



HIV TESTING HISTORY AMONG GAY/BISEXUAL MEN RECRUITED IN BARCELONA: EVIDENCE OF HIGH LEVELS OF RISK BEHAVIOR AMONG SELF-REPORTED HIV+ MEN

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Abstract—As part of the first quantitative study of men who have sex with men (MSM) and HIV/AIDS in Spain, anonymous, self-administered questionnaires were distributed via gay/lesbian organization mailings, bathhouses, and sex shops in Barcelona. We analyzed 547 gay/bisexual men along self-reported HIV testing history—i.e. untested, previously tested HIV−, and previously tested HIV+. Eleven variables discriminated significantly between the three groups in multivariable analysis. HIV− men were over-represented in the mailing subsample. While untested men exhibited potentially protective behaviors (e.g. least likely to have had stable and casual sex partners with HIV/AIDS and to practice anal intercourse), they were also least likely to be out with their homosexuality and most likely to never use condoms when they practiced anal intercourse. HIV+ men were most likely to report insertive and receptive anal intercourse with a condom and least likely to practice insertive anal intercourse without a condom in the past month, yet they were also most likely to report the highest interpersonal barriers to safer sex, recent cocaine use with sex, meeting sex partners in public restrooms, and recent episodes of STD. A potentially volatile combination of higher sexual activity (e.g. more sex partners and casual sex activity) coupled with the presence of safer sex barriers (e.g. poor scores on indices measuring safer sex disposition, elevated drug use accompanying sex) was evidenced among HIV+ men. There were no statistically significant differences between the three groups for anal intercourse without a condom, but with 37.5% of this collective reporting one such episode in the past month, all groups can be considered equally risky. Against the backdrop of a 20.5% self-reported HIV prevalence, there is considerable need for enhanced prevention efforts among gay/bisexual men in general and targeted strategies among HIV+ men in particular. Copyright © 1997 Elsevier Science Ltd

Key words—HIV/AIDS, gay/bisexual men, sexual behavior, HIV testing

INTRODUCTION

The decade of the 1990s has witnessed Spain's ascent to the top in European annual and cumulative AIDS incidence. Unlike most Western European countries where men who have sex with men (MSM) make up a large percentage of the national AIDS case load, Spain's pattern of subepidemics, along with that of Italy, is characterized by a majority (around 65%) of AIDS cases among injecting drug users (IDUs), with MSM in distant second comprising some 15% of the case load (European Centre for the Epidemiological Monitoring of AIDS, 1994). In the autonomous region of Catalonia, which accounts for one-quarter of the AIDS cases in Spain, the relative percentage of cases among MSM has always been slightly higher

than the Spainwide average, hovering around the 20–25% mark since 1987 (CEESCAT, 1995).

Given the severity of the epidemic among IDUs in both relative and absolute terms—cross-sectional studies in Barcelona (Rodés *et al.*, 1994) and elsewhere in Spain (Zunzunegui Pastor *et al.*, 1993) have shown HIV prevalence upwards of 50%—the few studies performed to date have largely focused on IDU and its accompanying subepidemics of heterosexual and perinatal transmission. Information on HIV infection among gay/bisexual men has been scarce and quantitative evaluations of HIV-related behaviors nonexistent. The secondary position of MSM in the AIDS epidemic and the resultant lack of information on HIV within the collective have prompted attitudes ranging from misplaced optimism—“AIDS is a problem among gay men in Spain, *but* it is not as serious as among Spanish drug users or gay men elsewhere”—to complete denial—“AIDS is a drug user's problem” (de Miguel, 1991).

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Internationally, consensus appears to be slow in the debate on the effects of HIV status and HIV testing on risk behavior among MSM. Positions in favor of testing have generally operated under the two assumptions that (1) HIV+ men aware of their infection will take measures to prevent risk of transmission to others, and (2) untested men pose a great risk for HIV transmission, given their unknown and potentially positive serostatus. First, while many cohort studies on behavior change have witnessed a dramatic decline in risk behavior among HIV+ men (Becker and Joseph, 1988), it has also been shown that HIV+ men continue to exhibit levels of risk behavior that remain higher (Calzavara *et al.*, 1991) or are on par with those of HIV- men (McCusker *et al.*, 1988; van Griensven *et al.*, 1989), which may still be substantial. Second, cross-sectional studies comparing tested and untested men have yielded widely disparate results (Dawson *et al.*, 1991; Waddell, 1993; Church *et al.*, 1993). Against such varied findings, one thing is certain: assumptions of the safety of tested men (especially HIV+ men) and the dangers of untested men are not well grounded. Since some findings actually suggest the contrary, the role of HIV testing and HIV status among MSM merits further evaluation, given their implications for epidemiology and prevention.

As the first community-based survey of gay/bisexual men and the HIV epidemic in Spain, the present study was conducted in Barcelona as a collaborative effort between the AIDS Prevention and Control Program of the Catalan government and STOP-SIDA, the main community-based organization for AIDS education and prevention among gay men in the region. This paper examines the relationship between self-reported HIV testing history and socio-behavioral variables of interest, by comparing men previously tested HIV+, HIV-, and untested men. Many of the studies that have presented MSM data along these three groups have tended to forego statistical tests (Schmidt *et al.*, 1992), to drop one of the categories in statistical analysis (Wiktor *et al.*, 1990), or to perform two separate analyses—e.g. HIV+ vs HIV- and tested vs untested (Dawson *et al.*, 1991). By not submitting the data to statistical analysis or by excluding pertinent data from analysis, valuable information may be lost. Furthermore, the aggrupation of HIV+ and HIV- men under a single label "tested" may not be appropriate if very real differences exist between the two groups. In light of these important considerations, the present analysis was conducted using three categories—HIV+, HIV-, and untested—including throughout a multivariate analysis of HIV testing history among gay/bisexual men.

METHODS

In mid-1993, some 2000 anonymous, self-administered questionnaires were distributed with the assist-

ance of STOP-SIDA. The questionnaires were mailed to male members of the Barcelona-based Coordinadora Gai-Lesbiana (CGL)—the gay/lesbian umbrella organization which houses STOP-SIDA—and distributed in person by volunteers at three bathhouses and the two gay sex shops in Barcelona. The survey instrument included items on socio-demographic background, psycho-social factors (e.g. sexual orientation, social network, and HIV-related attitudes), sexual behavior, situational and state conditional factors accompanying sex (e.g. pick-up sites and substance use), previous HIV testing history, and STDs in the past six months. Respondents returned the questionnaires by pre-posted mail, and the crude overall rate of return was 28%. More information on the recruitment scheme and questionnaire contents can be found elsewhere (Blanch, 1993).

Questions on sexual behavior were framed either within the past month or the past six months. The 10 men who reported no sexual relationships in the previous six months were excluded from all analyses of sexual behavior. Respondents were asked to provide frequencies for specific sexual practices with both stable and casual sex partners in the past month. Sexual behaviors examined in the past month included oral- and anal-genital sex (with condom, no condom but withdrawal before ejaculation, no condom with ejaculation). Frequencies were elicited from the respondent for insertive and receptive modalities separately. In the analytical phase, oral- and anal-genital practices were then further grouped as "safer" and "risky" in accordance with safer sex guidelines. Safer oral-genital intercourse was defined as fellatio with a condom or avoiding ejaculation in the mouth if not using a condom. Safer anal-genital intercourse meant penetration with a condom. Anal-genital intercourse was considered risky if it involved penetration without a condom, regardless of withdrawal or ejaculation in the rectum. Since we were interested in overall levels of risk behavior—be it the respondent at risk or his partner—no insertive-receptive dichotomy was implemented in categorizing behaviors according to risk for HIV transmission.

Summary indicators for oral and anal sex were calculated for each case based on the actual reported frequencies. They also reveal the amount of overlap between safer and risky activities. For those who practiced oral-genital sex in the past month, we added the number of times a man had practiced oral sex with a condom to condomless oral sex without ejaculation in the mouth and divided that sum over the total frequency of oral sex. Similarly, the frequency of safer anal intercourse was divided over the total frequency of anal intercourse in its three forms to calculate the percentage of condom use in anal-genital penetrations in the past month. Finally, in order to assess the relative frequency of withdrawal and ejaculation

among those who practiced unprotected anal intercourse, the number of penetrations with ejaculation was divided over the total frequency of anal intercourse without a condom.

Largely based on items used by Hays *et al.* (1990), seven psycho-social indices were created from responses to questions measured on a five-point Likert scale ranging from "strongly agree" to "strongly disagree". The six multi-item indices—each composed of either three or four items—were tested with reliability analysis. The Cronbach's alphas ranged from moderate to high (0.54–0.79) for all but one item—i.e. perceived safer sex norms in the gay community (Cronbach's alpha = 0.29). The index for self-control was based on just one item. To facilitate interpretation, the score presented for each index is a composite average of the item scores coded such that higher scores favor safer sex, except for interpersonal barriers and personal risk for which lower scores indicate protective behavior.

Statistical analysis

Continuous variables such as age and the psycho-social indices were analyzed using one-way ANOVA along with Tukey's HSD procedure to compensate for multiple *post hoc* comparisons. Continuous variables with a skewed distribution such as numbers of sex partners and frequencies of sexual behaviors were evaluated using the nonparametric Kruskal-Wallis one-way ANOVA. Ordinal and nominal variables were examined using contingency tables and the Mantel-Haenszel chi-squared test.

Given the three categories in our dependent variable HIV testing history, the multivariable technique implemented was a stepwise discriminant analysis. All variables with a $P \leq 0.10$ in the bivariable analysis were introduced into a series of discrim-

inant analyses. The socio-demographic variables age and education were also included in the models despite higher P values ($P < 0.20$). In each model, the criterion for entry was minimizing Wilks' lambda. Analyses were performed until an optimal model comprised solely of significant discriminating variables was erected.

RESULTS

Of the 551 men who returned valid questionnaires, four men who had been tested but did not reveal their results were excluded from the analysis. The remaining group of 547 men was made up of 216 men (39.5%) who had never been tested for HIV antibody ("untested"), 263 men (48.1%) who had previously tested negative ("HIV-"), and 68 men (12.4%) who had previously tested positive ("HIV+").

A preliminary analysis was performed to examine differences in background characteristics and HIV testing by recruitment strata—CGL mailing, bathhouses, and sex shops. There were statistically significant differences along most of the socio-demographic variables. For example, the bathhouse stratum was older ($P = 0.0002$), more likely to live in an area with less than 1 million inhabitants ($P = 0.04$), and more likely to define their sexual orientation as bisexual ($P = 0.0002$). The respondents from the CGL mailing were more likely to be out with their homosexuality ($P < 0.00001$) and to have taken the HIV-antibody test ($P = 0.02$).

Table 1 presents selected socio-demographic and psycho-social variables for which $P \leq 0.10$ in the three-group comparison.

Table 1. Selected background characteristics by HIV testing history

Variable	Untested		HIV-		HIV+		P
	N	%	N	%	N	%	
Recruitment site							0.02
CGL mailing	117/215	54.4	179/262	68.3	38/67	56.7	
Bathhouses/saunas	67/215	31.2	63/262	24.0	21/67	31.3	
Sex shops	31/215	14.4	20/262	7.6	8/67	11.9	
Residence (no. of inhab.)							0.04
< 20,000	23/213	10.8	15/260	5.8	1/66	1.5	
20–100,000	24/213	11.3	26/260	10.0	6/66	9.1	
100,000–1 million	32/213	15.0	32/260	12.3	5/66	7.6	
> 1 million	134/213	62.9	187/260	71.9	54/66	81.8	
Out of the closet	177/216	81.9	241/263	91.6	62/68	91.2	0.004
Social circle							0.01
Mostly gay	50/214	23.4	72/263	27.4	31/68	45.6	
Mostly heterosexual	35/214	16.4	36/263	13.7	6/68	8.8	
Equally mixed	129/214	60.3	155/263	58.9	31/68	45.6	
Knowing people with HIV/AIDS	153/191	80.1	215/244	88.1	65/68	95.6	0.003
Primary sex partner	7/156	4.5	38/213	17.8	31/61	50.8	<0.00001
Casual sex partner	28/143	19.6	66/187	35.3	41/52	78.8	<0.00001
Friend	97/173	56.1	157/223	70.4	55/64	85.9	0.00003
Acquaintance	136/187	72.7	191/233	82.0	56/61	91.8	0.003
	N	Mean (SD)	N	Mean (SD)	N	Mean (SD)	
Gay community norms	199	2.60 (0.85)	252	2.62 (0.72)	66	2.26 (0.67)	0.002
Support from friends	195	3.64 (1.06)	249	3.86 (0.91)	66	3.69 (1.11)	0.06
Interpersonal barriers	197	1.84 (0.85)	245	1.69 (0.73)	66	1.98 (0.87)	0.02

Socio-demographic characteristics

Detailed treatment of the general characteristics of the entire study population can be found elsewhere (Blanch, 1993). Briefly, the mean age of the respondents was 33.5 years ($SD = 8.5$), the men were largely urban (69.9% living in a city with more than 1 million inhabitants), and the vast majority (85.7%) had completed at least a secondary school education.

Comparing the men along HIV testing history, we found that HIV- men were over-represented in the mailing stratum, and HIV+ men were most likely to live in a city of over 1 million inhabitants, with untested men being least likely ($P = 0.04$). HIV+ men comprised the youngest group with an average age of 32 years ($SD = 5.6$, $P = 0.17$). When analyzed in 10-year categories (P for trend = 0.04), the data reveal that HIV+ men are over-represented in the 30–39-year-old range (53.7% vs HIV- 39.5% and untested 40.3%), and their lower average age is a result of their under-representation in the 40 and above age groups (9% vs HIV- 21.5% and untested 26%). The groups did not differ significantly along education or employment status.

Psycho-social factors

Over three-quarters of the respondents defined their sexual orientation as exclusively homosexual. Untested men were more likely than men who had been tested to label their sexual experiences as bisexual or heterosexual (25.5% vs HIV- 18.6% and HIV+ 16.4%, $P = 0.12$), although there were no differences between the three groups in terms of sexual feelings. In addition, untested men were significantly less likely than tested men to be out with their homosexuality. However, despite their differences in sexual identities, untested men resembled HIV- men in the composition of their social circle. HIV+ men stood out with nearly half being in a predominantly gay circle.

When asked if they knew anyone with HIV/AIDS, practically all HIV+ men (95.6%) said they did compared with 88.1% of HIV- men and 80.1% of untested men ($P = 0.003$). This same pattern (HIV+ > HIV- > untested) holds when we examine the respondents' relationship to the person with HIV/AIDS.

Several of the constructed psycho-social indices for safer sex successfully distinguished between the three groups. HIV+ men had a significantly lower mean score on gay community norms than either HIV- or untested men, meaning that HIV+ men were less convinced that safer sex exists as the norm in the gay community than their counterparts. In a similar vein, HIV+ men perceived less support for condom use from their friendship network than HIV- men, but interestingly, untested men reported the same lack of support as HIV+ men. HIV+

men were also most likely to anticipate negative reactions towards safer sex from their sex partners. Although not statistically significant, it is instructive to note that HIV+ men also reported being least proficient in sexual communication skills ($P = 0.25$), lower self-control in a sexual encounter ($P = 0.28$), and the highest personal risk for infection/reinfection ($P = 0.22$).

Sexual behavior

The men were asked about the number of sex partners and anal intercourse in the past six months. Despite the fact that about 20% of the men labeled themselves as bisexual, only half of them reported a female sex partner in that time period (median of 1 among those reporting any female sex partners), with no differences between the three groups. The median number of male sex partners was 10 for HIV+ men and 6 for HIV- and untested men ($P = 0.05$), with less than one-fifth of the respondents reporting one male sex partner in the previous six-month period.

A similar pattern was exhibited for the number of male sex partners with whom anal intercourse was practiced. HIV+ men had a median number of 4 penetrative sex partners (PSP) compared to 2 for HIV- and 1.5 for untested men ($P = 0.007$). Upon analysis of PSP by categories, it became evident that much of the difference is attributable to men who had no PSP (i.e. did not practice anal intercourse) in the past six months (HIV+ 8.8% vs HIV- 15.4% vs untested 22.5%). In other words, despite differences in the number of sex partners, the proportion of sex partners with which one practices anal intercourse is comparable among the three groups.

Table 2 presents the proportions of men who practice oral- and anal-genital sex in its various modalities in the past month. In all three groups, a significantly greater proportion of men practiced oral-genital sex in its safer rather than risky form in the past month (93.5% vs 21.8%, $P < 0.00001$). However, HIV+ men were less likely to practice oral sex with ejaculation in the mouth than HIV- and untested men ($P = 0.07$). There were no differences between proportions of insertive and receptive oral sex.

Turning to insertive vs receptive modalities of anal intercourse in the past month, it appears that the three groups are similar with regard to insertive anal intercourse, although HIV+ men were significantly more likely to practice receptive anal intercourse than HIV- and untested men (72.3% vs 52.6% and 50.0%, $P = 0.006$).

Both HIV+ and HIV- men were significantly more likely to practice anal intercourse with a condom than without ($P < 0.00001$); however, as a group, untested men were only slightly more likely to practice safer anal intercourse ($P = 0.10$), with nearly half not using condoms. For anal-genital

Table 2. Oral- and anal-genital sex in the past month by HIV testing history

Variable	Untested N	%	HIV- N	%	HIV+ N	%	P
Oral-genital sex	188/201	93.5	229/244	93.9	62/64	96.9	0.60
Safer	192/207	92.8	238/255	93.3	63/65	96.9	0.48
Risky	44/198	22.2	58/239	24.3	7/64	10.9	0.07
Anal-genital sex	143/203	70.4	195/251	77.7	54/65	83.1	0.06
Safer	100/203	49.3	165/252	65.5	50/65	76.9	0.00003
Insertive	77/204	37.7	133/253	52.6	38/65	58.5	0.001
Receptive	66/205	32.2	106/252	42.1	41/66	62.1	0.00008
Risky	84/204	41.2	91/249	36.5	20/66	30.3	0.26
Insertive	66/203	32.5	74/248	29.8	12/66	18.2	0.08
Receptive	57/204	27.9	56/249	22.5	17/65	26.2	0.40

intercourse with a condom, the proportions of insertive and receptive practitioners were roughly equal among HIV+ and untested men, whereas HIV- men were significantly less likely to practice the receptive form ($P = 0.02$).

The three groups bore greater resemblance to one another when it came to risky anal intercourse. In fact, no differences were found between the three groups in terms of receptive anal intercourse without a condom; roughly one-quarter of the men in each group practiced this high risk activity in the past month. Interestingly, however, HIV+ men appeared less likely than HIV- and untested men to practice insertive anal intercourse ($P = 0.08$). As with safer anal intercourse, HIV- men were more likely to penetrate than to be penetrated without a condom (29.8% vs 22.5%, $P = 0.06$).

Table 3 conveys information on the frequency of sexual practices by risk for HIV transmission as calculated from actual reported events. For example, among those who have practiced oral sex in the past month, the great majority in all three groups always did so safely. Those who experienced ejaculation with oral sex tended to do so occasionally, as only three men in the sample always practiced oral sex with ejaculation in the mouth.

Among those who practiced anal intercourse in the past month, about one-third in each group used condoms sometimes, but significant differences arose when it came to "always" and "never" condom use. Untested men were least likely to always use condoms and most likely to never use condoms.

In contrast, HIV+ men were most likely to use condoms always and least likely never to use condoms, regardless of partner type. The proportion of consistent condom use was higher with casual partners than stable partners for HIV- and untested men, but not for HIV+ men. In fact, 34% of the HIV+ men who practiced anal intercourse in the past month did so without a condom. Among men who had practiced anal intercourse without condoms in the past month, HIV+ men were significantly more likely than their counterparts to practice withdrawal ($P = 0.05$ for always withdraw vs sometimes/always ejaculate).

Situational and state conditional factors

The most popular places for meeting sexual partners were bars and dance clubs. Nearly 90% of the sample reported frequent or occasional pick-ups; no differences were found between the three groups with respect to meeting sex partners in either bars or backrooms. HIV+ men were significantly more likely than either HIV- or untested men to frequent bathhouses (86.9% vs 71.9% and 67.5%, $P = 0.05$), parks and other outdoor areas (73.8% vs 53.7% and 48.5%, $P = 0.007$), and public restrooms (33.3% vs 15.8% and 23.8%, $P = 0.03$).

While the three groups possessed similar alcohol and hashish consumption patterns accompanying sex in the past six months, a significantly higher proportion of HIV+ men tended to consume recreational drugs associated with heightened sexual activity. The most striking difference was found in

Table 3. Calculated frequency of sexual practices in the past month by HIV testing history

Variable	Untested N	%	HIV- N	%	HIV+ N	%	P
Oral-genital w/o ejaculation							0.39
Always	128/169	75.7	150/199	75.4	46/53	86.8	
Sometimes	39/169	23.1	48/199	24.1	7/53	13.2	
Never	2/169	1.2	1/199	0.5	0/53	0.0	
Anal-genital w/ condoms							0.0008
Always	56/127	44.1	91/172	52.9	31/47	66.0	
Sometimes	33/127	26.0	55/172	32.0	14/47	29.8	
Never	38/127	29.9	26/172	15.1	2/47	4.3	
Anal-genital w/o condoms							0.17
Always withdraw	32/71	45.1	34/81	42.0	12/16	75.0	
Sometimes ejaculate	15/71	21.1	21/81	25.9	2/16	12.5	
Always ejaculate	24/71	33.8	26/81	32.1	2/16	12.5	

the use of nitrite inhalants, whereby a higher proportion of HIV+ men consumed the drug and with greater frequency (50.8% vs HIV- 31.6% and untested 32.0%, $P = 0.0005$). HIV+ men were also more likely to consume cocaine (19.7% vs HIV- 8.7% and untested 7.1%, $P = 0.08$) and acids/ecstasy (12.7% vs HIV- 3.5% and untested 4.0%, $P = 0.05$). Finally, we found that over one-quarter of the HIV+ men reported an STD in the past six months compared to 9% among HIV- and untested men ($P = 0.00002$).

Multivariable analysis

Table 4 shows the results of the multivariable discriminant analysis. Given the three groups of the dependent variable HIV testing history, two canonical discriminant functions were calculated. Both functions were statistically significant ($P < 0.0001$), and based on their eigenvalues, we see that Function 1 is endowed with three times more discriminating power than Function 2. Overall, 33.6% of the variation in Function 1 and 14.4% in Function 2 is explained by the variables.

Eleven variables were retained in the optimal model. The order in which they appear in the table is an approximation of their relative importance, based on the absolute magnitude of the standardized coefficients and the pooled within-group structure coefficients (the latter not shown). Having had a casual or stable sex partner with HIV/AIDS most strongly distinguished between the three groups. Recent cocaine use with sex and receptive anal intercourse with a condom were the other Function 1 variables of note. The next cluster of variables from interpersonal barriers to being out with one's homosexuality had comparable discriminating power, mostly in the weaker Function 2. Insertive anal intercourse without a condom was the weakest of the variables independently associated with HIV testing history.

Table 4. Discriminant analysis of variables independently associated with HIV testing history

Variable ^a	Standardized canonical discriminant function coefficients	
	Function 1 ^a	Function 2 ^a
Casual sex partner with HIV/AIDS	0.63	0.04
Stable sex partner with HIV/AIDS	0.56	0.06
Cocaine use accompanying sex ^b	0.32	0.04
Receptive anal-genital with condom ^c	0.28	-0.19
Interpersonal barriers	0.13	-0.47
Recruitment site	-0.14	0.41
Insertive anal-genital with condom ^c	-0.003	0.58
STDs ^b	0.15	-0.38
Meet sex partners in restrooms	-0.04	-0.26
Out with one's homosexuality	0.18	0.25
Insertive anal-genital w/o condom ^c	-0.17	-0.02
Eigenvalue	0.49	0.17
Canonical corr.	0.58	0.38

^a $P < 0.0001$ for all variables and both discriminant functions.

^bIn the past six months.

^cIn the past month.

DISCUSSION

The representativeness of the study sample to the population of men who have sex with men population at large cannot be ascertained due to the lack of a sampling frame, a nearly universal limitation in such studies. To our benefit, the respondents of this study were recruited via three sources, and the differences that surfaced between the subsamples suggest that, at the very least, a certain element of diversity is present. Our best estimate of a rate of return (28%) is on the low side, which raises concerns of response bias. Given the absence of previous studies among MSM in Catalonia and Spain at large, only by improving participation rates in future studies can we properly address the impact that selective participation has had, if any, in the present study.

A second possible limitation of the study deals with the fact that the information on which the analyses are based was entirely self-reported. The reliability and validity of self-reported sex behaviors have been shown to be good among gay/bisexual men (Saltzman *et al.*, 1987). Our main variable of interest was HIV testing history, but for previously tested men, there was no serological confirmation of their self-reported HIV-antibody status. It is important to bear in mind when interpreting the results that the study sample includes, for example, men who reported that they had previously tested negative, and not serologically confirmed HIV-antibody negative men. A future study including saliva sample collection will permit serological testing and possible corroboration with the results presented here.

In the present study, detailed information on sexual practices was limited to the past month, whereas information on sexual partners and anal intercourse was based on the past six months. An appropriate time frame is essential, since it must capture the sexual activity of the study population. Short time frames may improve recall yet run the risk of losing people who have infrequent sex or those who practice rare activities. Given that 32.5% of the sample reported practicing anal intercourse less than once per month in the past six months (in addition to the 13.8% who did not practice it at all), a one-month time period may not have been adequate for assessing that behavior. Of particular concern was the finding that differences between the groups in the frequency of anal sex at one month vanished at six months. Unfortunately, data are not available for more detailed comparisons, but the issue of time and sexual behavior merits further consideration.

The strongest variables independently associated with HIV testing history were ever having had a stable or casual sex partner with HIV/AIDS. Our findings agree with studies on prevalent and incident HIV infection (Cáceres and van Griensven, 1994), which found that HIV+ men were more likely than

HIV- men to report having had a sex partner with HIV/AIDS, as well as an English study on HIV testing (Dawson *et al.*, 1991) that tested men were more likely than untested men to have had a close friend or lover with HIV/AIDS. It comes as no surprise that HIV+ men would have had an infected sex partner since the route of transmission for most of these men was probably sexual, but it appears that having had a sex partner with HIV/AIDS may lead to greater testing in general. While many studies (van Griensven *et al.*, 1989; Dawson *et al.*, 1991) including this one have witnessed less sexual risk behavior with casual than stable sex partners, both types of sex partners distinguished between the three groups.

We found elevated levels of consumption of some recreational drugs among HIV+ men. Although surviving several multivariable models, nitrite inhalants were ultimately eliminated, despite elevated and frequent use among HIV+ men. There was evidence of effect modification with receptive anal intercourse. Recent cocaine use accompanying sex, however, was found to be independently associated with HIV testing history. HIV+ men were more likely than HIV- and untested men to have used cocaine during sex in the past six months. Increased cocaine use has been associated with HIV seropositivity among gay men (Chmiel *et al.*, 1987), but largely only at the bivariable level (Darrow *et al.*, 1987; van Griensven *et al.*, 1987; Mak *et al.*, 1990).

Recent sexually transmitted disease (STD) was also found to be independently associated with HIV testing history. While it has been shown that tested men (Dawson *et al.*, 1991) in general and men previously tested HIV+ (Gruet and Dubois-Arber, 1992) in particular are more likely to have had an STD in their lifetime, over one-quarter of the HIV+ respondents in this study reported having an STD in the past six months. Although a greater proportion of HIV+ men reported anal intercourse, the difference was due to anal-genital penetration with a condom. Therefore, their higher percentage of STDs cannot be attributed to anal intercourse without a condom alone. HIV+ men did report more male sex partners in the past six months, and unlike their HIV- and untested counterparts, HIV+ men did not distinguish between stable and casual partners, practicing similar proportions of rimming and unprotected anal intercourse with both types of sex partners. Another explanation could be detection bias if HIV+ men indeed received more or more vigilant medical attention. Unfortunately, we do not have the data to test this hypothesis. While there is ample evidence that STDs may act as a co-factor for HIV infection (Chmiel *et al.*, 1987; Coates *et al.*, 1988), the opposite may also be true (Kanki and Coutinho, 1992).

Three of the four anal intercourse variables survived the multivariable analysis. Both safer and risky modalities for insertive anal intercourse were

independently associated with HIV testing history. Tested men were more likely than untested men to practice insertive penetration with a condom; however, we also observed that HIV+ men were significantly less likely than HIV- and untested men to practice insertive anal intercourse without a condom, even though this finding is not universal (Higgins *et al.*, 1991). Consistent with a cross-sectional study among Danish gay/bisexual men (Schmidt *et al.*, 1992), more HIV+ men in this sample practiced receptive anal intercourse in the past month than HIV- men, who in turn were both more likely to practice receptive anal intercourse than untested men. An English study (Dawson *et al.*, 1991) reported the same pattern for receptive anal intercourse without a condom. However, in our study, this relationship was true only for penetrations with a condom; the three groups did not differ along receptive anal intercourse without a condom. Our results further corroborate those from a Sydney cohort study (Tindall *et al.*, 1989), which found that HIV+ men were more likely than HIV- men to practice receptive anal intercourse with condoms and withdrawal when not using condoms, but both groups were equally likely to practice receptive anal intercourse without a condom.

As evidenced in a Swiss study among MSM (Gruet and Dubois-Arber, 1992), we found that HIV testing history was linked to meeting sex partners in bathhouses, parks, and public restrooms, although only the lattermost was significant in the multivariable analysis. HIV+ men were more likely than either HIV- or untested men to pick up sex partners in public restrooms. These results may be interpreted in the context of an English study among men who have sex with men in public restrooms (Church *et al.*, 1993), which yielded a self-reported seroprevalence nearly double that of other English cross-sectional studies with MSM samples that are more diverse.

Untested men were less likely than those tested to be out with their homosexuality, which supports findings that untested men as a group are least integrated within a gay community (Gruet and Dubois-Arber, 1992). That HIV- men should be over-represented in the mailing substratum is somewhat surprising, given that similar studies in other Western European countries (Gruet and Dubois-Arber, 1992; Bochow, 1993) have seen relatively greater participation of HIV+ men in gay groups and HIV/AIDS organizations. However, respondents were not surveyed as to their affiliation in other AIDS service organizations, of which there are several in Barcelona. One novel finding is that HIV+ men perceived the greatest interpersonal barriers for safer sex, which may be a reflection of perennial difficulty in negotiating condom use and/or issues surrounding the possible disclosure of HIV positivity.

The descriptive findings in this study lend statistical backbone to many of the themes raised by the

existing literature. They also provide useful profiles of the groups in question. As for untested men, we found that they either resemble or surpass HIV- men in distinguishing themselves from HIV+ men along a series of protective behaviors—e.g. less sexual activity in general. But their moderately high perception of interpersonal barriers and lower scores on other psycho-social indices would suggest that when they do have sex, it may be more difficult for them to practice safer sex. For example, even though untested respondents were less likely than those tested to have practiced anal intercourse in the past month, those who did were significantly more likely to never use condoms. Thus, we cannot conclusively support either contention that they comprise a collective at greater (Waddell, 1993) or lesser (Dawson *et al.*, 1991) risk for HIV infection.

Although it is clear that the behavior of HIV+ individuals has a considerable impact on the shape of the epidemic, the particular needs of HIV+ gay men in terms of prevention have not been adequately examined or attended to. Possible reasons are many. The erroneous assumption that HIV is not that serious a problem among gay/bisexual men in this area and the general assumption that seropositivity should serve as strong enough incentive for risk reduction have favored a certain inertia. In this study, HIV+ men were more sexually active than their counterparts. We found increased recreational drug use accompanying sex, which may hamper both their immunity (MacGregor, 1988) as well as their ability to practice safer sex (Leigh, 1990). If past sexual behavior is indeed a predictor of present behavior (McCusker *et al.*, 1989), we can better comprehend the tendency of HIV+ men as a group to have more sex partners, to frequent bathhouses and public cruising areas more often, and not to distinguish between stable and casual sex partners in frequency of anal intercourse without a condom.

Our findings point to a need for HIV/AIDS education and prevention aimed at HIV+ gay/bisexual men. Their unfavorable scores on practically all of the psycho-social indices related to risk behavior indicate that seropositive MSM have the greatest need for support and skills training in safer sex. And then there are issues of particular importance for HIV+ gay men. The nearly threefold prevalence of STDs among HIV+ men in the past six months may be an alarming indicator of recent risky sexual behavior and/or increased susceptibility to STDs due to seropositivity. In either case, co-morbidity between HIV and STD needs to be addressed, given its implications for disease progression and transmission. As it stands, education and prevention activities that stress protecting oneself from HIV infection implicitly target an HIV- audience. Thus, programs for people with HIV/AIDS would do well to incorporate sexual issues, and prevention programs should target relevant messages at HIV+ men and not take their participation for granted.

The self-reported seroprevalence of 20.5% in this study agrees with serological data from MSM in voluntary testing centers throughout Spain (Aviñó *et al.*, 1994), suggesting a countrywide problem of considerable magnitude. Although not as high as that among IDUs in Barcelona, the self-reported seroprevalence in this study is the highest among MSM reported in Europe to date (Gruet and Dubois-Arber, 1992; Pollak, 1992). In neighboring France, where gay/bisexual male cases make up the majority of their cumulative AIDS case load—the highest in Europe—the latest self-reported seroprevalence is 17% (Gruet and Dubois-Arber, 1992). Furthermore, three-quarters of the men in this sample practiced anal intercourse with another man in the past month, and half of those who did had at least one penetration without a condom. Even more alarming was the fact that HIV+ men were as risky as their HIV- and untested counterparts. With a high proportion of risky sexual behaviors against a backdrop of elevated seroprevalence, there is no question that efforts to manage the HIV epidemic within this collective need to be intensified.

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