

1-1-1988

## Behavioral Change in Homosexual Men at Risk of AIDS: Intervention and Policy Implications

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### Recommended Citation

Montgomery, Suzanne B. and Joseph, Jill G. (1988) "Behavioral Change in Homosexual Men at Risk of AIDS: Intervention and Policy Implications," *New England Journal of Public Policy*. Vol. 4: Iss. 1, Article 26. Available at: <https://scholarworks.umb.edu/nejpp/vol4/iss1/26>

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# Behavioral Change in Homosexual Men at Risk for AIDS:

# Intervention and Policy Implications

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*With more than fifty thousand cases of acquired immunodeficiency syndrome (AIDS) diagnosed since its initial recognition in 1981 and no cure or vaccine in sight, experts agree that prevention is of the utmost importance. Yet very little research has investigated how existing social-psychological and health behavioral knowledge can be applied to the special circumstances of programmatic responses to AIDS. One of the central aims of our own research group has been to describe the psychosocial determinants of successful behavioral risk reduction among homosexual men, the largest affected group. This work is reviewed and its implications for the development of intervention programs and public health policy are discussed.*

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**T**he first report of life-threatening, untreatable, and unexplained immune suppression in otherwise healthy young male homosexuals appeared in 1981.<sup>1, 2, 3, 4</sup> Most AIDS cases have been concentrated in urban centers such as New York City, Miami, Los Angeles, and San Francisco. Since the first recognition of AIDS in 1981, the study of this disorder has progressed rapidly, largely through investigation of cases arising in specific high-risk groups, such as homosexual men, intravenous drug users, and hemophiliacs. Most of these cases have also resided in the urban epicenters of the epidemic.<sup>5</sup> As of January 18, 1988, more than 51,361 people in the United States had developed the syndrome as defined by the Centers for Disease Control (CDC). More than half the persons who have developed AIDS have already died, and the three-year mortality rate is 90 percent. Even more disturbing are estimates from the CDC and the World Health Organization (WHO) that as many as 1.5 million people in the United States and between 5 million and 19 million worldwide are already infected with human immunodeficiency virus (HIV).<sup>6</sup> Most experts agree that the AIDS cases reported so far represent only the beginning of a much larger epidemic.<sup>7</sup>

That AIDS has occurred mostly in young adults, who ordinarily comprise the healthiest

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segment of the population, has serious implications. Recent studies have identified AIDS as the fastest growing cause of premature death as measured by potential years of life lost.<sup>8</sup> For example, in New York City, the leading cause of death among men between twenty and thirty-nine years of age is AIDS. It is also disturbing that, in the United States, blacks and Hispanics represent nearly 39 percent of all cases.<sup>9</sup> Not only is the number of AIDS cases among minorities disproportionate, but blacks and Hispanics also survive for a shorter time after having been diagnosed with the syndrome.<sup>10, 11</sup>

The first public health efforts to prevent the spread of the then still unknown HIV were initiated in 1983, when blood-collection agencies requested that persons known to be at risk for AIDS (for example, homosexual men) voluntarily stop donating blood.<sup>12</sup> In addition, community-based organizations of homosexual men soon made the AIDS problem one of their main concerns. They urged their constituency to comply with the blood banks' request, and soon began developing "safe sex" guidelines based on the available epidemiological evidence that AIDS was a sexually transmitted disease associated with certain identifiable risk behaviors.<sup>13</sup>

Epidemiologically, the highest risks are associated with intravenous drug use and certain sexual practices: among gay men in particular, unprotected (without a condom) receptive anal intercourse,<sup>14, 15</sup> especially in combination with multiple, casual partners. Perinatal transmission (occurring at about the time of birth) is also well documented. Serologic surveys of asymptomatic members of risk groups have revealed a high prevalence of infection with HIV, ranging from 40 to 70 percent of homosexual men in San Francisco and from 50 to 60 percent of intravenous drug users in New York City and northern New Jersey.<sup>16, 17</sup> Transmission by casual social contact, such as handshaking or face-to-face conversation, is not known to occur. Even in settings of close personal care of AIDS patients at home, transmission has not occurred when proper precautions were taken.<sup>18</sup> There is also no documented evidence that insect vectors (for example, lice and mosquitoes) or vaccines (such as hepatitis B vaccine) are implicated in HIV transmission.

Certain key features make control of AIDS difficult: First, the infection is spread predominantly through sexual contact, and second, there is a period of infectivity, lasting months or years, in which a person is often unaware that he or she is carrying the virus.<sup>19</sup> Since a large proportion of seropositive asymptomatic persons have been shown to be viremic (having the AIDS virus in the blood), all seropositive individuals, whether symptomatic or not, must be presumed to be capable of spreading this infection until it is proven otherwise.<sup>20</sup> Further, it appears that once an individual has been infected with HIV, the virus remains in the body indefinitely.<sup>21</sup>

In a thorough review, Osborn concludes that "the most attractive opportunity for coping with the AIDS epidemic is prevention. If transmission is not interrupted by medical, behavioral, or other modifications, there seems no doubt that those in high-risk groups will uniformly become infected."<sup>22</sup> Therefore, the main task of public health today is to prevent infection of people not yet infected with HIV. The population has to be educated about the syndrome, its transmission, and the consequences of engaging in behaviors that will put themselves or others at risk for infection. Ways have to be found to *motivate* people to change their behavior. One cannot assume that knowledge and education alone will provide the necessary motivation. It is therefore increasingly important to develop frameworks that can serve as the theoretical and empirical bases for programs through which messages about prevention and behavior change can be delivered and evaluated more successfully. Behavioral patterns among those at risk for AIDS must be carefully described. The behavioral risk reduction that has already occurred then has to be analyzed

in order to detect relevant factors that may explain such change. In this context, it will be necessary to describe the relationship of personal beliefs and attitudes to behavior. The challenge is to find modes through which society can best encourage risk reduction without further exacerbating the social stigma associated with high-risk behavior.<sup>23</sup>

Literature from the behavioral sciences should help inform this critical preventive effort. If necessary, new research should address the special issues that arise in this situation — issues that pose a set of circumstances and psychosocial concerns with which most health-related research has not yet dealt. Not only is a person at risk threatened with a potentially fatal condition, but AIDS carries its own unique set of stigmatizing consequences. Moreover, AIDS is linked to sexual and drug use behaviors that are often poorly understood and inadequately discussed in the public domain.

Altering any personal health-related behavior is often extremely difficult. Nevertheless, much insight has been provided by behavioral-science approaches, particularly in the field of health behavior and related sociological and psychological disciplines. In many cases, simply being aware that benefits will ultimately result from behavior modification does not suffice to change established behavioral patterns that often provide certain intrinsic rewards for the individual. Those seeking to change their behavior may theoretically agree that change is necessary yet find this knowledge insufficient for permanent adoption of the suggested lifestyle. However, considerable progress has been made, both theoretically and practically, in identifying successful motivation and behavior-management approaches to modifying lifestyle.<sup>24</sup> In some instances, this may entail helping people to develop new perspectives about their lives and demonstrating how the behavior/lifestyle change is consistent with continued pleasure or enjoyment. The key is to develop alternatives that are both feasible and ultimately sufficiently rewarding so that they themselves serve as a motivation for the maintenance of change.<sup>25</sup>

As discussed earlier, epidemiological studies link behavioral patterns to the development of AIDS. For example, one of the earliest studies of Kaposi's sarcoma and AIDS in homosexual men concluded that the variable most strongly associated with the illness was "fast lane" sexual practices, in particular anonymous sexual encounters with many different partners. Other risk factors included exposure to feces during sex and a history of other infectious diseases such as hepatitis B. On the basis of such early research and of ongoing investigation that validated them, behavior-change recommendations were issued by the CDC.<sup>26</sup> Thus, "safer sex" guidelines have been developed which urge homosexuals and heterosexuals potentially at risk for transmission of HIV to avoid the exchange of "bodily fluids," particularly semen, during sexual activity.<sup>27</sup> Common sexual practices that would put a person at risk have been described, and individuals are encouraged to avoid or modify them, for instance through the consistent and careful use of condoms along with a spermicide containing Nonoxynol-9.<sup>28</sup>

Numerous epidemiological/behavioral research studies are being conducted among homosexual men, and all of these report that considerable behavioral change has occurred in this particular high-risk group.<sup>29</sup> Most of the work investigating behavioral change in response to AIDS among homosexually active males is being conducted in a few cities; all of this work focuses on describing sexual behaviors linked to risk-reduction recommendations, such as frequency of receptive/insertive anal intercourse; use of condoms or spermicide, or both, during anal intercourse; and number of sexual partners. Regardless of whether a high-, medium-, or low-risk population was studied, major declines in the prevalence of receptive anal intercourse were documented.<sup>30, 31, 32</sup> Although the use of condoms is increasing, this practice is not yet either universal or consistent. A trend toward re-

duced numbers of sexual partners is generally observed.<sup>33, 34, 35</sup> Risk reduction appears to be occurring more frequently through the modification, rather than the elimination, of particular sexual activity. Longitudinal data generally indicate more individual recidivism and instability than are suggested by aggregate changes.

In the relatively short time since AIDS was recognized as a major health threat (and, more important, since behaviors have been clearly identified as risk factors), little published research has become available describing the predictors and determinants of the behavioral change. The few studies that document behavior change do not generally investigate what *leads* to such change.<sup>36, 37, 38</sup> This article will review work conducted by our group during the past few years to describe both the magnitude and determinants of behavioral risk reduction in a cohort of homosexual men. These findings, and the theoretical constructs underlying them, will be discussed specifically in terms of their relevance to program and policy development.

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## Health Behavior Theory

During the past two decades, considerable theoretical and empirical work has been done in order to understand the psychosocial predictors of health-promoting behaviors.<sup>39</sup> Although more than a dozen separate models of health behavior are described in the literature, a review conducted by Cummings, Becker, and Maile points out that they all share a common set of conceptual elements.<sup>40</sup> These are accessibility of care; evaluation of care; perception of symptoms and threat of the disease; social-network characteristics; knowledge about the disease; and demographic characteristics.

It seems unlikely that the very complex issues of AIDS-related behavioral change would be thoroughly addressed by any one model. Nonetheless, our group decided to identify a core model of potential predictors. The Health Belief Model (HBM) was chosen, as it incorporates all the dimensions discussed above while leaving theoretical room for appropriate expansion.<sup>41</sup> Other models that were considered applicable and were reviewed for that purpose include Fishbein and Ajzen's theory of reasoned action; fear arousal models; subjective utility; and the Triandis Intention Model.<sup>42</sup>

### *The Health Belief Model and Its Applicability to the AIDS Crisis*

According to the Health Belief Model (HBM), preventive health behaviors are a function of an individual's perceptions of four factors: (1) personal vulnerability to acquiring a disease; (2) the severity of the disease; (3) a feasible path of action that can be taken to prevent disease; and (4) the benefits versus costs of the potential action. For the model to apply, there must be a general concern about health, and cues must be provided in order to focus the individual's attention on a specific set of preventive behaviors (examples of such cues are information supplied through the mass media or advice given by a health care professional).<sup>43</sup> This model was developed in the early 1950s by a group of social psychologists in an attempt to explain the "widespread failure" of people to accept the concept of disease prevention, for example, screening for the early detection of asymptomatic disease (such as Tay-Sachs disease and breast self-examination) and vaccination behavior.<sup>44</sup> The model was derived from a well-established body of psychological and behavioral theory (particularly value-expectancy approaches and theory about "decision making under conditions of uncertainty").<sup>45</sup> As with most value-expectancy approaches, the Health Belief Model suggests two common determinants of impulse to action: (1) "va-

lence,” which is the value placed by an individual on a particular outcome or goal, and (2) “subjective probability,” the individual’s perception or estimate that a particular action will produce the desired outcome.<sup>46</sup> In summary, the HBM hypothesizes that people will not become motivated to undertake preventive action unless they are psychologically ready. Readiness is defined by the extent to which individuals have minimal knowledge; think of themselves as potentially vulnerable; see the disease as sufficiently threatening; are convinced of the efficacy of the preventive activity; and have minimal barriers to undertaking change.<sup>47</sup> The HBM also acknowledges the importance of sociodemographic variables. However, it is hypothesized that these variables influence the decision to undertake a preventive action only indirectly by influencing the individual’s perceptions.

In a review of the relevant health education theory, Lamb and Liebling<sup>48</sup> point out that sexual activity is a spontaneous act and may not always be under rational control, which may limit the applicability of the HBM in this context. Also, in a recent review, Berkman notes that whether conditions for successful behavior change are fulfilled and whether a person then engages in risk-reducing behaviors rather than maladaptive modes of coping depend, among other things, on a person’s social support networks, socialization experiences, beliefs regarding self, and the reinforcements of the environment.<sup>49</sup> Given Berkman’s remarks and the earlier mentioned limitations of the model, it was felt necessary to expand the model to include such relevant psychosocial dimensions as social support, AIDS-related stresses, personality and coping characteristics, and mental health.

This expanded model was used to investigate data from approximately a thousand homosexual men at risk for AIDS who participated in both an HIV natural history study — the Chicago-based Multicenter AIDS Cohort Study (MACS)<sup>50</sup> — and the Coping and Change Study (CCS), the behavioral/psychosocial investigation that formed the basis of this article. The challenge was to determine whether the HBM and an expanded set of predictors explained behavioral change in a population subgroup of homosexual males that based part of its identification on the very right to pursue a lifestyle that now puts them at risk.

Approximately 95 percent of MACS participants agreed to take part in the concurrent supplemental psychosocial study. All findings reported in this article are limited to a subset of individuals who participated in four assessments between 1984 and 1986. The members of this cohort are largely white (93 percent); in their mid-thirties; well educated (average education attainment 16.4 years); and have a mean income of \$24,922.<sup>51</sup> Ninety-three percent of the men reported being in a “primary relationship” with another man, and well over 95 percent described themselves as exclusively homosexual. Although it cannot be presumed that participants in this study are representative of all homosexual men in Chicago, they do resemble closely white male homosexuals diagnosed with AIDS as well as cohorts being studied elsewhere.<sup>52, 53</sup>

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## Methods and Results of Behavioral Data

A self-administered questionnaire in the Coping and Change Study asked participants to report frequency and type of sexual activity as practiced with a variety of partners, ranging from one’s primary sexual partner to anonymous sexual partners. The questionnaire inquired about behaviors during the preceding month, a time span that is sufficiently short to permit accurate recall but long enough to reduce the intra-individual variability of sexual behavior.<sup>54</sup>

Across the two years of study, there was a consistent reduction in “risky” behaviors, such as receptive anal sex or contact with multiple sexual partners, and an overall increase in preventive behaviors, such as condom use during anal sex. In order to meaningfully summarize a variety of sexual behaviors that could lead to HIV exposure, a summary Risk Index (RI) was constructed.<sup>55</sup> Duplicate ELISA and Western blot assay data were available for all participants.<sup>56</sup> This information was used to validate the self-reported risk information and indicated that the men generally provided accurate data. It was also apparent that, generally speaking, there are two broad risk groups: (1) those who are celibate or who are avoiding receptive anal sex, and (2) those who continue to engage in receptive anal intercourse.

It is clear that during the two-year observational period, extensive aggregate risk reduction occurred. Risk reduction strategies that are preferred over celibacy include eliminating receptive anal sex, becoming monogamous, and using condoms. Individual change exhibits considerable variability, with approximately 60 percent of the men demonstrating a consistently low-risk or improving pattern over the course of the two-year investigation. However, it is worrisome that approximately 25 percent of all homosexual men in this cohort do not consistently practice safer sex, although they at least occasionally do so.<sup>57</sup> In addition, a small group consistently engages in high-risk behaviors with multiple sexual partners. It should be acknowledged that this overall description fails to take into account certain other changes. For example, men who have dramatically reduced their number of sexual partners but still engage in unprotected anal sex are classified as “consistently” at high risk. Nonetheless, the increasing seroprevalence of HIV infection in the male homosexual population suggests that the somewhat stringent definitions of the summary Risk Index are appropriate. Simply reducing the number of one’s partners in the environment of rising seroprevalence may not lower risk of infection at all. Similar concerns have been raised by Martin.<sup>58</sup> He points out that although many of the respondents he observed changed some aspect of their behavior, it is disturbing that many do not change their behavior *completely*. He argues that if the epidemic is to be successfully contained, this group of nonchangers and recidivists has to be the target of special intervention efforts.

We realized, therefore, that it was of particular importance to describe the psychosocial predictors of successful change and its maintenance. As did other research groups, we found sociodemographic characteristics to be important initial screening devices to target special “higher” risk groups.<sup>59, 60</sup> Younger respondents are less likely either to initiate positive changes or to maintain them once initiated. Another finding points to the protective or helpful nature of being in a “primary” relationship. Although age and primary relationship are often related, the fact that both of these variables were significant in a multivariate model indicates that they are independently related to risk reduction. Education level is similarly important, with a higher level being predictive of positive behavioral changes. Finally, the special importance of the findings that nonwhite respondents are significantly less likely to successfully change or to maintain changes, or both, has to be stressed. This finding is especially noteworthy, because there were few nonwhite respondents (thus limiting statistical power) and because these respondents, as part of a major research effort, had above-average, consistent, and similar access to risk-reduction information, as did the white respondents.

It is apparent that preventive programs among homosexual men should target their intervention efforts at higher-risk men. Programs should be developed to accommodate less-educated individuals, and special efforts should be made to reach younger and nonwhite homosexual men. These latter individuals have been the hardest to reach for any

intervention effort. Nonetheless, the crisis of AIDS may increase the likelihood of success. For example, a recent review suggests that intravenous drug users, a demonstrably disadvantaged group, are altering their drug-using and needle-sharing behaviors in response to the threat of AIDS.<sup>61</sup> After identifying the subgroups most in need of intervention, the next task is to specify the program content most likely to facilitate behavioral risk reduction. In order to do so, the determinants for risk reduction in the cohort with whom we are working will be examined for their applicability to the development of intervention programs.

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### **The Special Issue of Perceived Risk and Mandatory Testing**

Many existing or proposed public health programs assume that it is useful to make individuals aware that they are “at risk.” A further assumption is that the perception of being at risk in turn leads to appropriate behavioral changes. This is the main argument advanced in the cause of mandatory testing. The research evidence on the issue is, at best, sketchy. In a forthcoming study of HIV antibody testing and subsequent behavior change, Mayer et al. found that the observed behavioral changes were the same whether respondents were knowingly seropositive or seronegative or had chosen not to obtain their serologic results.<sup>62</sup> Although few of the men in our study had requested information regarding their antibody status, the perceived risk of AIDS was assessed from everyone. Longitudinal analyses demonstrated that an increased perception of risk either had *no* effect on behavior or was negatively associated with risk reduction. This issue was specifically investigated in another report from our research group.<sup>63</sup> On the whole, there was no evidence that in the investigated group of men such a perception of risk was related to subsequent positive changes in behavior or to the development of other health beliefs that might facilitate such behavioral risk reduction. On the contrary, evidence showed that those who perceived themselves to be at increased risk subsequently had increased barriers to behavioral risk reduction and experienced a range of psychological and social distress. In a group already burdened by the complex behavioral, social, and psychological demands of the AIDS epidemic, this has potentially serious consequences. For example, psychological and social distress may ultimately reduce adherence to behavioral risk reduction guidelines or may disrupt maintenance of already established, positive behaviors. Other research efforts investigating the consequences of voluntarily being told one’s HIV antibody status observed that persons choosing to be told tended to be initially the most functional and psychologically healthy individuals. However, once they were informed that they were seropositive, there was a deterioration in overall mental health.<sup>64</sup> These effects were observed *despite* the fact that all those seeking disclosure of their antibody status were counseled about the meaning of the result. In conjunction with our findings that depression is a predictor of behavioral recidivism, this should lead to caution regarding mandatory implementation of HIV antibody testing.

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### **Other Important Psychosocial Variables Explaining Behavioral Change**

Personal predispositions and reactions were also assessed for their relationship to behavioral risk reduction. An increased sense of personal mastery also predicted successful behavioral risk reduction. As might be expected, those who have a “doom orientation”



were less likely to change their behavior positively. Coping styles also differentiated the two groups. Instead of coping with the threat of AIDS through active problem solving, persons who were less successful tended to cope by denial. This response may help relieve psychological distress but has demonstrably adverse effects on behavior. However, it is possible that coping styles can be taught and therefore altered. A program designed to improve skills that may be helpful in “unlearning” behaviors could address these issues. Such a program would, of course, need to confront the potential pessimism regarding behavioral change among those who are already seropositive. Unfortunately, no epidemiological evidence is yet available which clearly indicates the value of behavioral change in altering HIV natural history for these individuals. However, the potential benefits derived from reducing further exposure to HIV and other immunosuppressive agents could be emphasized. This might enable homosexual men to realistically assess their risk status in a more constructive and optimistic way.

Another powerful predictor of positive behavioral change was whether or not social norms were perceived to be consistent with behavioral recommendations. Unfortunately, our research indicates that the group at highest risk is also a group that is less a part of the homosexual male community. Such individuals tend to “detach” themselves from the problem by being less involved in the community, knowing less about AIDS, having fewer friends with AIDS, and denying themselves an emotional reaction to the crisis. These findings highlight the special value of intervention programs that *arise from* the targeted subculture or community. Community-based groups may be better able to reach their own marginal members, increase personal identification with the larger “at risk” group, and simultaneously provide culturally appropriate information. Furthermore, such groups often have comprehensive AIDS-relevant services that are focused both on behavioral risk reduction and on psychological needs. This would seem desirable, as data emerging from our group suggest that these two domains are, in fact, interrelated. Not only is an emotion-focused coping style predictive of subsequent risk reduction, but those with less psychological distress are also less likely to positively change their behavior. Taken together, these findings may indicate that accepting and dealing with psychological issues are part of facilitating behavioral risk reduction.

It is not enough to get people to change. AIDS may never go away. Behavioral change, if it is to have any impact on the containment of this disease, has to be consistent. People will have to change their behavior in such a way that they will be able to maintain these behavioral changes for the rest of their lives. Unlike behavioral changes undertaken to address chronic diseases, incomplete change or brief recidivism can be deadly in the case of HIV transmission. Therefore, recommendations to be more “careful” in choosing sexual partners or to have unprotected anal sex only with a monogamous partner, for example, are extremely dangerous, because they promote a sense of false security. It must be stressed that the control of HIV transmission requires adequate behavioral changes that are applied consistently. Recidivism can be as hazardous as never changing. The frequently observed phenomena of transitory backsliding and incremental change are unfortunately unacceptable in the case of AIDS. Therefore, as mentioned above, the development of programs designed to maintain and support existing behavioral changes is absolutely essential.

It is apparent that further efforts to identify the individual and social determinants of behavioral risk reduction should be undertaken. More important, the results of such research should be applied in the development of intervention programs and should then be carefully evaluated. With no cure or vaccine currently available, our only preventive tool

is behavioral risk reduction. We must design the best prevention programs possible, which means carefully utilizing the existing and available theories and data. A program that is based on the insight gained from research rather than on unrelated or only slightly similar experiences can more adequately address the real issues involved in trying to change a behavior as complex, central, and reinforcing as human sexuality. 🧠

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## Notes

1. M. S. Gottlieb et al. P. carinii pneumonia and mucosal candidiasis in previously healthy homosexual men: Evidence of a new cellular immuno-deficiency. *New England Journal of Medicine* 305: 1425–1431, 1981.
2. A. E. Friedman-Kier et al. Kaposi's sarcoma and P. carinii pneumonia among homosexual men: NYC and California. *Morbidity and Mortality Weekly Report* 30: 205–208, 1981.
3. M. S. Gottlieb, H. M. Schanker, P. Fan, A. Saxon, J. D. Weisman, I. Posalki. Pneumocystic pneumonia: Los Angeles. *Morbidity and Mortality Weekly Report* 30: 250–252, 1981.
4. D. T. Durack. Opportunistic infections and Kaposi's sarcoma in homosexual men. *New England Journal of Medicine* 305: 1465–1467, 1981.
5. J. E. Groopman, P. A. Volberding. The AIDS epidemic: Continental drift. *Nature* 307: 211–212, 1984.
6. World Health Organization (WHO). Number of AIDS Cases by Country and Continent (handout). Third International Conference on AIDS, Washington, D.C., 1987.
7. R. Brookmeyer, M. H. Gail. Minimum size of the AIDS epidemic in the United States. *Lancet* 1320–1322, December 6, 1986.
8. A. J. H. Stevens, E. S. Searle, G. P. A. Winyard. AIDS and life years lost: One district's challenge. *British Medical Journal* 294: 572–573, 1987.
9. Public Health Service Plan for the Prevention and Control of AIDS and the AIDS Virus. Report of the Coolfront Planning Conference, June 1986.
10. Centers for Disease Control. Additional recommendations to reduce sexual and drug abuse related transmission of human T-lymphotropic virus type III/lymphadenopathy-associated virus. *Journal of the American Medical Association* 255 (14): 1843–1849, 1986.
11. G. Weston. AIDS in the black community. *Black/Out* 1, 2: 13–15, 1986.
12. J. Pindyck, A. Waldman, E. Zing, et al. Measures to decrease the risk of AIDS transmission by blood transfusion: Evidence of blood donor cooperation. *Transfusion* 25: 3–9, 1985.
13. Bay Area Physicians for Human Rights Scientific Committee: AIDS Risk Reduction (pamphlet). San Francisco Bay Area Physicians for Human Rights, 1983.
14. J. J. Goedert, M. G. Sarngadharan, R. J. Biggar, D. M. Winn, M. H. Greene, D. L. Mann, R. C. Gallo, et al. Determinants of retrovirus (HTLV-III) antibody and immunodeficiency conditions in homosexual men. *Lancet* 2: 711–716, 1984.
15. J. E. Groopman, K. H. Mayer, M. G. Sarngadharan, D. Ayotte, D. Allen, R. C. Gallo. Seroepidemiology of human T-lymphotropic virus type III among homosexual men with the acquired immunodeficiency syndrome or generalized lymphadenopathy and among asymptomatic controls in Boston. *Annals of Internal Medicine* 102: 334–337, 1985.
16. S. H. Weiss, H. M. Ginzberg, J. J. Goedert, et al. Risk Factors for HTLV-III Infection Among Parenteral Drug Users (abstract). Twenty-second Annual Meeting of the American Society of Clinical Oncology, Los Angeles, May 1986.
17. H. W. Jaffe, W. W. Darrow, D. F. Echenberg, et al. AIDS in a cohort of homosexual men: A 6-year follow-up study. *Annals of Internal Medicine* 103: 210–214, 1985.

18. G. H. Friedland, B. R. Saltzman, M. F. Rogers, et al. Lack of transmission of HTLV-III/LAV infection to household contacts of patients with AIDS or AIDS-related complex with oral candidiasis. *New England Journal of Medicine* 314: 344–349, 1986.
19. E. D. Acheson. AIDS: A challenge for the public health. *Lancet* 662–666, March 22, 1986.
20. Centers for Disease Control. Update: Acquired immunodeficiency syndrome on the San Francisco cohort study, 1978–1985. *Morbidity and Mortality Weekly Report* 34: 573–575, 1985.
21. R. C. Gallo, S. Z. Salahuddin, M. Popovic, et al. Frequent detection and isolation of cytopathic retrovirus (HTLV-III) from patients with AIDS and at risk for AIDS. *Science* 224: 500–503, 1984.
22. J. E. Osborn. The AIDS epidemic: Multidisciplinary trouble. *New England Journal of Medicine* 314 (12): 779–782, 1986.
23. K. H. Mayer. The Epidemiologic Investigation of AIDS. Hastings Center Report, August 1985, pp. 12–15.
24. H. B. Kaplan, R. J. Johnson, C. A. Bailey, W. Simon. The sociological study of AIDS: A critical review of the literature and suggested research agenda. *Journal of Health and Social Behavior* 28 (2): 140–157, 1987.
25. Institute of Medicine. *Health and Behavior: Frontiers of Research in the Biobehavioral Sciences*. D. A. Hamburg, G. R. Elliott, D. L. Parron (Eds.). National Academy Press, Washington, D.C., 1982.
26. Centers for Disease Control. Prevention of acquired immune deficiency syndrome: Report of interagency recommendations. *Morbidity and Mortality Weekly Report* 32: 101–104, 1983.
27. C. E. Koop. Surgeon general's report on acquired immune deficiency syndrome. *Public Health Reports* 102 (1): 1–3, 1987.
28. Centers for Disease Control. Additional recommendations to reduce sexual and drug abuse related transmission of human T-lymphotropic virus type III/lymphadenopathy-associated virus. *Journal of the American Medical Association* 255 (14): 1843–1849, 1986.
29. J. L. Martin. The impact of AIDS on gay male sexual behavior patterns in New York City. *American Journal of Public Health* 77: 578–581, 1987.
30. L. McKusick, J. A. Wiley, et al. Reported changes in sexual behavior of men at risk for AIDS, San Francisco, 1982–1984 AIDS behavioral research project. *Public Health Reports* 100 (6): 622–629, 1985.
31. J. L. Martin. AIDS risk reduction recommendations and sexual behavior patterns among gay men: A multifactorial approach to assessing change. *Health Education Quarterly* 13: 347–358, 1986.
32. W. Winkelstein, M. Samuel, N. S. Padian, J. A. Wiley. Selected sexual practices of San Francisco heterosexual men and risk of infection by the human immunodeficiency virus. *Journal of the American Medical Association* 257: 1470–1471, 1987.
33. McKusick et al., 1985.
34. Martin, 1987.
35. Winkelstein et al.
36. Martin, 1986.
37. McKusick et al., 1985.
38. J. G. Joseph, S. B. Montgomery, C. A. Emmons, R. C. Kessler, D. G. Ostrow, C. B. Wortman, K. O'Brien, M. Eller, S. Eshleman. Magnitude and determinants of behavioral risk reduction: Longitudinal analysis of a cohort at risk for AIDS. *Psychology and Health* 1: 73–96, 1987.
39. M. H. Becker, L. A. Maiman. Models of Health-Related Behavior. *Handbook of Health, Health Care, and the Health Professions*. D. Mechanic (Ed.). Free Press, New York, 1983.

40. K. M. Cummings, M. H. Becker, M. C. Maile. Bringing the models together: An empirical approach to combining variables used to explain health actions. *Journal of Behavioral Medicine* 3 (2): 125–145, 1983.
41. George A. Lamb and Linette G. Liebling review the HBM as to its applicability to health education practice in AIDS prevention in “The Role of Education in AIDS Prevention,” published in this issue of the *New England Journal of Public Policy*.
42. See a review by John P. Kirscht, Preventive health behavior: A review of research and issues. *Health Psychology* 2 (3): 277–301, 1983.
43. M. H. Becker. The Health Belief Model of personal health behavior. *Health Education Monographs* 2: 324–508, 1974.
44. I. M. Rosenstock. Historical origins of the Health Belief Model. *Health Education Monographs* 2: 328–335, 1974.
45. Becker, Maiman.
46. L. A. Maiman, M. H. Becker. The Health Belief Model: Origins and correlates in psychological theory. *Health Education Monographs* 2: 326–353, 1974.
47. I. M. Rosenstock. Why people use health services. *Milbank Memorial Fund Quarterly* 44: 94–124, 1966.
48. Lamb, Liebling.
49. L. F. Berkman. The Relationship of Social Networks and Social Support to Morbidity and Mortality. *Social Support and Health*. S. Cohen and S. L. Lyne (Eds.). Academic Press, New York, 1985, 241–262.
50. Participants in the here discussed Coping and Change Study (CCS) were recruited from a cohort of approximately one thousand homosexual men who were enrolled in the Multicenter AIDS Cohort Study (MACS) in Chicago. This collaborative biomedical study, funded by the National Institute of Allergy and Infectious Diseases (NIAID) and the National Cancer Institute (NCI), was designed to investigate the natural history of AIDS by collecting biannual medical and laboratory data from study participants. All participants in the Chicago MACS were invited to enroll in the psychosocial investigation discussed here. For more information about the MACS, please refer to D. Kaslow, D. G. Ostrow, and the Multicenter AIDS Cohort Study (MACS): Rationale, organization, and selected characteristics of the participants. Paper presented at the Society for Epidemiologic Research Meetings, Pittsburgh, June 1986.
51. C. Emmons, J. G. Joseph, R. C. Kessler, C. Wortman, S. B. Montgomery, D. Ostrow. Psychosocial predictors of reported behavior change in homosexual men at risk for AIDS. *Health Education Quarterly* 13 (4): 331–345, 1986.
52. R. Anderson, J. Levy. Prevalence of antibodies of AIDS-associated retrovirus in single men in San Francisco. *Lancet* 1 (8422): 217, 1985.
53. D. Ostrow, C. Emmons, N. Altman, J. G. Joseph, J. Phair, J. Chmiel. Sexual behavior change and persistence in homosexual men. Paper presented at the International Conference on AIDS, Atlanta, Ga., June 1985.
54. J. G. Joseph, S. B. Montgomery, R. C. Kessler, D. G. Ostrow, C. A. Emmons, J. P. Phair. Two-year-long longitudinal study of behavioral risk reduction in a cohort of homosexual men. Paper presented at the Third International AIDS Conference, Washington, D.C., June 1987.
55. On the basis of CDC guidelines, respondents’ answers to various questions regarding sexual activities were quantified in a summary Risk Index in the following way:
  - Level 1: No Risk: Celibate: yes.
  - Level 2: Low Risk: Either if respondent was monogamous and had receptive anal sex with a condom, *or*: if respondent was nonmonogamous but had no receptive anal sex.

Level 3: Modified High Risk: Either if respondent was monogamous but had receptive anal sex without a condom, or: if respondent was not monogamous but had receptive anal sex with a condom.

Level 4: High Risk: If a respondent was not monogamous and did not use a condom during anal intercourse.

56. J. Parry. An immunoglobulin G capture assay for antihuman T-lymphotrophic virus type III/LAV and its use as a confirmatory test. *Journal of Medical Virology* 19 (4): 387-398, 1986.
57. CDC, 1983.
58. Martin, 1986.
59. McKusick et al., 1985.
60. Winkelstein et al.
61. M. H. Becker, J. G. Joseph. AIDS and behavioral change to reduce risk: A review. In press, *American Journal of Public Health*.
62. K. Mayer, J. McCusker, J. Zapka, A. M. Stoddart, J. S. Avrunin, S. P. Saltman. HIV antibody test disclosure and subsequent behavior. Forthcoming, *American Journal of Public Health*.
63. J. G. Joseph, S. B. Montgomery, C. A. Emmons, J. P. Kirscht, R. C. Kessler, D. G. Ostrow, C. B. Wortman, K. O'Brien, M. Eller, S. Eshleman. Perceived risk of AIDS: Assessing the behavioral and psychological consequences in a cohort of gay men. *Journal of Applied Social Psychology* 17 (3): 231-250, 1987.
64. L. McKusick, T. J. Coates, J. A. Wiley, S. F. Morin, R. Stall. Prevention of HIV infection among gay men and bisexual men: Two longitudinal studies. Paper presented at the Third International Conference on AIDS, Washington, D.C., 1987.