of the randomized controlled trial in Mwanza was the simple enhancement of the quality of clinical STD services for symptomatic persons, which was recognized by the population and translated rapidly into increased use of services (*24*). Better and faster methods are needed to assess effective access to STD clinical care in communities, and strategies are needed to extend services rapidly to those in need and at risk for HIV and STD transmission. Accordingly, ACHSP makes the following recommendations:

- Basic clinical services (i.e., STD diagnosis and treatment) should be readily available to all sexually active adults and adolescents in the United States who believe they have been exposed to or have symptoms of an STD. These services should be accessible without fees or with only nominal fees (i.e., clients with symptoms should not be denied care because of inability to pay), available at least five days per week, and available the same day that care is sought (i.e., without advanced appointments being required). These services can be provided in categorical public STD clinics but also should be available in other primary-care settings, including hospital walk-in clinics, community and migrant-worker health centers, family-planning clinics, clinics for adolescents, primary-care physicians' offices, and clinics in MCOs or integrated inpatient/outpatient provider institutions.

  In particular, HIV-infected persons with STD symptoms need to be able to obtain STD diagnosis and treatment easily, and STD services should be a routine part of quality HIV care. Furthermore, presumptive treatment should be available at no cost or nominal cost to sex partners of persons with STDs. In particular, MCOs should provide treatment services to sex partners of enrollees with STDs, even if

these sex partners are not themselves enrollees. Family-planning clinics also should provide STD diagnosis and treatment services to sex partners of their clients.

- All health-care providers who care for persons with or at risk for STDs should be aware of current national guidelines for STD treatment (*76*) and should provide care according to those guidelines or to local adaptations of those guidelines. Also, although guidelines exist for STD clinical management (*76,93*), a substantial gap often exists between published guidelines and actual practice (*94*). Therefore, CDC's STD treatment guidelines (*69*) should be disseminated to practitioners who treat STDs, as well as to those who help establish policies for clinical practice (e.g., clinical quality promotion and assurance committees, formulary committees, and other groups whose activities support good clinical care).

- All health-care providers should receive adequate training for early detection and treatment of STDs. Because of the ongoing rapid evolution of health care in the United States, training needs are evolving continually. The aforementioned shift to managed care and other changes in health delivery and financing will require that MCO and other primary-care clinicians in diverse disciplines provide an increasing proportion of STD clinical care. Thus, training needs for STD clinical management will broaden, and new strategies will be needed to train the expanding base of providers of STD clinical care.

  To support these changes, the STD training needs of primary-care practitioners should be assessed in all jurisdictions of the United States with a prevalence of treatable STDs. Training plans can be developed and implemented based on this assessment. CDC supports a national network of STD prevention training centers to consult on STD clinical management training needs, which is accessible via the World Wide Web at <http://lnpharmatics.uc.edu/stdptc.html>.

Enhanced Screening for STDs in Medical Settings

Because most STDs are asymptomatic, voluntary care-seeking specifically for STD-related symptoms is unlikely to lead to detection of most infections. Thus, STD screening programs are a critical component of expanding early detection and treatment.

Although many persons at risk for STDs cannot or do not access health-care services specifically for STD testing and treatment, they often do visit several health-care settings for other purposes. Such visits currently represent missed opportunities to diagnose and treat STDs and to decrease transmission of HIV infection. In 1996, the U.S. Public Health Service published national guidelines for screening for syphilis, gonorrhea, chlamydial infection, and genital herpes (*93*). Other national organizations also have issued guidelines for screening specific population groups, such as adolescents (*95*). These guidelines were developed to prevent the complications of STDs themselves and generally do not account for the individual or population-level risk for HIV infection caused by the presence of these STDs in individuals or communities. Because of the impact of HIV disease on individuals and communities, ACHSP

endorses the existing screening guidelines and extends them to include the following recommendations:

- All sexually active females aged <25 years visiting health-care providers for any reason should be screened for chlamydia and gonorrhea at least once per year, unless screening in that setting has been documented to yield a low prevalence of infection (e.g., <2% using sensitive tests). In a low-prevalence population, more selective screening criteria (*96*) or more sensitive laboratory tests can be used. Examples of health-care settings in which this screening can occur are family-planning clinics, prenatal clinics, emergency rooms and walk-in clinics, community and migrant-worker health centers, clinics for adolescents, school-based clinics, clinics in correctional facilities, and primary-care provider offices (during routine physical examinations).
- All young, sexually active men should be screened routinely for chlamydial and gonococcal infections, which is increasingly feasible and acceptable because of new diagnostic tests that allow the use of urine as a specimen for screening. In the absence of well-defined screening criteria, the prevalence of infections can be assessed in clinical settings where young men are accessible, and routine screening should be implemented in settings or subpopulations in which the prevalence is high (e.g., ≥2%). Examples of health-care settings in which this screening can occur are emergency departments, walk-in clinics, community and migrant-worker health centers, clinics for adolescents, school-based clinics, clinics in correctional facilities, and primary-care provider offices (during routine physical examinations). Adolescent and young MSM particularly are at high risk for HIV infection and other STDs and constitute a critically important population for routine STD screening (*48,59*).
- In addition to routinely screening adolescents and young adults, clinicians also should provide chlamydia and gonorrhea screening at least once per year to older, higher-risk males and females visiting health-care providers for any reason. Examples of higher-risk persons are those who abuse substances, persons with a history of STDs or more than one sex partner per year, those in correctional facilities, and persons from communities with high rates of STDs. Determination of high-risk status also should take into account the prevalence of HIV infection in the subpopulation being considered. Health-care providers and public health agencies should use these screenings to collect sufficient data about the local prevalence of STDs and the risk factors for positivity to develop locally relevant definitions of high-risk status.
- Serologic screening for syphilis should be conducted in high-risk persons (e.g., those with multiple sex partners or who have exchanged sex for money or drugs, persons admitted to jails, and users of illicit drugs). Because syphilis rates in the United States vary considerably by region and among subpopulations within high incidence regions, local epidemiologic data and pilot testing can be used to guide local screening efforts. Syphilis screening should be more routine in jurisdictions with high incidence rates (e.g., notified rates greater than the *Healthy People 2000* goal of 4/100,000 cases of primary and secondary syphilis). It also should be expanded rapidly during outbreaks and extended to persons

encountered in emergency departments of public hospitals and other clinical or community venues with an appreciable prevalence of syphilis.

- Persons already infected with HIV should be screened routinely for STDs. Early STD detection and treatment in this subpopulation could be particularly effective and cost-beneficial in reducing HIV transmission for three reasons: most STDs promote increased shedding of HIV (*1,20*); the number of HIV-infected persons is smaller than the number of persons at risk for becoming infected; and HIV-infected persons often are receiving regular medical care.

  Specifically, all HIV-infected persons who might be at risk for STD acquisition should be screened regularly for curable STDs, including gonorrhea, chlamydial infection, syphilis, and — among women — trichomoniasis. In addition, persons with HIV/AIDS should be assessed for genital herpes, educated about symptoms of herpes, and counseled to particularly avoid sex during periods with symptoms of reactivation of genital herpes, which are associated with higher rates of HIV viral shedding (*16*). Screening frequency should depend on the person's risk behavior, the potential risk behavior of the person's partner(s), and the incidence of STDs in the local population, but generally should occur at least yearly if any potential risk exists for STD acquisition. It should be performed more frequently if any incident STDs are detected by symptoms or screening. These services should be provided as part of and at the site of routine, quality HIV care.

Counseling Persons with HIV/AIDS and a New STD

The presence of a new STD in a person with HIV/AIDS strongly suggests unprotected sex, a behavior that could place another person or persons at risk for HIV infection. Counseling should consist of several components, including the following:

- Determining the type and frequency of sexual behaviors that have occurred.
- Determining the number and HIV-infection status of the partner(s) with whom the person with HIV/AIDS and a new STD has had sex.
- Counseling the person with HIV/AIDS and a new STD on the need to eliminate unprotected sex, especially with persons of unknown or negative HIV-infection status, and on the role other STDs play in facilitating HIV transmission to other persons.
- Counseling the person with HIV/AIDS and a new STD on issues related specifically to STD treatment and prevention, including avoidance of future STDs, proper screening and evaluation for STDs, and adherence to all aspects of prescribed STD treatment (e.g., abstaining completely from sex for the appropriate period following treatment with a recommended antimicrobial regimen for the diagnosed STD) (*76*).
- Assisting with notification of the partner(s) (HIV-infected, uninfected, or unknown status) about exposure to STD and HIV infection and the need to be evaluated, tested, and treated.

In addition to these counseling messages, any newly or previously identified person with HIV/AIDS who is not in a high-quality HIV/AIDS treatment program should be referred to one.

Expanded STD Screening in Nonmedical Settings

Many persons at increased risk for STDs and HIV infection visit health-care providers infrequently, and some populations are easier to reach outside traditional clinical settings. Newer screening tests (i.e., those using urine samples or self-obtained swabs) make screening in nonmedical settings increasingly feasible. ACHSP makes the following recommendations for STD screening in nonmedical settings:

- Persons entering correctional and detention facilities should be screened for syphilis, gonorrhea, and chlamydia. When possible, females also should be screened for trichomoniasis and bacterial vaginosis. This recommendation includes state and federal prisons, local jails and holding centers, and juvenile detention centers. STD screening could be particularly important in jails and other short-term facilities where many persons at high risk (e.g., those detained for charges related to commercial sex) stay for short periods before being released (*77*). Therefore, such screening should occur as soon as possible after a person enters a correctional or detention facility, preferably within the first 24 hours.
- Adolescents should be screened for gonorrhea and chlamydia in institutions that serve them, including schools, community-based programs for at-risk populations, and employment/training (e.g., Job Corps), sports, and summer youth programs. The disease prevalence found after pilot screening should determine the extent and frequency of screening. In general, adolescents should be tested for these diseases at every visit if the prevalence of infection is ≥2%.
- High-risk persons in street settings should be screened for gonorrhea, chlamydia, and syphilis whenever feasible during community outreach programs designed to prevent HIV infection. This type of screening often is best accomplished through partnerships between health agencies and community-based organizations or representatives of the target communities. Noninvasive diagnostic tests (e.g., urine tests), self-obtained specimens, and mobile clinics can help facilitate testing in street settings. The yield or prevalence of infection detected through these programs can be used to verify that appropriate groups have been reached through outreach, with a goal of targeting screening activities at communities or populations that yield a prevalence of ≥2%.

Presumptive Treatment for STDs

Persons with positive tests for STDs often are difficult to locate when the results become available, and even when they are found, they have had the opportunity to transmit the infection during the interval between testing and treatment. Because of this risk and because of the safety of the antibiotics used to treat curable STDs, persons likely to have these STDs should be treated presumptively while awaiting laboratory confirmation. Presumptive antibiotic treatment for STDs has been part of CDC's STD treatment guidelines for many years (69). ACHSP endorses these

guidelines, viewing them now as part of a national strategy for HIV prevention, especially in settings where the likelihood of STD infection is high or prompt follow-up for subsequent treatment is in question. These guidelines include the following recommendations:

- When doubts exist about whether a patient will follow up for test results or adhere to recommendations to avoid sexual activity while potentially infected with an STD, men with urethral discharge and sexually active females with mucopurulent cervical discharge should be treated presumptively with antibiotics for gonorrhea and chlamydial infection (*76*). Presumptive treatment for primary syphilis is recommended in persons who have new onset genital ulcers and are from communities or groups with high syphilis rates. HIV-infected persons with genital ulcers or urethritis also should receive such empiric treatment, to decrease the load of excreted virus as quickly as possible.

  Medical providers also should consider presumptive treatment for other STDs (e.g., trichomoniasis) and genital infections (e.g., bacterial vaginosis), depending on clinical findings and disease prevalence in the population served. When presumptive treatment is administered, laboratory testing should be undertaken whenever possible to confirm the nature of the infection.

- Sex partners of persons treated presumptively for curable STDs also should be treated presumptively for these diseases. This recommendation is based on a) the likelihood that sex partners are infected with the same organism(s) as index patients, b) the high risk for reinfection of the treated index patients by their partners if the partners are not treated quickly, and c) the possibility that confirmatory laboratory tests on the index patients will give false negative results. When presumptive treatment is administered to sex partners, laboratory testing should be undertaken whenever possible to confirm the nature of the infection.

Behavioral Issues Related to Early Detection and Treatment of STDs

Although early STD detection and treatment essentially represents a biomedical tool for lowering the risk for sexual transmission of HIV infection, important associated behavioral issues exist. The most important new messages for persons at risk for HIV infection and other STDs include a) other STDs facilitate HIV transmission, and early STD detection and treatment is an HIV prevention strategy; b) recognizing and watching for the symptoms of STDs is important; and c) most STDs produce no symptoms, so routine screening is crucial. A complementary set of messages should be developed and disseminated to health-care providers, and specific information on where to obtain quality STD services should be available to persons who need it.

These behavioral messages should supplement, not supplant, messages already emphasized in HIV-prevention counseling, such as the advantages of reducing the number of sex partners, the importance of knowing the HIV serostatus of one's partner(s), the importance of consistent and correct condom use, and the need to develop and implement strategies for avoiding risky sexual and other behaviors.

ADDITIONAL SUPPORTIVE ACTIVITIES

HIV Screening Among Persons with Other STDs

Screening for HIV infection among persons with other STDs is an important HIV prevention strategy. Although HIV counseling and testing among persons with other STDs has long been recommended and applied in the United States (*97*), the extent of the practice of this preventive service varies and is limited in many jurisdictions. A person could be more receptive to HIV prevention messages delivered when an STD is diagnosed. Therefore, broader practice of HIV counseling and testing among STD patients, although not strictly pertinent to the strategy of early STD detection and treatment, could provide an opportunity to reinforce awareness of the cofactor role of STDs for HIV transmission and the importance of seeking timely medical care for STD symptoms. It also provides an important opportunity to assess coinfection rates for HIV infection and other STDs. However, these services should be implemented with scrupulous attention to the quality of the counseling and with adequate referral systems to redirect HIV-seropositive and at-risk HIV-seronegative persons into long-term primary-care, prevention, and drug treatment services, as appropriate.

Community-Level Prevention of the Highest Risk STDs

Some less common STDs in the United States have been associated with a higher-than-average prevalence of HIV coinfection and transmission risk. Examples include rectal gonorrhea among MSM and the bacterial genital ulcer diseases (syphilis and chancroid). Rectal gonorrhea in men should be monitored carefully, and its persistence should be considered a community-level sentinel event reflecting a mixture of higher-risk behavior, STD cofactor effects, and other HIV transmission risk factors. It should prompt an urgent HIV prevention response, including but not restricted to enhanced STD detection and treatment among MSM.

Also, because of the strong impact of syphilis and chancroid on HIV transmission, U.S. public health officials are developing and implementing plans to eliminate domestic transmission of syphilis (*98*). This program could be particularly important because of the apparent cyclical nature of syphilis epidemics in the United States in the absence of concerted efforts toward elimination of this disease (*49,55*). Therefore, ACHSP supports syphilis elimination as a potentially high-impact activity leading to reduced STD-facilitated HIV transmission in the United States. It recommends that STD and HIV prevention programs collaborate in the development and implementation of syphilis elimination plans in their jurisdictions.

Improving and Using STD Surveillance for HIV Prevention

Early detection and treatment of curable STDs as an HIV prevention strategy also has implications for public health surveillance of STDs. Improved quality, completeness, and timeliness of STD surveillance can provide critical information to target early STD detection and treatment and help target HIV prevention strategies. If reporting requirements are met, expanded early detection of STDs within a jurisdiction should lead to more complete STD surveillance data, which could be an important element of the epidemiologic profile used by HIV prevention community planning

groups (*99*). Although it also could lead to an increase in reported STD rates in the initial years of expanded services, this result should be seen as a positive indicator of enhanced early detection of STDs. The rates should decline in subsequent years.

In addition to these general concerns, several surveillance issues are important to improving early STD detection and treatment for HIV prevention. In many areas of the United States and nationally, data are not collected systematically on the anatomic site of infection for persons with gonorrhea. However, gonorrhea among MSM, especially rectal gonorrhea, can be an important indicator of the potential for HIV transmission. Therefore, the anatomic site of gonococcal infection should be reported consistently as part of routine notifiable disease surveillance in all jurisdictions.

Enhanced STD surveillance also should include monitoring the prevalence of STDs and HIV infection in settings where there are persons at high risk for both (e.g., correctional facilities and drug treatment centers) (*77,86,100,101*). This latter surveillance strategy complements the expanded early detection and treatment of STDs in settings where higher-risk persons are encountered. The observed prevalence of STD and HIV infections in these specific venues, as well as additional data when available on STD/HIV coinfections, should be used to guide further program interventions (*100*). Finally, HIV counseling and testing data systems should be modified to ensure that STD diagnoses are captured.

Cross-Training HIV and STD Prevention Staff

Implementing the strategy of enhanced STD detection and treatment for HIV prevention is likely to require or be enhanced by greater mutual familiarity and sense of shared purpose within state and local HIV and STD prevention programs. Cross-training program and management staff in the current practices, technology, and guidelines of the other program should mutually strengthen both HIV and STD prevention programs. In many jurisdictions and/or for certain subpopulations, cross-training could be an initial activity to help adapt these general recommendations to the specific epidemiologic, health-care, and prevention service needs of the local population.

Potential Role of Other STDs

Although this report has emphasized early detection and treatment of curable, especially bacterial, STDs, other STDs and related conditions also warrant appropriate management and could constitute equally important opportunities for HIV prevention. For example, evidence exists for a cofactor role of vaginitis caused by the common, sexually transmitted parasite *T. vaginalis*, so including *T. vaginalis* in screening protocols for women whenever feasible is likely to lower the risk for HIV transmission. Infections with HSV-2 are highly prevalent in the U.S. population (*45*) and occur in at least half of individuals in some subpopulations at high risk for HIV infection (e.g., MSM). As a persistent, latent infection causing recurring genital ulcers and associated with greater genital tract HIV shedding (*16*), HSV-2 coinfection could represent a major STD cofactor effect. At a minimum, persons with both HIV infection and genital herpes should be counseled especially to avoid sex when herpes is symptomatic because HIV viral shedding is more active during such periods. However, the optimal detection and treatment strategy corresponding to this particular STD/HIV interaction

has not been well-defined and, for the moment, remains a critical area for needed research. Emerging data on bacterial vaginosis as a risk factor for HIV acquisition in women (*13,102*) likewise represent a major potential opportunity, as well as a challenge. Although bacterial vaginosis is a highly prevalent condition, no well-defined effective strategies for long-term prevention exist beyond treating individual patients.

RESEARCH ISSUES

In addition to practical steps that can be implemented immediately, several research issues need to be addressed to maximize the longer-term impact of early STD detection and treatment as a strategy for HIV prevention. These include a) methods to better assess, at national and local levels, the attributable risks related to different STD pathogens; b) methods to better assess the potential prevention impact of different approaches to enhanced STD treatment and prevention; c) protocols for assessing access to and quality of clinical STD services in communities and for specific populations within communities; d) the prevalence of STDs and risk factors for STDs among asymptomatic persons currently not screened for STDs (e.g., men), so screening guidelines can be refined further; e) the incidence of curable STDs in certain high-risk populations (e.g., HIV-infected persons), so guidelines can better specify the best frequency of screening; f) the field performance and practical issues involved in using both new and older noninvasive tests (e.g., urine tests and self-obtained swabs) to identify STDs in nonmedical settings; g) the precise balance of benefits and risks of presumptive or prophylactic antimicrobial therapy for persons who, based on epidemiologic data, have extremely high rates of curable STDs; and h) the role of HSV-2 and other viral STDs in HIV transmission and the potential role of suppressive or other chemotherapy for genital herpes in reducing the risk for HIV transmission.

Similarly, new behavioral and operational research is required to complement, facilitate, and enhance overall HIV prevention efforts because of increased emphasis on early STD detection and treatment. Examples include how to best provide HIV and STD prevention counseling when asymptomatic STDs are detected and how to improve HIV prevention referral systems and processes within the full range of STD detection and treatment facilities and settings (i.e., HIV counseling and testing centers, MCOs, and street outreach settings). Operations research also is needed to better understand how to organize STD prevention services to prevent HIV transmission. Additional research issues will arise as the initial program activities described previously are implemented.

CONCLUSIONS

Early detection and treatment of other STDs should be a critical component of national, state, and local strategies to prevent HIV infection and AIDS, in concert with the behavioral and other interventions that constitute a comprehensive HIV prevention approach. Because the United States has the highest rates of curable STDs among industrialized nations (*39,40*) and a high prevalence of HIV infection (*103*), the potential impact of enhanced STD control on the prevention of sexually transmitted HIV infections in the United States is likely to be substantial. The initial steps outlined in this report should be implemented by state and local HIV and STD prevention

programs as part of a comprehensive HIV prevention effort. Evaluation of these initial efforts should be used to guide subsequent implementation of this strategy.

Acknowledgment

The authors acknowledge the substantive contributions of Thomas A. Farley, M.D., M.P.H., Louisiana Office of Public Health, and Deborah A. Cohen, M.D., M.P.H., Louisiana State University.

References

1. Wasserheit JN. Epidemiological synergy. Interrelationships between human immunodeficiency virus infection and other sexually transmitted diseases. Sex Transm Dis 1992;19:61–77.
2. Royce RA, Sena A, Cates W Jr, Cohen MS. Sexual transmission of HIV. N Engl J Med 1997; 336:1072–8.
3. Cameron DW, Simonsen JN, D'Costa LJ, et al. Female to male transmission of human immunodeficiency virus type 1: risk factors for seroconversion in men. Lancet 1989;403–7.
4. Telzak EE, Chiasson MA, Bevier PJ, Stoneburner RL, Castro KG, Jaffe HW. HIV-1 seroconversion in patients with and without genital ulcer disease. A prospective study. Ann Intern Med 1993; 119:1181–6.
5. Plummer FA, Simonsen JN, Cameron DW, et al. Cofactors in male-female sexual transmission of human immunodeficiency virus type 1. J Infect Dis 1991;163:233–9.
6. De Vincenzi I, European Study Group on Heterosexual Transmission of HIV. A longitudinal study of human immunodeficiency virus transmission by heterosexual partners. N Engl J Med 1994;331:341–6.
7. Kassler WJ, Zenilman JM, Erickson B, Fox R, Peterman TA, Hook EW III. Seroconversion in patients attending sexually transmitted disease clinics. AIDS 1994;8:351–5.
8. Otten MW Jr, Zaidi AA, Peterman TA, Rolfs RT, Witte JJ. High rate of HIV seroconversion among patients attending urban sexually transmitted disease clinics. AIDS 1994;8:549–53.
9. Craib KJ, Meddings DR, Strathdee SA, et al. Rectal gonorrhoea as an independent risk factor for HIV infection in a cohort of homosexual men. Genitourin Med 1995;71:150–4.
10. Laga M, Alary M, Nzila N, et al. Condom promotion, sexually transmitted diseases treatment, and declining incidence of HIV-1 infection in female Zairian sex workers. Lancet 1994;344: 246–8.
11. Mehendale SM, Rodrigues JJ, Brookmeyer RS, et al. Incidence and predictors of human immunodeficiency virus type 1 seroconversion in patients attending sexually transmitted disease clinics in India. J Infect Dis 1995;172:1486–91.
12. Holmberg SD, Stewart JA, Gerber AR, et al. Prior herpes simplex virus type 2 infection as a risk factor for HIV infection. JAMA 1988;259:1048–50.
13. Sewankambo N, Gray RH, Wawer MJ, et al. HIV-1 infection associated with abnormal vaginal flora morphology and bacterial vaginosis. Lancet 1997;350:546–50.
14. Plummer FA, Wainberg MA, Plourde P, et al. Detection of human immunodeficiency virus type 1 (HIV-1) in genital ulcer exudate of HIV-1–infected men by culture and gene amplification [Letter]. J Infect Dis 1990;161:810–1.
15. Kreiss JK, Coombs R, Plummer F, et al. Isolation of human immunodeficiency virus from genital ulcers in Nairobi prostitutes. J Infect Dis 1989;160:380–4.
16. Schacker T, Ryncarz AJ, Goddard J, Diem K, Shaughnessy M, Corey L. Frequent recovery of HIV-1 from genital herpes simplex virus lesions in HIV-1–infected men. JAMA 1998;280:61–6.
17. Ghys PD, Fransen K, Diallo MO, et al. The associations between cervicovaginal HIV shedding, sexually transmitted diseases and immunosuppression in female sex workers in Abidjan, Côte d'Ivoire. AIDS 1997;11:F85–F93.
18. Atkins MC, Carlin EM, Emery VC, Griffiths PD, Boag F. Fluctuations of HIV load in semen of HIV positive patients with newly acquired sexually transmitted diseases. BMJ 1996;313:341–2.
19. Clemetson DBA, Moss GB, Willerford DA, et al. Detection of HIV DNA in cervical and vaginal secretions. Prevalence and correlates among women in Nairobi, Kenya. JAMA 1993;269: 2860–4.
20. Cohen MS, Hoffman IF, Royce RA, et al. Reduction of concentration of HIV-1 in semen after treatment of urethritis: implications for prevention of sexual transmission of HIV-1. Lancet 1997;349:1868–73.

21. Dickover RE, Garratty EM, Herman SA, et al. Identification of levels of maternal HIV-1 RNA associated with risk of perinatal transmission. Effect of maternal zidovudine treatment on viral load. JAMA 1996;275:599–605.
22. Spinola SM, Orazi A, Arno JN, et al. *Haemophilus ducreyi* elicits a cutaneous infiltrate of CD4 cells during experimental human infection. J Infect Dis 1996;173:394–402.
23. Levine WC, Pope V, Bhoomkar A, et al. Increase in endocervical CD4 lymphocytes among women with nonulcerative sexually transmitted diseases. J Infect Dis 1998;177:167–74.
24. Grosskurth H, Mosha F, Todd J, et al. Impact of improved treatment of sexually transmitted diseases on HIV infection in rural Tanzania: randomised controlled trial. Lancet 1995;346:530–6.
25. Gilson L, Mkanje R, Grosskurth H, et al. Cost-effectiveness of improved treatment services for sexually transmitted diseases in preventing HIV-1 infection in Mwanza Region, Tanzania. Lancet 1997;350:1805–9.
26. Wawer MJ, Sewankambo NK, Gray RH, et al. Community-based trial of mass STD treatment for HIV control, Rakai, Uganda: preliminary data on STD declines [Abstract no. MoC.443]. Vol.1. XIth International Conference on AIDS. Vancouver, Canada, July 7–12,1996;39.
27. Wawer MJ. The Rakai randomized, community-based trial of STD control for AIDS prevention: no effect on HIV incidence despite reductions in STDs [Abstract no. 12473]. In Conference Supplement, of the 12th World AIDS Conference. Geneva, Switzerland, June 28-July 3,1998;9.
28. Wawer MJ, Serwadda D, Gray RH, et al. Trends in HIV-1 prevalence may not reflect trends in incidence in mature epidemics: data from the Rakai population-based cohort, Uganda. AIDS 1997;11:1023–30.
29. Hayes R, Wawer M, Gray R, et al. Randomised trials of STD treatment for HIV prevention: Report of an international workshop. Genitourin Med 1997;73:432–43.
30. Hayes RJ, Schulz KF, Plummer FA. The cofactor effect of genital ulcers on the per-exposure risk of HIV transmission in sub-Saharan Africa. J Trop Med 1995;98:1–8.
31. Boily MC, Anderson RM. Human immunodeficiency virus transmission and the role of other sexually transmitted diseases. Measures of association and study design. Sex Transm Dis 1996;23:312–32.
32. Boily MC. Transmission dynamics of coexisting chlamydial and HIV infections in the United States. In Eng TR, Butler WT, eds. The hidden epidemic. Confronting sexually transmitted diseases. Washington, DC: National Academy Press, 1997:316–29.
33. Boily MC, Brunham RC. The impact of HIV and other STDs on human populations. Are predictions possible? Infect Dis Clin North Am 1993;7:771–92.
34. Robinson NJ, Mulder DW, Auvert B, Hayes RJ. Proportion of HIV infections attributable to other sexually transmitted diseases in a rural Ugandan population: simulation model estimates. Int J Epidemiol 1997;26:180–9.
35. Garnett GP, Anderson RM. Strategies for limiting the spread of HIV in developing countries: conclusions based on studies of the transmission dynamics of the virus. J Acquir Immune Defic Syndr Hum Retrovirol 1995;9:500–13.
36. Over M, Piot P. Human immunodeficiency virus infection and other sexually transmitted diseases in developing countries: public health importance and priorities for resource allocation. J Infect Dis 1996;174(suppl 2):162–75.
37. The World Bank. Confronting AIDS: Public priorities in a global epidemic. Washington DC: The International Bank for Reconstruction and Development/The World Bank 1997;1–14.
38. Nelson KE, Celentano DD, Eiumtrakol S, et al. Changes in sexual behavior and a decline in HIV infection among young men in Thailand. N Engl J Med 1996;335:297–303.
39. Institute of Medicine. The hidden epidemic. Confronting sexually transmitted diseases. Washington, DC: National Academy Press, 1997:1–54.
40. CDC. Sexually transmitted diseases surveillance, 1996. Atlanta: U.S. Department of Health and Human Services, Public Health Service, CDC, 1997.
41. CDC. Ten leading nationally notifiable infectious diseases—United States, 1995. MMWR 1996; 45:883–4.
42. CDC. Chlamydia screening practices of primary-care providers—Wake County, North Carolina, 1996. MMWR 1997;46:819–22.
43. CDC. Chlamydia prevalence and screening practices—San Diego County, California 1993. MMWR 1994;43:366–9.

44. Fox KK, Whittington WL, Levine WC, Moran JS, Zaidi AA, Nakashima AK. Gonorrhea in the United States, 1981–1996: demographic and geographic trends. Sex Transm Dis 1998;25 (in press).
45. Fleming DT, McQuillan GM, Johnson RE, et al. Herpes simplex virus type 2 in the United States, 1976 to 1994. N Engl J Med 1997;337:1105–11.
46. CDC. Recommendations for the prevention and management of *Chlamydia trachomatis* infections, 1993. MMWR 1993;42(No. RR-12):1–39.
47. CDC. Gonorrhea among men who have sex with men—selected sexually transmitted disease clinics, 1993–1996. MMWR 1997;46:889–92.
48. Lafferty WE, Hughes JP, Handsfield HH. Sexually transmitted diseases in men who have sex with men. Acquisition of gonorrhea and nongonococcal urethritis by fellatio and implications for STD/HIV prevention. Sex Transm Dis 1997;24:272–8.
49. Nakashima AK, Rolfs RT, Flock ML, Kilmarx P, Greenspan JR. Epidemiology of syphilis in the United States, 1941–1993. Sex Transm Dis 1996;23:16–23.
50. Torian LV, Weisfuse IB, Makki HA, Benson DA, DiCamillo LM, Toribio FE. Increasing HIV-1 seroprevalence associated with genital ulcer disease, New York City, 1990–1992. AIDS 1995; 9:177–81.
51. Campos-Outcalt D, Ryan K. Prevalence of sexually transmitted diseases in Mexican-American pregnant women by country of birth and length of time in the United States. Sex Transm Dis 1995;22:78–82.
52. Edlin BR, Irwin KL, Faruque S, et al. Intersecting epidemics—crack cocaine use and HIV infection among inner-city young adults. Multicenter Crack Cocaine and HIV Infection Study Team. N Engl J Med 1994;331:1422–7.
53. Rolfs RT, Joesoef MR, Hendershot EF, et al. A randomized trial of enhanced therapy for early syphilis in patients with and without human immunodeficiency virus infection. N Engl J Med 1997;337:307–14.
54. CDC. Outbreak of primary and secondary syphilis—Baltimore City, Maryland 1995. MMWR 1996;45:166–9.
55. St. Louis ME, Farley TA, Aral SO. Untangling the persistence of syphilis in the South. Sex Transm Dis 1996;23:1–4.
56. Mertz KJ, Weiss JB, Webb RM, et al. An investigation of genital ulcers in Jackson, Mississippi, with use of a multiplex polymerase chain reaction assay: high prevalence of chancroid and human immunodeficiency virus infection. J Infect Dis 1998;178 (in press).
57. Diaz T, Chu SY, Conti L, et al. Risk behaviors of persons with heterosexually acquired HIV infection in the United States: results of a multistate surveillance project. J Acquir Immune Defic Syndr Hum Retrovirol 1994;7:958–63.
58. Belongia EA, Danila RN, Angamuthu V, et al. A population-based study of sexually transmitted disease incidence and risk factors in human immunodeficiency virus-infected people. Sex Transm Dis 1997;24:251–6.
59. Ruiz J, Facer M, Sun RK. Risk factors for human immunodeficiency virus infection and unprotected anal intercourse among young men who have sex with men. Sex Transm Dis 1998; 25:100–7.
60. Gourevitch MN, Hartel D, Schoenbaum EE, et al. A prospective study of syphilis and HIV infection among injection drug users receiving methadone in the Bronx, NY. Am J Public Health 1996;86:1112–5.
61. Wortley PM, Fleming PL. AIDS in women in the United States. Recent trends. JAMA 1997; 278:911–6.
62. CDC. Update: trends in AIDS incidence—United States, 1996. MMWR 1997;46:861–7.
63. Mastro TD, De Vincenzi I. Probabilities of sexual HIV-1 transmission. AIDS 1996;10:S75–S82.
64. St. Louis ME, Wasserheit JN, Gayle HD. Janus considers the HIV pandemic—harnessing recent advances to enhance AIDS prevention [Editorial]. Am J Public Health 1997;87:10–2.
65. Landry DJ, Forrest JD. Public health departments providing sexually transmitted disease services. Fam Plann Perspect 1996;28:261–6.
66. Battelle Institute. Evaluation of STD clinic flow and utilization—final report. Arlington, Virginia: Battelle, Centers for Public Health Research and Education, 1993;contract no. 200-88-0642.
67. CDC. HIV prevention practices of primary-care physicians — United States, 1992. MMWR 1994; 42:988–92.

68. DeLisle S. Preserving reproductive choice: Preventing STD-related infertility in women. SIECUS Report 1997;25:18–21.
69. CDC. Recommendations of the U.S. Public Health Service Task Force on the use of zidovudine to reduce perinatal transmission of human immunodeficiency virus. MMWR 1994;43(No. RR-11):1–20.
70. Goldenberg RL, Andrews WW, Yuan AC, Mackay HT, St. Louis ME. Sexually transmitted diseases and adverse outcomes of pregnancy. Clin Perinat 1997;24:23–41.
71. CDC. Guidelines for the prevention and control of congenital syphilis. MMWR 1988;37(suppl): 1–13.
72. Moran JS, Kaufman JA, Felsenstein D. Survey of health care providers: who sees patients needing STD services, and what services do they provide? Sex Transm Dis 1995;22:67–9.
73. Gunn RA, Veinbergs E, Friedman LS. Adolescent health care providers. Establishing a dialogue and assessing sexually transmitted disease prevention practices. Sex Transm Dis 1997;24:90–3.
74. Gunn RA, Rolfs RT, Greenspan JR, Wasserheit JN. The changing paradigm of sexually transmitted disease control in the era of managed health care: developing partnerships to implement a community-wide population-oriented approach. JAMA 1998;279:680–4.
75. CDC. Prevention and managed care: opportunities for managed care organizations, purchasers of health care, and public health agencies. MMWR 1995;44(No.RR-14):1–12.
76. CDC. 1998 Guidelines for treatment of sexually transmitted diseases. MMWR 1998;47(No. RR-1):1–111.
77. Blank S, McDonnell DD, Rubin SR, et al. New approaches to syphilis control. Finding opportunities for syphilis treatment and congenital syphilis prevention in a women's correctional setting. Sex Transm Dis 1997;24:218–26.
78. Wasserheit JN, Aral SO. The dynamic topology of sexually transmitted disease epidemics: implications for prevention strategies. J Infect Dis 1996;174:S201–S213.
79. Rietmeijer CA, Yamaguchi KJ, Ortiz CG, et al. Feasibility and yield of screening urine for *Chlamydia trachomatis* by polymerase chain reaction among high-risk male youth in field-based and other nonclinic settings. A new strategy for sexually transmitted disease control. Sex Transm Dis 1997;24:429–35.
80. Gunn RA, Podschun GD, Fitzgerald S, et al. Screening high-risk adolescent males for *Chlamydia trachomatis* infection: obtaining urine specimens in the field. Sex Transm Dis 1998;25:49–52.
81. Phillips KA, Flatt SJ, Morrison KR, Coates TJ. Potential use of home HIV testing. N Engl J Med 1995;332:1308–10.
82. Emmons WW, Paparello SF, Decker CF, Sheffield JM, Lowe-Bey FH. A modified ELISA and Western Blot accurately determine anti-human immunodeficiency virus type 1 antibodies in oral fluids obtained with a special collecting device. J Infect Dis 1995;171:1406–10.
83. Kassler WJ, Dillon BA, Haley C, Jones WK, Goldman A. On-site, rapid HIV testing with same-day results and counseling. AIDS 1997;11:1045–51.
84. National Institute of Justice and CDC. 1994 Update: HIV/AIDS and STDs in Correctional Facilities. U.S. Department of Justice, Office of Justice Programs, National Institute of Justice and U.S. Department of Health and Human Services, Public Health Service, CDC, 1995;NCJ 156832:1–63.
85. CDC. Assessment of sexually transmitted diseases services in city and county jails—United States, 1997. MMWR 1998;47:429–31.
86. Beltrami JF, Cohen DA, Hamrick JT, Farley TA. Rapid screening and treatment for sexually transmitted diseases in arrestees: a feasible control measure. Am J Public Health 1997;87: 1423–6.
87. Phillips RS, Hanff PA, Wertheimer A, Aronson MD. Gonorrhea in women seen for routine gynecologic care: criteria for testing. Am J Med 1988;85:177–82.
88. Schachter J, Stoner E, Moncada J. Screening for chlamydial infections in women attending family-planning clinics. West J Med 1983;138:375–9.
89. Handsfield HH, Lipman TO, Harnisch JP, Tronca E, Holmes KK. Asymptomatic gonorrhea in men. Diagnosis, natural course, prevalence, and significance. N Engl J Med 1974;290:117–23.
90. Alexander-Rodriguez T, Vermund SH. Gonorrhea and syphilis in incarcerated urban adolescents: prevalence and physical signs. Pediatrics 1987;80:561–4.
91. Ellerbeck EF, Vlahov D, Libonati JP, Salive ME, Brewer TF. Gonorrhea prevalence in Maryland state prisons. Sex Transm Dis 1989;16:165–7.

92. Grosskurth H, Mayaud P, Mosha F, et al. Asymptomatic gonorrhea and chlamydial infection in rural Tanzanian men. BMJ 1996;312:277–80.
93. U.S. Preventive Services Task Force. Guide to clinical preventive services, 2nd ed. Baltimore, Maryland: Williams & Wilkins, 1996.
94. Hessol NA, Priddy FH, Bolan G, et al. Management of pelvic inflammatory disease by primary-care physicians. A comparison with Centers for Disease Control and Prevention guidelines. Sex Transm Dis 1996;23:157–63.
95. American Medical Association. Guidelines for adolescent preventive services. Chicago, IL: American Medical Association, 1992.
96. Mertz KJ, Levine WC, Mosure DJ, Berman SM, Dorian KJ, Hadgu A. Screening women for gonorrhea: demographic screening criteria for general clinical use. Am J Public Health 1997; 87:1535–8.
97. CDC. Public Health Service guidelines for counseling and antibody testing to prevent HIV infection and AIDS. MMWR 1987;36:509–15.
98. St.Louis ME, Wasserheit JN. Elimination of syphilis in the United States. Science 1998;280: 353–4.
99. Valdiserri RO, Aultman TV, Curran JW. Community planning: a national strategy to improve HIV prevention programs. J Community Health 1995;20:87–100.
100. Levine WC. The complementary roles of case reporting and prevalence monitoring in STD surveillance [Abstract]. In Proceedings of the 1996 National STD Prevention Conference, Tampa, FL: US Department of Health and Human Services, Public Health Service, CDC and the American Social Health Association, 1996;A4:65.
101. Mertz KJ, Blank S, Courtney JG, et al. A system for monitoring STD prevalence among persons admitted to jails and juvenile detention facilities in the United States [Abstract]. In Proceedings of the International Congress of Sexually Transmitted Diseases, Seville, Spain: International Society of Sexually Transmitted Disease Research 1997;1:117, P335.
102. Taha TE, Kumwenda N, Liomba G, Miotti PG, Hoover DR, Mtimavalye LAR, Broadhead RL, Dallabetta GA, Yang L-P, Chiphangwi JD. Bacterial vaginosis and disturbances of vaginal flora: association with increased acquisition of HIV. AIDS 1998 (in press).
103. Karon JM, Rosenberg PS, McQuillan G, Khare M, Gwinn M, Petersen LR. Prevalence of HIV infection in the United States, 1984 to 1992. JAMA 1996;276:126–31.

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