Changes in Prevalence of HIV Infection and Sexual Risk Behavior in Men Who Have Sex With Men in San Francisco: 1997–2002

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Objectives. We assessed differences in HIV prevalence and sexual risk behavior among men who have sex with men (MSM) between 1997 and 2002 in San Francisco.

Methods. We used 2 population-based random-digit-dial telephone surveys of MSM households in San Francisco in 1997 (n=915) and 2002 (n=879).

Results. Estimated HIV prevalence increased from 19.6% in 1997 to 26.8% in 2002. Measures of sexual risk also increased. Unprotected anal intercourse with a partner of different or unknown HIV serostatus increased from 9.3% to 14.6%. Mean number of male partners increased from 10.7 to 13.8. The largest reported increase was 18.9% to 26.8% for "serosorting," or choosing unprotected anal intercourse partners believed to have the same HIV serostatus as oneself. Men aged 30 to 50 reported the largest increase in unprotected anal intercourse, whereas men aged 18 to 29 reported the largest increase in serosorting. Changes in the age distribution did not explain the increase in risky behavior.

Conclusions. Both HIV prevalence and sexual risk increased substantially among MSM in San Francisco between 1997 and 2002. Serosorting is being adopted more frequently than condom use by young MSM, but its effectiveness as a harm reduction strategy is not known. (*Am J Public Health.* 2007;97:1677–1683. doi:10.2105/AJPH.2005.062851)

Between 1997 and 2002, highly effective multidrug antiretroviral treatments were widely adopted in the United States and there was a subsequent significant decline in the AIDS death rate.[1] During the same period, there were reports of increases in risky sexual behavior among men who have sex with men (MSM), associated in some studies with "treatment optimism," the view among persons at risk that HIV infection was no longer as threatening as in the past.[2–5]

From November 1996 through February 1998, we conducted a random-digit dial telephone survey of MSM in Chicago, Los Angeles, New York, and San Francisco (Urban Men's Health Study 1997 [UMHS 1997]).[6,7] From May 2002 through January 2003, we conducted a similar random-digit dial phone survey in San Francisco alone (UMHS 2002) that used nearly identical methodology and resulted in a very similar sample size, thus allowing us to examine changes in HIV prevalence and sexual behavior since 1997.

A consequence of the maturing HIV epidemic among MSM is an increased sophistication about transmission risk, which influences sexual decisionmaking. To examine the degree to which "serosorting"—choosing sexual partners thought to have the same HIV serostatus as oneself—has become a factor in sexual risk behavior, we report on changes between 1997 and 2002 in a 6-level measure of risk that incorporates knowledge of the partner's HIV serostatus, specific sexual behavior, and condom use. We also examine changes in the age distribution of our 2 samples to determine whether behavior change could be attributed to changes in the age distribution of MSM in San Francisco.

METHODS

The Surveys

UMHS 2002 was a household probability sample of adult MSM using a random-digit-dial telephone survey modeled on UMHS 1997. UMHS 1997 was carried out in Chicago, Los Angeles, New York, and San Francisco in 1995 and 1996[6]; UMHS 2002 was conducted in San Francisco only. UMHS 1997 identified 13 zip codes where an estimated 87% of the MSM living in San Francisco resided. Because the geographic distribution of AIDS cases is a good marker of the location of MSM households and our examination of the distribution before launching UMHS 2002 matched that of the UMHS 1997 distribution by 90% to 95%, we used the same 13 zip codes for UMHS 2002.

We randomly selected telephone numbers from the 198 telephone exchanges that had some numbers in the targeted 13 zip codes. We determined a household's eligibility by screening for residency in San Francisco and the presence of at least 1 man aged 18 years or older who reported that he had engaged in same-gender sex since age 14 or who self-identified as homosexual, bisexual, or gay. One adult MSM from each household was randomly selected to be interviewed and offered a $25 cash incentive. Interviews were conducted in English or Spanish through computer-assisted telephone interview (CATI) technology. Westat Corporation (Rockville, Md) carried out sampling, telephone interviewing, and weighting data for UMHS 2002.

Between May 2002 and January 2003, a total of 36 259 telephone numbers were called, resulting in the identification of 7465 households with MSM, 5506 (73.8%) of which completed the eligibility screening questions. Of the screened households, 21.7% (1193) contained an MSM, 879 of whom completed the interview (73.7% of eligible households).

A nearly identical methodology and similar eligibility and completion rates were obtained in San Francisco for the earlier UMHS 1997. A total of 1194 screened households (21.6%) contained an eligible MSM, 915 (76.6%) of whom completed the interview.

Measuring HIV Status and Sexual Risk

Both surveys obtained the self-reported results of each subject's last HIV test. The

instruments for UMHS 1997 and UMHS 2002 used very similar questions on sexual behavior, including sections on demographics, residency and migration, recent risk behaviors, attendance at venues "where men sometimes go to meet other men," participation in MSM organizations, HIV and other sexually transmitted disease (STD) testing, and detailed partner-by-partner sexual behavior questions for up to the 4 most recent sexual partners in the past 12 months (including identifying a primary partner if there was one). Recent risk behaviors that subjects were asked about included total number of male sexual partners and condom use during anal intercourse in the past 12 months.

The partner-by-partner section asked about knowledge of a partner's HIV serostatus, specific sex acts, and condom use for each act. On the basis of the partner-by-partner data, we constructed an index of HIV sexual risk that took into account the sex act (insertive vs receptive anal intercourse), condom use, and knowledge of the partner's HIV serostatus. This variable had 6 categories of hierarchical risk related to sexual activity in the past 12 months: (1) no male sexual partners, (2) no anal intercourse partners, (3) anal intercourse with 100% condom use (protected partners), (4) anal intercourse without 100% condom use but only with partners thought to have the same HIV serostatus as the respondent (serosorting), (5) unprotected anal intercourse in which the insertive partner was HIV negative and the receptive partner was HIV positive or serostatus unknown (risk to the insertive partner), and (6) unprotected anal intercourse in which the receptive partner was HIV negative and the insertive partner was HIV positive or serostatus unknown (risk to the receptive partner). Respondents received only 1 code, corresponding to the highest risk that applied. In this report, we categorized as having "high-risk sexual behaviors" those in the category "risk to the receptive partner" on the assumption, strongly supported by many earlier studies,[7,8] that the receptive partner is at greater risk than the insertive partner during unprotected anal intercourse.

Statistical Methods

Weights for UMHS 1997 and UMHS 2002 were constructed from the sampling probabilities and nonresponse proportions and standardized to the size of the completed sample. Statistical testing and construction of 95% confidence intervals of variable distributions within each sample was performed with weighted data and the survey commands in Stata version 9 (Stata Corp, College Station, Tex) to correct for the design effect. Relationships between categorical variables and outcomes were tested by conversion of the Pearson χ^2 statistic into an F statistic through second-order Rao and Scott correction.[9] Mean differences were assessed with the *t* statistic. To test differences in a measure between the 2 surveys, weighted estimates of the parameters and standard errors adjusted for the design effect from the separate data sets were used to compare means (*t* tests) and independent proportions (*z* scores).

RESULTS

Demographic Characteristics of Respondents

The demographic characteristics of the participants in the 1997 and 2002 samples were similar except for changes in age distribution, employment status, and proportion tested for HIV. In 2002, 29.1% were older than 49 years (vs 17.7% in 1997; $P<.001$), whereas 8.5% were 18 to 29 years old (15.9% in 1997; $P<.001$) and 31.8% were 30 to 39 years old (38.0% in 1997; $P=.015$). The proportion reporting full-time employment declined from 69.5% in 1997 to 60.2% ($P<.001$). Similar declines in full-time employment were seen in all age groups. Race (80% White), education (41%–42% had a 4-year degree, 23%–26% an advanced degree), and income distribution (18%–19% earned <$20 000 and 35%–38% earned >$60 000 annually) were statistically unchanged.

Changes in Estimated HIV Prevalence and Associated Variables

Estimated self-reported HIV prevalence increased from 19.6% to 26.8% between 1997 and 2002 (Table 1; $P<.001$). The proportion of those ever tested for HIV increased to 96.4%, up from 92.0% ($P<.001$) (data not shown). Among HIV-negative men, the proportion tested for HIV in the past year was virtually unchanged (51.9% and 51.2%). The median time period since the respondent first tested positive for HIV was between 7 and 8 years in 1997 and increased to between 12 and 13 years in 2002, indicating that the great majority of infections were long standing. In 1997, 9.3% of HIV-positive men had first tested positive within the past 2 years, compared with 8.4% in 2002.

In both years, age, race/ethnicity, and employment were associated with differences in HIV prevalence ($P<.05$). Those aged 40 to 49 years, non-Whites, and nonworking MSM had the highest estimated prevalence in both samples. In 2002, education, income, and number of male sexual partners entered as a 4-level variable (0, 1, 2–5, ≥6 partners) were associated with HIV prevalence ($P<.05$). There was an association of marginal statistical significance with attending a sex club or bathhouse. In 1997, associations with marginal statistical significance were found for income, number of male sexual partners, attending a sex club or bathhouse, and "cruising," or looking for sexual partners in various venues.

Testing for differences in estimated HIV prevalence between the 2 samples showed statistically significant increases in 2002 in the 2 oldest age groups (Table 1; $P=.044$ and .011, respectively), in non-Hispanic White and Hispanic men ($P=.021$ and $P<.001$), and among those with income of less than $20 000 ($P=.003$) and between $20 000 and $60 000 ($P<.001$). Although there appeared to be large changes in the estimated prevalence for African Americans and for those of other or mixed ethnicity, because of small numbers in those categories, there was considerable variability in the point estimates (e.g., for African Americans, 95% confidence interval [CI]=19.7%, 58.3% in 1997 and 9.6%, 42.6% in 2002). Similarly, prevalence increases among attendees of 2 less-frequented venues (sex clubs or bathhouses and STD clinics) did not achieve statistical significance, but the HIV prevalence increase among men who visited bars or nightclubs did achieve significance. The HIV prevalence rate among cruising-area visitors increased only slightly. For all venues, increases in prevalence among nonattendees were statistically insignificant.

TABLE 1—HIV Prevalence in 2 Probability Telephone Samples of Men Who Have Sex With Men: San Francisco, 1997 and 2002

	UMHS 1997 (n = 915)		UMHS 2002 (n = 879)	
	HIV Prevalence, %	*P*[a]	HIV Prevalence, %	*P*[a]
Overall prevalence, % (95% CI)	19.6 (16.9, 22.6)		26.8 (23.8, 30.0)	
Age, y		<.01		<.01
18–29	5.5		3.8	
30–39	18.6		20.2	
40–49	31.6		40.7	
≥50	14.9		26.0	
Education		.36		<.01
<4 years of college	22.5		39.5	
4-year college degree	18.5		21.5	
Advanced degree	17.6		17.4	
Household income, $		.08		<.01
<20 000	26.4		43.4	
20 000–60 000	17.9		28.8	
>60 000	17.8		15.8	
Race/ethnicity		.03		.01
Non-Hispanic White	20.1		25.6	
Hispanic	10.6		34.0	
Non-Hispanic African American	37.0		21.9	
Non-Hispanic Asian/API	11.3		14.1	
Non-Hispanic other/mixed	28.5		54.5	
Employment status		<.01		<.01
Working full-time	14.3		18.6	
Working part-time	18.5		25.7	
Not working	36.5		43.6	
No. male sexual partners in past 12 mo		.10		.02
None	12.2		23.1	
1	17.5		18.5	
2–5	21.4		27.3	
≥6	23.3		31.5	
Visited STD clinic in past 12 mo		.98		.21
Yes	19.3		30.8	
No	19.6		25.7	
Visited gay bar/nightclub in past 12 mo		.23		.88
Yes	20.4		26.6	
No	15.4		27.2	
Visited sex club/bathhouse in past 12 mo		.08		.07
Yes	23.4		31.0	
No	17.7		24.7	
Visited cruising area in past 12 mo		.09		.59
Yes	23.2		25.6	
No	17.7		27.4	

Note. UMHS = Urban Men's Health Study; CI = confidence interval; STD = sexually transmitted disease; API = Asian/Pacific Islander. "Men who have sex with men" includes men reporting having had sex with men since age 14 or men who self-identify as homosexual, bisexual, or gay. Prevalence is by self-reported HIV test results. A subsample of respondents in UMHS 1997 tested themselves for HIV through use of home kits; results of these self-administered tests raised estimated prevalence to 22%. No such HIV testing was performed in UMHS 2002. Percentages were from weighted data.
[a]*P* values from a design-based F test in Stata version 9 (Stata Corp, College Station, Tex) to correct for the design effect.

Changes in HIV Risk Behavior

Substantial changes were seen in the distribution of our 6-level measure of sexual risk behavior (Table 2). The proportion reporting no male sexual partners in the past year remained nearly the same (*P*=.494). Among sexually active MSM, the proportion reporting no anal intercourse or 100% condom use during anal intercourse as their highest level of sexual risk declined (*P*=.002 and *P*=.036, respectively), whereas the proportion reporting 100% serosorting, risk to the insertive partner, and risk to the receptive partner ("high-risk sexual behavior") increased (*P*<.001, *P*=.027, and *P*=.033, respectively). Moreover, the mean number of sexual partners in the past 12 months for men at each risk level showed a monotonic increase with increasing risk in 2002, a relationship not seen in 1997.

Overall, mean number of male sexual partners in the prior 12 months increased from 10.7 to 13.8 between 1997 and 2002 (the median number increased from 3 to 4 and the range from 0–300 to 0–400). However, the mean number of sexual partners reported by HIV-positive MSM declined from 21.3 to 13.7, while for HIV-negative MSM it increased from 8.2 to 13.8 (data not shown). The mean number of unprotected insertive anal intercourse partners reported by HIV-positive men increased from 1.0 to 3.1 (*P*=.002). The mean number of unprotected receptive anal intercourse partners reported by HIV-negative men increased from 0.45 to 1.36, but this difference was not statistically significant (*P*=.200). The proportion of HIV-positive men reporting serosorting increased from 17.1% to 24.3% (*P*=.098), and HIV-negative men reported nearly the same percentage increase, from 20.0% to 27.7% (*P*=.004).

We examined associations with the prevalence of high-risk sexual behavior in the 2 surveys, defining it as the highest risk category on our 6-level measure. In UMHS 2002, we found no association with demographic measures but statistically significant associations with all the measures of visiting venues except cruising areas (Table 3). In contrast, in UMHS 1997, frequenting a cruising area in the past year was the only venue variable with a statistically significant association

TABLE 2—Distribution of HIV-Related Sexual Risk Behavior in Past 12 Months in 2 Probability Telephone Samples of Men Who Have Sex With Men: San Francisco, 1997 and 2002

Risk Category	% of Participants (Mean No. Male Partners)[a] UMHS 1997 (n = 915)	UMHS 2002 (n = 879)	P[b]
No male sexual partners	14.8	13.5	.49
No anal intercourse	25.0 (15.1)	18.1 (8.3)	<.01
Anal intercourse with 100% condom use	32.1 (12.7)	27.0 (12.5)	.04
Unprotected anal intercourse, 100% HIV seroconcordant	18.9 (7.3)	26.8 (13.7)	<.01
Unprotected, serodiscordant anal intercourse, risk to the insertive partner[c]	4.8 (16.8)	7.5 (23.9)	.03
Unprotected, serodiscordant anal intercourse, risk to the receptive partner[d]	4.5 (12.4)	7.1 (47.6)	.03

Note. UMHS = Urban Men's Health Study. Respondents were classified into the highest risk category reported in the partner-by-partner assessment of up to 4 sexual partners in the past year. Columns sum to 100%. "Seroconcordant" means the respondent thought his partner had the same HIV infection status as himself; "serodiscordant" means that he thought they differed by HIV infection status.

[a]Mean number of male sexual partners in past 12 months for all respondents in the risk category. Classification into the risk categories was based on detailed questions only for the 4 most recent sexual partners.

[b]Comparing the proportion of respondents within the category between the 1997 sample and the 2002 sample. Corrected standard errors were computed separately for each sample and the difference in proportions was tested by *z* statistic.

[c]Unprotected anal intercourse in which the insertive partner was HIV negative and the receptive partner was HIV positive or of unknown HIV status.

[d]Unprotected anal intercourse in which the receptive partner was HIV negative and the insertive partner was HIV positive or of unknown HIV status.

(*P*=.03). While high-risk sexual behavior among MSM who went to a cruising area increased by over 20% in 2002, it also more than doubled among those not visiting cruising areas, resulting in a nonsignificant association between cruising and high-risk sexual behavior.

Changes in Sexual Risk Behavior Within Age Groups

Because the age distribution of the men had shifted toward the older age groups between 1997 and 2002 and men aged 30 to 49 reported the highest proportion of risky sexual behavior, we looked at the distribution of our 6-level measure of sexual risk within age groups for both samples to determine whether the increase in risk behavior since 1997 could be attributed to the older age distribution in 2002 (Table 4). We found evidence for an increased proportion of high-risk sexual partners in all age groups. The smallest increase was among those aged 50 years and older (4.1% to 4.9%), which was the group showing the largest gain in the proportion of the MSM population between 1997 and 2002. The largest increase was among 40- to 49-year-olds (more than doubling, from 3.8% to 9.2%), a group whose proportion of the MSM population increased less than 2% between the 2 surveys. The second riskiest group, 30- to 39-year-olds, declined as a percentage of MSM between the 2 surveys. We also saw large increases in all age groups in the proportion reporting 100% serosorting in unprotected anal intercourse; this trend was strongest among 18- to 29-year-olds, who reported an increase from 25.1% in 1997 to 40.0% in 2002. Similarly, there were substantial declines in all 4 age groups in the proportions reporting no anal intercourse partners. It would therefore appear that the demographic shift toward older age could not account for the observed changes in the distribution of sexual risk behavior.

DISCUSSION

We found 3 significant changes among MSM in the epidemiology of HIV and sexual behavior associated with risk of HIV transmission in 2 probability telephone samples in San Francisco. First, the estimated prevalence of HIV infection increased by 40% between 1997 and 2002. Second, risky sexual behavior increased in the same period. There was approximately a 60% increase in the proportion of men reporting a high-risk sexual behavior partner, a 30% increase in the mean number of sexual partners, and a tripling of the mean number of anal intercourse partners among those reporting high-risk sexual behavior. Third, there was a shift away from avoiding anal intercourse or engaging in intercourse with 100% condom use and toward using knowledge of a sexual partner's HIV serostatus to reduce the risk of HIV transmission. This latter trend was most pronounced among younger MSM. By 2002, we observed the highest prevalence of high-risk sexual behavior among 40- to 49-year-olds and the second highest risk among 30- to 39-year-olds. The 18- to 29-year-old age group was riskier than men aged 50 and older.

Although HIV prevalence was measured by self-report, several factors suggest that we only slightly underestimate serological prevalence. These include the high proportion of MSM who had been tested for HIV (92% and 96% in the 2 samples), the large proportion of men with long-standing HIV infection (nearly 80% of the HIV-positive men first tested positive 5 or more years earlier), and in the 1997 survey, the low proportion (1.8%) of purportedly HIV-negative men and previously untested men who tested HIV positive through the use of home test kits.[7]

Several factors may have produced the large increase in prevalence between 1997 and 2002. The highly effective regimens of triple drug therapy were just being introduced when we conducted the 1997 study, and death rates were already beginning to fall. The 13.6% decline in the proportion of men aged 18 to 40, and the nearly 50% decline in the proportion aged 18 to 30, contributed to the higher prevalence, although it was also related to longer survival with HIV. The increase in risky sexual intercourse may also have contributed to higher prevalence. Because these were 2 cross-sectional samples and not a longitudinal study, some differences could be because of differential in- and out-migration, although 77% of men in 2002 had lived in San Francisco for more than 5 years.

Associations with prevalence of HIV infection reflect both factors determining the duration of infection and risk factors for incident

TABLE 3—Prevalence of High-Risk Sexual Behaviors in the Past 12 Months in 2 Probability Telephone Samples of Men Who Have Sex With Men: San Francisco, 1997 and 2002

	UMHS 1997 (n = 915)		UMHS 2002 (n = 879)	
	High-Risk Sexual Behaviors Prevalence, % (95% CI)	P[b]	High-Risk Sexual Behaviors Prevalence, % (95% CI)	P[b]
Overall prevalence, % (95% CI)	4.4 (3.1, 6.3)		7.1 (5.5, 9.1)	
Age, y		.81		.34
18–29	3.7		6.6	
30–39	5.4		7.2	
40–49	3.8		9.2	
≥50	4.1		4.9	
Education		.80		.53
<4 years of college	5.0		8.2	
4-year college degree	3.8		6.8	
Advanced degree	4.8		5.5	
Household income, $		.92		.82
<20 000	4.4		8.3	
20 000–60 000	4.3		7.1	
>60 000	5.1		6.6	
Race/ethnicity		.44		.66
Non-Hispanic White	4.3		6.7	
Hispanic	4.3		9.0	
Non-Hispanic African American	12.1		12.1	
Non-Hispanic Asian/API	2.5		3.4	
Non-Hispanic other/mixed	3.3		6.9	
Employment status		.29		.97
Working full-time	4.5		7.0	
Working part-time	1.1		6.4	
Not working	5.9		7.1	
No. male sexual partners in past 12 mo		.21		<.01
1	3.5		3.7	
2–5	3.6		6.0	
≥6	7.2		12.0	
Visited STD clinic in past 12 mo		.65		<.01
Yes	6.0		12.4	
No	4.5		6.0	
Visited gay bar/nightclub in past 12 mo		.11		<.01
Yes	4.9		8.3	
No	1.9		1.8	
Visited sex club/bathhouse in past 12 mo		.46		<.01
Yes	5.3		12.0	
No	4.0		5.0	
Visited cruising area in past 12 mo		.03		.31
Yes	6.9		8.5	
No	3.1		6.4	

Note. UMHS = Urban Men's Health Study; CI = confidence interval; STD = sexually transmitted disease; API = Asian/Pacific Islander.

[a]Unprotected anal intercourse in which the receptive partner was HIV negative and the insertive partner was HIV positive or of unknown HIV status.

[b]*P* values from a design-based F test in Stata version 9 software (Stata Corp, College Station, Tex) to correct for the design effect.

infection. As the AIDS epidemic is now 25 years old and our data show that most of the men sampled reported testing positive more than a decade ago, it is not surprising that age was more strongly related to prevalence of infection than measures of sexual behavior and visiting sex-oriented venues. In contrast to prevalence of HIV infection, the proportion of MSM reporting a high-risk sexual behavior partner (which is paralleled by higher numbers of sexual partners) was associated with venue attendance but not with most demographic variables. The results underscore the notion that certain venues may serve to identify and lend access to the risk-taking subpopulation of MSM.[10,11]

We observed an increase in risky sexual behavior regardless of the measure used, but we have emphasized a measurement of risk that uses partner-by-partner information on the nature of the sexual behavior, the use of condoms, and knowledge of the partner's HIV serostatus. Although each of these considerations has been used previously to assess risk, we believe this particular 6-level classification of risk to be a new summary measure. As an incremental measure of risk that categorizes each individual according to his riskiest behavior in the past 12 months, we believe this provides a clearer discrimination of both the risk behaviors and the types of risk reduction methods being widely used by MSM. Its limitation as a measure is that it does not necessarily provide information on all of the respondent's recent sexual partners, beacuse there are limits on the number of partners for whom such detailed information can realistically be sought.

Although there was an increase in risky behavior, the widely used measure of the proportion of men reporting unprotected anal intercourse seriously misrepresents the amount of increased risk if serosorting is effective in reducing risk, a question we were not able to examine. The proportion of men reporting unprotected anal intercourse increased from 28.1% in 1997 to 41.4% in 2002, an absolute increase (percentage point increase) of 13.3% and a relative increase (the ratio of the 2 percentages) of 47%. In contrast, the proportion reporting unprotected receptive anal intercourse in which the receptive partner was HIV negative and the insertive partner was

TABLE 4—Changes in Distribution of HIV Sexual Risk Behavior Within Age Groups in 2 Probability Telephone Samples of Men Who Have Sex With Men: San Francisco, 1997 and 2002

	% of Participants, by Age Group							
	UMHS 1997 (n = 915)				UMHS 2002 (n = 879)			
Risk Category	18–29	30–39	40–49	≥50	18–29	30–39	40–49	≥50
No male sexual partners	16.3	7.3	13.4	30.6	3.0	7.4	10.6	26.3
No anal intercourse	13.4	22.9	27.4	35.5	7.6	12.2	17.1	28.7
Anal intercourse with 100% condom use	35.7	35.9	34.8	17.0	37.7	30.7	26.4	20.4
Unprotected anal intercourse, 100% HIV seroconcordant	25.1	24.1	14.8	9.7	40.0	32.5	28.8	14.5
Unprotected, serodiscordant anal intercourse, risk to the insertive partner[a]	5.7	4.3	5.9	3.0	5.1	10.0	7.9	5.2
Unprotected, serodiscordant anal intercourse, risk to the receptive partner[b]	3.8	5.5	3.8	4.1	6.6	7.2	9.2	4.9

Note. UMHS = Urban Men's Health Study. Respondents were classified into the highest risk category reported in the partner-by-partner assessment of up to 4 sexual partners in the past year. "Seroconcordant" means the respondent thought his partner had the same HIV infection status as himself; "serodiscordant" means that he thought they differed by HIV infection status.

[a]Unprotected anal intercourse in which the insertive partner was HIV negative and the receptive partner was HIV positive or of unknown HIV status.

[b]Unprotected anal intercourse in which the receptive partner was HIV negative and the insertive partner was HIV positive or of unknown HIV status

HIV positive or of unknown HIV status increased from 4.5% to 7.1%. Although the latter represented a relative increase of 58%, the absolute increase was only 2.6%. It is quite different to report that nearly half of MSM are having risky sex (i.e., any unprotected anal intercourse) than to report that 7.1% are at high risk or that 14.6% are at risk (i.e., the sum of "risk to insertive partner" and "risk to receptive partner" in unprotected anal intercourse in which serosorting is not practiced).

Reported serosorting in anal intercourse increased 7.9% in 2002, the largest absolute difference from 1997. There is no dispute that relying on presumed knowledge of a sexual partner's HIV status is not a completely safe strategy, but our data demonstrate that it is being widely used by MSM, especially young MSM. Among men aged 18 to 29, in 2002 it was more frequent than condom use in anal intercourse (40% vs 38%). Serosorting now has to be considered an important strategy for harm reduction among MSM, and its effectiveness should be evaluated.

Finally, our data show that, if one assumes that serosorting is not high-risk behavior, young MSM are not the age group at highest risk, contrary to common belief. There were some substantial changes in behavior among 18- to 29-year-olds between 1997 and 2002. Much smaller percentages reported no male sexual partners (16.3% vs 3.0%) and no anal intercourse partners (13.4% vs 7.6%), and a much larger proportion reported serosorting with anal intercourse partners (25.1% to 40.0%) as their highest level of risk behavior. Despite these changes since 1997, the proportion of young MSM at highest risk in 2002 was lower than the proportion of the 2 middle-age groups (30- to 49-year-olds) at highest risk.

The question arises whether these San Francisco data can be generalized to other urban MSM. A recent report by the Centers for Disease Control and Prevention (CDC) provides behavioral data from interviews of HIV-positive MSM from 16 surveillance sites around the country (interviewed May 2000–December 2002).[12] It found that 35% of HIV-positive men reported insertive anal intercourse with a partner who was HIV negative or of unknown serostatus, of whom 18% did not use a condom; the overall proportion of HIV-positive men in the CDC study who had "high-risk sexual behaviors" as we defined it in our 6-level variable was therefore 6.3%. This figure is close to our 7.1% for MSM overall, but it is based on HIV-positive men only and on the most recent sexual encounter rather than the 4 most recent sexual partners. It is at least suggestive that our data are not unique to San Francisco.

We do not know whether the findings specific to young MSM can be generalized to young MSM beyond San Francisco. In the CDC report, a higher proportion of young men than in our study reported being sexually active with a male during the preceding 12 months, but it does not report on specific risk behavior by age. Because a great deal of attention has been paid to targeting young men on the assumption that they are the highest-risk group, it is important to determine whether our data apply to young MSM in other geographic locations. HIV prevention efforts may be emphasizing risk among young MSM at the expense of middle-aged MSM who are at higher risk. New strategies are needed for HIV prevention among at-risk middle-aged MSM. The challenges faced by HIV prevention services in addressing what are likely to be more-established sexual patterns among older MSM are considerable and will demand creativity and focused effort. ■

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Contributors

D.H. Osmond participated in originating and conducting the study and analyzing data and was the primary author of the article. L.M. Pollack participated in originating and conducting the study, supervised data collection, performed the statistical analyses, and contributed to writing the article. J.P. Paul contributed to the design of the study and writing the article. J.A. Catania originated of the study, obtained the funding, and supervised all aspects of its implementation and contributed to writing the article.

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Human Participant Protection

The study was approved by the institutional review boards of the University of California, San Francisco, and Westat Corporation.

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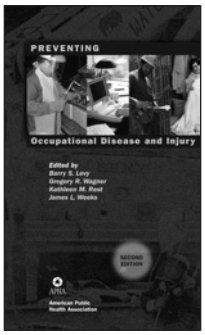

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