

# Sexual Behavior and Frequency of Antibodies to Type 1 Human Immunodeficiency Virus (HIV-1) in a Group of Peruvian Male Homosexuals<sup>1</sup>

CARLOS CÁCERES P.,<sup>2,3,4</sup> EDUARDO GOTUZZO,<sup>2</sup>  
STEPHEN WIGNALL,<sup>5</sup> & MIGUEL CAMPOS<sup>2</sup>



*The most important risk factor for HIV infection in North America and Western Europe is homosexual behavior. This article describes a 1988 survey of active male homosexuals in Lima, Peru, that investigated patterns of homosexual behavior and HIV seropositivity.*

Various circumstances associated with human immunodeficiency virus (HIV) infection throughout the world have been assuming increased health importance in recent years. Indeed, if we consider that 273,425 cases of AIDS were reported to WHO up to July 1990 (1), with far higher numbers of HIV-infected people being projected, it is reasonable to conclude that we are in the throes of a pandemic.

Latin America has not remained isolated from this problem. To date, Latin American countries have reported 23,971 cases of AIDS, 8.77% of the total cases reported to WHO up to July 1990 (1).

Since epidemiologic study of AIDS began, certain risk factors have been identified. In North America and Western Europe, the most important of these has been male homosexual behavior (2-4), which in recent years has been linked to approximately 70% of all AIDS cases reported in the United States (5). In addition, epidemiologic studies comparing infected homosexual men with others free of infection have shown that a higher frequency of infection has been associated with having large numbers of sexual partners and engaging in anal intercourse without using a condom (6).

In Peru, the first AIDS case was described in May 1983 (7). According to Peru's Special AIDS Control Program (8), the total number of AIDS cases reported up to March 1990 was 276, and the estimated rate of underreporting was 40%. In this universe, 20% of the reported cases were found in people who had traveled abroad, and who very likely were infected outside the country. Of the 276, 89.5% were adult males, the ratio of adult males to adult females in this population being 11.2. With respect to risk factors, 193 (78.1%) of the adult males reported homosexual or bisexual behavior,

<sup>1</sup>This article has previously been published in Spanish in the *Boletín de la Oficina Sanitaria Panamericana*, Vol. 111, No. 3, pp. 218-230, 1991. Correspondence should be directed to Dr. Carlos F. Cáceres, Instituto de Medicina Tropical Alexander von Humboldt, Universidad Cayetano Heredia, AP 5045, Lima 100, Peru.

<sup>2</sup>Alexander von Humboldt Institute of Tropical Medicine, Universidad Peruana Cayetano Heredia, Lima, Peru.

<sup>3</sup>School of Public Health, University of California at Berkeley, California, U.S.A.

<sup>4</sup>Via Libre Association, Lima, Peru.

<sup>5</sup>Institute of Tropical Disease Research, U.S. Naval Medical Research Institute Detachment (NAM-RID), Lima, Peru.

while four (1.6%) also reported having used intravenous drugs.

The seroprevalence of HIV infection in Peru was indicated by a survey carried out between March 1987 and March 1988 (9), mainly among healthy blood donors but also to a lesser extent among healthy people at risk and among people displaying symptoms. This survey revealed a positive response rate of 0.42% (213 in a survey population of 50,719). Of those infected, 123 (57.7%) were homosexually active males, so that of the 2,500 homosexually active males who participated in the survey, 4.9% yielded seropositive results—a rate of HIV seropositivity surpassed only by hemophiliacs, with 5.2%. In addition, a 1985 study carried out in Lima on a group of 98 middle-aged male homosexuals and bisexuals of high socioeconomic status (10) found that 11 (95% CI = 11.22%  $\pm$  6.25%) had HIV antibodies.

The preceding findings suggest that HIV infection in Peru continues to be associated primarily with homosexual or bisexual behavior. Unfortunately, very little is known about patterns of homosexual behavior in Peru. In view of this, it was proposed that a descriptive cross-sectional study be made of a group of homosexually active men residing in Lima for the purpose of describing their patterns of sexual activity, investigating the prevalence of HIV antibodies among them, and exploring possible risk factors for HIV infection. This article reports the results of that study.

## METHODS

### Sample Size and Eligibility Criteria

Basing the estimated prevalence of HIV infection in the male homosexual population on the approximate figure of 8% reported in the National Serological

Survey conducted by NAMRID (9) for this group at the end of 1987, and working at the 0.05 level of significance with a confidence interval of 0.1, it was calculated that the minimum sample size would need to be 113 subjects. Those eligible to participate in the study were males over the age of 16 years who were self-described as homosexuals or bisexuals, or who reported sexual activity involving other men. The following were excluded from the study: any person whose clinical picture suggested the presence of stage IV HIV infection; anyone who asked to be tested because he could clearly perceive symptoms; and anyone who was unwilling to participate on a voluntary basis.

### Survey Instrument and Laboratory Procedures

A survey developed specifically for this study, which was first tested in a preliminary fashion on a 10-person sample, gathered data on each subject's socio-demographic background, patterns of sexual behavior, other epidemiologically relevant factors, possible current symptomatology, and knowledge and attitudes about AIDS. Since the survey included information on extrainguinal lymphadenopathy, it involved examination of the subject's cervical, supraclavicular, and axillary ganglia.

The subject's socioeconomic status was determined by totaling points assigned him for his level of education, occupation, income, area of residence, and possession of housing. This produced a total point count ranging from 1 to 15. On the basis of this total, the subject's socioeconomic status was judged to be low (1-3 points), lower-middle (4-7), middle (8-11), or upper (12-15).

A point system was also used to assess drug use. Points were assigned for use of marijuana, cocaine, cocaine base, amyl

nitrites, or intravenous drugs (0, 1, or 2 points being assigned for each drug depending on whether the patient admitted to no drug use, occasional use, or regular use). Theoretically, up to 10 points could be assigned. A score of 1 signified limited use of recreational drugs, while a score of 2 or more was taken to indicate significant drug use.

The estimated prevalence of HIV infection among the study subjects was based on detection of HIV serum antibodies. The serum collected from each subject was tested using the Genetic Systems enzyme immunoassay kit for HIV-1; those samples that tested positive on two separate occasions were confirmed by Western Blot using the DuPont kit. Upon examination, those that yielded the response pattern specified by the laboratory were declared positive.

## Procedure

Between January and April 1988, 124 persons were recruited. This recruitment was based on written and oral information provided at the premises of the Institute of Tropical Disease Research/US Naval Medical Research Institute Detachment (NAMRID); at the offices of the Movimiento Homosexual de Lima (MHOL), an organization that provides services to the homosexual community in Lima; in customary gathering places of homosexual men (bars and discotheques); on public streets; or through contacts made by third parties. The recruiting effort varied according to location.

The NAMRID laboratory, for the purposes of another study, had been receiving the general public to provide screening for HIV antibodies. During this screening, participants were asked to furnish confidential epidemiologic information on various matters, including a history of homosexual relations. Therefore,

the people who were recruited at the NAMRID laboratory for the purposes of the study reported here were males who had reported having homosexual relations and who agreed to answer an additional questionnaire.

On the other hand, those recruited at the MHOL offices, in public places, on public streets, or through third parties were invited to collaborate in a research project by answering a confidential questionnaire and allowing a blood sample to be drawn for HIV antibody screening. (Those agreeing to participate were not obligated to pick up their HIV test results.)

The questionnaire was administered mainly by the study director or by a NAMRID laboratory worker who was given appropriate training for this purpose. In a few cases the study subjects filled out the questionnaire themselves, under supervision. The participants were given either oral or written information about AIDS and its prevention after they had completed the survey, as well as an additional counseling session if they came in to learn their test results. When the results were positive, the subjects were given special recommendations, and those in need of medical or psychotherapeutic support were directed to specialists.

## Analysis

The distribution of the study variables within the sample was ascertained, and the prevalence of HIV infection was determined. Also, it was felt that the sample size (initially calculated for a descriptive study) might be insufficient to support a rigorous analysis of the risk factors for HIV infection. However, a tentative assessment was made of the relationship between HIV infection and the other variables involved in order to obtain preliminary information that could

be used as a basis for subsequent analytic studies. To that end odds ratios and their 95% confidence intervals were calculated, and the p values of the Fisher exact test were similarly evaluated at a significance level of 0.05. For this purpose we worked directly with the dichotomous variables, and in instances where the variables were of a discrete or ordinal nature, these variables were dichotomized.

## RESULTS

### Sociodemographic Patterns

The population sample consisted of 124 subjects with an average age of 25.8  $\pm$  11.4 years ( $\bar{X} \pm 2$  SD) and an age range of 16 to 49 years. As indicated in Table 1, 70% were between 21 and 30 years old; 79.0% had been born in Lima.

Regarding education, occupation, and

**Table 1.** Sociodemographic characteristics of the study group.

	Study group members	
	No.	%
<i>Age in years:</i>		
< 21	17	13.7
21-30	87	70.2
31-40	16	12.9
> 40	4	3.2
<i>Occupation:</i>		
Office worker	69	55.6
Student	33	26.6
Free-lance professional, independent worker	18	14.5
Unemployed	4	3.2
<i>Socioeconomic status:</i>		
Lower/lower-middle	25	20.2
Middle	73	58.8
Upper	26	21.0
<i>Place of recruitment:</i>		
NAMRID laboratory	37	29.8
MHOL offices	33	26.6
Public gathering places	11	8.9
Public streets	4	3.2
Third parties	39	31.5

socioeconomic status, 76.6% reported some primary education and 21.8% said they had received some (complete or incomplete) secondary schooling. The questionnaire responses indicated that over half (55.6%) of the subjects were office workers, 14.5% were independent workers or professionals, 26.6% were students, and 3.2% were unemployed. About a quarter (25.8%) said they had no income of their own, while 8.1% said they received the minimum wage, 34.7% said they were paid between one and three times the minimum wage, and 31.4% said their salaries were more than three times the minimum wage. With respect to socioeconomic status, the respondents' scores indicated that 0%, 20.2%, 59.2%, and 21%, respectively, belonged in the lower, lower-middle, middle, and upper categories established by the survey.

Regarding the respondents' place of recruitment, 29.8% were recruited at the NAMRID laboratory, 26.6% at MHOL, 8.9% at customary male homosexual gathering places (bars and discotheques), 3.2% on public streets, and 31.5% through their contacts with people in the other groups.

### Patterns of Sexual Activity

Most of those surveyed (89.5%) reported having exclusively homosexual relations over the previous six months, while the remaining 10.5% said they had relations with people of both sexes (Table 2). The reported length of time that they had been homosexually active was most frequently (in 31.5% of the cases) between 5 and 10 years.<sup>6</sup> The average num-

<sup>6</sup>The following percentages of the study subjects said they had been homosexually active for the indicated periods: 0.8% for less than six months, 15.3% for six months to two years, 22.6% for two to five years, 31.5% for five to 10 years, and 29.8% for over 10 years.

**Table 2.** Patterns of sexual activity.

	Study group members	
	No.	%
<i>Orientation:</i>		
Exclusively homosexual	111	89.5
Bisexual	13	10.5
<i>Source of homosexual partners:</i>		
Exclusive partner	35	28.2
Close friends	40	32.3
Acquaintances	19	15.3
Strangers	30	24.2
<i>Number of sexual relations in preceding 12 months:</i>		
0-10	37	29.8
11-25	27	21.8
26-50	35	28.2
51-120	20	16.1
> 120	5	4.0
<i>Number of sex partners in preceding 12 months:</i>		
0-1	15	12.0
2-3	43	34.7
4-8	33	26.6
9-20	24	19.4
> 20	9	7.3
<i>Activities practiced:</i>		
<i>Fellatio (orogenital):</i>		
Not practiced	15	12.1
In active (insertive) role	14	11.3
In passive (receptive) role	23	18.5
In both roles	72	58.1
<i>Anal intercourse:</i>		
Not practiced	3	2.4
Active role, with condom	4	3.2
Active role, without condom	16	12.9
Passive role, with condom	5	4.0
Passive role, without condom	27	21.8
Both roles, with condom	21	16.9
Both roles, without condom	48	38.7
<i>Anilingual contact:</i>		
Not practiced	73	58.9
Passive role (anal)	23	18.5
Active role (oral)	5	4.0
Both roles	23	18.5

ber of homosexual contacts during the previous 30 days was 3.7 (95% CI =  $\pm$  0.68), while for the previous year it was 38.2 (95% CI =  $\pm$  7.33). The average number of sexual partners was 1.8 (95% CI =  $\pm$  0.33) for the previous month

(47.6% reported having only one partner), and 7.6 (95% CI =  $\pm$  1.79) for the previous year.

Most subjects (60.5%) said their sexual partners were exclusive or were drawn from a close circle of friends, while 24.2% said their partners were strangers (from the street or public places) (see Table 2).

With regard to actual practices, 87.9% reported engaging in fellatio, with 76.1% of the respondents assuming the passive (receptive) position or both passive and active positions. Nearly all (97.6%) said they had anal intercourse, while only 24.2% said they had used a condom (81.5% of the respondents said they had assumed the passive position or both active and passive positions, and of these only 25.7% had used a condom). Only 41.1% of the subjects said they had engaged in any anilingual activity.

A few subjects (5.6% of the study group) reported having had relations with an HIV-seropositive person; 20.9% reported having made trips abroad over the preceding seven years during which they had engaged in sexual activity; and 29.8% reported having had sexual relations with foreigners from countries with high HIV prevalences (e.g., Brazil, France, and the United States) during the preceding seven years.

About a tenth of the study group (10.5%) reported some heterosexual activity during the preceding six months. The average number of reported heterosexual relations in that period was 3.5, and the average number of female sex partners was 1.6. Most (61.6%) of those involved said their female partners were friends or acquaintances; none of them reported any contact with prostitutes.

Vaginal intercourse was practiced in all of these heterosexual relationships, and only 23.1% of those involved said they had used condoms. Only one person in the study group reported having any children.

**Table 3.** The study group's epidemiologic history with regard to various risk factors.

History of:	Study group members	
	No.	%
Transfusions	3	2.4
Frequent injections	16	12.9
Tattoos/acupuncture	4	3.2
Alcohol consumption	90	72.6
Use of recreational drugs:		
None (no points)	85	68.5
Limited (1 point)	24	19.4
Significant (2–10 points)	15	12.1

### Other Risk Factors

As Table 3 shows, 2.4% of the respondents reported receiving transfusions. Over half (54%) consumed alcohol as often as twice weekly, and 17.7% did so more often. Regarding drugs, 68.5% reported no use of illicit drugs; 19.4% and 12.1%, respectively, indicated limited and significant drug use. None of the study subjects reported using intravenous drugs.

Regarding sexually transmitted diseases, 17.7% of the respondents reported a history of gonorrhea and 9.7% said they had had nongonococcal urethritis. A history of syphilis, venereal warts, or genital herpes was reported by 5% of the subjects. A quarter (25%) of the respondents had a history of hepatitis. Extrainguinal lymphadenopathy was found in 11.3%.

### Knowledge and Attitudes about AIDS

Regarding knowledge of AIDS, as Table 4 indicates, 31.5% of the participants were found to have a good understanding of how the virus is transmitted while an additional 62.9% had some understanding. A third (33.9%) could tell that the term "seropositive persons" referred to people capable of transmitting the infection; and 71.8% correctly explained how to prevent transmission.

With respect to attitudes, 57.3% said

**Table 4.** Knowledge and attitudes regarding AIDS.

	Study group members	
	No.	%
<i>Knowledge about:</i>		
Mode of AIDS transmission:		
None	7	5.6
Some	78	62.9
Adequate	39	31.5
Who transmits it:		
None	41	33.1
Some	41	33.1
Adequate	42	33.9
Types of prevention:		
None	6	4.8
Some	29	23.4
Adequate	89	71.8
<i>Attitudes:</i>		
Importance given:		
None	6	4.8
Limited	47	37.9
Much	71	57.3
Preventive measures taken:		
None	43	34.7
Condom or selection of partners	59	47.6
Condom and selection of partners	22	17.7

they considered AIDS a significant danger in their current lives. About a third (34.7%) said they had taken no preventive measures, but added that they were inclined to do so after receiving orientation; 47.6% had adopted one of two useful measures: care in selection of their sexual partners or condom use; only 17.7% had adopted both measures.

### Current HIV Serology and Possible Risk Factors

Eight of the 124 subjects (6.5%) were HIV-seropositive, the remaining 116 being seronegative (95% CI = 2.2%–10.8%). Examination of relationships between seropositivity and all major variables (see Table 5) yielded the following results:

*Subjects' place of recruitment.* First contingency analysis of this variable's

**Table 5.** HIV serology and risk factors identified.

Factor	HIV(+)	HIV(-)	OR (95% CI) <sup>a</sup>	p <sup>b</sup>
<i>Number of sexual contacts during the previous year:</i>				
More than 120	2	3	12.5 (0.8-127.3)	.0332
Up to 120	6	113		
<i>Number of male partners during the previous year:</i>				
More than 20	3	6	11.0 (1.3-72.1)	.0125
Up to 20	5	110		
<i>Passive (receptive) anal intercourse without using a condom:</i>				
Practiced	8	59	Not determined	.0074
Not practiced	0	57		
<i>Drug use:</i>				
Significant	4	11	9.5 (1.5-57.3)	.0075
None/limited	4	105		
<i>Place of recruitment:</i>				
Public gathering places, public streets	4	7	15.6 (2.5-100.6)	.002
Other places	4	101		
<i>Extragenital lymphadenopathy:</i>				
Present	5	9	19.8 (3.1-142.2)	.0004
Absent	3	107		
<b>All subjects:</b>	<b>8 (6.5%)</b>	<b>116 (93.5%)</b>		

<sup>a</sup>OR (95% CI) = Odds ratio (95% confidence interval).

<sup>b</sup>p = p value of Fisher's exact test.

five categories and the presence of HIV infection revealed that these variables were not independent ( $p \leq .05$ ). The original five categories for place of recruitment were then consolidated into two categories (laboratory, MHOL offices, and third-party contacts versus public gathering places and public streets) and evaluated relative to HIV infection. This indicated that the odds ratio (OR) for obtaining positive results from the subjects who were recruited in bars or along public streets was 15.6 (95% CI = 2.5-100.6;  $p = .002$  according to the Fisher test).

**Number of sexual contacts with other men in the previous 12 months.** The OR of seropositivity for subjects with more than 120 contacts was 12.5 (95% CI = 0.8-127.3;  $p = .0332$  by Fisher test).

**Number of male sex partners during the previous 12 months.** The OR of seropositivity for subjects with more than 20 partners was 11.0 (95% CI = 1.3-72.1;  $p = .0125$  by Fisher test).

**Engaging in passive anal intercourse without a condom.** All (100%) of the seropositives had engaged in passive anal intercourse without using condoms, as compared to 59% of the seronegative subjects. In this case the odds ratio was not determined.

**Drug use.** When the respondents were assigned points for drug use and grouped into either no use/infrequent use (0-1 point) or significant use (2-10 points) categories, we found a relative risk of 9.5 (95% CI = 1.5-57.3;  $p = .0075$

by Fisher test) for the group with significant drug use.

*Extragenital lymphadenopathy.* When seropositives were compared with seronegatives, the odds ratio for presenting extragenital lymphadenopathy was 19.8 (95% CI = 3.1–142.2;  $p = .0004$  by Fisher test).

## DISCUSSION

It was recognized early in the history of AIDS that homosexual behavior was epidemiologically linked to what would become defined as infection with HIV in much of the world (2–4). This association has been found in Peru, where it has emerged from AIDS case statistics and the results of serologic surveys in the general population (7–10).

No available sociodemographic information deals with the Peruvian population's sexual orientation or behavior. Therefore, it was not possible to design a representative sample of homosexual males coming from various social groups and having various patterns of socialization with other homosexual males. However, anecdotal data suggest that patterns of socialization between homosexual males (probably including sexual behavior and its associated risks) are related to such factors as age, socioeconomic status, and education. For this reason, it is likely that the findings of this study are reasonably generalizable to a population of young homosexual males with middle and lower-middle socioeconomic status and with sufficient concern about the AIDS risk for a considerable proportion to come in voluntarily and request HIV screening.

The declaration of exclusive homosexuality by nine-tenths of the sample (in response to the question regarding sexual orientation during the preceding six months) is difficult to interpret. It may

represent the approximate proportion of homosexuals with exclusively homosexual behavior (in contrast to bisexuality) in the reference population. On the other hand, it may be the product of a selection bias—if, for example, exclusively homosexual males tend to declare their homosexual behavior more readily than bisexuals, or to have closer ties to other participants who encouraged them to go to the laboratory, or to be more inclined to agree to participate in this study as a result of prior sensitization. However, the possible overrepresentation of exclusively homosexual men does not alter the theoretical consequences of the findings, to the extent it can be assumed that a majority of the casual male partners of bisexuals are exclusively homosexual.

Despite the study population's youth, the most frequently stated duration of homosexual activity was between 5 and 10 years, which suggests early initiation of sexual activity.

Based on the average number of sexual relations in one year, an average frequency of one sexual encounter every 9–10 days was obtained. It was observed that this frequency tended to increase when there was a stable relationship with a partner. At the same time, even though the average number of sexual partners in the previous year had been 7.6 (95% CI =  $\pm 1.79$ )—a figure similar to that reported by Willoughby for nonintervention populations (11)—it was very interesting to find that almost 50% of the sample reported having had no more than three partners.

These figures suggest that a small number of subjects with a high index of casual contacts is inflating the average in this sample. At the same time, in 60% of the cases the most frequent source of sex partners was said to be those close to the subject (an exclusive partner or close friends). These two findings imply that the study group tended to report mod-



erate numbers of sexual partners, and that these tended to be members of a close social circle.

With regard to the sexual activities practiced, fellatio was very common, being reported by 88% of the subjects. An even larger proportion (98%) engaged in anal intercourse, with 81.5% assuming the passive role or both active and passive roles, but with only 25% habitually using a condom. This low rate of condom use, compared to rates noted in other studies (10–15), is an indicator of the limited extent to which this practice has taken hold—whether because of insufficient condom dissemination or reluctance to adopt the practice—and of a need for educational interventions and programs that will increase the availability of condoms to this population.

Although 6% of the subjects reported having sexual relations with HIV-seropositive people, all of them said they were unaware of their partners' HIV status at the time of the relations. About a third (30%) of the subjects reported sexual contact with someone native to a country with a relatively high prevalence of HIV infection (principally Brazil, France, and the United States).

Our analysis of heterosexual activity was restricted to the 13 respondents who reported sexual contact with women during the six months preceding the survey. These respondents reported relatively low average numbers of sexual relations (3.5) and sexual partners (1.6) during that period, suggesting that the group as a whole was not very active heterosexually. The percentage of subjects habitually using condoms when having vaginal intercourse was similar to the percentage habitually using condoms for homosexual anal intercourse.

With regard to use of recreational drugs, including amyl nitrites, only 31.5% reported any drug use, and over three-fifths of these reported only occa-

sional use of one drug, generally marijuana. Amyl nitrites ("poppers"), which are extremely popular in North America for their euphoric effect and dilation of the anal sphincter, had been used by only a small proportion of the group (6.5%). The reason appears related to the fact that these drugs were never openly commercialized and their use was restricted to people who had lived abroad. It is also noteworthy that none of the respondents reported any intravenous drug use, indicating a different situation from that prevailing in many countries within as well as outside Latin America. These results are consistent with the NAMRID survey (9), which found that only 15 out of 61,880 people reported a history of intravenous drug abuse.

As already noted, only 5% of the respondents reported a history of oral herpes, genital herpes, venereal warts, or syphilis; 18% reported gonorrhea; 10% reported nongonococcal urethritis; and 25% reported "hepatitis."

This contrasts with the results of a survey by Rojas et al. (10). In that survey 16% of the subjects reported a history of syphilis, and serologic screening combined with the reported information indicated that 25% of the subjects either had experienced syphilis or were still suffering from it. In addition, 44%, 34%, and 23% of the Rojas study participants, respectively, reported histories of gonorrhea, viral hepatitis, and nongonococcal urethritis.

Although it is logical that the Rojas study should find more frequent histories of these diseases, given that study population's higher average age (28.5 years, 95% CI  $\pm$  1.08 years) and higher level of education, this general trend could indicate that this was a more sexually active group, and therefore more exposed to sexually transmitted diseases.

Regarding knowledge and attitudes of our study population, we found an aver-

age to high level of knowledge about AIDS, together with quite a high level of concern about the AIDS danger. With respect to measures taken, two-thirds of the respondents reported having adopted the practice of using a condom during anal intercourse and/or having exercised care in selecting sexual partners. However, the survey questions did not go into any detail regarding the consistency of condom use or the selective approach used in finding partners, and fewer than 20% reported having adopted both measures. One out of every 10 respondents reported having undergone HIV screening on previous occasions.

Although our study population was partially self-selected; contained many "worried well"; reported relatively low average numbers of sex partners, many of them selected from a close circle of friends; and exhibited average to high levels of knowledge and anxiety regarding AIDS, this population did not show evidence of any particularly striking changes in sexual behavior. This is consistent with the fact that exaggerated importance is commonly ascribed to HIV screening, to a point where it comes to be regarded as the central preventive measure. Indeed, the experience of being tested for antibodies, promoted by many health professionals, produces uncertain results if it is not accompanied by appropriate counseling that takes advantage of the subject's moment of emotional readiness in order to provide concrete guidelines for preventive behavior that are largely independent of the actual test results (16-18).

In addition, the usual contrast between adequate levels of knowledge and slight changes in sexual conduct, which is found particularly in studies of homosexual men, is being explained through new AIDS risk reduction models (19). According to these models, acquisition of information about the disease and its modes

of transmission is insufficient by itself to motivate a change in behavior, being only one element in a complex of intellectual, emotional, and social factors. There is thus a very clear need for new methodologies of educational intervention among homosexual and bisexual men, ones to be developed as required with the help of the above theoretical models, that will be directed at reducing the incidence of HIV infection by encouraging replacement of risky sexual activities with other less risky ones.

The prevalence of HIV seropositivity in our study population was 6.5% (95% CI = 2.2-10.8). Comparing this with the figure of 11.2% ( $\pm$  6.25%) that was found by Rojas et al. in 1985 (10), three years earlier, we can see that while the numbers differ considerably, the confidence intervals do overlap. Therefore, we cannot rule out the possibility that the observed difference is due to chance ( $p > .05$ ).

It seems appropriate to summarize here the differences between the Rojas study and ours. In the first place, the sample of 98 persons in that study was assembled in order to examine the frequency of syphilis in the homosexual/bisexual population, a circumstance which introduced a selection bias. In addition, the subjects were recruited mainly from bars. The average age was higher (28.5 years  $\pm$  5.5), and the socioeconomic level was generally middle to upper. A higher percentage of subjects reported sexually transmitted disease, and the subjects' average numbers of sexual relations and sex partners during the 12 months preceding the survey was also higher. In addition, all but one of the 11 HIV seropositives in the survey had traveled to or lived in areas where HIV infection was endemic.

The above facts establish that the Rojas study population had different socio-demographic characteristics and higher indexes of sexual activity than our study population, and they suggest that the

former group represented a particular universe within the Peruvian homosexual population (relatively well-educated middle- to upper-class homosexuals and bisexuals who had foreign ties and frequented bars in 1985). These circumstances could explain the relatively high rate of seropositivity found in those subjects.

Our seropositivity figure comes from data gathered three years later and does not differ significantly from that of Rojas. It also relates to a broader socio-demographic universe, one whose members were mostly middle class, typically belonged to younger age groups, and included a higher proportion of students and office workers. Even so, the tendency toward self-selection by sample members (relating to frequent concern about the HIV risk and the subjects' voluntary request to be screened for antibodies) could have produced an unusually motivated study population, one at lower risk of HIV infection, with the result that the HIV prevalence in the reference group could have been underestimated.

On the other hand, our HIV seropositivity figure does not differ significantly from that of 7.7% found for the homosexual group by NAMRID's National Serologic Survey (9), or from the 4.4% figure found by that survey for a group defined in broad terms as having some homosexual behavior.

It is also important to touch on the 1987 work by Cruz et al. (20) that deals with the prevalence of sexually transmitted diseases among homosexual men complaining of gastrointestinal symptoms who came in for consultations at the Infectious Disease Unit of the Cayetano Heredia Hospital. These workers also did serologic screening for HIV and determined that three out of 30 patients examined were positive (10.0%, 95% CI =  $\pm$  10.7%). For purposes of comparison

with our results, it should be noted that this was a small group (30 patients) with low socioeconomic status, and that it consisted of people manifesting symptoms of illness who came to seek medical care.

Comparing these various HIV prevalences with those found among urban homosexual populations in the United States and Europe (prevalences ranging between 20% and 73% in 1986–11–14, 21, 22), it is reasonable to conclude that the prevalence of HIV infection is still at a moderate level in our Peruvian homosexual study population. It should also be noted that 57% of the seropositives found in the National Serologic Survey (9) up to March 1988 and 81% of the people with AIDS found up to May 1988 (23) reported homosexual behavior, this being until now the most important risk factor for HIV infection/disease in Peru. In general, this supports the hypothesis that AIDS transmission in Peru through 1988 conformed to epidemiologic pattern I established by WHO (24), pattern I areas being those where "HIV transmission and AIDS cases occur mostly in homosexual males and in individuals who use intravenous drugs" (25).

Finally, regarding the search for epidemiologic factors associated with greater risk of infection, we need to recall that even though we worked with an appropriate sample size for ascertaining seroprevalence, we did not have the ideal statistical strength for making an analytical study of risk factors (which implies the ability to detect existing associations). For this reason, weaker associations within our study population may have passed unnoticed. Nonetheless, there appears to be no justification for questioning the validity of those factors that were effectively detected. Factors noted in North American and European studies (11–14) as being strongly associated with HIV infection have also been detected in

this study. People having had more than 120 homosexual contacts during the previous year, or more than 20 sexual partners during that same time period, showed odds ratios favoring HIV seropositivity of 12.5 and 11.0 respectively. By the same token, people who engaged in anal sex in the passive position or in both the passive and active positions without using a condom showed a rate of HIV infection that differed significantly from that of the rest.

It is recognized that the increased risk posed by a high turnover in partners is due to the fact that the more different people an individual has sexual relations with, the more likely that person is to encounter an infected sexual partner. In addition, it may be assumed that even when relations occur with only one infected person, the probability of transmission increases as a function of the number of contacts with that person, and also as a function of the infectious potential of the sexual activity. (For this latter reason, penetrative sexual practices involving an exchange of fluids continue to be considered the most infectious.)

The amount of recreational drug use also differed between those who were and were not infected with HIV. People who occasionally used at least two recreational drugs, or who habitually used at least one, showed an odds ratio favoring HIV infection of 9.5. Since intravenous drug use was not detected in any respondent, this finding can be interpreted as meaning that higher levels of recreational drug use are generally associated with increased social and sexual activity, and with reduced prospects for controlling the safety of sexual practices (26).

Another reason why nonintravenous drug users could be at increased risk of sexual HIV transmission is because, having reached a certain level of drug dependence and experienced some degree of deterioration in their personality and so-

cial functioning (particularly with the use of cocaine base), they may not have the money needed to buy the substance and may thus become involved in clandestine prostitution, independently of their sex (although the clients are usually men). In the case of the group studied here, this practice was not explored, but we do not feel it offers the most obvious explanation of the increased risk of HIV infection among recreational drug users.

The association found in our study between extrainguinal adenopathies and HIV seropositivity affirms in our group that a significant proportion of HIV-infected individuals in a determined population will present this symptom, which corresponds to clinical stage III of the infection.

The place of recruitment was another factor that differentiated the serologic groups. Recruitment in a public gathering place or on the street (as opposed to recruitment through NAMRID, MHOL, or third party contacts) was associated with HIV infection. In general, it appears likely that those recruited in the latter manner were better informed and more motivated regarding AIDS prevention. At the same time, those recruited in bars, discotheques, and on the street were likely to be more socially and sexually active, and to have made more extensive use of alcohol and recreational drugs.

No association was found between HIV seropositivity and such factors as greater age (three of the seropositives were under age 21); a longer period of homosexual activity; an exclusively homosexual (as opposed to bisexual) orientation; receptive fellatio (a practice whose "high risk" continues to be controversial from the point of view of epidemiologic evidence in the literature—12); a history of contacts with seropositives or with people native to regions which through 1988 were considered high-prevalence areas (this indicates that HIV transmis-

sion was occurring fundamentally among Peruvians); alcohol use (as opposed to use of other recreational drugs); pathologic history; or differences in knowledge or attitudes regarding AIDS. It is very important to continue investigating with more powerful study designs the role of these factors that produced negative results in the study reported here—especially since they include such directly modifiable variables as knowledge and attitudes, whose importance has already been established in other studies.

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### *Tenfold Increase in AIDS Cases Predicted by Year 2000*

The World Health Organization predicts that the number of AIDS cases in the world will increase over the next eight years from the estimated 1.5 million today to 12-18 million by the year 2000. During the same period, the cumulative number of adults and children infected with the human immunodeficiency virus will triple or quadruple, rising from the current 9-11 million to 30-40 million.

It was in recognition of the growing size and scope of the AIDS pandemic that WHO selected "Sharing the Challenge" as the theme for World AIDS Day, observed on 1 December 1991. As WHO's Director-General, Dr. Hiroshi Nakajima, stated, "A challenge of this magnitude cannot be met by any one community, country, or organization in isolation. Yet experience shows that the AIDS challenge *can* be tackled successfully by people working in partnership."

Source: World Health Organization, Press Release WHO/56, 28 November 1991.