

Research letters

Emerging HIV-1 epidemic in China in men who have sex with men

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China is currently undergoing a serious HIV-1 epidemic in intravenous drug users, sex workers, and former plasma donors. Little is known, however, about HIV-1 risk in Chinese men who have sex with men. In this study of seroprevalence in such men in Beijing, we recorded 15 (3.1%, 95% CI 1.8–5.1) of 481 men infected with HIV-1. Overall, 238 (49%) of participants reported unprotected anal intercourse during the previous 6 months. HIV-1 seropositivity was independently associated with being older than 39 years and having had more than 20 male sexual partners. Most men older than 39 years had been married. Our findings suggest the potential for spread of HIV-1 between men who have sex with men and to their heterosexual partners.

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In June, 2002, the UN warned that China could face a “catastrophe [involving] unimaginable human suffering” without swift action to control the spread of HIV-1.¹ By December, 2001, Chinese authorities reported 30 736 HIV-1 infections.¹ However, the UN estimated that by the end of 2001, between 800 000 and 1.5 million were already infected, and that the number of infections could reach 10 million by 2010.¹ Although about 75% of current HIV-1 infections are attributable to intravenous drug use and transfusion of HIV-1-infected blood and blood products,² sexual transmission might become the predominant mode of HIV-1 transmission, as the virus spreads from drug users and sex workers into the general population.¹

Men who have sex with men in China are believed to number between 2 and 8 million,³ and might have an important role in spreading the HIV-1 epidemic to heterosexually active people.¹ However, infection rates among such men are unknown. China’s national HIV/AIDS sentinel surveillance is restricted to five at-risk groups: drug users, female sex workers, truck drivers, pregnant women, and patients with sexually transmitted diseases (STDs).¹ Data are not being obtained for sexual orientation. The few studies that have been done in men who have sex with men have been restricted to estimation of the prevalence of HIV-1 risk behaviour.⁴ We have assessed both HIV-1 prevalence rates and levels of risk behaviour in such men in Beijing, the Chinese city with the largest recorded number of HIV-1 infections in these men.

From September, 2001, to January, 2002, we recruited potential study participants through informal social networks and in bars, parks, and bath-houses frequented by men who have sex with men (ie, convenience sampling). Recruiters hired from among the target population approached potential participants to determine their study eligibility, which were: age 18 years or older, same-gender sex (ie, ever had sex with another man), and residence in Beijing. Of the 501 men screened, 489 were eligible for study participation, and 482 provided oral informed consent. The study was approved by the committee for human research of the University of California, San Francisco, CA, USA and by the institutional review board, Beijing Association of STD/AIDS Prevention.

Three female health-care workers, who were trained as interviewers, administered a 20 min face-to-face standard questionnaire followed by pretest counselling and collection of oral mucosal transudate samples that were later tested for

HIV-1. After specimen collection, participants were given HIV-1-prevention information and prenumbered cards showing appointment dates (usually for 1 week later) for post-test counselling. When a sample tested positive for HIV-1, participants had their blood drawn during the post-test counselling visit, and were asked to return for confirmed results on a third visit.

Oral mucosal transudate samples were obtained with the OraSure HIV-1 oral-specimen collection-device (OraSure Technologies, Bethlehem, PA, USA). All samples were tested twice for HIV-1 with an ELISA by the Beijing municipal STD clinic (Vironostika HIV-1 Microelisa System, bioMérieux Inc, Durham, NC, USA). If the second test was positive, the serum sample was confirmed by a Western blot (Genelabs Diagnostics, Singapore).

For data analysis we calculated HIV-1 prevalence and did bivariate and multiple logistic-regression analyses to identify factors associated with HIV-1 infection. We modified multivariate models through backwards elimination that removed explanatory variables with p values greater than 0.20.

Of 481 participants who had sufficient oral-fluid samples for HIV-1 testing, 15 (3.1%, 95% CI 1.8–5.1) tested positive (table). Overall, 238 (49%) participants reported unprotected anal intercourse with men during the 6 months before the study, and 107 (22%) had unprotected anal or vaginal intercourse with women during the same period. Mean age was 27 years (median 25, SD 8). Multivariate analyses showed that age older than 39 years and more than 20 male sexual partners were associated with HIV-1 infection (table).

Our data suggest that there is low but significant HIV-1 prevalence in men who have sex with men in Beijing. However, in view of high rates of unprotected sex in such men, HIV-1 infection rates will continue to rise unless prevention measures are implemented. Our results for HIV-1 prevalence are close to those recorded in Chinese men in other high-risk populations. For example, in patients from STD clinics in Guangdong, Yunnan, and Guangxi provinces, which have the highest number of sexually transmitted cases, HIV-1 prevalences were 1.3%, 2.0%, and 2.7%, respectively.¹

Prevalence of infection was 4.5 times higher for men older than 39 years than in those aged 39 or younger, irrespective of number of male sexual partners in their lifetime. 293 (64%) of the older men had been married, compared with only 53 (11%) of the younger men. These findings suggest that men who have sex with men could potentially serve as a sexual bridge between high-risk men and low-risk women, and that this sexual mixing pattern might contribute to the sexual transmission of HIV-1 to heterosexually active adults. To some extent, this pattern has been seen in other Asian countries, notably India.⁵

Our estimates of HIV-1 prevalence might have been affected by the selection bias due to convenience sampling. Rigorous investigations with systematic sampling are needed to obtain accurate and reliable estimates of HIV-1 prevalence in Chinese men who have sex with men. Our data suggest that these men, at least in Beijing, are part of an emerging HIV-1 epidemic. Efforts are urgently needed to prevent further spread of infection both in these men and to their heterosexual partners.

Variable	Number	HIV-1 positive	Odds ratio (95% CI)	Adjusted odds ratio* (95% CI)
Overall	481	15 (3.1%)
Age (years)				
18–39	448	11 (2.5%)	1.00	1.00
40–69	33	4 (12.1%)	5.48 (1.64–18.27)	4.48 (1.31–15.33)
Marital status				
Never married	409	10 (2.4%)	1.00	..
Ever married	72	5 (6.9%)	2.98 (0.99–8.98)	
Education (age range in years)				
Junior high school or less (12–14)	95	3 (3.2%)	1.00	..
Senior high school (15–17)	187	5 (2.7%)	0.84 (0.20–3.60)	
College graduate (18–21)	199	7 (3.5%)	1.10 (0.55–2.20)	
Had Beijing residence card				
No	312	9 (2.9%)	1.00	..
Yes	169	6 (3.6%)	1.24 (0.43–3.54)	
Self-reported sexual orientation†				
Homosexual	282	9 (3.2%)	1.00	..
Bisexual	162	5 (3.7%)	1.06 (0.37–3.03)	
Heterosexual or undecided	37	0 (0.0%)		
Type or place of recruitment‡				
Personal contact	246	10 (4.1%)	1.95 (0.66–5.78)	..
Bars	163	5 (3.1%)	1.00	
Parks and bath-houses	72	0 (0.0%)		
AIDS knowledge score§				
1–5	70	3 (4.3%)	1.00	..
6–7	127	2 (1.6%)	0.36 (0.06–2.19)	
8–9	284	10 (3.5%)	0.82 (0.22–3.04)	
Ever had STD				
No	371	11 (3.0%)	1.00	..
Yes	109	4 (3.7%)	1.25 (0.39–4.00)	
Ever tested for HIV-1				
No	392	10 (2.6%)	1.00	..
Yes	88	5 (5.7%)	2.30 (0.77–6.91)	
Ever had sex with women				
No	171	3 (1.8%)	1.00	..
Yes	308	12 (3.9%)	2.27 (0.63–8.16)	
Lifetime number of male sex partners				
1–20	352	7 (2.0%)	1.00	1.00
21 or more	123	8 (6.5%)	3.43 (1.21–9.66)	3.00 (1.04–8.61)

*Only age entered in model because highly correlated with marital status ($\chi^2=66.12$, $p<0.0001$). †Bisexual and heterosexual or undecided combined to calculate odds ratios. ‡Bars and parks and bath-houses combined to calculate odds ratios. §Nine true-or-false statements about HIV-1 transmission used to assess AIDS knowledge; median=8.

HIV-1 seroprevalence by participants' characteristics

Conflict of interest statement
None declared.

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The importance of conflict-related mortality in civilian populations

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Civil conflict affects the health of individuals in many countries, and draws a substantial amount of international humanitarian aid. The most widely used indicator of the effect of conflict is the rate of civilian death during conflict. We aimed to assess mortality estimates from conflicts in Sudan, Somalia, the Democratic Republic of Congo, and Afghanistan by calculating the relative risk of death during and after conflict compared with that in preconflict peacetime. Katala, in the Democratic Republic of Congo, had the highest relative risk of death during conflict (11.2 [9.1–13.8] and 103.3 [94.7–112.6], for children younger than 5 years and the whole population, respectively). Our results suggest that high rates of civilian mortality are determined more by the pre-existing fragility of the affected population than the intensity of the conflict. In many instances, a high rate of civilian deaths during conflict shows that international development aid before the conflict was grossly inadequate.

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In 2002, more than 39 countries were engaged in or were recovering from a civil conflict. Most conflicts last several years and profoundly affect individuals in part or all of the country. In the past decade, the international community has provided substantial resources for humanitarian aid (mostly medical

