

# Buenos Aires Cohort of Men Who Have Sex with Men: Prevalence, Incidence, Risk Factors, and Molecular Genotyping of HIV Type 1

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## ABSTRACT

The prevalence, incidence, risk factors, and molecular genotyping of HIV-1 infection among men who have sex with men (MSM) were assessed through a prospective cohort study. The study was conducted in Buenos Aires from February 2003 to December 2004. Sociodemographic, sexual risk behavior data, and blood samples for HIV testing were collected at baseline and at 6 and 12 months. Cox regression analysis was applied to determine risk factors associated with HIV seroconversion. HIV-positive samples were analyzed by partial (*pro/RT*) and full-length genome sequencing. Of 811 HIV-negative participants evaluated at baseline, 327 volunteers that fulfilled the inclusion criteria were enrolled. Retention rates at 6 and 12 months were 97.2% and 91.5%, respectively. Twelve MSM seroconverted for HIV infection [incidence rate = 3.9 (95% CI = 2.0–6.7) per 100 person-years]. HIV seroconversion was associated with a greater number of different sexual contacts in the preceding 6 months ( $\geq 10$ , hazard ratio = 3.3, 95% CI: 1.1–10.4). By partial *pro/RT* genotyping analysis, 83% HIV-positive samples were subtype B and 17% samples were BF recombinants, most of these being unique recombinant forms. This study describes for the first time the recruitment and follow-up of a cohort of MSM in Argentina. Retention rates and HIV incidence rate were high. These data should be considered as a promising potential population for HIV vaccine trials.

## INTRODUCTION

**I**N ARGENTINA, surveillance data collected for AIDS since 1982 indicate that the number of cases increased over the first 15 years and then decreased after 1997 when HAART was implemented. More than 65% of the HIV/AIDS burden is concentrated in Buenos Aires, the capital of the country, and its surroundings. By December 2005, a total of 30,496 AIDS cases was reported and an estimated 127,000 persons were living with

HIV/AIDS in Argentina. Men who have sex with men (MSM) represented 18% of the total number of notified AIDS cases. New HIV infection diagnosis in the male population was suspected to be through sexual transmission in 65% (22% MSM and 43% heterosexual), and 21% in injecting drug users (IDUs) during 2004.<sup>1</sup> A prior study conducted in 2000–2001 reported an HIV prevalence of 13.8% in MSM.<sup>2</sup>

In South America, five different subtypes (A, B, C, D, and F)<sup>3,4</sup> and four circulating recombinant forms (CRF) CRF02\_

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AG, CRF12\_BF,<sup>5,6</sup> CRF28\_BF, and CRF29\_BF,<sup>7</sup> have been described. Molecular studies suggest that the most common subtype circulating in heterosexual<sup>8</sup> and IDU populations<sup>9</sup> in Buenos Aires are B/F recombinants. The HIV-positive samples obtained in the 2000–2001 prevalence study among MSM were processed by heteroduplex mobility assay (HMA) (*env*) and 90% ( $n = 85$ ) were subtype B and 10% ( $n = 10$ ) were subtype F in envelope, typical of the B/F recombinants.<sup>8</sup> In addition, full-length sequencing analysis of HMA subtype B indicated that some of these were also B/F recombinants. It is, therefore, likely that slightly less than 90% of the strains in the Buenos Aires MSM population were subtype B at that time, reflecting the evolving complexity of the HIV-1 epidemic.<sup>6</sup>

The development and follow-up of a cohort study are necessary prior to considering a given population for evaluating candidate vaccines. Finding populations with a high incidence, high retention rates, and subjects willing to participate and be compliant with intensive follow-up procedures is crucial for successful vaccine trials.<sup>10,11</sup> On the other hand, knowledge of the circulating HIV-1 subtypes in a given population could also be necessary to determine whether already developed candidate vaccines are adequate for local needs or if a tailored HIV vaccine needs to be prepared.<sup>11,12</sup>

The objectives of this study were to establish a prospective MSM cohort in order to measure HIV incidence and risk factors associated with HIV seroconversion, to assess the retention rate and the willingness of the population to participate in future HIV vaccine trials, as well as to describe HIV-1 subtypes among newly infected individuals.

## MATERIALS AND METHODS

### *Study population and recruitment procedures*

Men who resided in Buenos Aires city and surrounding areas, who reported sexual relations with men in the preceding 6 months, who were at least 18 years of age, and who self-reported as HIV negative were invited to participate in a prevalence study during the period between February and December 2003. Participants were recruited from NEXO's clients and by means of informational leaflets that were distributed in gay nightclubs, porno cinemas, gymnasiums, and streets. NEXO Asociación Civil is a large, gay-supporting nongovernmental organization ([www.nexo.org](http://www.nexo.org)). Pretest and posttest counseling for HIV and other sexually transmitted infections (STI) was provided by trained interviewers. Furthermore, in a confidential manner, the interviewers explained the study objectives and procedures and obtained written informed consent. A venous blood sample (10 ml) for HIV testing was obtained and 2 weeks later (second visit) the HIV serology result was given.

During the second visit, participants for the cohort were recruited. To participate in the cohort study, the participant had to be HIV negative at baseline, had to report no present or past injecting drug use in the preceding year, and had to express a commitment for follow-up for 12 months. Physical examination and psychological evaluation were part of the admission procedures and potential participants were excluded for a variety of mental and practical reasons. The interviewers explained the cohort study to the eligible participants and invited them to

participate and sign a new written informed consent. A venous blood sample (10 ml) for HIV testing was obtained at 6- and at 12-month visits and epidemiological and clinical data were collected using a standardized questionnaire. Questionnaires outlined demographic characteristics, current sexual practices, prior history of STI, previous HIV testing, weekly number of sexual partners, condom use, sexual contact with foreigners, history of exchange of sex for money or goods, and use of illegal drugs.

All participants who became HIV infected during the cohort period were subsequently referred for medical follow-up at local designated medical centers. In Argentina, medical care and antiretroviral therapy are provided free of charge to all HIV-infected people (<http://www.msal.gov.ar/hm/site/sida/site/programa-nacional-area-gerenciamiento.asp>). At the 12-month visit, participants were interviewed about their willingness to participate in an HIV vaccine trial. The motives for acceptance or refusal (nonexclusive) were registered.

### *Laboratory methods*

**HIV diagnosis.** HIV infection was diagnosed by means of enzyme-linked immunosorbent assay (Enzygnost Anti-HIV 1/2 Plus ELISA, Dade Behring, Marburg, Germany) and agglutination test (Bio-Rad, Fujirebio Diagnostics, Inc., Tokyo, Japan). Serum samples that were reactive by agglutination and/or ELISA were confirmed by Western blot assay (NEW LAV BLOT I, Bio-Rad Laboratories, Inc., Seattle, WA).

**Genotyping.** We performed partial *pol* gene sequencing of all HIV-1 seroconversions diagnosed in the cohort and full-length sequencing of nine HIV-1 cases. Of these samples peripheral blood mononuclear cells (PBMCs) were separated by Ficoll-Hypaque from venous blood. PBMCs were used for DNA extraction by the QIAmp DNA extraction kit (QIAGEN Inc., Valencia, CA). The protease/RT region was amplified using Pro5F/RT3474R in the first round and Pro3F/ProRT for the second round. The conditions of the PCR amplification have been previously described.<sup>13</sup>

The full-length genome amplification was performed using the Expand Long Template PCR System (Roche Applied Science, Penzberg, Germany) and a hot start method using a melting max barrier (DyNAwax). The first-round amplification was performed in a volume of 50  $\mu$ l with primers MSF12b and OFMR1. The second-round amplification was completed using 1  $\mu$ l of the first-round product and primers F2NST and UNINEF 7. This nested strategy amplifies about 9 kb of the HIV genome and was slightly modified from that previously used.<sup>14</sup> The amplified products were then sequenced with Big Dye terminators using an ABI 3100 automated sequencer (Applied Biosystems Inc., Foster City, CA).

All sequences were assembled using the software Sequencher (Genecodes Inc., Ann Arbor, MI) and examined in a multiple alignment with standard subtype references of GenBank and Argentine samples (Clustal X). Phylogenetic analyses were then conducted using the neighbor-joining method with Kimura's two-parameter model of distance calculation; bootstrap analysis was performed with 100 replicas. Trees were constructed with the software PAUP version 4.0 (Sinaur Associates, Inc., Sunderland, MA) using tree-bisection-reconnection

branch swapping (hold 10,000) and bootstrap analysis (100 replicates). Bootscan analysis and a visual inspection of the alignment were used to determine the presence of recombination and to locate breakpoints.<sup>15</sup> After the identification of the breakpoints, each segment was extracted and subjected to phylogenetic analysis to confirm the subtype assignment. Recombinant breakpoint locations were designated relative to HXB-2 (Genbank accession number: K03455).

### Statistical analyses

Chi-square and Fisher's exact test were used to compare proportions and the Student *t*-test and the Mann-Whitney *U* test to compare continuous variables. Logistic regression analysis was used to estimate the magnitude of associations of risk factors with HIV infection at baseline, which were expressed as odds ratios (OR). Odds ratios were adjusted (AOR) for age, educational level, and number of different sexual partners in the preceding 6 months. HIV incident case was defined as an HIV seronegative volunteer at the baseline with subsequent HIV-positive serology during follow-up. Cox proportional hazards regression was used to determine risk factors associated with HIV seroconversion. All reported *p* values were two-sided and those *p* < 0.05 were considered statistically significant. Statistical analyses were performed using EPI INFO 2005 and SPSS version 12.0 (SPSS Corporation, Chicago, IL).

## RESULTS

### Study population

A total of 877 MSM was screened at baseline. The volunteers had a mean age of 30 years, had a high formal education level (secondary or higher, 85.5%), and most of them were employed (75.3%) (Table 1). Fifty-one percent of volunteers had health care insurance and 45% reported consuming some illegal drug. The mean age of sexual initiation was 17.8 years and 84% of volunteers reported themselves as being "gay." Only 4% of the volunteers had a former injecting drug sex partner in his lifetime, whereas a higher percentage of volunteers reported having had a steady HIV-positive sex partner in his lifetime (31.5%). Forty-two percent of the volunteers reported casual sexual contact with foreigners and a high percentage of the volunteers used condoms on an irregular basis (sometimes or never at all). On the other hand, more than 50% of volunteers (52%) reported never using condoms when having anal sex and 94% did not use it during oral sex. In addition, among those who did use condoms, 38% of them reported experiencing condom breakage during sexual intercourse over the preceding 6 months.

### Prevalence

Among the 877 MSM self-reported HIV-negative volunteers enrolled at the baseline, 66 volunteers were HIV positive yield-

TABLE 1. SOCIODEMOGRAPHIC CHARACTERISTICS OF MSM VOLUNTEERS AT BASELINE AND THOSE ENTERING THE 12-MONTH COHORT STUDY: BUENOS AIRES, ARGENTINA, 2003<sup>a</sup>

Feature	Baseline	Cohort
Age mean $\pm$ SD (years)	30.6 $\pm$ 8.8	30.8 $\pm$ 8.7
Level of education		
Superior	595 (68.0)	254 (78.0)
Secondary	154 (17.5)	46 (14.0)
Primary	128 (14.5)	27 (8.0)
Employed		
Yes	590 (67.0)	230 (70.0)
No	287 (33.0)	97 (30.0)
Income (dollars per month)		
330	143 (16.0)	59 (18.0)
0–330	529 (61.0)	205 (63.0)
Stable housing		
0–1 house moving (in the last 2 years)	699 (80.0)	275 (84.0)
Health care insurance		
Yes	450 (51.0)	195 (60.0)
No	427 (48.0)	132 (40.0)
Sexual self-identity		
Gay/homosexual	736 (84.0)	304 (93.0)
Bisexual	89 (10.0)	23 (7.0)
Travestite/transgender	16 (2.0)	0
Heterosexual/uncertain	34 (4.0)	0
Age mean of sexual initiation as MSM $\pm$ SD (years)	17.8 $\pm$ 8.0	18 $\pm$ 4.8
Exchange sex for money or goods		
Yes	56 (6.5)	5 (1.5)
No	814 (93.5)	322 (98.5)

<sup>a</sup>MSM, men who have sex with men; SD, standard deviation; 1 dollar, 3 Argentinean pesos.

TABLE 2. RISK FACTOR ANALYSIS FOR HIV INFECTION AT BASELINE SCREENING IN MSM: BUENOS AIRES, ARGENTINA, 2003<sup>a</sup>

Feature	HIV prevalence (%)	HIV positive/total (n/N)	OR (95% CI)	p value	AOR (95% CI)	p value
Age group (years)						
18–29	6.7	34/506	Ref.			
≥30	8.6	32/371	1.3 (0.8–2.2)	0.353	1.0 (0.9–1.0)	0.476
Educational level						
Secondary or superior	6.5	49/749	Ref.			
Primary or less	13.3	17/128	2.2 (1.2–3.9)	0.012	2.1 (1.2–3.9)	0.009
Employment						
Yes	9.8	21/215	Ref.			
No	6.6	39/598	1.5 (0.8–2.6)	0.176	1.3 (0.9–1.7)	0.076
Health care insurance						
Yes	4.2	19/450	Ref.			
No	11.0	47/427	2.8 (1.6–4.9)	0.0002	2.7 (1.5–4.7)	0.0007
Sexual self-identity						
Gay/homosexual	7.1	52/735	Ref.			
Bisexual, travestite/transgender, heterosexual, uncertain	10.0	14/140	1.5 (0.7–2.7)	0.229	1.3 (0.7–2.6)	0.348
Age of sexual initiation as MSM (years)						
≥17	7.2	29/401	Ref.			
<17	7.8	37/474	1.1 (0.6–1.8)	0.847	1.0 (0.6–1.6)	0.944
Sexual contacts in the last 6 months						
<10	7.4	53/716	Ref.			
>10	8.2	13/159	1.1 (0.6–2.0)	0.822	1.0 0.5–1.9	0.887
Irregular condom use for anal sex						
No	7.4	31/419	Ref.			
Yes	7.6	35/458	1.0 (0.6–1.7)	0.993	1.1 (0.6–1.8)	0.778
Irregular condom use for oral sex						
No	4.1	2/49	Ref.			
Yes	7.7	64/828	2.0 (0.5–12.3)	0.268	2.3 (0.5–9.8)	0.261
Unspecific symptoms						
No	5.2	31/597	Ref.			
Yes	12.5	35/280	2.6 (1.6–4.3)	0.0002	2.6 (1.5–4.3)	0.0003
Symptoms of STI						
No	6.9	47/686	Ref.			
Yes	9.9	19/191	1.5 (0.8–2.6)	0.200	1.4 (0.8–2.5)	0.213
Sexual contact with foreigners						
No	6.7	34/507	Ref.			
Yes	8.7	32/369	1.3 (0.8–2.2)	0.337	1.4 (0.8–2.3)	0.206
Exchange sex for money or goods						
No	7.4	60/815	Ref.			
Yes	10.7	6/56	1.5 (0.6–3.5)	0.511	NA NA NA	
HIV-positive stable sex partner in the last 6 month						
No	7.2	42/583	Ref.			
Yes	7.5	20/268	1.0 (0.6–1.8)	0.994	1.0 (0.6–1.9)	0.812
Marijuana consumption						
No	7.4	37/502	Ref.			
Yes	7.8	29/372	1.1 (0.6–1.8)	0.906	1.1 (0.6–1.8)	0.760
Cocaine consumption						
No	7.7	56/732	Ref.			
Yes	6.9	10/145	0.9 (0.4–1.8)	0.907	0.8 (0.4–1.6)	0.547
Positive hepatitis B serology						
No	6.3	42/668	Ref.			
Yes	11.5	24/209	1.9 (1.1–3.2)	0.019	1.8 (1.1–3.2)	0.027
A prior syphilis history						
No	6.8	54/800	Ref.			
Yes	15.6	12/77	2.5 (1.2–5.0)	0.009	2.3 (1.1–4.8)	0.024
Current reactive VDRL						
No	6.5	53/816	Ref.			
Yes	20.0	12/60	3.6 (1.7–7.1)	<0.001	3.2 (1.6–6.6)	0.001

<sup>a</sup>HIV, human immunodeficiency virus; MSM, men who have sex with men; OR, odds ratio; AOR, odds ratio adjusted by age, educational level, and having more than 10 sex partners in the last 6 months; 95% CI, 95% confidence interval; Ref., reference group for odds ratio calculation; irregular use of condom, never or sometimes; unspecific symptoms, fever, diarrhea, adenopathy, asthenia, headache, weight loss, algias, dermatologic symptoms; symptoms of STI, symptoms of sexually transmitted infection (disuria, rectum ulcer, penis ulcer); VDRL, Venereal Disease Research Laboratory.

ing a prevalence of 7.5% (95% CI = 5.9–9.5%). Most (76%) of the HIV-positive volunteers had undergone HIV serology over the preceding 10 years.

Primary or less education, not having health care insurance, reporting nonspecific symptoms (fever, diarrhea, adenopathy, asthenia, headache, weight loss, algias, and dermatologic symptoms) in the preceding 6 months as well as positive hepatitis B serology, a prior syphilis history, and a current reactive venereal disease research laboratory slide were significantly associated with HIV infection in univariate analysis (Table 2). All these factors remained significantly associated with HIV infection in multiple analyses. The prevalence of hepatitis B and syphilis in this population has been reported elsewhere.<sup>16</sup>

### Incidence

Among the 811 HIV-negative MSM in the prevalence study, 457 (56%) of volunteers fulfilled the initial cohort inclusion criteria. The primary reasons for not being invited were elements thought to influence study participation over the course of the year and fell into one of two categories: mental or behavioral characteristics that might result in problems and practical considerations having to do with outside commitments that might curtail participation. Among 457 volunteers, 82 (18%) volunteers were not interested in the cohort study and 375 (82%) agreed to perform the physical examination and psychological evaluation. In turn, 39 volunteers were excluded in the psychological evaluation and 9 volunteers were excluded after medical examination (e.g., unstable chronic pathologies).

Thus, a final cohort of 327 HIV-negative MSMs was established. The sociodemographic characteristics of the cohort participants are reported in Table 1. No significant difference was observed between the baseline and the cohort population. After 1 year of follow-up, 12 volunteers seroconverted to HIV infection: 9 (75%) by the 6-month visit and 3 (25%) by the 12-month visit. The HIV incidence rate was 3.9 (95% CI = 2.0–6.7) per 100-person years. The only risk factor associated with HIV seroconversion was a greater number of different sexual contacts in the preceding 6 months ( $\geq 10$ , hazard ratio = 3.29, 95% CI = 1.04–10.36) (Table 3). Furthermore, retention rates in our cohort study were high: 318 (97.2%) at the 6-month visit and 291 (91.5%) at the 12-month visit.

### Willingness to participate in an HIV vaccine trial

At the 12-month visit, 99.7% (290/291) of the HIV-negative subjects agreed to answer the questionnaire on willingness to participate in an HIV vaccine trial. After a brief explanation of the meaning of participating in a randomized vaccine clinical trial, 60.3% of volunteers expressed their willingness to participate or probably participate. There were two main reasons for participation: "It would make me feel as if I would be contributing to find an effective vaccine" (91.4%) and "I would feel I am helping my community" (86.3%). In contrast, among those ( $n = 115$ ) who stated nonparticipation preference, 66 (57.4%) of them declared that their reason was that "the vaccine may cause my HIV test to be reactive."

### Genetic characterization

The 12 samples of volunteers who seroconverted during the cohort study were genotyped by sequence of the protease/RT region of the genome. The phylogenetic analysis showed that 10 (83%) of the samples were subtype B and 2 were BF recombinants (Fig. 1). Full-length sequences were performed in 9 of 12 samples (3 could not be fully amplified), confirming the B subtype in 7 out of 8 ProRT B previously subtyped samples. One of the samples that was subtype B in the pol region had a small portion of subtype F (~500 bases) at the beginning of the gag sequence (sample ID: 143170). The other BF recombinant (sample ID: 158637) shares one of the pol breakpoints and the vpr/vpu breakpoint with the CRF12\_BF.

## DISCUSSION

To our knowledge, this prospective cohort study is the first one among MSM in Argentina carried out in order to determine the incidence of HIV infection and associated risk factors. In this country, the MSM population represents 22.3% of the total number of AIDS cases from 1982 to 2005. However, this percentage has diminished steadily through the years as an increase has been reported in the heterosexual population.<sup>1</sup> In 1984, the MSM rate peaked at 100% of all notified AIDS cases and 20 years later, this rate dropped to 18%.<sup>1</sup> This significant drop reflects a decrease in the absolute numbers of AIDS cases among MSM.

TABLE 3. RISK FACTORS ANALYSIS FOR HIV SEROCONVERSION, MSM COHORT, BUENOS AIRES, ARGENTINA, 2003–2004<sup>a</sup>

Feature	HR	(95% CI)	p value
Age in years	0.99	(0.93–1.06)	0.786
Sexual self-identity as bisexual (gays)	1.24	(0.16–9.61)	0.837
<17 years at sexual initiation as MSM ( $\geq 17$ )	1.56	(0.50–4.84)	0.440
Sex with HIV-positive men in the preceding 6 months (No.)	1.45	(0.39–5.34)	0.581
$\geq 10$ sexual contacts in the preceding 6 months (<10)	3.29	(1.04–10.36)	0.042
IDU partner in the last 6 months (no)	3.11	(0.40–24.16)	0.278

<sup>a</sup>HR, hazard ratio; 95% CI, 95% confidence interval; MSM, men who have sex with men; HIV, human immunodeficiency virus; IDU, injecting drug use. In parentheses the reference category for hazard rate calculations.



who had (7.6%) or had not had (7.3%) previous HIV testing was not different. Among the screened MSM at baseline, 14% declared they were bisexual, thus representing an important "bridging" core group for transmission to other populations, such as heterosexually active women.

If we compare the data from the prevalence study in 2000–2001 among MSM regardless their serological status (13.8%)<sup>2</sup> to the baseline survey conducted in this study only made up of self-reported HIV negatives (7.5%), we may hypothesize that approximately 50% of the HIV-positive MSM population in Buenos Aires might not be aware of their HIV infection. On the other hand, in the prevalence study in 2000–2001, 11% of those who considered themselves to be negative were in fact infected. Therefore, we can assume that about 50–80% (11% out of 13.8%) of HIV-infected MSM did not know they were infected. In Argentina, an estimated 80,000 people living with HIV/AIDS are not only unaware of their infection but also of the risk of transmission, and of these, between 15,000 and 16,000 subjects should be MSM.

At the baseline visit of our cohort study, only 44% of volunteers were eligible for participation and 10% were found ineligible after clinical examination and psychological interviews. The strict selection processes along with the careful follow-up explain the high retention rates observed in our cohort study (97.2% at the 6-month visit and 91.5% at the 12-month visit).

During the 12-month follow-up period, 12 cases of HIV-1 infection were detected yielding an incidence rate of 3.9 per 100-person years. It is important to point out that 75% of the seroconversions occurred during the first 6 months of follow-up (incidence rate for the first 6 months = 5.5 per 100-person years). As in any cohort study, a higher incidence rate will be observed during the first months of follow-up and then the incidence will drop over time. An early seroconversion has also been reported in the Belo Horizonte MSM open cohort that was followed-up for 10 years, but more than 60% of those volunteers seroconverted before an 18-month follow-up (incidence rate = 2.2 per 100-person years).<sup>18</sup>

In our cohort study, the only significant risk factor associated with HIV seroconversion was a greater number (>10) of different sexual contacts in the preceding 6 months. On the other hand, a high percentage of HIV incident cases reported the lack of condom use during casual sex; however, this risk factor was not statistically significantly associated with HIV seroconversion.

In a previous MSM study in 2000–2001, the HIV incidence rates were 6.0% and 6.6% per 100-person years when incidence rates were measured by interval seroconversion and by STARHS technology, respectively.<sup>17</sup> Comparing these estimates with the present cohort study, our HIV incidence rate was lower (3.9%) but without a statistically significant difference. These estimations also show that the risk for HIV transmission among the MSM population in Buenos Aires still remains high. Similar HIV incidence rates have been also observed among MSM populations in the United Kingdom (3.5% in 2002 by STARHS),<sup>19</sup> in San Francisco (4.2% in 1999 by STARHS),<sup>20</sup> and in Spain (1.91 to 3.28 % by follow up).<sup>21</sup>

Successful recruitment and a high level of retention were attained in our cohort study. These facts together with the high HIV incidence rate found and the high proportion of participants who would agree to participate would indicate that MSMs

represent an ideal population for conduction of future HIV vaccine trials.

As observed in our 2000–2001 study, subtype B was predominant in MSM populations from Buenos Aires.<sup>7</sup> Sequencing of the 12 HIV-incident samples from our study also showed subtype B predominance. However, BF recombinants were not uncommon in the MSM population from both studies. Most of them were URF between B and F, an epidemiological pattern that was also observed in heterosexuals in Buenos Aires.<sup>9</sup> The proportion of both subtype B and recombinants BF was similar to those observed in male commercial sex workers in Montevideo, Uruguay in 2001.<sup>22</sup>

Additionally, both the high rates of newly infected cases and the high levels of unknown HIV infection among MSM are of public health concern. Strategies to increase the availability of HIV testing as well as specific and effective prevention programs targeting this highly vulnerable population should be developed.

In conclusion, this prospective cohort is the first one among MSM to examine the risk of contracting HIV infection in Argentina. High retention rates were obtained and a high HIV incidence rate was found. The only risk factor associated with seroconversion was a greater number of different sexual contacts in the preceding 6 months. Successful HIV vaccine trials require populations with high levels of incident infection, high levels of retention rates, and a high motivation to participate. The cohort study described in this report contains all of these ingredients and should be considered as a promising potential site for future HIV vaccine trials in Argentina.

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