

# Are We Headed for a Resurgence of the HIV Epidemic Among Men Who Have Sex With Men?

## ABSTRACT

HIV remains a critical health issue for men who have sex with men (MSM). In the United States, an estimated 365 000 to 535 000 MSM are living with HIV, and 42% of new HIV infections occur in this population. Recent data on sexually transmitted diseases and on sexual behavior indicate the potential for a resurgence in HIV infections among MSM. Outbreaks of gonorrhea and syphilis have been reported in a growing number of cities, and several studies have observed an increase in unprotected anal intercourse among MSM.

These increases in HIV risk behavior may be attributed to several factors that have affected the sexual practices of MSM, including changes in beliefs regarding the severity of HIV disease. These emerging data have implications for surveillance and intervention research activities and indicate a need to reevaluate, refocus, and reinvigorate HIV prevention efforts for MSM. Our recommendations for addressing the HIV prevention needs of MSM include the need to consider HIV-related issues within the broader context of the physical, mental, and sexual health of MSM. (*Am J Public Health.* 2001;91:883–888)

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Since the first cases of AIDS were reported in 1981,<sup>1</sup> the HIV epidemic has taken a devastating toll on men who have sex with men (MSM). In the United States, more than 260 000 MSM have died of AIDS—a number greater than that for all other risk groups combined (Centers for Disease Control and Prevention [CDC], unpublished data, September 2000). Although the number of lives lost is staggering, the potential toll of the epidemic on MSM was substantially mitigated by grassroots efforts within the gay community that led to significant declines in risk behavior in the 1980s.<sup>2,3</sup> In the mid-1990s, the advent of highly active antiretroviral therapy (HAART) led to dramatic declines in AIDS and HIV-related mortality,<sup>4–6</sup> leading some to foresee an end to the epidemic.<sup>7</sup>

Sadly, the end of the HIV epidemic is not in sight. Although HAART has extended the lives of many, treatment is costly, lifelong, and difficult to maintain. It has multiple side effects, and it can lead to drug-resistant strains of HIV that can be transmitted to others.<sup>8–15</sup> Furthermore, there are now indications that we may be headed for a resurgence of HIV infections among MSM.

In this commentary we review the evidence regarding the potential for an increase in HIV infections among MSM in the United States. We draw on HIV/AIDS and sexually transmitted disease (STD) surveillance data, HIV prevalence and incidence studies, and behavioral research. We also discuss the public health implications of these data within the broader context of gay and bisexual men's health.

### *HIV and AIDS Among MSM*

The HIV epidemic continues to disproportionately affect MSM. An estimated 365 000 to 535 000 MSM in the United States are infected with HIV,<sup>16</sup> representing more than half of all persons living with HIV and approximately 70% of HIV-infected men. Given that only 5% to 7% of American men have had sex with another man during adulthood,<sup>17,18</sup> these figures are overwhelming. Although MSM no longer account for the majority of new HIV infections, they are estimated to account for 42% of all new infec-

tions—more than any other group (CDC, unpublished data, September 2000). Moreover, although rates of new HIV infections declined among MSM in the United States between the mid-1980s and the mid-1990s,<sup>19,20</sup> data from San Francisco suggest that rates of new infections may be starting to increase.<sup>21,22</sup>

The HIV prevalence rate for MSM is substantially higher than that for the general population. In a population-based study of MSM in 4 major metropolitan areas conducted from 1996 through 1998, 18% of participants, compared with less than 1% of the overall population, reported that they were HIV-seropositive.<sup>16,23</sup> Compared with older MSM, younger MSM have lower HIV prevalence rates, but they are at substantial risk for infection over time. According to a 7-city study of MSM aged 15 to 22 years conducted from 1994 through 1998, 7% were infected with HIV. Although none of the 15-year-olds in this study were infected, the rates of infection rose steadily with increasing age, to nearly 10% among 22-year-olds.<sup>24</sup>

African American and Latino MSM have been particularly hard hit by the HIV epidemic. African Americans and Latinos accounted for 53% of all MSM diagnosed with AIDS in 1999, and the AIDS incidence rates for African Americans and Latinos were markedly higher than those for MSM of other races and ethnicities (CDC, unpublished data, October 2000). In 1999, the AIDS incidence rate among African American MSM (55.5 cases/100 000 men) was more than 5 times that for White MSM (10.9), and the rate for Latino MSM (26.8) was almost 2.5 times the rate for White MSM. In contrast, the AIDS incidence rate for Native American MSM (10.9) was the same as that for Whites, and the rate for Asian and Pacific Islander MSM (5.5) was half the rate for Whites.

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## ***Other STDs Among MSM***

STDs are markers for high-risk sexual practices that can transmit HIV. In addition, the role of STDs in facilitating HIV transmission makes these infections especially portentous.<sup>25</sup> Recent STD data suggest that risky sexual practices may be increasing among MSM in some parts of the United States.<sup>26,27</sup>

Increases in STDs among MSM have been reported in a number of American cities. The Gonococcal Isolate Surveillance Project, which monitors antimicrobial resistance among men attending STD clinics in 26 cities, reported that from 1992 through 1999, the proportion of gonococcal isolates from MSM increased significantly, from 5% to 13% of all samples.<sup>28,29</sup> Increases in gonorrhea cases among MSM have also been detected in the District of Columbia; Portland, Ore; San Francisco, Calif; and Seattle, Wash, and in a 9-city study of persons living with HIV.<sup>28-33</sup> In addition, outbreaks of syphilis among MSM have recently been reported in Chicago, Ill; Los Angeles, Calif; Seattle, Wash; and San Francisco, Calif.<sup>34-38</sup> For example, after several years in which the number of cases declined, syphilis reemerged in Seattle-King County, Washington, in 1997, and cases among MSM began to increase.<sup>34,35</sup> From 1987 through 1991, 15% (51/337) of men with syphilis were MSM, compared with 21% (12/57) from 1992 through 1996 and 84% (32/38) from 1997 through 1998.

## ***Sexual Behavior Among MSM***

Assessing recent trends in risk behavior among MSM is extremely difficult, because only limited longitudinal data have been collected on the sexual practices of this population. Findings from 2 San Francisco studies indicate a trend in the mid-1990s toward increased risk taking. In one study, the percentage of young MSM who reported engaging in unprotected anal intercourse increased from 37% in 1993-1994 to 50% in 1996-1997.<sup>39</sup> In 1996-1997, 46% of MSM who reported having had unprotected anal intercourse had engaged in this behavior with a partner whose HIV serostatus was unknown or different from their own. A similar trend toward increased risk behavior was observed in community surveys that were conducted in San Francisco from 1994 through 1997.<sup>30</sup> In contrast, a cross-sectional study of MSM in New York City reported relatively low levels of risk behaviors and an increase in condom use at first anal intercourse.<sup>40</sup>

Many studies have underscored the difficulty of maintaining safer sexual practices

for an extended period, and investigators have pointed out the potential for a return to riskier sexual practices.<sup>41-45</sup> Data from the Multi-center AIDS Cohort Study show that over a 2-year period, 47% of men returned to unprotected receptive anal intercourse and 44% returned to unprotected insertive anal intercourse.<sup>46</sup> According to a recent report from the San Francisco Men's Health Study, most of the men (68%) who were followed from 1993 through 1997 reported on one or more occasions that they had engaged in unprotected anal intercourse.<sup>39</sup>

Considerable research has focused on subgroups of MSM that may be at increased risk for HIV infection. For example, researchers in the United States have found that younger MSM are more likely than older MSM to engage in risky sexual practices.<sup>47</sup> Studies of MSM who are current or recovering substance users, particularly those who inject drugs, have documented high levels of risk for HIV infection.<sup>48-51</sup> Many researchers have documented high rates of risky sexual behavior among MSM of color.<sup>52-57</sup> A recent study, however, found rates of unprotected anal intercourse among young African American, Hispanic, and Asian MSM that were comparable to, or in some instances less than, those of Whites.<sup>58</sup>

As the number of persons living with HIV has increased in recent years (CDC, unpublished data, September 2000), more attention has been paid to the sexual practices of HIV-seropositive MSM.<sup>59</sup> Although many HIV-seropositive MSM believe they have a responsibility to protect their sex partners from HIV infection,<sup>60</sup> a notable minority participate in behaviors that can transmit HIV to uninfected partners.<sup>61-63</sup> Some HIV-seropositive MSM have unprotected sex only with other men who are also HIV-seropositive, but others report risky sexual practices with partners who are uninfected. For example, 22% of MSM in one study reported that they had engaged in unprotected insertive anal intercourse in the previous 3 months with a partner who was HIV-seronegative or whose serostatus was unknown.<sup>62</sup>

## ***Emerging Factors That May Contribute to Increased Risk***

In addition to the demographic, psychosocial, and situational factors that have repeatedly been associated with HIV risk,<sup>41-45,64-68</sup> several newly emerging factors may partially account for recent trends toward increased sexual risk taking. Of these, the association between beliefs about HAART and increased sexual risk taking has received the most attention.<sup>69-76</sup> Some re-

searchers have speculated that pharmaceutical advertisements that minimize the negative aspects of HIV infection and HAART with unrealistically upbeat portrayals of HIV-seropositive persons may also lead to increased risk behavior.<sup>77</sup> Although few data are available, other medical advances, such as the testing of vaccine candidates, the availability of postexposure therapy, and viral load monitoring, have the potential to affect the sexual practices of MSM by influencing their perceptions of the risk and consequences of HIV infection.<sup>78-82</sup>

Other emerging factors might also lead to increased risk behaviors among MSM. A 4-city study indicates that "AIDS burnout," which results from years of exposure to prevention messages and long-term efforts to maintain safer sex practices, is an independent predictor of unprotected anal intercourse among HIV-seropositive MSM.<sup>75</sup> As HIV prevention efforts have been expanded to meet the needs of other populations, decreased visibility and gaps in prevention services for MSM may have reduced the salience of HIV infection among gay men in some communities.<sup>26</sup> Outdated or overly simplistic safer sex messages for MSM (a common criticism in recent years) have led to a backlash against existing prevention efforts.<sup>26, 83-85</sup> For example, men who seek partners for unprotected sex, "barebackers," have been the focus of debate in the gay media, which has sometimes positively portrayed these men as rebels who are breaking away from a conformist pack.<sup>77,86</sup> Although it is likely that men who self-identify as barebackers constitute a small minority of MSM, the visibility of this group has the potential to shift safer sex norms within the gay community.

## ***Implications for Public Health***

The emerging STD and behavioral data underscore the potential for a resurgence of HIV infections among MSM. Data from multiple sources suggest a trend toward increased risk taking among MSM in San Francisco, and reports of increased STD rates among MSM in other cities reflect similar trends. Given these findings, it is imperative that public health officials review and strengthen activities in 3 key areas: surveillance, intervention research, and prevention.

Because of the importance of surveillance data in planning prevention efforts, there is an urgent need to address gaps in our ability to monitor changes in HIV, STDs, and sexual practices among MSM. Foremost, there is a tremendous need to improve HIV and behavioral surveillance, so that new cases of HIV infection and changes in risk

behavior can be detected early.<sup>20</sup> This is particularly important now, given that the population-level effects of HAART on HIV transmission among MSM are not known. Improved HIV treatments have the potential to decrease HIV infection rates by lowering viral load among persons taking these medications, but they also have the potential to increase HIV infection rates by increasing risk behavior.<sup>64,69–74,87,88</sup> The use of the sensitive/less sensitive enzyme immunoassay (“detuned” EIA) is one strategy that may improve the ability of public health officials to monitor trends in recent HIV infections, to detect HIV outbreaks quickly, and to limit their spread.<sup>89,90</sup> Identifying opportunities to collect information about MSM as part of general population surveys that address health-related issues represents an important strategy for improving behavioral surveillance. In addition, population-based surveys that focus exclusively on MSM are not only feasible but essential for providing in-depth information about the sexual and other health-related practices of MSM.<sup>23,91,92</sup> Finally, there is a need for improved STD screening and surveillance,<sup>93</sup> which will require additional provider training, changes in STD reporting, and improved clinical services for MSM.

There is also a pressing need for additional research to develop interventions for MSM. Relatively few studies have examined the effects of behavioral interventions for MSM—only 10 of 99 scientifically rigorous intervention studies included in a recent comprehensive review focused on MSM.<sup>94</sup> The underrepresentation of MSM, especially MSM of color, in intervention research stands in great contrast to the overrepresentation of MSM among persons living with HIV. Because of well-documented barriers to condom use, research is also needed to develop and test the effectiveness of alternatives to latex condoms (e.g., negotiated safety, rectal microbicides, rectal use of female condoms).<sup>95–101</sup>

Most important, there is an urgent need for health departments, community-based organizations, and prevention advocates to conduct critical assessments of local prevention activities for MSM and, if needed, to reinvigorate and strengthen these programs. Comprehensive programs for MSM are essential and should include ongoing broad-based awareness campaigns to keep HIV salient in the minds of MSM and to reinforce community norms that support risk-reducing practices. In addition, more intensive interventions designed for subgroups of MSM at increased risk are needed. Special attention should be paid to the needs of African American and Latino MSM, those who abuse alcohol and other substances, HIV-

seropositive MSM, and young MSM who are developing and exploring new social and sexual identities.<sup>102–104</sup>

In addition to the need to strengthen current prevention efforts, there is a critical need to facilitate the transfer of effective interventions for MSM and to move beyond strategies that promote behavior change at the individual level. Resource limitations and other barriers make it difficult for many community-based organizations to adopt approaches to HIV prevention that are not primarily informational.<sup>105–108</sup> Addressing these barriers will require sustained technology transfer efforts and a long-term commitment on the part of government, universities, and private foundations to building the capacity of community-based organizations.

It is essential that prevention programs recognize that HIV risk occurs within a broader context of physical and mental health problems, including psychologic distress, substance use, violence and sexual assault, and STDs other than HIV.<sup>64,83,91,111–114</sup> These factors, which are often interrelated, may have a common basis in the considerable prejudice, homophobia, and stigmatization that MSM in the United States continue to experience.<sup>115,116</sup> Stigmatization and homophobia not only affect the perceptions and practices of individual MSM, they also hamper the provision of interventions that are effective, affirming, and tailored to meet the needs of this population.<sup>108</sup> Addressing the effects of stigmatization and homophobia will require an ecological approach to HIV prevention that includes efforts to intervene at the community, structural, and policy levels.<sup>61,117,118</sup>

As Stall warned years ago, the best way to lose the fight against HIV among MSM is to declare victory and leave the field.<sup>119</sup> Despite remarkable successes in the prevention and treatment of HIV, the epidemic remains an undeniable and pervasive threat to the health and well-being of MSM. To respond to the continued threat of HIV, a sustained and coordinated effort on the part of the gay community, prevention providers, and public health officials at the local, state, and federal levels is required. The emerging data presented here suggest that we may be headed toward a resurgence in HIV infections among MSM, unless we act decisively to reevaluate, refocus, and reinvigorate our prevention efforts. □

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## References

- Centers for Disease Control. Pneumocystis pneumonia—Los Angeles. *MMWR Morb Mortal Wkly Rep.* 1981;30:250–252.
- Shilts R. *And the Band Played On: Politics, People, and the AIDS Epidemic.* New York, NY: St. Martin's Press; 1987.
- Revenson TA, Schiaffino KM. Community-based health interventions. In: Rappaport J, Seidman E, eds. *Handbook of Community Psychology.* New York, NY: Kluwer Academic/Plenum; 2000:471–493.
- HIV/AIDS Surveillance Report.* Atlanta, Ga: Centers for Disease Control and Prevention; 1999.
- Fleming PL, Wortley PM, Karon JM, DeCock KM, Janssen RS. Tracking the HIV epidemic: current issues, future challenges. *Am J Public Health.* 2000;90:1037–1041.
- Centers for Disease Control and Prevention. Trends in AIDS incidence, deaths, and prevalence—United States, 1996. *MMWR Morb Mortal Wkly Rep.* 1997;46:165–173.
- Sullivan A. When plagues end. *New York Times.* November 10, 1996;6: 52.
- Boden D, Hurley A, Zhange L, et al. HIV-1 drug resistance in newly infected individuals. *JAMA.* 1999;282:1135–1141.
- Hecht FM, Grant RM, Petropoulos CJ, et al. Sexual transmission of an HIV-1 variant resistant to multiple reverse-transcriptase and protease inhibitors. *N Engl J Med.* 1998;339: 307–311.
- Little SJ, Daar ES, D'Aquila RT, et al. Reduced antiretroviral drug susceptibility among patients with primary HIV infection. *JAMA.* 1999;282: 1142–1149.
- Fischl MA. Antiretroviral therapy in 1999 for antiretroviral-naive individuals with HIV infection. *AIDS.* 1999;13(suppl 1):S49–S59.
- Volberding PA. Advances in the medical management of patients with HIV-1 infection: an overview. *AIDS.* 1999;13(suppl 1):S1–S9.
- Moore RD. Cost effectiveness of combination HIV therapy: 3 years later. *Pharmacoeconomics.* 2000;17:325–330.
- Chesney MA, Ickovics J, Hecht FM, Sikipa G, Rapkin J. Adherence: a necessity for successful HIV combination therapy. *AIDS.* 1999;13(suppl 1):S271–S278.
- Carr A, Cooper DA. Adverse effects of antiretroviral therapy. *Lancet.* 2000;356:1423–1430.
- 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;276:126–131.
- Binson D, Michaels S, Stall R, Coates TJ, Gagnon JH, Catania JA. Prevalence and social distribution of men who have sex with men: United States and its urban centers. *J Sex Res.* 1995;32:245–254.
- Rogers SM, Turner CF. Male–male sexual contact in the USA: findings from five sample surveys, 1970–1990. *J Sex Res.* 1991;28:491–519.
- Quan VM, Steketee RW, Valleroy L, Weinstock H, Karon J, Janssen R. HIV incidence patterns,

- trends, and association with HIV prevalence in the United States, 1978–1999. In: Program and abstracts of the XIII International Conference on AIDS; July 9–14, 2000; Durban, South Africa. Abstract MoPeC2450.
20. Institute of Medicine. *No Time to Lose: Getting More From HIV Prevention*. Washington, DC: National Academy Press; 2000.
  21. McFarland W, Schwarcz S, Kellogg TA, Hsu L, Kim A, Katz MH. Implications of highly active retroviral treatment for HIV prevention: the case of men who have sex with men in San Francisco. In: Program and abstracts of the XIII International Conference on AIDS; July 9–14, 2000; Durban, South Africa. Abstract MoPpD1127.
  22. San Francisco Department of Public Health and AIDS Research Institute/UCSF. Response to the updated estimates of HIV infection in San Francisco, 2000. Available at: <http://hivinsite.ucsf.edu/ari/HIVestimatesReport8900.pdf>. Accessed October 20, 2000.
  23. Stall R, Catania J, Osmond D, et al. The distribution of HIV infection among men who have sex with men: a household-based sample of four large urban centers in the USA. In: Program and abstracts of the XIII International Conference on AIDS; July 9–14, 2000; Durban, South Africa. Abstract ThOrC716.
  24. Valleroy LA, MacKellar DA, Karon JM, et al. HIV prevalence and associated risks in young men who have sex with men. *JAMA*. 2000;284:198–204.
  25. Fleming DT, Wasserheit JN. From epidemiological synergy to public health policy and practice: the contribution of other sexually transmitted diseases to sexual transmission of HIV infection. *Sex Transm Infect*. 1999;75:3–17.
  26. Aral S. Elimination and reintroduction of a sexually transmitted disease: lessons to be learned? *Am J Public Health*. 1999;89:995–997.
  27. *Sexually Transmitted Disease Surveillance, 1999*. Atlanta, Ga: Division of STD Prevention, Centers for Disease Control and Prevention; September 2000.
  28. Centers for Disease Control and Prevention. Gonorrhea among men who have sex with men—selected sexually transmitted disease clinics, 1993–1996. *MMWR Morb Mortal Wkly Rep*. 1997;46:889–892.
  29. Fox KK, del Rio C, Holmes KK, et al. Gonorrhea in the HIV era: a reversal of trends among men who have sex with men. *Am J Public Health*. 2001;91:959–964.
  30. Centers for Disease Control and Prevention. Increases in unsafe sex and rectal gonorrhea among men who have sex with men—San Francisco, California, 1994–1997. *MMWR Morb Mortal Wkly Rep*. 1999;48:45–48.
  31. Barrow R, Mertz K, Litchfield B, et al. Increase in gonorrhea in men who have sex with men in Washington, DC: high-risk sexual behavior, diverse *Neisseria gonorrhoeae* subtypes, and human immunodeficiency virus infection. In: Program and abstracts of the National STD Prevention Conference; December 1998; Dallas, Tex:141.
  32. Do A, Hanson DL, Dworkin MS, Jones JL, ASD Project Group. Risk factors and trends of gonorrhea incidence among HIV-infected patients, United States. In: Program and abstracts of the XIII International Conference on AIDS; July 9–14, 2000; Durban, South Africa. Abstract WePeC4397.
  33. Ashford DA, Townes JM, Castle J, et al. An outbreak of gonorrhea among gay men in Portland: risk factors for infection. In: Program and abstracts of the International Conference on Emerging Infectious Diseases; March 1998; Atlanta, Ga. Abstract P-12.7.
  34. Williams LA, Klausner JD, Whittington WLH, Handsfield HH, Celum C, Holmes KK. Elimination and reintroduction of primary and secondary syphilis. *Am J Public Health*. 1999;89:1093–1097.
  35. Centers for Disease Control and Prevention. Resurgent bacterial sexually transmitted disease among men who have sex with men—King County, Washington, 1997–1999. *MMWR Morb Mortal Wkly Rep*. 1999;48:773–777.
  36. Ciesielski C, Beidinger H. Emergence of primary and secondary syphilis among men who have sex with men in Chicago and relationship to HIV infection. In: Program and abstracts of the 7th Conference on Retroviruses and Opportunistic Infections; January 30–February 2, 2000; Chicago, Ill. Abstract 470.
  37. Klausner JD, Wolf W, Fischer-Ponce L, Zolt I, Katz MH. Tracing a syphilis outbreak through cyberspace. *JAMA*. 2000;284:447–487.
  38. Centers for Disease Control and Prevention. Outbreak of syphilis among men who have sex with men—Southern California, 2000. *MMWR Morb Mortal Wkly Rep*. 2001;50:117–120.
  39. Ekstrand ML, Stall RS, Paul JP, Osmond DH, Coates TJ. Gay men report high rates of unprotected anal sex with partners of unknown or discordant HIV status. *AIDS*. 1999;13:1525–1533.
  40. *Results of the 1998 Beyond 2000 Sexual Health Survey*. New York, NY: Gay Men's Health Crisis; June 1999.
  41. Kelly JA, St. Lawrence JS, Bransfield TL. Predictors of vulnerability to AIDS risk behavior relapse. *J Consult Clin Psychol*. 1991;59:163–166.
  42. Stall R, Ekstrand M, Pollack L, McKusick L, Coates TJ. Relapse from safer sex: the next challenge for AIDS prevention efforts. *J Acquir Immune Defic Syndr*. 1990;3:1181–1187.
  43. Ekstrand ML, Coates TJ. Maintenance of safer sexual behaviors and predictors of risky sex: the San Francisco Men's Health Study. *Am J Public Health*. 1990;80:973–977.
  44. de Wit JB, van Griensven GJ, Kok G, Sandfort TG. Why do homosexual men relapse into unsafe sex? Predictors of resumption of unprotected anogenital intercourse with casual partners. *AIDS*. 1993;7:1113–1118.
  45. Graham RP, Kirscht JP, Kessler RC, Graham S. Longitudinal study of relapse from AIDS-preventive behavior among homosexual men. *Health Educ Behav*. 1998;25:625–639.
  46. Adib SM, Joseph JG, Ostrow DG, Tal M, Schwartz SA. Relapse in sexual behavior among homosexual men: a 2-year follow-up from the Chicago MACS/CCS. *AIDS*. 1991;5:757–760.
  47. Mansergh G, Marks G. Age and risk of HIV infection in men who have sex with men. *AIDS*. 1998;12:1119–1128.
  48. Centers for Disease Control and Prevention. HIV/AIDS among men who have sex with men and inject drugs—United States, 1985–1998. *MMWR Morb Mortal Wkly Rep*. 2000;49:465–470.
  49. Rhodes F, Deren S, Wood MM, et al. Understanding HIV risks of chronic drug-using men who have sex with men. *AIDS Care*. 1999;11:629–648.
  50. Paul JP, Stall R, Davis F. Sexual risk for HIV transmission among gay/bisexual men in substance-abuse treatment. *AIDS Educ Prev*. 1993;5:11–24.
  51. Ostrow DG, Beltran ED, Joseph JG, DiFrancisco W, Wesch J, Chmiel JS. Recreational drugs and sexual behavior in the Chicago MACS/CCS cohort of homosexually active men. *J Subst Abuse*. 1993;5:311–325.
  52. Peterson JL, Coates TJ, Catania JA, Middleton L, Hilliard B, Hearst N. High-risk sexual behavior and condom use among gay and bisexual African-American men. *Am J Public Health*. 1992;82:1490–1494.
  53. Carballo-Diequez A, Dolezal C. HIV risk behaviors and obstacles to condom use among Puerto Rican men in New York City who have sex with men. *Am J Public Health*. 1996;86:1619–1622.
  54. Choi KH, Coates TJ, Catania JA, Lew S, Chow P. High HIV risk among gay Asian and Pacific Islander men in San Francisco. *AIDS*. 1995;9:306–308.
  55. Diaz RM, Stall RD, Hoff C, Daigle D, Coates TJ. HIV risk among Latino gay men in the Southwestern United States. *AIDS Educ Prev*. 1996;8:415–429.
  56. Heckman TG, Kelly JA, Bogart LM, Kalichman SC, Rompa DJ. HIV risk differences between African-American and white men who have sex with men. *J Natl Med Assoc*. 1999;91:92–100.
  57. Lemp GF, Hirozawa AM, Givertz D, et al. Seroprevalence of HIV and risk behaviors among young homosexual and bisexual men. The San Francisco/Berkeley Young Men's Survey. *JAMA*. 1994;272:449–454.
  58. Valleroy LA, MacKellar D, Rosen D, Secura G, the Young Men's Survey Team. HIV prevalence and predictors of unprotected receptive anal intercourse for 15- to 22-year-old men who have sex with men sampled in seven urban areas, USA. In: Program and abstracts of the XII International Conference on AIDS; July 1998; Geneva, Switzerland. Abstract 23120.
  59. Janssen R. Serostatus approach to fighting the HIV epidemic (SAFE): a new prevention strategy to reduce transmission. In: Program and abstracts of the 8th Conference on Retroviruses and Opportunistic Infections; February 2001; Chicago, IL. Abstract S20.
  60. Wolitski RJ, Gomez C, Parsons J, Ambrose T, Remien R. HIV-seropositive men's perceived responsibility for preventing HIV transmission of HIV to others. In: Program and abstracts of the XII International Conference on AIDS; July 1998; Geneva, Switzerland. Abstract 23361.
  61. Marks G, Burris S, Peterman TA. Reducing sexual transmission of HIV from those who know they are infected: the need for personal and collective responsibility. *AIDS*. 1999;13:297–306.
  62. Gomez CA, the Seropositive Urban Men's Study Team. Sexual HIV transmission risk behaviors among HIV-seropositive (HIV+) injection drug users and HIV+ men who have sex with men: implications for interventions. In: Program and abstracts of the National HIV Prevention Conference; August 29–September 1, 1999; Atlanta, Ga. Abstract 180.

63. Denning P, Nakashima AK, Wortley P. Increasing rates of unprotected anal intercourse among HIV-infected men who have sex with men in the United States. In: Program and abstracts of the XIII International Conference on AIDS; July 9–14, 2000; Durban, South Africa. Abstract ThOrC714.
64. Stall RD, Hays RB, Waldo CR, Ekstrand M, McFarland W. The Gay '90s: a review of research in the 1990's on sexual behavior and HIV risk among men who have sex with men. *AIDS*. 2000;14(suppl 3):S101–S114
65. Becker MH, Joseph JG. AIDS and behavioral change to reduce risk: a review. *Am J Public Health*. 1988;78:394–410.
66. Rosario M, Mahler K, Hunter J, Gwadz M. Understanding the unprotected sexual behaviors of gay, lesbian, and bisexual youths: an empirical test of the cognitive-environmental model. *Health Psychol*. 1999;18:272–280.
67. Fisher JD, Fisher WA, Williams SS, Malloy TE. Empirical tests of an information-motivation-behavioral skills model of AIDS-preventive behavior with gay men and heterosexual university students. *Health Psychol*. 1994;13:238–250.
68. Gold RS, Skinner MJ. Situational factors and thought processes associated with unprotected intercourse in young gay men. *AIDS*. 1992;6:1021–1030.
69. Kelly JA, Hoffmann RG, Rompa D, Gray M. Protease inhibitor combination therapies and perceptions of gay men regarding AIDS severity and the need to maintain safer sex. *AIDS*. 1998;12(10):F91–F95.
70. Kalichman SC, Nachimson D, Cherry C, Williams E. AIDS treatment advances and behavioral prevention setbacks: preliminary assessment of reduced perceived threat of HIV-AIDS. *Health Psychol*. 1998;17:546–550.
71. Diley JW, Woods WJ, McFarland W. Are advances in treatment changing views about high-risk sex? *N Engl J Med*. 1997;337:501–502.
72. Vanable PA, Ostrow DG, McKirnan DJ, Taywaditep KJ, Hope BA. Impact of combination therapies on HIV risk perceptions and sexual risk among HIV-positive and HIV-negative gay and bisexual men. *Health Psychol*. 2000;19:134–145.
73. Remien RH, Wagner G, Carballo-Diequez A, Dolezal C. Who may be engaging in high-risk sex due to medical treatment advances? *AIDS*. 1998;12:1560–1561.
74. Lehman JS, Hecht FM, Stevens M, Wortley P, Fleming PL. Potential for increased HIV transmission among at-risk populations as more effective HIV treatments become available: results from the HIV-testing survey (HITS). In: Program and abstracts of the XIII International Conference on AIDS; July 9–14, 2000; Durban, South Africa. Abstract ThPeD5812.
75. Ostrow DG, Fox K, Chmiel JS, et al. Attitudes toward highly active retroviral therapy predict sexual risk-taking among HIV-infected and uninfected gay men in the Multicenter AIDS Cohort Study (MACS). In: Program and abstracts of the XIII International Conference on AIDS; July 9–14, 2000; Durban, South Africa. Abstract ThOrC719.
76. Bartholow B, Valleroy L, MacKellar D. Knowledge and attitudes regarding post-exposure prophylaxis (PEP) and highly active antiretroviral therapy (HAART) as correlates of HIV risk behavior among young men who have sex with men (MSM) in the US. In: Program and abstracts of the XIII International Conference on AIDS; July 9–14, 2000; Durban, South Africa. Abstract ThPeD5810.
77. Suarez T, Miller J. Negotiating risks in context: a perspective on unprotected anal intercourse and barebacking among men who have sex with men—where do we go from here? *Arch Sex Behav*. 2001;30:287–300.
78. Chesney MA, Chambers DB, Kahn JO. Risk behavior for HIV infection in participants in preventive HIV vaccine trials: a cautionary note. *J Acquir Immune Defic Syndr Hum Retrovirol*. 1997;16:266–271.
79. Bamberger JD, Waldo CR, Gerberding JL, Katz MH. Postexposure prophylaxis for human immunodeficiency virus (HIV) infection following sexual assault. *Am J Med*. 1999;106:323–326.
80. Kalichman SC. Post-exposure prophylaxis for HIV infection in gay and bisexual men. Implications for the future of HIV prevention. *Am J Prev Med*. 1998;15:120–127.
81. Remien RH, Smith RA. HIV prevention in the era of HAART: implications for providers. *AIDS Reader*. 2000;10:247–251.
82. Waldo CR, Stall RD, Coates TJ. Is offering post-exposure prevention for sexual exposures to HIV related to sexual risk behavior in gay men? *AIDS*. 2000;14:1035–1039.
83. Doll LS, Ostrow DG. Homosexual and bisexual behavior. In: Holmes KK, Mardh P, Sparling PF, et al., eds. *Sexually Transmitted Diseases*. New York, NY: McGraw-Hill; 1999: 151–162.
84. Odets W. AIDS education and harm reduction for gay men: psychological approaches for the 21st century. *AIDS Public Policy J*. 1994;9: 1–15.
85. Gallagher J. Risky business. *Advocate*. March 17, 1998:46–48.
86. Gendin S. They shoot barebackers, don't they? *Poz*. February 1999:51.
87. Cohen MS. Preventing sexual transmission of HIV—new ideas from sub-Saharan Africa. *N Engl J Med*. 2000;342:970–973.
88. Quinn TC, Wawer MJ, Sewankambo N, et al. Viral load and heterosexual transmission of human immunodeficiency virus type 1. *N Engl J Med*. 2000;342:921–929.
89. Janssen RS, Satten GA, Stramer SL, et al. New testing strategy to detect early HIV-1 infection for use in incidence estimates and for clinical and prevention purposes. *JAMA*. 1998;280: 42–48.
90. McFarland W, Schwarcz SK, Page-Shafer K, et al. Detection of recent HIV infection using the Standardized Testing Algorithm for Recent HIV Seroconversion: new public health opportunities for prevention. In: Program and abstracts of the XIII International Conference on AIDS; July 9–14, 2000; Durban, South Africa. Abstract MoPpC1099.
91. Stall R, Paul JP, Greenwood G, et al. Patterns of alcohol, drug use, and alcohol-related problems among men who have sex with men: the Urban Men's Health Study. *Addiction*. In press.
92. Stall RD, Greenwood GL, Acree M, Paul J, Coates TJ. Cigarette smoking among gay and bisexual men. *Am J Public Health*. 1999;89:1875–1878.
93. Council of State and Territorial Epidemiologists. Surveillance for STDs among men who have sex with men (MSM). Position statement. Available at: <http://www.cste.org/ps1999/ps99ID10.htm>. Accessed March 3, 2001.
94. Sogolow E, Peersman G, Semaan S, Strouse D, Lyles C, the Prevention Research Synthesis Team. CDC's HIV/AIDS Prevention Research Synthesis Project: development, initial results, and future directions. *J Acquir Immune Defic Syndr Hum Retrovirol*. In press.
95. Kippax S, Crawford J, Davis M, Rodden P, Dowsett G. Sustaining safe sex: a longitudinal study of a sample of homosexual men. *AIDS*. 1993;7: 257–263.
96. Kippax S, Noble J, Prestage G, et al. Sexual negotiation in the AIDS era: negotiated safety revisited. *AIDS*. 1997;11:191–197.
97. Kippax S. Negotiated safety agreements among gay men. In: O'Leary A, ed. *Beyond Condoms: Alternative Approaches to HIV Prevention*. New York: Kluwer Academic/Plenum. In press.
98. Carballo-Diequez A, Stein Z, Saez H, Dolezal C, Nieves-Rosa L, Diaz F. Frequent use of lubricants for anal sex among men who have sex with men: the HIV prevention potential of a microbicide gel. *Am J Public Health*. 2000;90: 1117–1121.
99. Gibson S, McFarland W, Wohlfeiler D, Scheer K, Katz M. Experiences of 100 men who have sex with men using the Reality condom for anal sex. *AIDS Educ Prev*. 1999;11:65–71.
100. Marks G, Mansergh G, Crepaz N, Murphy S, Miller LC, Appleby PR. Future HIV prevention options for men who have sex with men: intention to use a potential microbicide during anal intercourse. *AIDS Behav*. 2000;4: 279–287.
101. Wolitski RJ, Halkitis PN, Parsons JT, Gomez CA. HIV-seropositive gay and bisexual men's awareness and use of alternative barrier methods for the prevention of HIV transmission. *AIDS Educ Prev*. In press.
102. Seal DW, Kelly JA, Bloom FR, et al. HIV prevention with young men who have sex with men: what young men themselves say is needed. *AIDS Care*. 2000;12:5–26.
103. Rotheram-Borus MJ, Roasrio M, Reid H, Koopman C. Predicting patterns of sexual acts among homosexual and bisexual youths. *Am J Psychiatry*. 1995;152:588–595.
104. Rotheram-Borus MJ, Marelich WD, Srinivasan S. HIV risk among homosexual, bisexual, and heterosexual male and female youths. *Arch Sex Behav*. 1999;28:159–177.
105. Somlai AM, Kelly JA, Otto-Salaj L, et al. Current HIV prevention activities for women and gay men among 77 ASOs. *J Public Health Manag Pract*. 1999;5:23–33.
106. Goldstein E, Wrubel J, Faigles B, DeCarlo P. Sources of information for HIV prevention program managers: a national survey. *AIDS Educ Prev*. 1998;10:63–74.
107. Kraft JM, Mezoff JS, Sogolow ED, Neumann MS, Thomas PA. A technology transfer model for effective HIV/AIDS interventions: science and practice. *AIDS Educ Prev*. 2000;12:7–20.
108. Valdeserri RO. Technology transfer: achieving the promise of HIV prevention. In: Peterson J,

- DiClemente R, eds. *Handbook of HIV Prevention*. New York, NY: Kluwer Academic/Plenum; 2000:267–283.
109. Council on Scientific Affairs of the American Medical Association. Health care needs of gay men and lesbians in the United States. *JAMA*. 1996;275:1354–1359.
110. Lenderking WR, Wold C, Mayer KH, Goldstein R, Losina E, Seage GR III. Childhood sexual abuse among homosexual men: prevalence and association with unsafe sex. *J Gen Intern Med*. 1997;12:250–253.
111. Jinich S, Paul JP, Stall R, et al. Childhood sexual abuse and HIV risk-taking behavior among gay and bisexual men. *AIDS Behav*. 1998;2:41–51.
112. Bartholow BN, Doll LS, Joy D, et al. Emotional, behavioral, and HIV risks associated with sexual abuse among adult homosexual and bisexual men. *Child Abuse Negl*. 1994;18:747–761.
113. Robins AG, Dew MA, Davidson S, Penkower L, Becker JT, Kingsley L. Psychosocial factors associated with risky sexual behavior among HIV-seropositive gay men. *AIDS Educ Prev*. 1994;6:483–492.
114. Marks G, Bingman CR, Duval TS. Negative affect and unsafe sex in HIV-positive men. *AIDS Behav*. 1998;2:89–99.
115. Meyer IH. Minority stress and mental health in gay men. *J Health Soc Behav*. 1995;36:35–56.
116. Stokes JP, Peterson JL. Homophobia, self-esteem, and risk for HIV among African American men who have sex with men. *AIDS Educ Prev*. 1998;10:278–292.
117. Wohlfeiler D. Structural and environmental HIV prevention for gay and bisexual men. *AIDS*. 2000;14(suppl 1):S52–S56.
118. Sumartojo E. Structural factors in HIV prevention: concepts, examples, and implications for research. *AIDS*. 2000;14(suppl 1):S3–S10.
119. Stall R. How to lose the fight against AIDS among gay men. *BMJ*. 1994;309:685–686.