*Sexually Transmitted Diseases,* September 2004, Vol. 31, No. 9, p.568–574
DOI: 10.1097/01.olq.0000137905.94154.0a


# *Prevalence and Risk Behaviors of Hong Kong Males Who Seek Cross-Border Same-Sex Partners in Mainland China*

JOSEPH T. F. LAU, PHD, JEAN H. KIM, SCD, MASON LAU, BSC, AND H. Y. TSUI, MPHIL

***Background:*** **Little is known about cross-border sex-networking behaviors among men who have sex with men (MSM)**

***Goal:*** **The goal of this study was to determine the prevalence of cross-border sex-networking in mainland China among MSM in Hong Kong and the associated risk behaviors**

***Study:*** **A telephone survey was conducted. A total of 15,230 Hong Kong Chinese men aged 18 to 60 participated in the study.**

***Results:*** **Of the 283 MSM engaged in some MSM behaviors in the last 6 months, 15.2% had engaged in sexual activity with a man in mainland China in the 6 months before the survey. These "cross-border MSM" were more likely than others to have practiced risk behaviors such as having patronized male commercial sex workers, having contracted a sexually transmitted disease (STD), having had ≥3 MSM partners, and having higher prevalence of HIV testing in the last 6 months (adjusted odds ratio, 3.32–43.83).**

***Conclusions:*** **There is an urgent need for a regional approach to HIV/STD prevention for MSM in southern China.**

*From the Centre for Epidemiology & Biostatistics, Faculty of Medicine, The Chinese University of Hong Kong*

LARGE-SCALE POPULATION MOBILITY has had a tremendous impact on the epidemiology of HIV/AIDS, particularly in developing countries[1–4] where population mobility has been shown to exacerbate the disease prevalence by bringing infected groups in contact with uninfected individuals.[5–7] Hong Kong's return to the People's Republic of China has been marked by a phenomenal increase in cross-border traffic. In 2001, over 52 million visits between Hong Kong and mainland China were documented,[8] indicating vast potential for rising prevalence of diseases such as HIV. Although international studies have shown that cross-border heterosexual risk behaviors for HIV are commonplace,[6,9,10] the authors of this study could not identify any studies in the past 5 years pertaining to the topic of cross-border gay behaviors.

A recent study has documented a high prevalence of heterosexual cross-border sex-networking among male residents of Hong Kong.[6] It was estimated that over 50% of the male Hong Kong residents, who were clients of female sex workers (FSW), had visited a FSW in mainland China and at least 10,000 Hong Kong male residents cross the border to purchase sex from FSW everyday.[6] Of greater public health concern is the heterosexual cross-border sex-networkers in China have been demonstrated to be more likely to practice unsafe sex than those who solicited commercial sex within Hong Kong or in other geographic locales.[11] The high prevalence of HIV that has been recently acknowledged in mainland China could portend a similar epidemic in Hong Kong with the cross-border men who have sex with men (MSM) sex-networkers acting as a bridge population to Hong Kong where the HIV prevalence is yet low.

Although risk behaviors among MSM in China are commonly believed to be elevated,[12,13] very little is known about the prevalence of HIV among MSM in this part of the world,[13–15] because few studies on MSM behaviors have been conducted in China. In Hong Kong, 2 reports have revealed that MSM in Hong Kong frequently engage in unprotected oral and anal sex, have multiple sex partners, and possess attitudes that are not conducive to safe sex practices.[16,17] It is necessary to know whether the patterns of cross-border heterosexual networking are being replicated among cross-border MSM networkers. It is also important to investigate the attitudinal barriers to HIV prevention in this group. As social and economic activities between Hong Kong and mainland China become increasingly integrated, unsafe cross-border MSM sexual behaviors are expected to be more common.

### *Objectives*

The first objective of this study is to investigate the prevalence of cross-border sexual behaviors among MSM in Hong Kong and to understand the profile of these "cross-border MSM." The second objective of this study is to determine whether those who had engaged in cross-border MSM activity in mainland China in the last 6 months differed from MSM who had not in terms of HIV-related knowledge, attitudes, and risk behaviors.

## Methods

### *Sampling and Procedure*

The target population comprised all Chinese Hong Kong males between the ages of 18 to 60. A telephone survey was carried out from July 2001 to October 2001. Its purpose was to study risk behaviors among MSM in Hong Kong. Telephone numbers were sampled randomly from up-to-date residential phone directories (random page, column, and row numbers were generated by a computer program), which contained all listed household telephone numbers in Hong Kong and were stratified by the 3 major

The study was funded by the Hong Kong Council for the AIDS Trust Fund.

Correspondence: Prof. Joseph T. F. Lau, Director, Centre for Epidemiology & Biostatistics, Faculty of Medicine, The Chinese University of Hong Kong, 5/F, School of Public Health, Prince of Wales Hospital, Shatin, NT, Hong Kong. E-mail: jlau@cuhk.edu.hk

Received for publication February 10, 2004, and accepted April 22, 2004.

geographic regions of Hong Kong (Hong Kong Island, Kowloon, and the New Territories). Almost 100% of the Hong Kong residents have telephones at home (Hong Kong Office of the Telecommunications Authority, personal communication, January 28, 2000). The interviews were conducted between 6 PM and 10:30 PM to avoid overrepresenting unemployed individuals and undersampling workers and students. All interviews were conducted by trained research staff with a structured, closed-ended questionnaire. Unanswered telephone calls were given at least 2 more attempts before being classified as invalid.

When telephone contacts were successfully established, the first household contact was briefed that it was a study collecting opinions about HIV/AIDS prevention and it was sponsored by the Hong Kong Council for the AIDS Trust Fund, and that their contribution would help the government's policy formulation. They were requested to ask the male household member between the ages of 18 to 60 whose past birthday was closest to the day of the interview to answer the phone. (Approximately 77% of the households with at least 1 male member had only 1 male member, 17.9% had 2, and only 5% had more than 2 male household residents [Hong Kong Census & Statistics Department, personal communication, April 26, 2002].) These prospective respondents were asked about their age to confirm eligibility. Eligible respondents were then briefed in the aforementioned manner and were asked for consent to join the study.

The interviewer then asked several questions (about sociodemographic information and general knowledge/attitude on AIDS) to establish rapport (part I, details see subsequently in this article); this facilitates the asking of more sensitive questions in the second part of the interview (part II). The respondents were then briefed that the second part of the questionnaire would cover questions related to HIV-related behavior and such questions were prerecorded in a computerized phone system (the "dot-line" service) and that they only needed to key in their responses. To ensure the anonymity and confidentiality of the respondents, respondents were fully guaranteed that their telephone number would not be recorded. The "dot-line" telephone number was not released to the respondents. This service has often been used by TV stations for public opinion polling and is widely known to the public. Some researchers argued that telephone survey methods are preferred for collecting personal and sensitive data.[18] Previous studies showed that this computerized call-in method results in higher reported frequency of risk behaviors when compared with the conventional telephone interview method.[19,20] It has also been used in a number of other local studies.[21–26]

Those who agreed to enter the second part of the interview were connected to the "dot-line" through the "conference line service," which allows 1 of the 2 parties to call a third one without hanging up and allows all 3 parties to make simultaneous phone conversations. The interviewer left the line after connection was made. The respondents then keyed in their responses after listening to the prerecorded questions.

Of all valid household contacts (defined as households with at least 1 Chinese male person who was 18–60 years old, n = 26,163), approximately 58.2% of them (n = 15,230) had 1 male member join and complete the nonsensitive part I; 97.8% of these respondents went on to complete the part II questionnaire. The overall response rate, defined as the number of completed interviews divided by the total number of valid household contacts (14,894 of 26,163), was approximately 57%.

Based on the responses to the question "Have you ever had sex with a man (anal, oral, or masturbation)?," respondents were classified as non-MSM or ever-MSM. Of the ever-MSM respondents, if the respondent also reported having had sexual contact with at least 1 male sex partner in the last 6 months, he was classified as an active MSM, otherwise the respondent was categorized as a nonactive MSM. The active-MSM group was further divided into non-anal-sex MSM and anal-sex MSM based on whether the active MSM reported having had anal sex with a man in the last 6 months.

### *Measurements*

#### *Sociodemographic Background and HIV-Related Knowledge/ Attitude (Part I)*

Sociodemographic information (age, education level, and marital status) was collected from the respondent. The respondent's HIV-related knowledge was examined by 3 questions asking about the long asymptomatic latency period of HIV ("A person can remain looking healthy even after a long period of infection."), HIV transmission route ("Mouth-to-mouth kissing with a person infected with HIV will result in HIV transmission."), and the HIV's window period of transmission ("HIV infection is detectable 1 week after infection took place."). Respondents were also asked about their perception about the likelihood of HIV infection from homosexual behavior.

#### *Men Who Have Sex With Men's Behavior and Sexual Practices (Part II)*

Respondents who reported having ever had sex (including anal sex, oral sex, and masturbation) with another man (ever MSM) were asked about the number of male sex partners in the last 6 months. Only respondents who reported to have at least 1 male sex partner in the last 6 months (active MSM) went on to complete the subsequent parts of the questionnaire.

MSM were also asked whether they had successfully found MSM sex partners across the border in mainland China in the last 6 months and whether they had engaged in sexual intercourse with such sex partners in the last 6 months. Those who had found MSM sex partners in mainland China in the last 6 months were categorized as "cross-border MSM" in this article.

Respondents were asked whether they had engaged in anal sex with another man in the last 6 months. For those who had had anal sex with another man in the last 6 months (anal-sex MSM), they were asked whether condoms were always used and whether they had had anal sex with male commercial sex workers in the last 6 months. In addition, respondents were asked whether they had engaged in oral sex, with or without a condom, with another man in the last 6 months. They were also asked whether they had ever had sex with a woman in the last 6 months.

#### *Attitudes Related to Condom Use, Condom Efficacy, and HIV Infection (Part II)*

Items were asked to assess respondents' attitudes related to condom use, condom efficacy, and HIV infection. Specifically, respondents were asked to agree or disagree with the following statements: 1) "Condom use can effectively reduce the chance of HIV infection from anal sex with MSM partners," 2) "You have complete control over condom use when having sex with MSM partners," 3) "The chance of contracting HIV is very high from oral sex without using condoms," 4) "The chance of contracting HIV is very high from anal sex without using condoms," and 5) "Condom use is necessary for sex with MSM partners."

TABLE 1. Characteristics of the MSM Study Sample by China Sex-Networking Status

| | Non-cross-border MSM (n = 240) | Cross-border MSM (n = 43) | All Active MSM (n = 283) | |
|---|---|---|---|---|
| | Col % | Col % | Col % | Chi-squared test *P*-value |
| Age group | | | | 0.077 |
| 18–25 | 38.8 | 34.9 | 38.2 | |
| 26–35 | 31.3 | 20.9 | 29.7 | |
| 36–45 | 17.1 | 16.3 | 17.0 | |
| 46–60 | 12.9 | 27.9 | 15.2 | |
| Education level | | | | 0.051 |
| Primary or below | 10.8 | 14.0 | 11.3 | |
| Form 1–5 | 48.3 | 67.4 | 51.2 | |
| Form 6–7 | 12.5 | 4.7 | 11.3 | |
| University or higher | 28.3 | 14.0 | 26.1 | |
| Currently married | | | | 0.469 |
| No | 61.7 | 55.8 | 60.8 | |
| Yes | 38.3 | 44.2 | 39.2 | |
| MSM category | | | | 0.531 |
| Non-anal-sex MSM | 77.1 | 81.4 | 77.7 | |
| Anal-sex MSM | 22.9 | 18.6 | 22.3 | |

*Active MSM who did not cross the border to China for sex in the last 6 mo.
Univariate chi-squared *p*-value comparing cross-border MSM versus the rest of the Active MSM.

*Sexually Transmitted Disease History, HIV Antibody Testing, Perceptions of HIV Risk, and Future Safe Sex Intentions (Part II)*

Respondents were asked whether they had ever contracted an STD in the last 6 months and whether they had undergone an HIV antibody testing in the last 6 months. Furthermore, they were asked about their self-perceived chance of HIV infection and future safe sex intentions ("likelihood of using condoms every time for MSM sex in the next 6 months" and "In the next 6 months, would you use condoms more frequently for fear of HIV?").

*Statistical Analysis*

Chi-squared tests were conducted to determine whether observed differences in the proportions were statistically significant between "cross-border MSM" and the rest of the active MSM. Statistical analyses of the associations between cross-border sex-networking and HIV knowledge and attitudes, future safe sex intentions, and risk behaviors were also conducted using multiple logistic regression controlling for MSM subgroup (anal-sex MSM and nonanal-sex MSM), marital status (currently married vs. not currently married), age group, and education level. For ordinal variables (eg, education level), the first category was used as a reference group in the analyses. To determine the background factors associated with cross-border sex-networking activity, a stepwise logistic regression was run using age, education level, marital status, and MSM subgroup as candidate variables. Relevant odds ratios (OR) and respective 95% confidence interval (CI) were presented. A $P$ value $<0.05$ was considered statistically significant. All analyses were conducted using SPSS for Windows version 11.0 (SPSS Inc., Chicago, IL).

## Results

*Demographic Profile of Cross-Border Men Who Have Sex With Men Compared With the Rest of Active Men Who Have Sex With Men*

Among all active MSM in the study (n = 283), 15.2% (n = 43; 95% CI, 11.0–19.4%) had engaged in cross-border MSM behaviors in mainland China in the last 6 months. From Table 1, it can be seen that anal sex behavior in the last 6 months and marital status were not significantly associated with such cross-border sex-networking. Univariately, "cross-border MSM" were marginally more likely to be older (chi-squared test, $P = 0.077$) and less educated (chi-squared test, $P = 0.051$) than the rest of the active MSM. A stepwise logistic regression model using variables listed in Table 1 as input variables showed that an educational attainment of lower than Form 6 (OR, 2.69; 95% CI, 1.18–6.12; $P = 0.019$) was an independent predictor of cross-border MSM activity. An age greater than 45 (OR, 2.15; 95% CI, 0.98–4.70; $P = 0.055$) was a marginally significant predictor.

*HIV-Related Knowledge and Attitudes*

For the 3 HIV-related knowledge questions, the between-group comparisons were not of statistical significance, both univariately and after adjusting for age, education level, marital status, and anal sex MSM behaviors (Table 2).

Respondents who had engaged in MSM behaviors in China were much less likely to believe that condom use could reduce the chance of HIV infection from anal sex with MSM sex partners (Table 2). This remains true even after adjusting for age, education level, marital status, and anal sex activity (adjusted OR, 0.30; $P < 0.01$; Table 2). There were no significant differences between the 2 groups with regard to perceived control over condom use, perceived infectivity of HIV through MSM behaviors, oral sex or anal sex. Nor were there statistically significant differences between the 2 groups in the perceived necessity of using condoms for sex with MSM partners (Table 2).

*Future Safe Sex Intentions and Perceptions of HIV Risk*

A comparison of future safe sex intentions and perceptions of HIV risk between "cross-border MSM" and the rest of active MSM is presented in Table 2. In the univariate analysis, the "cross-border MSM" group (56.4%) was not significantly more likely to perceive a higher chance of contracting HIV than the other group (43.8%; chi-squared test, $P = 0.147$). However, such became statistically significant after controlling for background

TABLE 2. HIV Knowledge, Attitudes, and Future Intentions by Cross-border Sex-networking Status

| | Non-cross-border MSM*/ Col % | Cross-border MSM Col % | Chi-squared *P-value* |
|---|---|---|---|
| Correctly answered the following HIV-related knowledge questions: | | | |
| "Yes" to: "A person can remain looking healthy even after a long period of infection" | 45.4 | 44.2 | 0.881 |
| *Adjusted Odds Ratio (95% CI)* | *1.00* | *1.28 (0.63,2.59)* | |
| "No" to: "Mouth-to–mouth kissing with a person infected with HIV will result in HIV transmission" | 72.5 | 72.1 | 0.956 |
| *Adjusted Odds Ratio (95% CI)* | *1.00* | *1.17 (0.54,2.56)* | |
| "No" to: "HIV infection is detectable one week after infection took place" | 63.3 | 51.2 | 0.131 |
| *Adjusted Odds Ratio (95% CI)* | *1.00* | *0.66 (0.33,1.31)* | |
| Agreed with the following attitudinal and belief statements: | | | |
| "Condom use can effectively reduce the chance of HIV infection from anal sex with MSM partners" | 90.1 | 72.5 | 0.002 |
| *Adjusted Odds Ratio (95% CI)* | *1.00* | *0.30 (0.12,0.73)‡* | |
| "You have complete control over condom use when having sex with MSM partners" | 83.2 | 75.0 | 0.216 |
| *Adjusted Odds Ratio (95% CI)* | *1.00* | *0.55 (0.23,1.31)* | |
| "HIV infectivity via MSM behaviors is &lquote;High or Very High' " | 46.3 | 53.5 | 0.381 |
| *Adjusted Odds Ratio (95% CI)* | *1.00* | *1.15 (0.57,2.34)* | |
| "The chance of contracting HIV is very high from oral sex without using condoms" | 55.5 | 61.5 | 0.484 |
| *Adjusted Odds Ratio (95% CI)* | *1.00* | *1.06 (0.49,2.27)* | |
| "The chance of contracting HIV is very high from anal sex without using condoms" | 84.9 | 77.5 | 0.246 |
| *Adjusted Odds Ratio (95% CI)* | *1.00* | *0.56 (0.22,1.40)* | |
| "Condom use is necessary for sex with MSM partners" | 84.8 | 80.5 | 0.485 |
| *Adjusted Odds Ratio (95% CI)* | *1.00* | *0.77 (0.31,1.91)* | |
| Future safe sex intentions and perceptions: | | | |
| Perceived chance of contracting HIV in the future | | | 0.147 |
| No chance (ref) | 56.2 | 43.6 | |
| Likely/most likely | 43.8 | 56.4 | |
| *Adjusted Odds Ratio (95% CI)* | *1.00* | *2.12 (1.01,4.46)†* | |
| In the next 6 mo, would use condoms more frequently for fear of HIV | | | 0.440 |
| Mostly no (ref) | 33.0 | 39.5 | |
| May be/mostly yes | 67.0 | 60.5 | |
| *Adjusted Odds Ratio (95% CI)* | *1.00* | *1.02 (0.47,2.22)* | |
| Likelihood of using condoms every time for MSM sex in the next 6 mo | | | 0.238 |
| No chance (ref) | 56.4 | 46.2 | |
| Likely/most likely | 43.6 | 53.8 | |
| *Adjusted Odds Ratio (95% CI)* | *1.00* | *1.63 (0.79,3.38)* | |

*Active MSM who did not cross the border to China for sex in the last 6 mo.
Odds ratios were adjusted for age, education level, marital status and anal sex MSM behavior.
†$P < 0.05$; ‡$P < 0.001$.

factors, including age, education level, marital status, and anal sex behavior (adjusted OR, 2.12; $P < 0.05$). There were no significant differences (both univariately and multivariately) in the perception of consistent condom use in the future or perceived likelihood of using condoms in the next 6 months as a result of fear of HIV (Table 2).

### *HIV-Related Men Who Have Sex With Men's Risk Behaviors, Prevalence of Sexually Transmitted Diseases, and HIV Antibody Testing*

The prevalence of risk behaviors were drastically different between the 2 groups (Table 3). "Cross-border MSM" were much more likely to have had anal sex with male commercial sex workers in the last 6 months when compared with the rest of the active MSM who had not practiced MSM behaviors in mainland China (75% vs. 12.7%; adjusted OR, 43.83; $P < 0.01$). Similar patterns were also found for the prevalence of self-reported STDs (25.6% vs. 2.1%; adjusted OR, 25.25; $P < 0.001$), the proportion who had had 3 or more MSM sex partners in the last 6 months (44.2% vs. 21.3%; adjusted OR, 4.15; $P < 0.001$), and the prevalence of HIV antibody testing in the last 6 months (30.2% vs. 10.9%; adjusted OR, 3.32; $P < 0.01$). The cross-border group was also more likely to be bisexual (81.4%) as compared with the rest of the active MSM (60.1%) (adjusted OR, 3.36; $P < 0.05$; Table 3).

TABLE 3. Comparison of Risk Behaviors in the Last 6 mo by Cross-border Sex-networking Status

| | Non-cross-border MSM† | Cross-border MSM | All Active-MSM | Chi-squared *P*-value |
|---|---|---|---|---|
| | Col % | Col % | Col % | |
| Had engaged in anal sex with male commercial sex workers in the last 6 mo§ | | | | <0.001 |
| No (ref) | 87.3 | 25.0 | 79.4 | |
| Yes | 12.7 | 75.0 | 20.6 | |
| *Adjusted Odds Ratio (95% CI)* | *1.00* | *43.83 (4.33,443.45)*** | – | |
| Had contracted STD‡ | | | | <0.001 |
| No (ref) | 97.9 | 74.4 | 94.3 | |
| Yes | 2.1 | 25.6 | 5.7 | |
| *Adjusted Odds Ratio (95% CI)* | *1.00* | *25.25 (6.50,98.09)**** | – | |
| No. of MSM sex partner‡ | | | | 0.004 |
| 1–2 (ref) | 78.8 | 55.8 | 75.3 | |
| 3–5 | 9.2 | 23.3 | 11.3 | |
| 6 or more | 12.1 | 20.9 | 13.4 | |
| *Adjusted Odds Ratio (95% CI) for 3+ partners* | *1.00* | *4.15 (1.93,8.91)**** | – | |
| Had tested for HIV antibody‡ | | | | 0.001 |
| No (ref) | 89.1 | 69.8 | 86.1 | |
| Yes | 10.9 | 30.2 | 13.9 | |
| *Adjusted Odds Ratio (95% CI)* | *1.00* | *3.32 (1.47,7.53)*** | – | |
| Bisexual behavior‡ | | | | 0.008 |
| No (ref) | 39.9 | 18.6 | 36.7 | |
| Yes | 60.1 | 81.4 | 63.3 | |
| *Adjusted Odds Ratio (95% CI)* | *1.00* | *3.36 (1.27,8.90)** | – | |
| Had engaged in anal sex‡ | | | | 0.531 |
| No anal sex (ref) | 77.1 | 81.4 | 77.7 | |
| Had anal sex | 22.9 | 18.6 | 22.3 | |
| *Adjusted Odds Ratio (95% CI)* | *1.00* | *1.04 (0.43,2.54)* | | |
| Had engaged in unprotected anal sex§ | | | | 0.214 |
| No, protected anal sex (ref) | 43.2 | 16.7 | 40.0 | |
| Yes, unprotected anal sex | 56.8 | 83.3 | 60.0 | |
| *Adjusted Odds Ratio (95% CI)* | *1.00* | *4.42 (0.42,46.18)* | – | |
| Had engaged in oral sex‡ | | | | 0.081 |
| No oral sex (ref) | 44.5 | 30.2 | 42.3 | |
| Had oral sex | 55.5 | 69.8 | 57.7 | |
| *Adjusted Odds Ratio (95% CI)* | *1.00* | *2.26 (1.06,4.86)** | | |
| Had engaged in unprotected oral sex¶ | | | | 0.559 |
| No, protected oral sex (ref) | 49.2 | 43.3 | 48.1 | |
| Yes, unprotected oral sex | 50.8 | 56.7 | 51.9 | |
| *Adjusted Odds Ratio (95% CI)* | *1.00* | *1.50 (0.63,3.55)* | – | |

Odds ratios were adjusted for age, education level, marital status and anal sex MSM behavior.
*$P < 0.05$; **$P < 0.01$; ***$P < 0.001$.
†Active MSM who did not cross the border to China for sex in the last 6 mo.
‡Questions were asked to all Active-MSM respondents.
§Percentages and adjusted Odds ratios calculated among those who had engaged in anal sex in the last 6 mo.
¶Percentages and adjusted Odds ratios calculated among those who had engaged in oral sex in the last 6 mo.

A slightly smaller percentage of "cross-border MSM" were anal-sex MSM (18.6% vs. 22.9% of other active MSM; chi-squared test, $P = 0.531$). A greater proportion of the "cross-border MSM" had engaged in unprotected anal sex in the last 6 months (83.3% vs. 56.8% of the other active MSM); these comparisons were not of statistical significance (Table 3). This could be the result of the lack of statistical power from the relatively small number of "cross-border MSM" respondents who had engaged in anal sex (n = 8 only). "Cross-border MSM" were more likely to have engaged in oral sex (adjusted OR, 2.26; $P < 0.05$; Table 3). Among MSM who had engaged in oral sex, the proportion engaging in unprotected oral sex, however, did not differ significantly between "cross-border MSM" and the rest of active MSM.

## Discussion

No behavioral surveillance surveys have been conducted on MSM in Hong Kong or in China. Furthermore, no cross-border MSM study was identified in the literature. In view of the high level of risk behaviors involved, such studies are warranted. The data obtained from this study could thereby serve as important baseline data for future behavioral surveillance studies.

Cross-border sex-networking among Hong Kong MSM was not significantly associated with anal sex behavior or marital status. Cross-border sex-networking was, however, more prevalent among less-educated, older MSM. Education is a proxy for socio-economic status hence, less educated and older respondents could be disadvantaged in seeking sex partners in the MSM community. Another study showed that younger MSM were much more likely to find same-sex partners through the Internet.[27] Older or less educated MSM could have lower computer literacy. The lack of viable sex-networking options among relatively older, less educated MSM could induce these MSM to cross the border to purchase sex in mainland China. The lower price of commercial sex for MSM in mainland China could also be appealing to this group of MSM. "Cross-border MSM" were also more likely to be

bisexual as compared with the rest of the MSM. It is possible that bisexual individuals would be more unwilling to disclose their gay identity and hence engage in MSM activities away from their place of residence. A recently published report on this group of MSM noted that bisexual MSM were more likely to find MSM behaviors unacceptable.[16]

After adjusting for background factors, the cross-border group exhibited no differences in HIV-related knowledge or most HIV-related perceptions (such as perceived HIV infectivity from oral and anal MSM behavior) as compared with the rest of the active MSM. "Cross-border MSM" were more likely to perceive low efficacy of condom use in preventing HIV/AIDS as compared with other MSM.

Although "cross-border MSM" were more likely to have undergone the HIV-antibody test (adjusted OR, 3.32) as compared with the rest of the active MSM, promotion of HIV antibody testing by voluntary counseling and testing for "cross-border MSM" is still important because the prevalence of HIV antibody testing remains low (30%) among the "cross-border MSM."

The solicitation of MSM commercial sex workers in China appears commonplace. The "cross-border MSM" was also much more likely to have had 3 or more MSM partners in the last 6 months than the other active MSM (44.2% vs. 21.3%). The differential level of HIV-risk behaviors among MSM according to the geographic locale of the sexual activities has mirrored a similar trend observed in the heterosexual population (male clients of female sex workers) in Hong Kong.[11] "Cross-border MSM" were also much more likely to have contracted STDs in the last 6 months. The marked difference in STD prevalence between these 2 MSM groups could at most only be partially explained by differential condom use. It is possible that the STD prevalence of the MSM partners found in mainland China was higher given that likelihood that the majority of these MSM partners in mainland China were commercial sex workers. In summary, the cross-border MSM were at high risk for HIV/STD infection.

One of the pressing priorities in such cross-border HIV prevention programs is to gain a better understanding of MSM commercial sex activity in mainland China. The sample size of "cross-border anal-sex MSM" in this sample is too small to understand whether cross-border MSM behaviors were associated with unprotected anal sex. The conservative research climate and lack of funding for studying cross-border MSM activities in Hong Kong have resulted in a lack of conclusive knowledge of this growing public health issue. Future studies should also clarify whether there exists differential condom use prevalence between MSM sex-networking in Hong Kong and MSM sex-networking in mainland China and reasons for any differences.

One limitation of this study could be the 57% response rate that could have resulted in selection bias. Nevertheless, the response rate is commonly between 50% and 60% for telephone surveys of a less sensitive nature,[28,29] and the study's response rate is comparable to those of other risk behavior surveys in the territory.[6,26] Because most of the nonresponses were made before the topic of the study was revealed and because only approximately 2% of those joining the study did not complete the sensitive part of the questionnaire, it is unlikely that a strong bias resulting from nonresponse had been introduced. Another possible limitation of this study could be the small sample size of some MSM subgroups that are captured in this survey, which resulted in low statistical power. Another limitation is the absence of detailed questions related to the cross-border MSM behavioral patterns such as the frequency of cross-border visits in the previous 6 months, duration of visits, and actual setting of MSM sexual activity within mainland China. The community- and population-based nature of the study, however, is a strength over many other MSM studies, and it sheds some new insight on problems related to cross-border risk behaviors.

A recent report estimated that of the estimated number of HIV/AIDS cases (approximately 1.2 million) in mainland China, approximately 11% were MSM.[30] Other studies have also shown that the HIV prevalence in the MSM population in China is noticeable.[31,32] The results of this study suggest that those Hong Kong MSM who practiced risk behaviors across the border could potentially form another bridge population for STD and HIV transmission besides similar bridges found in the heterosexual populations.[6,11] Effective HIV prevention programs among MSM have been documented in many countries,[33–35] but relevant programs have been scant in China. The conservative culture in China could have prevented community-building, acknowledgment of the size of the problem, and effective programs to be implemented. In Hong Kong, only a small-scale, pilot cross-border MSM intervention program has been launched. In view of the high risk involved and the uncertain HIV situation in mainland China, intervention programs using a regional approach are hence urgently required for stopping the spread of HIV/STD from 1 geographic locality to another.

## References


1. Broring G, Van Duifhuizen R. Mobility and the spread of HIV/AIDS: A challenge to health promotion. AIDS Health Promot Exch 1993; 1:1–3.
2. Decosas J. Labour migration and HIV epidemics in Africa. AIDS Anal Afr 1998; 8:6–7.
3. Fernandez I. Vulnerable to HIV/AIDS. Migration. Integration 1998; 57:36–42.
4. Quinn TC. Population migration and the spread of types 1 and 2 human immunodeficiency viruses. Proc Natl Acad Sci U S A 1994; 91:2407–2414.
5. Hughes GD. The effect of oscillating male migration on rural South African women's health: implications for sexually transmitted diseases and human immunodeficiency virus [Abstract]. Dissertation Abstracts International 1999; 59:40–52.
6. Lau JT, Thomas J. Risk behaviours of Hong Kong male residents travelling to mainland China: A potential bridge population for HIV infection. AIDS Care 2001; 13:71–81.
7. Solomon S, Kumarasamy N, Ganesh AK, et al. Prevalence and risk factors of HIV-1 and HIV-2 infection in urban and rural areas in Tamil Nadu, India. Int J STD AIDS 1998; 9:98–103.
8. Hong Kong Census and Statistics Department. Hong Kong Resident Departures by Destination. Available at: http://www.info.gov.hk/censtatd/eng/hkstat/hkinf/transport/transp8 index.html. Accessed May 10, 2003.
9. Hartwig K. Bridging borders in Southeast Asia: The politics of HIV prevention for women. Aidscaptions 1995; 2:28–31.
10. Lowndes CM, Alary M, Meda H, et al. Role of core and bridging groups in the transmission dynamics of HIV and STIs in Cotonou, Benin, West Africa. Sex Transm Infect 2002; 78(suppl 1):i69–77.
11. Lau JT, Tang AS, Tsui HY. The relationship between condom use, sexually transmitted diseases, and location of commercial sex transaction among male Hong Kong clients. AIDS 2003; 17:105–112.
12. Wang YG. AIDS, policy and bioethics: ethical dilemmas facing China in HIV prevention: A report from China. Bioethics 1997; 11:323–327.
13. Zhang B, Li X, Hu T. Survey on the high risk behaviors related to acquired immunologic deficiency syndrome and sexually transmitted diseases among men who have sex with men in mainland China [Chinese]. Chinese Journal of Epidemiology 2001; 22:337–340.
14. Chuang CY, Chang PY, Lin KC. AIDS in the Republic of China, 1992. Clin Infect Dis 1993; 17(suppl 2):S337–340.
15. Li X, Zhang B, Liu D. Survey of STD prevalence and related high risk sexual behaviors in Chinese MSM. Chinese Journal of Dermatology 2001; 34:189–191.

16. Lau JT, Kim JH, Lau M, et al. HIV-related behaviors and attitudes among Chinese men who have sex with men in Hong Kong: A population-based study. Report to the Hong Kong Council for the AIDS Trust Fund, August 2002.
17. Lau JT, Siah PC, Tsui HY. A study of the STD/AIDS related attitudes and behaviors of men who have sex with men in Hong Kong. Arch Sex Behav 2002; 31:367–373.
18. Czaja R. Asking sensitive behavioral questions in telephone interviews. Int Q Community Health Educ 1987–88; 8:23–32.
19. Lau JT, Thomas J, Liu JL. Mobile phone and interactive computer interviewing to measure HIV-related risk behaviours: The impacts of data collection methods on research results. AIDS 2000; 14:1277–1279.
20. Lau JTF, Tsui HY, Wang QS. Effects of two telephone survey methods on the level of reported risk behaviors. Sex Transm Infect 2003; 79:325–331.
21. Lau JT, Siah PC. Behavioural surveillance of sexually-related risk behaviours of the Chinese male general population in Hong Kong: A benchmark study. AIDS Care 2001; 13:221–232.
22. Lau JT, Wong WS. HIV antibody testing among the Hong Kong mainland Chinese cross-border sex networking population in Hong Kong. Int J STD AIDS 2001; 12:595–601.
23. Lau JTF, Thomas J, Lin CK. HIV-related behaviours among voluntary blood donors in Hong Kong. AIDS Care 2002; 14:481–492.
24. Lau JTF, Wong WS. Behavioural surveillance of sexually-related risk behaviours for the cross-border traveller population in Hong Kong: The evaluation of the overall effectiveness of relevant prevention programmes by comparing the results of two surveillance surveys. Int J STD AIDS 2000; 11:719–727.
25. Lau JTF, Tang ASY, Siah PC, et al. Assessment of HIV-related sexual risk behaviors among the general female population in Hong Kong. Arch Sex Behav 2002; 31:535–542.
26. Lau JTF, Tsui HY. Behavioral surveillance surveys of the male clients of female sex workers in Hong Kong—Results of three population-based surveys. Sex Transm Dis 2003; 30:620–628.
27. Lau JT, Kim JH, Lau M, et al. Prevalence and risk behaviors of Chinese men who seek same-sex partners via the Internet in Hong Kong. AIDS Educ Prev 2003; 15:516–528.
28. Chou KL, Mak KY, Chung PK, et al. Attitudes towards mental patients in Hong Kong. Int J Soc Psychiatry 1996; 42:213–219.
29. Kwan AC, Hu WH, Chan YK, et al. Prevalence of irritable bowel syndrome in Hong Kong. J Gastroenterol Hepatol 2002; 17:1180–1186.
30. Lu F. Epidemiology of HIV/AIDS in China. Paper presented at the 2nd National Symposium on Epidemiology for Younger Epidemiologists; Shenzhen, China; October 28–31, 2003.
31. Choi KH, Liu H, Guo Y, et al. Emerging HIV-1 epidemic in China in men who have sex with men. Lancet 2003; 361:2125–2126.
32. Zhang B, Liu D, Li X, et al. A survey of men who have sex with men: mainland China. Am J Public Health 2000; 90:1949–1950.
33. Choi KH, Lew S, Vittinghoff E, et al. The efficacy of brief group counseling in HIV risk reduction among homosexual Asian and Pacific Islander men. AIDS 1996; 10:81–87.
34. Peterson JL, Coates TJ, Catania J, et al. Evaluation of an HIV risk reduction intervention among African-American homosexual and bisexual men. AIDS 1996; 10:319–325.
35. Johnson WD, Hedges LV, Ramirez G, et al. HIV prevention research for men who have sex with men: A systematic review and meta-analysis. J Acquir Immune Defic Syndr 2002;30(suppl 1):S118–S129.