Prevalence of AIDS-Related Risk Factors and Condom Use in the United States

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A national probability survey of human immunodeficiency virus (HIV)–related risk factors among the general heterosexual population, the National AIDS (acquired immunodeficiency syndrome) Behavioral Surveys, has obtained data from 10,630 respondents. Data are presented on the prevalence of HIV-related risks in the general heterosexual population, on the distribution of the three largest risk groups across social strata, and on the prevalence and distribution of condom use among heterosexuals reporting a risk factor. Between 15 and 31 percent of heterosexuals nationally and 20 and 41 percent in cities with a high prevalence of AIDS reported an HIV risk factor. Condom use was relatively low. Only 17 percent of those with multiple sexual partners, 12.6 percent of those with risky sexual partners, and 10.8 percent of untested transfusion recipients used condoms all the time. Overall, the results suggest that current HIV prevention programs have, to a very limited extent, reached those heterosexuals with multiple sexual partners but have failed to reach many other groups of the heterosexual population at risk for HIV. New public health strategies may be needed for these specific risk groups.

Current estimates of the number of people who may be infected with HIV and projections of future infection trends are based on inadequate data (*1*). There is a lack of data on the sexual behavior of heterosexuals that places them at risk for HIV and other sexually transmitted diseases (STDs). Although the need for estimates of risky sexual practices has received popular attention, less widely discussed are problems with estimates of the proportion of people who received blood transfusions during the window of vulnerability (1978 to 1985) to the blood supply (*2*). The need for national data on HIV risk factors (such as we have obtained) has been documented by the National Academy of Sciences (*1*), the Presidential Commission on the HIV Epidemic (*3*), and other policy and scientific bodies. We conducted the National AIDS Behavioral Surveys (NABS) to estimate the prevalence of AIDS-related risk factors and prevention activities among heterosexuals in the United States.

We report findings on the prevalence of multiple-partnered sex, of people with "risky" sexual partners, and of transfusion recipients for heterosexual adults in the United States and for adults in geographic areas where there is a high prevalence of HIV infection. We also report on condom use among these risk groups. Data on other risk groups and on HIV antibody testing were also collected and are incorporated into some of our analyses (*4*); however, these issues will be described elsewhere (*5*). We oversampled African Americans and Hispanics because these groups are at higher risk for HIV infection than white Americans (*6, 7*). In addition, we oversampled people in the age range 50 to 75 years because older people in the United States are also at risk for HIV infection and little is known of their risk behavior (*3, 8*).

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Survey Procedures

A total of 10,630 (9) people aged 18 to 75 were interviewed. This overall sample was composed of two groups: (i) a national random digit dialing (RDD) sample (unweighted n = 2673) and (ii) a "high-risk" cities RDD sample (unweighted n = 8263). Demographic characteristics of the national and high-risk cities samples are presented in Table 1. We applied weights to both samples to adjust for unequal probabilities of selection and nonresponse (*10*). The high-risk cities sampled were selected on the basis of their location in metropolitan areas with large numbers of AIDS cases and large Hispanic or African American populations (*11*). These cities account for 61% of nonpediatric AIDS cases in the United States (including Puerto Rico) (1990) and 71% of cases in major U.S. metropolitan areas.

Six focus groups were formed to examine perceptions of the survey procedures and comprehension of survey questions. Additional relevant focus group data were purchased from the National Opinion Research Center at Chicago. Instruments, advance letters, and screening materials were translated into Spanish (*12*). Procedural and instrument changes were made on the basis of the focus group work and then further pretested in a national telephone survey [n = 300 (*13*)]. Further procedural, language, and item modifications were made on the basis of this pretest survey.

We collected data (June 1990 to February 1991) by telephone interview, using RDD procedures (*14, 15*). We oversampled respondents to obtain larger representations of older respondents and of racial and ethnic minorities within younger age cohorts (*14*). Cooperation rates for the national and high-risk cities samples were 70 and 65%, respectively (*16*), which compare favorably with other telephone and face-to-face (FTF) surveys in this area of research (*17–22*). Interviews were conducted in either English or Spanish (56% of Hispanics preferred Spanish interviews) (*23*). We made a minimum of 17 call attempts before retiring a telephone number (*24*).

Telephone surveys have been used successfully to obtain information on AIDS issues such as sexual behavior and drug use (*25*). Studies comparing telephone surveys to FTF interviews in the United States, Great Britain, and France (*25, 26*) indicate that phone surveys are comparable and, at times, may be superior to FTF methods for collecting data on sexual behavior because telephone surveys may provide greater privacy than standard FTF procedures (*25*). Mode comparison studies examining other highly sensitive issues (responses verified through reverse record methods) also indi-

Table 1. Demographic characteristics of the National AIDS Behavioral Surveys. The number of respondents is given in parentheses.

	High-risk cities		National	
	Unweighted percent	Weighted percent	Unweighted percent	Weighted percent
Women	57.9 (4785)	52.4 (4318)	58.4 (1561)	51.6 (1377)
Men	42.1 (3478)	47.6 (3924)	41.6 (1112)	48.4 (1291)
African American	33.8 (2795)	22.6 (1858)	13.5 (360)	11.3 (301)
Hispanic	20.7 (1711)	13.5 (1111)	8.3 (222)	7.3 (195)
White	42.7 (3525)	59.2 (4882)	75.9 (2030)	78.2 (2088)
Other*	2.8 (230)	4.7 (391)	2.3 (61)	3.2 (84)
Age				
18 to 29	29.5 (2439)	31.0 (2554)	20.7 (553)	28.3 (756)
30 to 39	27.4 (2262)	24.1 (1987)	22.3 (595)	24.5 (655)
40 to 49	17.7 (1462)	15.9 (1313)	15.2 (406)	17.5 (467)
50 to 59	10.4 (860)	11.8 (975)	17.0 (454)	12.7 (338)
60+	15.0 (1240)	17.1 (1412)	24.9 (665)	17.0 (453)
Education (years)				
<12	19.4 (1596)	21.5 (1771)	17.0 (453)	18.2 (487)
12	51.4 (4233)	55.4 (4567)	59.0 (1573)	60.1 (1605)
>12	29.3 (2410)	23.1 (1903)	24.0 (641)	21.6 (577)
Income ($1000)				
<10	23.0 (1808)	22.2 (1744)	18.2 (460)	17.9 (455)
10 to 20	24.2 (1899)	23.5 (1843)	22.0 (557)	22.0 (559)
21 to 40	31.4 (2465)	31.4 (2461)	32.8 (832)	32.7 (833)
41 to 60	11.6 (910)	12.5 (984)	15.5 (392)	16.1 (410)
61+	9.9 (776)	10.4 (816)	11.5 (292)	11.3 (288)
Marital status				
Married	38.9 (3206)	46.5 (3827)	57.2 (1528)	63.3 (1686)
Cohabiting†	5.0 (412)	5.8 (476)	2.9 (77)	3.7 (99)
Divorced	13.2 (1089)	10.2 (839)	10.8 (287)	7.1 (190)
Separated	6.0 (498)	4.4 (365)	3.3 (89)	2.6 (69)
Never married	30.1 (2483)	27.2 (2242)	17.1 (456)	19.0 (507)
Widowed	6.8 (561)	5.9 (484)	8.7 (232)	4.3 (113)

*Asian, Pacific Islander, and American Indian. †Cohabiting marital status: person is living with sexual partner but not married to that person.

cate comparability between telephone and FTF methods (*27*).

Measures of HIV-related risk factors. Individuals who have multiple partners are considered to be at greater risk of contracting HIV and other STDs than those who have a single sexual partner because the probability of encountering an infected partner increases as the number of partners increases (*28–30*). Even when condoms are used consistently, they may be used improperly, slip off, or break and thereby expose the person to possible infection. In the present study, respondents who reported two or more sexual partners in the past 12 months were categorized as having multiple sexual partners. A 12-month window was selected as one that would produce a minimum of recall errors and that would be a large enough window on a respondent's sexual life to provide meaningful data (*31*). A second definition of multiple-partnered sex was based on the number of sexual partners reported in the past 5 years. These definitions of risk based on 1- and 5-year estimates may underestimate risk for people who had large numbers of partners more than 5 years ago but who were monogamous over the past 5 years. Questions on the number of sexual partners in the past 5 years (young respondents) or 15 years (elderly respondents) were asked only of people who reported being sexually active at some point during the past 5 years (for those under 50 years of age) and past 15 years (for those 50 years and older).

Respondents receiving blood transfusions between 1978 and 1985 were categorized as at risk only if they received donor blood [excluding transfusion recipients who reported being negative for HIV infection (HIV−) and had no other risk factors (n = 53)]. The prevalence estimate of transfusion recipients may be an underestimate because of recall problems and because an estimated 12% of recipients may not know they were transfused (*32*). Our estimate reflects only people who have survived to 1990 to 1991.

Respondents were asked if they had ever been treated for the blood disease called hemophilia. Males responding affirmatively were coded as being at risk unless they reported being HIV−, with no other risk factors (*33, 34*).

Respondents who indicated they had injected themselves with heroin, speed, cocaine, or steroids in the past 5 years were coded as having a risk factor (*35–38*). These respondents were categorized as injection drug users (IDUs).

Respondents were categorized as having a risky sexual partner if their primary sexual partner, defined as the individual the respondent had sex with most frequently in the past year, had one or more of the following risk factors (*39*): HIV+ (being positive for HIV infection), IDU in the past 5 years, nonmonogamous, transfusion recipient, or hemophiliac. Questions about risk factors of a primary sexual partner were asked only of people who reported being sexually active at some point during the past 5 years for those under 50 years of age and past 15 years for those 50 years and older.

Questions on the frequency of specific sexual behavior, including condom use, were asked only of respondents reporting a risk factor. We adopted this approach to avoid invading the privacy of people who had no HIV risk factors. Two measures of condom use were constructed, one based on the proportion of condom use during all acts of vaginal intercourse in the past 6 months (aggregated across partners) and one based on all acts of anal intercourse (6-month report) (*40*). Six-month estimates of sexual behavior have reasonably good reliability, and the 6-month time frame is broad enough to sample behavior patterns that may not be apparent with assessments based on shorter time intervals (such as 1 month) (*25*). Current evidence from comparisons of self-reported condom use and infection rates for HIV and STDs in a variety of sample populations suggests that self-reports of condom use are valid (*41–43*). For present purposes, the condom use measures were categorized into four groups for respondents with an HIV-relevant risk factor (*44*): none (0%), low (1 to 49%), moderate (50 to 99%), and high (100%).

Standard demographic measures were obtained that assessed the respondent's age, race or ethnicity [black, white, Hispanic, or other (Asian, Pacific Islander, and American Indian)], education (in years), income (combined if married and personal if unmarried), marital status [married, unmarried (separated, divorced, widowed, and never married), or cohabiting (living with sexual partner but not married to that person)], and gender.

Sexual orientation was assessed in terms of the gender of the respondent's sexual partners in the past 5 years for respondents under age 50 and in the past 15 years for respondents 50 years and older ["In the last 5 (or 15) years, have you had sex with . . . men only, women only, to some extent with both men and women?"]. A longer interval was selected for older respondents because it was assumed that they were more likely than younger respondents to have been sexually inactive in the past 5 years.

Table 2. Prevalence estimates of the heterosexual population at risk for HIV. Values in parentheses represent 95% confidence intervals; *n* (weighted, numerator/denominator): Type A, 363/2408 (national) and 1353/6892 (cities); and Type B, 755/2408 (national) and 2838/6892 (cities).

Risk definition	National percent	High-risk cities percent
Type A*	15.1 (13.3 to 16.8)	19.6 (18.5 to 20.8)
Type B†	31.4 (29.1 to 33.6)	41.2 (39.7 to 42.6)
Type C‡	39.8 (37.5 to 42.2)	51.5 (50.0 to 53.0)

*Two or more partners per year, transfusion recipient, IDU, hemophiliac, or risky sexual partner. †Based on Type A, but increases the sexual partner's window to 5 years. ‡Type B adjusted for missing data (see text).

Table 3. Prevalence of HIV-related risk groups among adult heterosexuals: national and high-risk cities samples (weighted *n*). The number of respondents for each risk group is indicated by *n*.

Risk group	National percent (95% confidence interval)	*n*	High-risk cities percent (95% confidence interval)	*n*
Multiple partners*	7.0 (5.7 to 8.4)	170	9.5 (8.6 to 10.3)	651
Risky partner	3.2 (2.4 to 3.9)	76	3.7 (3.2 to 4.3)	258
Transfusion recipient	2.3 (1.6 to 2.9)	55	2.1 (1.6 to 2.5)	144
Multiple partner and risky partner	1.7 (1.1 to 2.3)	41	3.0 (2.6 to 3.6)	209
Multiple partner and transfusion recipient	0.0 (0.0 to 0.1)	1	0.3 (0.2 to 0.4)	20
Risky partner and transfusion recipient	0.2 (0.0 to 0.4)	4	0.3 (0.1 to 0.4)	19
All others†	0.7 (0.2 to 1.1)	16	0.7 (0.5 to 1.0)	51
No risk	84.9 (83.2 to 86.6)	2045	80.4 (79.2 to 81.5)	5539

*Past 12 months. †IDU, IDU and other combinations, hemophiliacs, and all three-way combinations of multiple partners, transfusion recipient, risky partner, IDU, hemophiliac, and HIV+.

We used SPSS software to conduct most analyses. Research Triangle Institute procedures (RTIFREQ and RTILOGIT, through SAS software) that take into account the complex survey design were used to compute adjusted standard errors for all analyses.

Prevalence of HIV-Related Risks

We constructed a range of prevalence estimates for HIV risk that differ in terms of assumptions and certain risk factor parameters. Three indicators of the overall prevalence of HIV-related risk factors were computed for heterosexual respondents in the national and high-risk cities samples. A conservative prevalence estimate (Type A, Table 2) was based on the presence of one or more of the following risk factors: two or more sexual partners in the past year, risky primary sexual partner, transfusion recipient, hemophiliac, or IDU in the past 5 years. People having none of these risks, as well as transfusion recipients and hemophiliacs who reported being HIV− and had no other risk factors, were all defined as "no risk." We also categorized as "no risk" those who declined to answer or responded "did not know" to some of the risk items and were "no risk" on all items to which they did respond. In this latter regard, we assumed that the "no risk" answers reflected the respondent's true risk status. We constructed two other definitions of risk that included (i) an increase in the multiple partners window to 5 years (two or more partners in the past 5 years) (Type B, Table 2); and (ii) the assumption that people who were missing on some risk items and were no risk on all other risk factors were, in fact, at risk (Type C, Table 2). In the latter redefinition, we assumed that all acts of declining to answer risk questions indicated an effort to conceal information that would have defined the person as having a risk factor. The number of people defined as having a risk factor doubled when the window for multiple partners was increased from 12 months (Type A) to 5 years (Type B) (Table 2). Combining the 5-year window adjustment for multiple partners with a change in assumptions about people with missing data (Type C) yielded a 9% average increase in prevalence across samples.

Sexual and transfusion-related risks. Prevalence estimates for specific risk groups for the national and high-risk cities samples are given in Table 3. People reporting multiple sexual partners or a risky primary sexual partner constituted the largest heterosexual risk groups. There was some overlap among risk groups, most notably for people reporting both multiple sexual partners and a risky primary sexual partner.

Demographic correlates of sex and transfusion-related risk. Using separate multiple logistic regression analyses, we examined demographic correlates (education, income, marital status, gender, race, and age): (i) of having sex with multiple partners in the past 12 months, (ii) of having a risky partner, and (iii) of being a transfusion recipient. Although all demographic characteristics are examined in each model, only significant variables are mentioned in the text. Interactions between gender and race (or ethnicity) were examined, but in no instance were they significant, and they are not reported here. In all analyses, heterosexual respondents within a specific risk category were compared to heterosexuals reporting no risk factors. For the sake of brevity, only the high-risk cities' results are reported, but similar results were obtained for the national sample. The analyses are mutually exclusive in that each risk factor is hierarchically defined as mutually exclusive [that is, the multiple partners analysis included individuals with multiple sexual partners (past 12 months) and any combination of other risk factors]. Analyses of risky partners included individuals reporting a risky partner and any other combination of risk factors except multiple partners. Analyses of transfusion recipients included only those transfusion recipients who reported neither multiple partners nor a risky sexual partner.

With respect to multiple sexual partners, a borderline effect was found for education ($P = 0.10$), and significant effects were found for marital status ($P = 0.001$), gender ($P = 0.001$), race ($P = 0.01$), and age ($P = 0.001$). Specifically, respondents were more likely to report multiple sexual partners if they had received education beyond high school relative to not having received a high school education [adjusted odds ratio (OR) = 1.3; see (*45*) for 95% confidence intervals)], unmarried as compared to cohabiting or married (OR = 9.5), male relative to female (OR = 3.1), African American (OR = 1.5) or white (OR = 1.4) relative to Hispanic, and in their 20s relative to 30s, 40s, 50s, or 60s (respective ORs = 1.3, 2.0, 4.0, and 5.6).

For people reporting a risky sexual partner, only two variables were significant, income ($P = 0.05$) and gender ($P = 0.01$). People more likely to report a risky primary sexual partner were those with low incomes (<$10,000 per year) relative to high incomes (>$40,000 per year) (OR = 1.9) and women relative to men (OR = 1.5).

For transfusion recipients, a borderline effect was observed for gender ($P = 0.06$, OR = 1.6), with women more likely than men to be recipients. Significant effects were found for marital status, with cohabiting or married respondents more likely than unmarried respondents to be transfu-

Table 4. Condom use during vaginal intercourse among sexually active heterosexual adults within the three largest risk groups (high-risk cities sample).

Risk group	n*	Condom use	Percent	95% confidence interval
Multiple partners†	803	None	37.8	33.6 to 41.9
		Low	28.1	24.5 to 31.7
		Moderate	17.1	13.7 to 20.5
		High	17.0	13.9 to 20.1
Risky partner‡	229	None	69.9	62.3 to 77.4
		Low	13.7	7.9 to 19.4
		Moderate	3.9	1.8 to 6.0
		High	12.6	6.9 to 18.3
Transfusion§	90	None	74.5	62.1 to 86.9
		Low	6.2	1.3 to 11.1
		Moderate	8.5	0.0 to 18.6
		High	10.8	2.5 to 19.1

*Weighted *n*. †Multiple partners include the following risk factors: multiple partners only, multiple partners and a risky partner, multiple partners and transfusion recipient, and the combination of these three factors. ‡Risky partner only, risky partner and transfusion recipient. §Transfusion recipient only.

sion recipients ($P = 0.05$; OR = 1.7), and for age ($P = 0.001$), where, relative to people in their 20s, those in their 40s, 50s, and 60s were all more likely to report transfusions between 1978 and 1985 (respective ORs = 3.2, 2.7, and 3.7). People in their 20s and 30s were equally likely to be transfusion recipients.

Condom use: people with sexual and transfusion-related risks. Data on condom use during vaginal intercourse for sexually active heterosexuals are presented in Table 4. Only high-risk cities data are provided, but similar results were obtained for the national sample. As before, the three risk categories were constructed to be mutually exclusive. People with multiple partners were the most likely to report moderate to high rates of condom use during vaginal intercourse. However, the majority of respondents across risk groups were in the none to low categories of condom use. Among heterosexual respondents with a risk factor who had practiced anal intercourse in the past 6 months ($n = 114$, high-risk cities), 71% never used condoms, 7% used them infrequently, 3% used them fairly frequently, and 19% always used condoms during anal intercourse.

In examining how condom use varied across risk groups and social demographic characteristics, we used multiple logistic regression analysis to examine two condom outcome measures [aggregated across vaginal and anal condom use; see (45) for all confidence intervals]: (i) any use of condoms versus no use and (ii) <50% rate of condom use compared to ≥50%. In order to examine condom use differences across the three largest risk groups, we performed a regression analysis with transfusion recipients as the reference group (high-risk cities sample). Relative to transfusion recipients, respondents with multiple partners were 4.7 times ($P = 0.001$) as likely to report using condoms and 2.1 times as likely to report using condoms at moderate to high rates ($P = 0.06$). People with risky partners did not differ significantly from transfusion recipients in terms of either condom use measure.

Logistic regression analyses were conducted to examine demographic correlates of condom use among respondents with a risk factor (high-risk cities sample). We found (multivariate analysis) that education ($P = 0.05$), marital status ($P = 0.001$), gender ($P = 0.05$), and age ($P = 0.01$) were significantly related to condom use. Those using condoms (versus no use) had received education beyond high school relative to not having received a high school education (OR = 1.6), were unmarried compared to married or cohabiting (OR = 2.7), male relative to female (OR = 1.4), and in their 20s relative to 30s, 40s, 50s, and 60s (respective ORs = 1.7, 2.8, 4.2, and 25.0). Respondents most likely to report using condoms at moderate to high rates (versus <50% use) were unmarried compared to married or cohabiting (OR = 1.9, $P < 0.01$) and in their 20s relative to those in their 30s, 40s, 50s, and 60s (respective ORs = 1.6, 2.0, 2.1, and 12.1; $P < 0.01$).

Interpreting HIV Risks Among Heterosexuals

Approximately 15 to 31% of adult heterosexuals nationally and 20 to 41% in high-risk cities were at some risk for HIV infection in the past 1 to 5 years. Although these figures may be a slight overestimate (we are ignoring condom use), it would be impractical to assess condom reports for periods extending over 5 years. It is more likely that the present figures are underestimates: some respondents may underreport their numbers of sexual partners and intravenous drug use because of embarrassment and fear of reprisals, or they may forget or not know details of their own or of their partner's HIV risk and antibody testing history (25).

The present study mapped HIV- and other STD-relevant risk factors together with condom use for a representative sample of heterosexual adults from the contiguous United States and major high-risk cities. This information is crucial if public health officials are to efficiently direct prevention programs toward those most in need of intervention. The present findings have greater generalizability and depth than results from earlier surveys (46) or more recent studies (17, 19–22, 47) that have addressed some AIDS- or STD-relevant issues (such as estimates of numbers of sexual partners) but have not provided an in-depth look at the full range of HIV risk factors across social strata.

The prevalence figures in this study should be interpreted cautiously. Respondents categorized as at risk in this study are not necessarily at high risk for HIV or other STDs. The magnitude of actual risk associated with any one or a set of HIV risk factors is difficult to determine. For instance, to make a more exact assessment of the risk associated with a person's sexual activity, one would need to know the size and characteristics of his or her sexual network, the prevalence of HIV infection across the social strata in which those sexual networks are embedded, the type and frequency of sexual practices engaged in, as well as information on donor infectivity and host susceptibility (29, 48). Even if one ignores many of these complexities and focuses only on the overall rate of HIV infection among heterosexuals, it cannot be concluded that most heterosexuals with a risk factor would be at high risk for HIV infection. The evidence to date suggests that rates of HIV infection, although increasing somewhat over time (based on the number of AIDS cases), remain relatively low in the general heterosexual population [a national HIV seroprevalence survey is still needed to validate this conclusion (6, 48, 49)]. Despite these cautions, it would be unwise, from a standpoint of disease prevention, to dismiss the high prevalence of HIV risk factors among the general heterosexual population. Heterosexuals should not wait until HIV infection rates increase dramatically before they take preventive action.

Among heterosexuals with a risk factor for HIV infection, people with multiple sexual partners were differentially distributed across a wide range of social strata. The findings suggest that wide-ranging prevention programs are needed to address the health implications of people having multiple-partnered sex. Respondents reporting multiple-partnered sex were more likely to

be male, African American or white (relative to Hispanic), unmarried, highly educated, and young adults. Condom use was higher among those reporting multiple sexual partners than in other heterosexual risk groups. Nevertheless, condom use at rates sufficient to prevent HIV and other STD transmission (100% use) remains relatively low among those with multiple partners.

Women and low-income individuals were more likely than those in other social strata to have risky sexual partners. Approximately 71% of respondents with a risky sexual partner reported not using condoms. Women, relative to men, were more likely to be in risky partnerships where condoms were not being used (for example, 64% of those with a risky partner were women in the high-risk cities). The overrepresentation of women among respondents with risky partners who were not using condoms may reflect relationships in which women feel powerless to influence the risk behaviors of their partners or to insist on protective actions that would prevent HIV transmission (*50*).

Transfusion recipients were clustered among women, among older individuals, and among married or cohabiting individuals. Transfusion recipients were using condoms at very low rates which, when coupled with the fact that very few transfusion recipients (23%) have been tested, suggests that efforts to encourage safer sex and antibody testing among this group have not been too successful. It remains to be determined whether or not transfusion recipients represent a continuing source of HIV transmission. The number of AIDS cases attributable to blood transfusion appears to be declining (*6*, *48*). Nonetheless, there may still be some transfusion recipients who unwittingly continue to infect others because they are unaware of their HIV status, and these individuals should either determine if their antibody status is negative or use condoms if they are sexually active and uncertain of their antibody status.

Our findings suggest that public health messages about condom use are, to some extent, reaching those in the heterosexual population who are most likely to have an HIV risk factor, particularly young adults. Young adults in their 20s are more sexually active than people in other age groups and, consequently, have been a central focus of HIV prevention programs. However, prevention efforts have not reached sexually active middle-aged and elderly adults with an HIV risk factor to the same extent. Either older people are ignoring AIDS prevention messages, or those messages are not being directed through the appropriate media for older age groups. Women with a risk factor and the less educated are also less likely to be using condoms. No racial differences in condom use were observed after we controlled for education and gender. In general, condom use was relatively low among heterosexuals with an HIV risk factor. It remains to be seen whether the apparent lack of concern by heterosexuals for the risks associated with STDs will change as a result of media attention given to public figures such as Earvin "Magic" Johnson, who reported being infected with HIV through heterosexual transmission.

Although we received good cooperation from respondents, higher cooperation rates would have served to strengthen our ability to generalize the findings. It is important to note that nonresponse in this survey was unrelated to the topic being investigated. In general, nonresponse in the present survey was not substantially greater and, in some respects, was lower than in other recent AIDS-behavioral surveys based on FTF or telephone methods (*17–22*, *47*). For instance, the San Francisco AIDS in Multi-ethnic Neighborhoods survey (FTF) and the Rand Los Angeles (telephone) surveys, which oversampled heterosexual minorities in major HIV epicenters, reported slightly lower cooperation rates than were achieved in our high-risk cities survey (*17*, *21*). Although the usefulness of telephone surveys is limited by the difficulties of sampling populations that are hard to reach (such as IDUs and street youth), about 96% of households in the United States are estimated to have telephones (*51*). Thus, the ability to reach household respondents is not diminished by telephone surveys. Moreover, there is evidence that some respondents [such as Hispanics and the elderly (*52*)] prefer telephone interviews to FTF methods. In the present study, we went to great lengths to make respondents feel comfortable with a telephone interview, and considerable effort was made to develop survey items that would be comprehensible to respondents across different educational, racial (or ethnic), and age groups.

There is a need for more surveys to assess the reliability of the present findings and to regularly monitor how the general U.S. population is responding to HIV and other STD prevention programs. There appears to be a general willingness by Americans to participate in surveys that ask sensitive questions relevant to AIDS. Indeed, on the basis of our national sample, we found that about 70% of U.S. residents were willing to participate in AIDS-related surveys in which they were asked sensitive questions about sexual behavior, drug use, and HIV antibody testing. This result is reflected in other general population-based AIDS-related surveys that have been conducted in Virginia, Massachusetts, California, and in other states (*17*, *19–22*, *47*).

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10. Post-stratification adjustments were based on the 1989 current population survey. We thank T. Piazza and Y. Cheng (Univ. of California, Berkeley, Survey Research Center) and G. Kalton (University of Michigan, Institute for Social Research) for their contributions in developing the sample weights for this study.
11. High-risk cities sampled include Atlanta, Baltimore, Boston, Chicago, Cleveland, Dallas, Fort Worth, Detroit, Houston, Los Angeles, Miami, New Orleans, New York, Philadelphia (including Camden, New Jersey), Pittsburgh, San Antonio, San Diego, San Francisco, Oakland, San Jose, East St. Louis, Tampa (including St. Petersburg), and Washington, DC.
12. A bilingual team of translators representing Cuban, Puerto Rican, and Mexican dialects was employed. For their efforts in this regard, we thank B. Marin of the University of California, San Francisco (UCSF), C. Arce (NuStat, Los Angeles), A. Perez-Vidal (University of Miami, Department of Psychiatry and HIV Center), L. Rogler (Director, Fordham University Hispanic Research Center), and M. Esquer (UCSF).
13. The pretest telephone survey (n = 300) obtained data from 250 respondents 18 to 49 years of age and 50 respondents 50 to 75 years of age (50% men and 50% women). The sample was made up in part of Hispanics (75% Spanish-speaking, including representatives of Puerto Rican, Cuban, and Mexican-American dialects) and of African Americans from the Midwest and whites from the deep South.
14. Data collection and interviewer training were conducted by Communications Technologies Corporation of San Francisco. Thirty-six percent of households (household addresses obtained by comparing our RDD numbers to a listed sample) were sent an advance letter (in English and Spanish). We generated the RDD sample by using multiple stratification procedures (stratified sampling of number banks, with sorting and systematic sampling by geographic region) developed by R. Groves (Institute for Social Research, University of Michigan) and T. Piazza (Survey Research Center, University of California, Berkeley) that allowed us to obtain a high proportion of households without using the typical replacement procedures of the two-stage cluster methods developed by Waksberg (*15*). We oversampled re-

spondents age 50 to 75 years (ratio of 1.4:1) and blacks and Hispanics age 18 to 49 years (ratio of 1.8:1) in the high-risk cities sample and Hispanics and blacks age 18 to 49 years (ratio of 2:1) and respondents age 50 to 75 years (ratio of 2:1) in the national sample. After we enumerated a household, one respondent was randomly selected for interview after standard informal consent procedures. The most common reason for refusal was reluctance to complete the household enumeration questions. The majority (95%) of householders refused participation before hearing that the survey was about AIDS. The initial household contact was told only that this was a health survey. Once a respondent was selected, after enumeration, the selected respondent was then told that the survey was about AIDS. Other than providing their first names, respondents remained anonymous throughout the interview. Respondents were interviewed only if they felt they had privacy. If a subject did not have privacy, another appointment was made for a time when privacy could be maintained for the course of the interview.

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39. We limited the risky partner assessment to inquiry about the primary sexual partner because we assumed that a respondent would have more in-depth personal knowledge of this person than they would of more transient sexual partners. The decision to focus on risk characteristics of the primary partner and to ignore other sexual partners does not influence the overall prevalence estimates because, by definition, people who had multiple sexual partners (past 1 to 5 years) are counted as having a risk factor.
40. Percentages reporting specific sexual behaviors (among sexually active respondents with a risk factor) are as follows: (i) ever tried anal intercourse, 22% national, 26% high-risk cities; (ii) tried anal intercourse in the last 6 months, 6% national, 10% central cities; and (iii) had vaginal intercourse in the last 6 months, 99% national, 99% central cities. Two percent of respondents with a risk factor are missing the condom measures because they were sexually inactive during the 6-month period covered by the condom report (4% national, 6% high-risk cities were sexually inactive in the past year). No substantial differences in missing data were found with respect to race (or ethnicity) or language of interview. Missing data on the demographic variables ranged from a low of <0.01% (national and cities) for education to a high of 2.6% for income (national, 4% cities). Missing data on other measures were also low (number of sexual partners in past year, 0.2% national, 0.2% cities; HIV antibody testing, 4% national, 3.5% cities).
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45. The 95% confidence intervals for the odds ratios for significant variables within each model are as follows: (i) multiple sexual partners model: education (0.95 to 1.85), marital status (7.25 to 12.44), gender (2.61 to 3.89); race and ethnicity: African American (1.12 to 2.05), whites (1.03 to 1.92); age: 30s (0.99 to 1.57), 40s (1.46 to 2.63), 50s (2.59 to 5.86), and 60s (3.38 to 8.45); (ii) risky sexual partners model: income (1.06 to 3.35), gender (1.07 to 2.01); (iii) transfusion recipients model: gender (0.97 to 2.59), marital status (1.04 to 2.86); age: 40s (1.39 to 7.48), 50s (1.15 to 6.32), and 60s (1.69 to 7.96); (iv) condom use (any versus no use) risk factor model: multiple partners (confidence interval = 2.38 to 9.23); (v) condom use (<50% versus 50% or more use) risk factor model: multiple partners (confidence interval = 0.95 to 4.65); (vi) condom use (any versus no use) demographic model: education (1.00 to 2.52), marital status (1.80 to 3.87), gender (1.00 to 1.92); age: 30s (1.19 to 2.43), 40s (1.57 to 4.77), 50s (2.23 to 7.28), and 60s (8.49 to 48.63); (vii) condom use (<50% versus 50% or more use) demographic model: marital status (1.17 to 2.98); age: 30s (1.08 to 2.33), 40s (1.05 to 3.81), 50s (1.04 to 24.03), 60s (3.36 to 39.8).
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