should include skills-training sessions which incorporate role playing and small group discussion. Experienced peers may be especially effective in addressing the perception that condoms interfere with sexual pleasure, since condom acceptance is known to increase with increased experience.[9]

Condom promotion programs must also be flexible enough to meet individual needs. There may be significantly different perceptions about condom use among women from different racial/ethnic backgrounds.

The observed discrepancy between the widespread endorsement of condoms and the frequency of reported use probably reflects the fact that many of the women we surveyed do not perceive themselves to be at risk for HIV infection,[10] because most reported only a single sexual partner. Therefore, the ability to generalize these findings to women who belong to targeted "risk groups" is limited. Nevertheless, we believe that the identification of generic barriers to women's use of condoms for contraception does provide direction for the development of condom promotion programs which can then be applied to other populations, especially those at increased risk of HIV infection.

REFERENCES
1. US Public Health Service: Understanding AIDS. Washington, DC: Govt Printing Office, 1988.
2. Cox DR: Analysis of Binary Data. London: Chapman and Hall, 1983.
3. Hart G: Role of preventive methods in the control of venereal disease. Clin Obstet Gynecol 1975; 18:243–253.
4. Felman YM, Santora FJ: The use of condoms by VD clinic patients. Cutis 1981; 237:330–336.
5. Curjel HE: An analysis of the human reasons underlying the failure to use a condom in 723 cases of venereal disease. J R Nav Med Serv 1964; 50:203–209.
6. Hart G: Factors influencing venereal infection in a war environment. Br J Vener Dis 1974; 50:68–72.
7. Valdiserri RO: Cum hastis sic clypeatis: The turbulent history of the condom. Bull NY Acad Med 1988; 64:237–245.
8. Yarber WL: Teenage girls and venereal disease prophylaxis. Br J Vener Dis 1977; 53:135–139.
9. Sherris JD, Lewison D, Fox G: Update on condoms: Products, protection, promotion. Popul Rep [H] Sept–Oct 1982; 10(5):121–156.
10. Kegeles SM, Adler NE, Irwin CE: Sexually active adolescents and condoms: Changes over one year in knowledge, attitudes, and use. Am J Public Health 1988; 78:460–461.

Sexual Behavior Changes and HIV Antibody in a Cohort of New York City Gay Men

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Abstract: A sample of 357 gay/bisexual men, ages 20 to 65, were interviewed in 1985 regarding their sexual patterns over the course of the AIDS (acquired immunodeficiency syndrome) epidemic. Within four months after the interview, men were tested for antibody to HIV (human immunodeficiency virus) and 36 per cent were found positive. Cessation of receptive anal intercourse was associated with HIV negative antibody status, (OR > 3.0). Reducing the number of sexual partners, becoming monogamous, or eliminating other forms of sexual contact were not related to risk of HIV. (*Am J Public Health* 1989; 79:501–503.)

Introduction

Without a vaccine against human immunodeficiency virus (HIV) or efficacious treatments for HIV-related illnesses, the primary means available for controlling the AIDS (acquired immunodeficiency syndrome) epidemic is through education and the self-regulation of transmission risk behavior. For gay/bisexual men, two main types of behavior change

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have been recommended[1–3]: reduce the number of different sexual partners, and eliminate the exchange of body fluids during sexual encounters. Although gay men in San Francisco and New York City have substantially changed their sexual behavior patterns to conform with these recommendations,[4–7] persistence of high-risk sexual activity continues among a minority of these well informed cohorts.[6] In addition, high rates of risk-taking behavior have been reported among gay men in areas with low AIDS incidence.[8,9]

While it is well established that unprotected anal intercourse is the primary sexual behavior associated with HIV infection,[10–15] evaluation of the usefulness of actual *changes* in sexual behavior in preventing HIV infection among those initially at high risk is less common.[16] Thus, we undertook this study to determine the extent to which changes in sexual behavior occurring after the onset of the AIDS epidemic altered the likelihood of HIV infection among gay men.

Methods

This analysis is based on 357 of the 746 gay men recruited to study the impact of AIDS on the New York City gay community.[7] Respondents were primarily White (87 per cent), college educated (81 per cent), with an average age of 36 (SD = 7.4). No differences were found between the groups who agreed to and who refused testing (but agreed to be interviewed) on any sexual behavior variable, including numbers of partners or frequency of anal intercourse. (See Martin, et al,[17] for a detailed discussion of this sample.)

HIV Antibody Serology

HIV testing was performed by the New York City Department of Health. Two HIV-ELISA (enzyme-linked

immunsorbent assay) tests and a Western Blot test were performed on each specimen using separate plates and control measures. In this study, three of the 360 samples were inconclusive and are not used in this analysis; 230 (64 per cent) were HIV antibody negative; 127 (36 per cent) were HIV antibody positive. No differences between HIV positive and HIV negative groups were found for race, education, or income. However, HIV positive subjects were two years younger than HIV negative subjects, on average (34.9 vs 37.5). The seroplevelance figure of 36 per cent as of 1986 is lower than the 44 per cent rate reported by Stevens, et al,[10] as of 1984 and suggests that prior estimates approaching 67 per cent infection of gay/bisexual populations[18] are too high.

Sexual Behavior Measures

The sexual behavior measures have been previously described[6,7] and have been shown to be reliable.[19] Structured interview data collected in mid-1985 was used to determine: total number of different sexual partners per year in 1980–81 (the pre-AIDS period) and in 1984–85 (the year prior to the interview); annual frequency of engaging in nine specific sexual acts: kissing, oral-genital contact (receptive and insertive), swallowing partner's semen, anal intercourse (receptive and insertive), receptive rectal ejaculation, and oral-anal contact (receptive and insertive). Each sex act was scored as (0) never engaged, (1) sometimes engaged i.e., 10 per cent to 25 per cent of the time, or (2) often engaged, i.e., 50 per cent of the time or more.

Univariate odds ratios (OR) and associated 95% confidence intervals were calculated using methods described by Fleiss.[20] Multivariate odds ratios (O^R) and associated 95% CI were calculated from beta coefficients and standard errors provided by PROC LOGIST of the Statistical Analysis System software.

Results

We replicated findings previously reported by others[10–15] with respect to pre-AIDS sexual activities and HIV risk. HIV positive men were more likely to have engaged in receptive anal intercourse in the pre-AIDS year either sometimes (O^R = 3.8, 95% CI = 1.5, 9.7) or often (O^R = 10.2, 95% CI = 4.0, 25.8) compared with HIV negative men. Since only 2 per cent of the respondents used condoms during that time period, it was not possible to evaluate the role of condoms in determining HIV status. No other sexual acts were found to be associated with HIV antibody status.

We also found evidence of synergy between numbers of partners and receptive anal intercourse. The odds of HIV infection among men with few partners (one to five) who frequently engaged in receptive intercourse was O^R = 5.5 (95% CI = 2.9, 10.4) compared with those who did not engage in this act. In contrast, among men with 21 or more partners who were frequent engagers in receptive intercourse the odds of HIV infection was O^R = 37.7 (95% CI = 19.8, 72.0).

Risk Reduction Efforts and HIV Status

We first examined number of partners reduction as a means of preventing HIV infection. Thirteen men stopped all sexual activity (became celibate) in 1984–85, of whom one (7.7 per cent) was HIV positive in 1986. Forty-two men reported one partner (became monogamous) in 1984–85, of whom 10 (23.8 per cent) were HIV positive in 1986. The remaining 301 respondents continued to report multiple partners in 1984–85, of whom 117 (38.9 per cent) were HIV

positive in 1986. The per cent difference positive between monogamous and multipartner groups was 15.1 (95% CI = 1.1, 29.1).

We next examined cessation of unprotected anal intercourse as a means of preventing HIV infection. Focusing on the 283 respondents who engaged in this sex act during the pre-AIDS period, 50 per cent (103/206) of those who continued to engage in receptive anal intercourse in 1984–85 were HIV positive as of 1986. In contrast, 23 per cent (18/77) of those who stopped unprotected receptive anal intercourse were HIV positive in 1986; OR = 3.3, (95% CI = 2.4, 4.4). This odds ratio remained unchanged in multivariate analyses which statistically adjusted for age, race, education, and lover status. The odds of being HIV positive in 1986 was unaffected by cessation of any of the other eight sexual acts studied.

Discussion

These findings show that cessation of unprotected anal intercourse is associated with lowered risk of HIV infection, even among gay men initially at very high risk for HIV. Although becoming monogamous was associated with a small decrease in the odds of HIV infection, risk-reduction interventions should stress the need (in those not celibate) for eliminating unprotected anal intercourse rather than becoming monogamous. Recent observation of this cohort indicates that as of 1986–87 82.9 per cent of the sample either abstained from receptive anal intercourse entirely, or used a condom 100 per cent of the time intercourse occurred. While this represents a 3.5-fold increase in risk reduction efforts over seven years of the AIDS epidemic, nearly 20 per cent of the sample continued to engage in unprotected receptive intercourse as of 1987. Continued educational messages are clearly needed for urban gay men in order to sustain and reinforce changes that have been made, as well as encourage those who have not changed to do so, since such changes may indeed make a difference in risk of HIV infection.

REFERENCES

1. Bay Area Physicians for Human Rights: Kaposi's sarcoma in gay men. San Francisco: BAPHR, 1982.
2. Gay Men's Health Crisis, Inc: GMHC Newsletter, New York, 1982; (1).
3. Berkowitz R, Callen M: How to have sex in an epidemic: One approach. New York: News From the Front Publications, 1983.
4. McKusick L, Horstman W, Coates TJ: AIDS and sexual behavior reported by gay men in San Francisco. Am J Public Health 1985; 75:493–496.
5. Research and Decisions Corporation: A report on: Designing an effective AIDS prevention campaign strategy for San Francisco: Results from the second probability sample of an urban gay male community. San Francisco: San Francisco AIDS Foundation, 1985.
6. Martin JL: AIDS risk reduction recommendations and sexual behavior patterns among gay men: a multifactorial categorical approach to assessing change. Health Ed Q 1986; 13:347–358.
7. Martin JL: The impact of AIDS on gay male sexual behavior patterns in New York City. Am J Public Health 1987; 77:578–581.
8. Jones CC, Waskin H, Gerety B, et al: Persistence of high risk sexual activity among homosexual men in an area of low incidence of acquired immunodeficiency syndrome. Sex Transm Dis 1987; 14:79–82.
9. Fleming DW, Cochi SL, Steece RS, et al: Acquired immunodeficiency syndrome in low-incidence areas: How safe is unsafe sex? JAMA 1987; 258:785–787.

10. Stevens CE, Taylor PE, Zang EA, *et al:* Human T-cell lymphotropic virus type III infection in a cohort of homosexual men in New York City. JAMA 1986; 265:2167–2172.

11. Mayer KH, Ayotte D, Groopman JE, *et al:* Association of human T lymphotropic virus type III antibodies with sexual and other behaviors in a cohort of homosexual men from Boston with and without generalized lymphadenopathy. Am J Med 1986; 80:357–363.

12. Kingsley LA, Kaslow R, Rinaldo CR Jr, *et al:* Risk factors for sero-conversion to human immunodeficiency virus among male homosexuals. Lancet 1987; 1:345–349.

13. Moss AR, Osmond D, Bacchetti P, *et al:* Risk factors for AIDS and HIV seropositivity in homosexual men. Am J Epidemiol 1987; 125:1035–1047.

14. Chmiel JS, Detels R, Kaslow RA, *et al:* The multicenter AIDS cohort study group. Am J Epidemiol 1987; 126:568–577.

15. Winkelstein W Jr, Lyman DM, Padian NS: Sexual practices and risk of infection by the AIDS-associated retrovirus: The San Francisco Men's

16. Winkelstein W Jr, Samuel M, Padian NS, *et al:* The San Francisco Men's Health Study: III. Reduction in human immunodeficiency virus transmission among homosexual/bisexual men. Am J Public Health 1987; 77:685–689.

17. Martin JL, *et al:* The impact of AIDS on a gay community: Changes in sexual behavior, substance use, and mental health. Am J Community Psychol 1989:17(in press).

18. Curran JW, Morgan WM, Hardy AM, *et al:* The epidemiology of AIDS: current status and future prospects. Science 1985; 229:1352–1357.

19. Martin JL, Dean L: Risk factors for AIDS-related bereavement in a cohort of homosexual men in New York City. *In* Cooper B, Helgason T (eds): Epidemiology and the Prevention of Mental Disorders. UK: Routledge, 1989.

20. Fleiss JL: Statistical Methods for Rates and Proportions (2nd Ed). New York: John Wiley & Sons, 1981; 71–75, 167–175.

Health Study. JAMA 1987; 257:321–325.

A Comparison of Acquired Immunodeficiency Syndrome and Kaposi's Sarcoma Incidence Rates, Atlanta, 1983–86

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Abstract: Recent temporal trends in incidence rates for acquired immunodeficiency syndrome (AIDS) and Kaposi's sarcoma were compared in metropolitan Atlanta, Georgia. From 1983 through 1986 the age-adjusted incidence rate of Kaposi's sarcoma among White males ages 25–49 increased 11-fold (2.2-24.4/100,000 person years). The annual incidence rate of AIDS increased ten-fold (11.3–113.3/100,000). These findings do not support earlier reports that the proportion of AIDS patients with Kaposi's sarcoma has decreased over time. (*Am J Public Health* 1989; 79:503–505.)

Introduction

In 1981, the first cases of acquired immunodeficiency syndrome (AIDS) in the United States were recognized among young homosexual males with Kaposi's sarcoma or *Pneumocystis carinii* pneumonia and no other known cause of immunodeficiency.[1,2] The proportion of reported AIDS cases with Kaposi's sarcoma has declined over time in the United States.[3,4] It has been suggested that some portion of this decreasing occurrence of AIDS-related Kaposi's sarcoma may be due to reduced exposure to cofactors of Kaposi's sarcoma,[3,5] such as the use of butyl nitrite among homosexual males.[5]

Few estimates of the incidence of AIDS have been reported because of difficulties in determining the size of the populations at risk.[2,6] Estimates of temporal trends in the occurrence of AIDS usually are based solely on changes in the total number of reported cases.[2,7,8] In contrast, trends over time in the incidence of Kaposi's sarcoma have been reported for the years prior to the onset of the current AIDS epidemic.[9] In the present study, recent temporal trends in incidence rates for both

AIDS and Kaposi's sarcoma are reported and compared for young White males in metropolitan Atlanta, an area that has a relatively high incidence of AIDS.[10]

Methods

The data on AIDS incidence presented in this report were collected by the AIDS Surveillance Unit of the Georgia Department of Human Resources. AIDS became a reportable disease by law in Georgia in January 1984. For each case, the diagnosing physician is required to complete a standard reporting form with demographic and clinical information. AIDS cases diagnosed prior to 1984 were identified retrospectively by active surveillance methods including: review of tumor registry reports for Kaposi's sarcoma cases under 60 years of age at diagnosis; survey of physicians by letter and telephone; review of death certificates from Georgia; and review of requests received by the Centers for Disease Control (CDC) for pentamidine isethionate, a medication used for the treatment of *P. carinii* pneumonia[1,2,11] for which CDC has been the sole supplier until recently.[11]

Since first published in September 1982,[12] the AIDS definition for surveillance purposes has undergone minor revisions. Because the current study included cases diagnosed only through 1986, the latest revision would have had minimal impact on case identification.

The data on Kaposi's sarcoma presented in this report were collected by the Georgia Center for Cancer Statistics, a population-based cancer registry affiliated with the Surveillance, Epidemiology and End Results (SEER) Program of the National Cancer Institute.[13] This registry has been responsible for obtaining information on all cancers diagnosed among residents of metropolitan Atlanta since 1975.[14]

The primary method of cancer patient identification was through review of pathology reports and discharge diagnoses at the hospitals, clinics, and freestanding pathology laboratories in and around metropolitan Atlanta. Overall, less than 1 per cent of cases reported to the registry were identified from death certificates only. The abstracted demographic and clinical information was transcribed onto standard data collection forms, edited, and coded according to the guidelines of the SEER Program.[13]