

## Reduction in risk-taking behaviors among MSM in Senegal between 2004 and 2007 and prevalence of HIV and other STIs. ELIHoS Project, ANRS 12139

Abdoulaye S. Wade<sup>a</sup>, Joseph Larmarange<sup>b</sup>, Abdou K. Diop<sup>a</sup>, Oulimata Diop<sup>a</sup>, Khady Gueye<sup>a</sup>, Adama Marra<sup>c</sup>, Amsata Sene<sup>d</sup>, Catherine Enel<sup>b</sup>, Pape Niang Diallo<sup>c</sup>, Ndeye Coumba Toure Kane<sup>c</sup>, Souleymane Mboup<sup>e</sup> and Annabel Desgrées-du-Loû<sup>b\*</sup>

<sup>a</sup>Programme Sida, Institut d'Hygiène Sociale, Dakar, Sénégal; <sup>b</sup>Centre Population Développement UMR 196 (Université Paris Descartes-INED-IRD), Institut de Recherche pour le Développement, Paris, France; <sup>c</sup>Institut de Recherche pour le Développement, US 009, Dakar, Sénégal; <sup>d</sup>Université Cheikh Anta Diop, Dakar, Sénégal; <sup>e</sup>Laboratoire de Virologie, Hôpital Le Dantec, Dakar, Sénégal

(Received 17 March 2009; final version received 10 August 2009)

An epidemiological survey conducted in Senegal in 2004 among men having sex with men (MSM) revealed high HIV prevalence and a high rate of risky behaviors within this population. Consequently, several prevention campaigns targeting MSM were implemented. A second survey was carried out in 2007 to assess the impact of these measures. This paper aims to examine trends in HIV and STI prevalence and in sexual behaviors between 2004 and 2007. The two surveys were conducted in four urban sites among 440 and 501 MSM – recruited using the snowball sampling method – in 2004 and 2007, respectively. A similar methodology was applied for both surveys. This consisted of a closed-ended questionnaire concerning socio-demographic, behavioral, and biomedical information plus a clinical examination including urine and blood tests to detect STIs and HIV infection.

Between 2004 and 2007, the frequency of different sexual practices reported by MSM remained stable, but condom use for each type of sexual practice rose. The percentage of men who reported consistent condom use during previous-month anal sex has increased by about 35% ( $p < 0.01$ ). The percentage of men who reported consistent condom use during previous-month non-commercial sex with women has increased by 14% ( $p < 0.01$ ). HIV prevalence remained stable from 22.4% [95% CI: 18.6–26.8] in 2004 to 21.8% [95% CI: 18.3–25.7] in 2007 (adjusted OR = 1.05,  $p = 0.8$ ). Gonorrhea prevalence decreased from 5.5% [95% CI: 3.6–8.3] in 2004 to 2.6% [95% CI: 1.5–4.5] in 2007 (adjusted OR = 0.5,  $p = 0.07$ ). The prevention campaigns, STI and HIV care and support programs conducted in Senegal among MSM have been followed by a reduction of risk-taking behaviors and STI prevalence among this population. Specific targeting of this group within HIV/STI prevention programs seems to be effective in decreasing sexual infections.

**Keywords:** HIV prevalence; Africa; men having sex with men; sexual behaviors; condom use

### Introduction

The HIV epidemic in Africa has long been regarded as a heterosexual epidemic given that HIV transmission through homosexual contact was considered negligible and was not given priority. However, several studies conducted within this continent in recent years have shown that HIV prevalence is two to twenty times higher among men having sex with men (MSM) than among the population overall (Baral, Sifakis, Cleghorn, & Beyrer, 2007; Sanders et al., 2007; Wade et al., 2005). In most African countries, homosexuality is highly stigmatized; it can often constitute a crime (Murray & Roscoe, 1998). Many men who have sex with other men conceal their homosexuality and thus avoid resorting to health care for fear of being rejected (Niang et al., 2003; Teunis,

1996, 2001; Van Griensven, 2007). HIV prevention and support programs are also far from unanimous in taking this specific group into consideration given that only 27 countries out of 86 (31%) included MSM in their national HIV surveillance report in 2007 (Saavedra, Izazola, & Beyrer, 2008).

A pioneer country in this field, Senegal started conducting ethnographic studies that showed the strong stigmatization experienced by MSM (Niang et al., 2003; Sappe 2003). This research was followed by an epidemiological survey in 2004 that measured the prevalence of HIV infection (21.5%) among MSM – 30 times higher than the general population – and their high-risk practices (Wade et al., 2005). Several prevention campaigns targeting MSM were then initiated by the National HIV/AIDS Program and also by NGOs.

\*Corresponding author. Email: annabel.desgrées@ird.fr

These campaigns involved a STI and HIV care and support program, and information to increase awareness about sexual risks within MSM circles, as well as an appeal to all actors of society to address the specific risks of MSM. In 2007 a second survey was conducted. This aimed at measuring the trends in HIV and STI prevalence and assessing the impact of awareness-raising campaigns on HIV risk-taking behaviors.

This paper examines the changes in sexual risk-prevention practices among MSM, and trends in HIV and STI prevalence, between 2004 and 2007 in Senegal.

### Population and methods

In 2004, a survey was conducted among 463 MSM aged 18–52 years, recruited through the snowball sampling method, in five cities in Senegal – Dakar, St Louis, Mbour, Thies, and Kaolack. This survey has already been described in a previous paper (Wade et al., 2005). Between February and July 2007 a survey using the same methodology was performed in all these sites except Kaolack (insufficient number of respondents on this site in 2004). In both surveys, locally recognized peer leaders were selected and were in charge of recruiting participants through informal social contacts in settings where MSM meet and through snowball referrals. We selected these peers among all MSM community organizations in order to represent all the different subgroups of MSM. Potential participants were asked to visit a health center – specially equipped to provide STI care – where the investigation was carried out, and where a research team doctor presented the objectives and procedures of the study. Eligibility criteria for the study were (1) male aged 18 years or over, (2) having ever had sex with another man, and (3) residence in the study site. After written consent, participants were interviewed by the doctor or the social worker in the research team, using a standardized face-to-face questionnaire covering socio-demographic characteristics and sexual behavior. Interviews lasted 30–45 minutes. A physical examination was performed. If clinical signs of STIs were found, participants received a syndromic treatment according to the Senegalese health authority protocol guidelines. Finally, all participants provided a blood sample to be tested for HIV, syphilis, chlamydia, and herpes simplex virus (HSV-2) antibodies. A urine sample was collected to be tested for current gonorrheal and chlamydial infections. Participants were asked to return within two weeks for their laboratory test results. In order to ensure participants' security and anonymity, neither questionnaires, nor clinical and laboratory result forms, gave any individual identifi-

cation. They were matched using numbered stickers, and participants' identities were recorded on the consultation registry of the study center, using numbers. This registry was strictly confidential and safeguarded by the principal investigator. Treatments were free of charge. The participants found to be HIV positive were provided with psychosocial support after post-test counseling and were referred to the local reference center for AIDS treatment where the decision about inclusion in an antiretroviral protocol was made after a complete medical check-up.

In both surveys, laboratory procedures were identical and conducted by the same laboratory. Details are provided in the previous paper on the 2004 study (Wade et al., 2005).

Data analysis was carried out using SPSS 16.0 for Windows (SPSS Inc., Chicago, IL). For each survey, socio-demographic characteristics and laboratory findings were tabulated. Frequency of each type of sexual practice was measured during the previous month. For each type of sexual practice, we measured consistent condom use (i.e., answer "always" to the question if they used a condom always, often, sometimes, or never). The 2004 and 2007 indicators were compared using the Chi-square test for categorical variables and the Fisher's exact test for two proportions. To compare HIV and STI prevalence between 2004 and 2007, we calculated the odds-ratio adjusted by socio-demographic characteristics.

### Results

In 2007, 501 eligible men – 306 in Dakar, 95 in St. Louis, and 100 in Mbour/Thies – attended the study center and agreed to participate after being informed. All participants completed the questionnaire and 500 consented to provide blood and urine samples. They were compared with the 440 participants of the 2004 survey in the same sites. There were no significant differences between the two samples regarding age and education (Table 1). In 2007, the percentage of individuals belonging to an MSM association had quadrupled compared to 2004, and the percentage participating in a prevention campaign had more than doubled ( $p < 0.01$ ). One-third of people surveyed in 2007 had participated in the 2004 survey.

HIV prevalence has remained stable overall at 22.4% [95% CI: 18.6–26.8] in 2004 and 21.8% [95% CI: 18.3–25.7] in 2007 (adjusted OR = 1.05 [95% CI: 0.74–1.48],  $p = 0.8$ ) (Table 2). The prevalence of STIs is decreasing. The decrease is significant for gonorrhea at the 10% threshold: the prevalence of gonorrhea decreased from 5.5% in 2004 to 2.6% in 2007 (adjusted OR = 0.5 [95% CI: 0.24–1.06],  $p = 0.07$ ) (Table 2).

Table 1. Socio-demographic characteristics, and HIV and STI prevalence among MSM in 2004 and 2007 – ANRS projects 1282 and 12139 – Senegal.

Socio-demographic characteristics	2004 <i>n</i> = 440		2007 <i>n</i> = 501		<i>p</i> <sup>a</sup>
	Percentage (%)	( <i>n</i> )	Percentage (%)	( <i>n</i> )	
Site					<0.01
Dakar	67.5	297	61.1	306	
Saint-Louis	10.2	45	19.0	95	
Mbour/Thies	22.3	98	20.0	100	
Age groups					0.12
18–19	19.3	85	19.4	97	
20–24	34.1	150	38.7	194	
25–29	28.9	127	22.2	111	
30–34	13.4	59	13.4	67	
35 and over	4.3	19	6.4	32	
Education					0.24
Never been to school	17.3	76	14.0	70	
Primary	39.8	175	38.9	195	
Secondary	38.4	169	40.1	201	
Higher	4.5	20	7.0	35	
Occupation					<0.01
None	10.2	45	5.6	28	
Student	14.1	62	25.9	130	
Trade	18.0	79	19.4	97	
Employee	4.1	18	3.8	19	
Hairdresser, beautician or artist	8.6	38	5.0	25	
Waiter, bartender or working in tourism	5.9	26	6.6	33	
Tailor	12.0	53	10.5	53	
Manual worker or driver	27.0	119	23.2	116	
Participation in the 2004 survey		All	33.9	170	
Member of an MSM NGO	11.4	50	40.9	201	<0.01
Ever participated in a prevention program for MSM	22.8	100	58.7	294	<0.01

<sup>a</sup>Comparison 2004/2007. Chi-square test (categorical variables) or Fisher's exact test (two proportions).

On one hand, the frequency of different sexual practices for the previous month did not vary greatly between 2004 and 2007 (Table 3, first column). On the other hand, consistent condom use has increased significantly for almost all types of sexual practices (except sexual relations with female sex workers) (Table 3, second column). The percentage of anal sex (insertive or receptive) systematically protected by condoms has increased by about 35%. During transactional intercourse with men, consistent condom use has increased twofold among respondents reporting having received money, and threefold among those who paid for the sexual relation. Bisexuality is frequent since one respondent out of three reported having had sexual relations with a woman during the previous month. During sexual encounters with women, consistent condom use has

also increased, but by less than half (47% in 2004 compared to 61% in 2007,  $p < 0.01$ ) (Table 3).

Meanwhile, multiple sexual relationships dropped among the youngest age group. The 2004 survey found that 19.5% of respondents under 20 years reported having had more than 20 sexual partners during their lifetime, compared to 4.1% among this age group in 2007.

## Discussion

This is the first survey to be repeated among MSM in Africa. These two studies conducted three years apart and using the same methodology enable trends in STI prevalence and sexual behaviors among MSM to be observed in relation with the implementation of the first programs targeting this population.

Table 2. HIV and STI prevalence among MSM in 2004 and 2007 – ANRS projects 1282 and 12139 – Senegal.

HIV and STI prevalence	2004 <i>n</i> = 440			2007 <i>n</i> = 501			Comparison 2007/2004		
	Percentage (%)	( <i>n</i> ′/ <i>n</i> )	95% CI	Percentage (%)	( <i>n</i> ′/ <i>n</i> )	95% CI	OR <sup>a</sup>	95% CI	<i>p</i>
HIV	22.4 <sup>b</sup>	94/419	18.6–26.8	21.8	109/500	18.3–25.7	1.05	0.74–1.48	0.797
HSV2	23.4	95/406	19.4–27.9	20.6	103/500	17.2–24.5	0.94	0.66–1.34	0.742
Syphilis	5.0	21/419	3.2–7.7	3.4	17/500	2.1–5.5	0.64	0.31–1.31	0.220
Gonorrhoea	5.5	23/419	3.6–8.3	2.6	13/500	1.5–4.5	0.50	0.24–1.06	0.070
Chlamydiae	4.0	17/419	2.5–6.6	3.2	16/500	1.9–5.3	0.10	0.48–2.07	0.991

<sup>a</sup>Odds ratio adjusted by site, age group, education and occupation.

<sup>b</sup>The value is slightly different from that (21.5%) published in Wade et al. (2005) due to the exclusion of the 22 respondents surveyed in Kaolack in 2004 (site not surveyed in 2007).

Table 3. Previous month sexual practices. Comparison between 2004 and 2007.

Previous month sexual practices	Year	Frequency			With consistent condom use		
		Percentage (%)	(n/N)	<i>p</i>	Percentage (%)	(n/N)	<i>p</i> *
<b>With a man</b>							
Insertive anal sex	2004	44.3	(195/440)	0.07	45.1	(88/195)	<0.01
	2007	39.1	(196/501)		77.6	(152/196)	
Receptive anal sex	2004	35.5	(156/440)	0.11	39.7	(62/156)	<0.01
	2007	39.5	(198/501)		75.3	(149/198)	
Oral sex	2004	41.4	(182/440)	0.30	11.0	(20/182)	0.31
	2007	39.3	(197/501)		13.2	(26/197)	
Commercial sex (received money)	2004	23.0	(101/440)	0.12	32.7	(33/101)	<0.01
	2007	26.5	(133/501)		72.2	(96/133)	
Commercial sex (gave money)	2004	5.5	(24/440)	0.51	29.2	(7/24)	<0.01
	2007	5.2	(26/501)		84.6	(22/26)	
<b>With a woman</b>							
Vaginal sex	2004	33.6	(148/440)	0.17	47.3	(70/148)	0.01
	2007	30.3	(152/501)		61.2	(93/152)	
Commercial sex (received money)	2004	3.0	(13/440)	0.01	30.8	(4/13)	0.16
	2007	0.8	(4/501)		75.0	(3/4)	
Commercial sex (gave money)	2004	4.3	(19/440)	0.60	52.6	(10/19)	0.39
	2007	4.2	(21/501)		61.9	(13/21)	

\**p*-Value. Fisher's exact test.

Note: The increase between 2004 and 2007 in consistent condom use for anal sex with a man was significant whatever the town, whatever the age group, and whatever the educational status or professional group. For vaginal sex, this increase was significant in Dakar but not in St Louis and Mbour/Thies.

The decrease in STI prevalence may reflect improved treatment availability. The behavioral indicators also suggest that the prevention campaigns carried out among MSM have been followed by a reduction of risk-taking sexual activities among this population: in 2007, we observed the same sexual practices as in 2004 but more protection was used. Hence the situation of MSM seems to have improved in terms of sexual infections between 2004 and 2007, in spite of the strong MSM stigmatization existing in Senegal (Niang et al., 2003; Sappe, 2003).

Our study design was not extensive enough to allow conclusions to be drawn about trends concerning the HIV epidemic in this population: hence the need for an estimation of variations in incidence involving more than two ways (Kamali et al., 2000; Wawer et al., 1997).

Our results cannot be extrapolated to the entire MSM population in Senegal: both surveys were performed using snowball sampling, because it is the only possible method for surveying highly stigmatized groups like MSM. However, this results in a convenient sample that is likely to incur high selection bias regarding the overall relevant population (Kendall et al., 2008). Nevertheless, the sampling scheme

was identical for the two surveys, making the two samples comparable (although not matched for confidentiality reasons). The stability of HIV prevalence and sexual practice frequency measured in both surveys confirms the robustness and relevance of this sampling scheme.

Self-reporting may lead to underestimation of non-protected sex. But this bias may have affected similarly both surveys and therefore should not affect trends.

The development of specific MSM campaigns must be pursued, and is particularly important in responding to the epidemic. Indeed, the MSM community remains at high risk of HIV transmission in Senegal. Despite high HIV prevalence (over 20%), one out of four anal sexual encounters remains unprotected. Likewise, heterosexual sex is frequent and less likely to be protected than homosexual sex. These issues should be addressed in future prevention campaigns.

#### Acknowledgements

We are indebted to the MSM leaders who made the ANRS 12139 study possible. We wish to thank Emmanuel Lagarde

for his helpful comments and Patricia Brossier for English editing.

The study was funded by the Agence Nationale de Recherche contre le Sida et les Hépatites (ANRS – project 12139).

## References

- Baral, S., Sifakis, F., Cleghorn, F., & Beyrer, C. (2007). Elevated risk for HIV infection among men who have sex with men in low- and middle-income countries 2000–2006: A systematic review. *PLoS Medicine*, *4*(12), e339.
- Kamali, A., Carpenter, L.M., Whitworth, J.A.G., Pool, R., Ruberantwari, A., & Ojwiya, A. (2000). Seven-year trends in HIV-1 infection rates, and changes in sexual behaviour, among adults in rural Uganda. *AIDS*, *14*(4), 427–434.
- Kendall, C., Kerr, L., Gondim, R., Werneck, G., Macena, R.H.M., Pontes, M.K., et al. (2008). An empirical comparison of respondent-driven sampling, time location sampling, and snowball sampling for behavioral surveillance in men who have sex with men, Fortaleza, Brazil. *AIDS and Behaviour*, *12*, S97–S104.
- Murray, S.O., & Roscoe, W. (1998). *Boy-wives and female husbands: Studies in African homosexualities*. New York: Palgrave.
- Niang, C.I., Tapsoba, P., Weiss, E., Diagne, M., Niang, Y., Moreau, A.M., et al. (2003). It's raining stones': Stigma, violence and HIV-vulnerability among men who have sex with men in Dakar, Senegal. *Culture, Health & Sexuality*, *5*(6), 499–512.
- Saavedra, J., Izazola, J., & Beyrer, C. (2008). *Jonathan Mann memorial lecture: Sex between men in the context of HIV—plenary session 2—TUPL0104*. Paper presented at the AIDS 2008, Mexico.
- Sanders, E.J., Graham, S.M., Okuku, H.S., van der Elst, E.M., Muhaari, A., Davies, A., et al. (2007). HIV-1 infection in high risk men who have sex with men in Mombasa, Kenya. *AIDS*, *21*(18), 2513–2520.
- Sappe, R. (2003). *Le SIDA et les rapports sexuels entre hommes en Afrique Noire*. Retrieved July 24, 2009, from [http://semgai.free.fr/doc\\_et\\_pdf/Senegal\\_Robin\\_Sappe.pdf](http://semgai.free.fr/doc_et_pdf/Senegal_Robin_Sappe.pdf)
- Teunis, N. (1996). Homosexuality in Dakar: Is the bed the heart of a sexual subculture. *Journal of Gay, Lesbian, and Bisexual Identity*, *1*, 153–169.
- Teunis, N. (2001). Same-sex sexuality in Africa: A case study from Senegal. *AIDS and Behavior*, *5*(2), 173–182.
- Van Griensven, F. (2007). Men who have sex with men and their HIV epidemics in Africa. *AIDS*, *21*(10), 1361–1362.
- Wade, A.S., Toure Kane, C., Niang Diallo, P., Diop, A., Gueye, K., Mboup, S., et al. (2005). HIV infection and sexually transmitted infections among men who have sex with men in Senegal. *AIDS*, *19*(18), 2133–2140.
- Wawer, M., Serwadda, D., Gray, R., Sewankambo, N., Li, C., Nalugoda, F., et al. (1997). Trends in HIV-1 prevalence may not reflect trends in incidence in mature epidemics: Data from the Rakai population-based cohort, Uganda. *AIDS*, *11*(8), 1023–1030.