Thesis Report

Understanding on Sub-Populations of Men who have Sex with Men (MSM) in Ho Chi Minh City, Vietnam:

Implication for HIV intervention among MSM

Hien Le
Master of Public Health, 2013

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An abstract of
A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
in partial fulfillment of the requirements for the degree of
Master of Public Health
in Global Health
2013

Abstract

Understanding on Sub-Populations of Men who have Sex with Men (MSM) in Ho Chi Minh City, Vietnam: Implication for HIV intervention among MSM

By Hien Le

Background. Men who have sex with Men (MSM) is an emerging HIV high risk population in Vietnam. Understanding on specific characteristics of MSM subpopulations is critical to design specific HIV interventions for each group. Current studies categorize MSM subpopulations by their visibility (hidden vs. unhidden), sexual orientation (homosexual vs. bisexual) or transaction sexual behavior (selling vs. non-selling sex). Very few studies define MSM subpopulations by their location of networking and HIV status.

Objective. This study explores the differences between 1) MSM recruited from street-based (MSMS) versus facility-based venues (MSMF), and 2) HIV negative and HIV positive MSM.

Methods. This is a secondary data analysis using a sub-dataset sampled by Time – Location sampling method on 400 MSM in Ho Chi Minh City, Vietnam. MSMS were compared to MSMF by demographic and HIV related characteristics, and networking locations. HIV negative and HIV positive MSM were compared by four major parameters: HIV risk perception, sexual behaviors, drug use behaviors and overlapping risks. Logistic regression was performed to define factors associated with HIV positive.

Results. There were no significant differences between MSMS and MSMF except higher proportion of test result for drug use among MSMF (9.5% vs. 1.6%, p=0.005). MSMF were 2.5 times more likely to use opiate drug over the last 30 days than MSMS (p = 0.013). There were no significant differences between HIV negative and HIV positive MSM. Results of logistic model showed that MSM with low education levels were 5 times more likely to be HIV positive than MSM with higher education level (adjusted OR = 4.85; 95%CI=1.41 – 16.65, p-value = 0.01) and MSM with correct HIV knowledge were 3 times more likely to be HIV positive than MSM who did not (adjusted OR = 3.36; 95% CI=1.24 – 9.10, p-value = 0.019).

Discussion. Significant difference in drug use suggested more studies needed to define the existence of possible MSM subpopulation by their networking locations. No significant differences between HIV negative and HIV positive MSM suggested notable risky behavior trend among HIV negative group. Effective interventions for HIV positive MSM should be continued. Intensive interventions should be prioritized for HIV negative MSM for constant HIV risk reduction.

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Acknowledgements

I would like to thank Dr. Scott Mc.Nabb for his mentorship, guidance, and support. I have learned so much from his expertise on scientific writing. I would like to thank Dr. Carlos Del Rio for his technical advises and great support for my 2 year study with Emory. I also would like to express my gratitude to Keith Sabin for helping me conceptualize the thesis and to Tran Minh Hoang for helping with data analysis. Finally, thanks to Tran Vu Hoang and Partnership in Health Research (PHR) for the permission of using a sub-dataset of the Study "Comparison of Sampling Methods on Most At Risk Populations (MARPs) used in Vietnam HIV Surveillance: Respondent Driven Sampling (RDS) vs. Time Location Sampling (TLS)" to conduct my secondary analysis.

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Definition of key terms

Men who have sex with Men (MSM): are men who disclosed their sexual orientation of having sex with men or with both men and women.

Street-based venues: according to Primary Study sampling method, street-based venues included parks, bus stations and streets.

Facility-based venues: according to Primary Study sampling method, facility-based venues included bars, massage facilities and karaoke bars.

MSM recruited from street-based venues: are MSM who were eligible to participate the Primary Study and were recruited from street-based venues by study team. In this paper, they were not yet defined as a sub-population of MSM in Vietnam.

MSM recruited from facility-based venues: are MSM who were eligible to participate the Primary Study and were recruited from facility-based venues by study team. In this paper, they were not yet defined as a sub-population of MSM in Vietnam.

I. Introduction

Infection with the human immunodeficiency virus (HIV) has occupied the attention of the global public health community since being recognized among gay men in the United States in the 1980s (1). HIV is now endemic on every continent and more than 34 million people are living with either HIV infection or the Acute Immunodeficiency Disease Syndrome (AIDS) (2). UNAIDS defines a "generalized epidemic" in a country if the prevalence of infection is >1% in the population (3). Most African countries are now experiencing a generalized epidemic that requires interventions targeting the general population regardless of education, social, economic status, or risk behaviors (4).

On the other hand, an epidemic is defined as "concentrated" if the prevalence is < 1% among the population, yet relatively high among sub-populations practicing high-risk behaviors (e.g., drug use, heterosexual or homosexual unsafe sex) (3). Most Asian countries are now experiencing a concentrated epidemic, requiring interventions that target most-at-risk populations (MARPs) (4).

Vietnam's HIV epidemic is similar to many countries in Asia; it is driven by MARPs. While the national prevalence is low (0.45% among 15 – 49 year olds), the Vietnam HIV/AIDS Estimates and Projections 2010 – 2015, predicts rates will be higher in urban centers (e.g., Hanoi, Ho Chi Minh City [HCMC]) and particularly elevated among MARPs (5). These are mainly injecting drugs users (IDUs), female sex workers (FSWs), and men who have sex with men (MSM) (6, 7). Many surveys and studies have been conducted since 1994 by local and international organizations to

measure the HIV prevalence and risk of MARPs in Vietnam. Understanding risk behavior trends and other HIV-related characteristics are critical to inform interventions. However, recruiting MARPs poses a challenge because these groups are hidden. Several approaches have been proposed that balance recruitment efficiency and inclusiveness (8).

In 2011, Partner in Health Research (PHR) – a research firm receiving funding and technical support from USAID Vietnam and Family Health International, Vietnam – conducted a study to compare two sampling methods: time location sampling (TLS) and respondent driven sampling (RDS). The overall goal was to determine which was more efficient. One key objective was to compare demographic and behavioral characteristics collected by the two methods from IDUs in Hai Phong City and MSM in HCMC. Four cross-sectional surveys used RDS and TLS methods implemented in parallel between the two MARPs (8). 130 MSM clusters were sampled by TLS in 13 Districts of HCMC and data were collected for 40 clusters by February 2012.

In workshop on HIV Transmission Prevention for MSM in Vietnam co-organized by Viet Nam Administration for AIDS Control (VAAC), Ha Noi AIDS Center and UNAIDS Viet Nam in October 30 2008, representative from UNAIDS highlighted the need for more qualitative research on MSM sub-populations in Vietnam (9). Having received permission to conduct a secondary analysis using the MSM dataset sampled by TLS in HCMC, my goal was to describe the HIV risk factors among Vietnamese MSM to better inform HIV interventions. This thesis focuses on developing an understanding on MSM sub-populations in HCMC, Vietnam.

Objectives:

1. Evaluate demographic and HIV-related characteristics of MSM recruited from street-based venues vs. MSM recruited from facility-based venues.
2. Compare risk factors of HIV-negative vs. HIV-positive MSM.

Background and Rationale

Globally, Men who have Sex with Men (MSM) are one of the most-at-risk populations (MARPs) for HIV infection. The first cases of HIV/AIDS were detected in the 1980s from a series of "unusual cases" perceived as a "gay disease" among men in the United States (1). Since then, together with the growth of global knowledge and understanding of the cause and development of the epidemic, MSM were found to be at high risk of HIV infection in many countries (10, 11). A meta-analysis of surveillance data in low- and middle-income countries found MSM to be 19.3 times more likely to be HIV-infected than the general population. Baral, *et* al. estimated the odds ratios for HIV infection among MSM to be 7.8 in low- and 23.4 in middle-income countries (12). Considerable bias in HIV-related RDS MSM studies may result in an underestimated risk of HIV prevalence (10). Despite a long history in battling HIV/AIDS in the gay, medical, and political communities, current HIV prevention efforts remain inadequate to control the increased infection rates in MSM. Additional behavioral and biomedical interventions are urgently needed to boost the global HIV prevention portfolios targeting MSM(13).

In Asia, low HIV prevalence among adults (< 0.5, 0.5% – 1.0%) in many countries indicated that the regional HIV epidemic is still at a concentrated stage (13). However, HIV prevalence has increased rapidly within MARPs of which MSM is a concern. According to WHO, the odds of

MSM in Asia being infected with HIV are 18.7 times higher than among the general population (14). From 2002 – 2007, the increase in reported cases of HIV infections among MSM doubled in Hong Kong (15), more than doubled in Japan (16) and Taiwan (17), and was four times greater in Singapore (18). Similar trends were seen in South East Asia and Mekong Sub-Region. The HIV prevalence among this group is quite high compared to that in the regional general population. It ranged from 0% - 7.8% in Cambodia (19, 20), 17.3% – 30.8% in Thailand (21), 29.3% in Myanmar (22), 5.6% in Lao PDR (23).

However, the quality of case reporting and epidemiological data of HIV infection varies in the region and is unavailable in some countries. Estimates of incidence rates often rely on epidemiologic studies or sentinel surveillance without a comprehensive picture of the role of male-to-male transmission in the overall context of HIV epidemic (13, 24). Culturally and politically, stigma and discrimination against MSM in the region pushes back progress in prevention already adopted in Western and developed countries many years ago. These also hamper efforts to draw the population from underground and respond adequately to their increasing HIV risk infection (24, 25). The underestimation of the magnitude of the problem and the urgency to push forward stronger prevention efforts targeting MSM are often emphasized for low- and mid-income regions including Asia. This is especially important when countries are characterized by a relatively low and declining HIV prevalence among heterosexual populations, but with > 20% prevalence among MSM, like Thailand and Cambodia (12, 24). MSM may account for 42% of new HIV infections in Asia by 2020 (26).

In Vietnam, MSM and homosexuality are neither illegal nor listed in legal documents subject to “social evil” behaviors such as drug use and prostitution. However, prior to the occurrence of the

first case of HIV in 1990 and the establishment of an open market and economic reform (1986), the “gay” population was marginalized or ignored by the political system and society. For instance, to deal with “social evils” or “taboo” behaviors in the society, the Government of Vietnam formed an agency titled the Department of Social Evil Prevention whose main function was to control drug use, prostitution, and HIV/AIDS only (27).

With economic reform, homosexuality became more visible and was seen as the influence of a western lifestyle introduced to Vietnamese youth (28). However, while the development of HIV infection in injecting drug users (IDUs) and female sex workers (FSWs) drew increased attention to HIV prevention, MSM were excluded from HIV sentinel surveillance and behavioral surveys (28). Same-sex behavior was not asked until 2006 when, for the first time, MSM were included in a large scale HIV/Sexually transmitted infections (STIs) integrated Behavioral and Biological Survey (6).

Prior to this survey, there were limited data on the relative importance of homosexual sex in the overall HIV epidemic. HIV prevalence in MSM in HCMC was reported in a few small-scale studies of HIV knowledge, sexual behavior, and risk factors. But behavior trend and social determinants associated with HIV infection was only explored in three studies prior to 2004 (28). The two rounds of IBBS in 2006 and 2009 were a critical step to get a more comprehensive picture of the overall HIV epidemic among MSM in Vietnam, which is characterized by drug use, heterosexual and homosexual risk behaviors, and the overlap cutting across these.

Ho Chi Minh City (formerly Saigon) is the largest city in Vietnam, with a population of approximately 7.5 million in 2011 (29). Located in the south, it is the commercial center of the country. The continued development in many economic sectors (including tourism) is a priority.

But in its wake are various types of new entertainment services and life styles. This permitted MSM to be more visible and HCMC was seen as the most open environment for MSM. This is a reason for many researchers to study about MSM in HCMC since 1999. Although the studies uncovered previously unknown issues about MSM and their HIV infection risks, very few provided understanding on the characteristics of MSM based on their networking locations and HIV risk behavior trends differed by their HIV status.

During the years of 2002 – 2008, in my capacity as Prevention Program Coordinator with CDC Vietnam, I provided technical support to the HIV prevention program targeting MARPs in 40 provinces of Vietnam. I met, worked, and talked with many gay individuals in HCMC who hardly identified their sexual orientation. Some attended my training course one day as a masculine "pure man" and the next day as a girl. The in-depth sharing of complex emotional and sexual lives as homosexual, bisexual, and drug-using individuals highlights the complexity of HIV-related risk behaviors in HCMC. Their utmost desire to be accepted as a dignified sub-population in Vietnam society inspired me to extend my knowledge and understanding about this population as a whole and their many possible sub-populations. I would bring the gained knowledge from this thesis to continue my work in Vietnam to reduce HIV infection risk among MSM and from them to general population. I strongly believe that by doing so we will remove the barrier between this population and the rest of the society and help them live healthy lives and contribute to society.

II. Literature Review

With the goal to *gain an in-depth understanding on HIV risk factors among the MSM sub-populations to better inform a tailored HIV intervention design tailored in Vietnam*, I focused on four objectives: 1) HIV prevalence among MSM in Vietnam to understand the magnitude of HIV infection in this population; 2) International guidelines and evidence to define predominant risk factors leading to HIV infection among and from MSM to the general population; 3) Up-to-date evidence on HIV infection risk factors among MSM and its sub-populations studied in Vietnam; 4) Conclusion on the existing evidence and gaps on knowledge that the thesis may contribute to filling in.

Measurement of HIV prevalence among MSM in Vietnam and the results from 2000 to 2009

Before 2006, national epidemiologic data on HIV prevalence for MSM group was missing in Vietnam. It was not included in HIV national sentinel surveillance and routine surveillance. HIV prevalence of **5.8%** among MSM attending HIV testing and counseling in the HCMC Pasteur Institute in 2000 were the first data reported (30). Following this report, in 2004, Nguyen, *et* al., implemented a cross-sectional study in HCMC using the TLS method to recruit 600 MSM from sites such as entertainment areas, dancing bars, coffee bars, sauna/massage parlors, secluded areas of public parks, restrooms of large new supermarkets, and theatres (31). This study collected data from the various sub-groups of MSM. Overall HIV prevalence was **8%** among

study participants, and specifically it was 6.8% among transvestites, 7.0% among non-transvestites, 13.5% among bisexuals, and 33.3% among sex workers (31).

In 2006, Vietnam MSM were included for the first time in a large scale HIV/STI IBBS targeting MARPs (6). MSM were perceived as a high risk group for HIV infection, and ranked third to IDUs and CSWs – the two groups have always been recognized as the most at risk populations in Vietnam. The result of IBBS 2006 showed that HIV prevalence was still highest among IDUs with 23.9% in Hanoi and 34% in HCMC, followed by street sex workers (SSW) with 23% in Hanoi and 11.1% in HCMC. MSM stood in the third position with the similar trend of HIV infection in SSW: higher in Hanoi with **9.4%** and lower in HCMC with only **5.3%**. However this difference was not statistically significant. This is also the first time HIV prevalence among MSM was reported for another city of Vietnam (Hanoi) rather than data from HCMC only (6).

In 2009, the results of IBBS II marked an increase in HIV prevalence among MSM (7). In HCMC, HIV prevalence among MSM who had sold sex increased from 9.5% in 2006 to 15.3% in 2009; and from 6.2% in 2006 to 14,3% in 2009 for MSM who had not sold sex. A similar situation was described in Hanoi (7). The sudden increase in HIV prevalence among MSM in 2009 may not necessarily be attributed to the increase in high-risk behaviors and their strong association with HIV infection only, but may also be due to the increasing visibility of MSM population in Vietnam. It may indicate that HIV surveillance and studies may have reached hidden and more sexually active MSM who potentially have higher risks of HIV infection compared to those participated in the previous studies. This observation is consistent with findings and comments from many previous studies that explained the connection between the economic growth in Vietnam, the openness of the society to an unusual social phenomenon and the higher level of

visibility and confidence of MSM population in Vietnam. IBBS 2009 also represented the largest coverage of MSM population to include behavioral and biological indicators of MSM from four cities and provinces instead of one city in 2000 and 2004 and two cities in IBBS 2006 (6, 7).

Without the third round of IBBS, it is still early to comment on the trend of HIV prevalence and risk behaviors of the MSM population in Vietnam. However, the dynamic of HIV prevalence measurement among this group has progressed since 2000 and drawn more attention from the national HIV system, public health professionals and policy makers. Despite the progress, it should be noted that the most recent measurements were conducted in four provinces of Vietnam only. Thus the result is not nationally representative. This issue is not an exception for Vietnam but was seen as a common practice of low and middle income countries by Baral Stefan *et* al.: "it was difficult even to find studies of the prevalence of male-male sexual contact in lower-income settings" and ", where HIV data were available, prevalence was consistently high" (12).

International guidelines and evidence of risk factors leading to HIV infection among MSM

Findings of the literature review for risk factors at the global and regional levels helped structure the following organization of risk factors for HIV infection among MSM into these categories:

HIV-risk perception

Low HIV-risk perception and knowledge is a proximal risk factor leading to behaviors causing many health problems, including HIV. In Asia, stigma and discrimination toward MSM are barriers for this population to gain access to HIV information and services that help them better perceive their risks for HIV infection (32). According to CDC, a number of risk factors associated

with increased HIV infection among black MSM may include: underestimation of personal risk, complacency about risk, and belief that HIV treatment minimizes the burden of HIV. In the US, since young MSM did not experience the severity of the early HIV epidemic, some may falsely believe that HIV is no longer a serious health threat because of treatment advances and decreased mortality. Being unaware of their risk behaviors, or in another word, having a low risk perception also resulted in low HIV testing rates, slow progress to access medical care, and unintentional HIV transmission to others (33). In 2008, 44% of MSM in the United States who tested positive for HIV did not know they were infected (34).

Sexual Risk Behavior (unprotected anal sex and transactional sex)

Fast Fact Sheets published by CDC, US/National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention (33) and Best Practice Collection on MSM and HIV disseminated by UNAIDS (32) delivered a clear message that **unprotected receptive anal sex** is the sexual behavior that carries **the highest risk for HIV acquisition**. In addition, at least 5–10% of all HIV infections worldwide are due to sexual transmission between men, though this figure varies among countries and regions (32). In WHO guideline on Prevention of HIV and STD for MSM, "Using condoms consistently during anal intercourse is strongly recommended for MSM and transgender people over not using condoms" was listed on the top of prevention strategies for sexual transmission among MSM stating a "strong recommendation with moderate quality of evidence" (14).

When unprotected anal sex is associated with types of partners (could be casual partners, regular partners, and/or selling sex partners) and number of partners, the transmission mode will be more complex and go beyond MSM groups, especially with transactional or heterosexual sex. A multivariate analysis of a study on Sexual Partnership Types as Determinant of HIV Risk in

South African MSM showed that only *partnership type* independently predicted whether the last anal sex event was unprotected (35). Another study on Risk Factors for HIV and unprotected anal sex among MSM in Kazakhstan found a strong association of infection between unprotected anal sex with male partners and transactional sex (36).

Similar analyses conducted among MSM who are frequent gay bars in Japan indicates that unprotected anal intercourse is related to sex with six or more sexual partners among those aged <24 and bisexual identity (37). Among male sex workers in Pakistan, greater numbers of anal sex clients were negatively associated with condom use (2). Compared with those reporting < 10 clients in the past month, sex workers reporting 30 or more clients were at 0.5 times less likely to use condoms. Significant risk factors for HIV infection among MSM in Phnom Penh, Cambodia are anal sex with multiple partners, unprotected vaginal sex with commercial female partners in the past month, and any STI are also the findings of a study on HIV, STIs, and sexual behaviors (19). This clearly illustrates the **multiple risks within sexual risk behaviors** of MSM. And to address the issues of HIV transmission among and from MSM to general population, any HIV prevention interventions targeting MSM should be designed to address these concurrent sexual risk behaviors.

Drug Use Behavior (injecting and non-injecting drugs)

Both the use of licit drugs (e.g., alcohol) and illicit drugs (e.g., amphetamines, cocaine, heroin, steroids) may be part of a culture where MSM meet. In some groups of MSM, drug use, including injecting drugs, is prevalent. Thus, many HIV prevention services targeting MSM should also address drug use (32). In addition, injecting drug use behavior is considered a very important risk factor for HIV infection through blood-borne transmission mode. Among 509

MSM who enrolled in a survey on HIV risk and the overlap of injecting drug use and high-risk sexual behaviors among MSM in Zanzibar (Unguja), Tanzania, 14% (n=66) reported injecting drugs in the past 3 months of whom (66% used heroin, 60% used a needle after someone else, and 68% passed a needle to someone else after using it) (38). Another study in Bangkok, Thailand observing the trend in HIV prevalence and risk factors among MSM from 2003 to 2007 observers found an increased trend in the use of amphetamine-type stimulants and benzodiazepines which are mainly used by MSM to prolong sexual pleasure. Drug use in the last 3 months increased from 3.6% in 2003 to 17.5% in 2005 and 20.8% in 2007 with $p<0.001$ for trend. And more importantly, this trend was also observed in using drug during the last sex. (0.7% in 2003, 1.5% in 2005, and 5.5% in 2007; $P <0.001$ for trend) (21).

Overlapping risks ("three in one" and PLUS)

When drug use behavior is associated with sexual risk behaviors, the risks for HIV infection are considered as two risks in one individual. For instance, drug users have sex with CSWs or vice versa, and female drug users sell sex to support their drug use behavior. Among MSM, the overlap of heterosexual, homosexual and drug use with various mixtures of related risk behaviors may be considered as "three in one" risk which makes risk behavior mode among this group more and more complex. Evidence from the Sexual and Drug Use Behaviors Sections mentioned above more or less illustrates this point. Further review of the mentioned-above studies will highlight the overlap cutting across these two categories of risk behaviors for HIV infection among MSM. Another finding from the study conducted among gay bar in Japan, showed that drug use was associated with unprotected anal sex in the 25-34 age group (37). In the study conducted among MSM in Tanzania, MSM-IDU were significantly more likely to have

two or more non-paying male receptive sex partners; to have engaged in group sex in the past month; to have symptoms of a sexually transmitted infection in past 6 months; and to be infected with HIV and co-infected with HIV and HCV compared to MSM who did not inject drugs (38). MSM-IDU were less likely to have used a condom at last sex with a non-paid female partners and to know where to get a confidential HIV test and to have ever been tested for HIV compared to MSM who did not inject drugs. One of the highlights of this study is the overlap included **risk perception** (ever been tested for HIV) with sexual risk behaviors and drug use behaviors; this combination of three risk factors might increase the chance of getting HIV among MSM.

Bridging Risks (from MSM to the general population)

Complex risk factors for HIV infection among MSM may inevitably serve as a bridge to transmit HIV from the group to the general population. Potential bridging risks were studied in the context of their heterosexual relationships with female partners. When MSM have unprotected sex with their male partners and may also have unprotected sex with women, they can bridge to the general population. For instance, Chow *et* al., tried to estimate HIV incidence among female partners of bisexual men in China and found that "the average Chinese MSM had approximately 0.89 (95% confidence interval (CI) 0.68-1.23) female sexual partners, with a mean number of total penetrative acts with the female partners of 0.57 (95% CI 0.52-0.62), in the past 6 months. Condom usage increased slightly from 23.57% (95% CI 14.20-32.93%) in 2002 to 27.33% (95% CI 19.88-34.78%) in 2010. Thus, the substantially increasing HIV prevalence among MSM has led to an increase in HIV incidence among partners of bisexual MSM of approximately 5.3-fold, from 0.18 per 1000 person-years in 2002 to 0.88 per 1000 person-years in 2010. It is concluded that

Bisexual Chinese MSM may be a bridge group to the general female population for HIV transmission. There has been a substantial HIV incidence increase among their female partners" (39).

In short, the following statement from Baral *et* al., fully describes HIV risk behaviors among MSM in low- and middle-income countries characterized by single risks, multiple risks, overlap and bridging risks as described above: "Individual-level acquisition risks have focused on the highest probability exposure: unprotected anal intercourse, and specifically on receptive anal intercourse. Use of "party" or "club" drugs has been associated with heightened sexual exposure risk among MSM, and, as with men who only report sex with women, HIV transmission in MSM is associated with genitourinary disease. However, the high frequency of male partners and a high lifetime number of male partners are also relevant" (12).

Evidence of HIV risk factors among MSM in Vietnam

In Vietnam, HIV risk factors among MSM were studied in the early days of the epidemic when MSM were not yet recognized as a high-risk population for HIV transmission. The risk factors recognized globally and regionally have been increasingly studied in Vietnam. In 1999, one manuscript showed an initial understanding of the gaps in HIV knowledge and risk behaviors of a group of gay men in Nha Trang Beach of Vietnam (40). In it, a vague understanding of "Body fluids" led to a misconception among the MSM that anal sex should be safe because the anus is dry and oral sex should be less safe because the mouth is wet. Along with the expansion of HIV interventions to MARPs including MSM, HIV knowledge among MSM has improved over time. A 2001 cross sectional survey in Vietnam of 219 MSM in HCMC found that most participants correctly identified high-risk sexual behaviors and that body fluids could transmit HIV, however,

risk perception was still very low (fewer than one third believed that homosexuals were at increased risk for HIV) (41).

More recent studies show an increase in correct knowledge about HIV prevention. In another 2004 cross sectional study in HCMC, 78% of participants believed that always using condom during anal sex could prevent HIV transmission and 93% correctly answered that sharing syringe and needle may transmit HIV Despite low proportions of condom use which was generally lower than 65% in all studied groups, the proportion of taking HIV test in this study was very low too – only 19.5% ever tested for HIV (31). There might have been many reasons for not taking HIV test in 2004, but this finding one more time showed that good HIV knowledge does not always pair with self-rated risk for HIV among MSM.

From the 1990s through the early 2000s, understanding on sexual risk behaviors among MSM became apparent over time. If masturbation and oral sex were the commonest sexual activities with occasional anal sex among MSM as reported by Wilson in 1999 (40), anal sex, vaginal sex and selling sex in association with condom use were more often reported in early 2000s. In 2001, Colby found that only 40% of his 219 study subjects used condoms during their last anal intercourse, 56% used condom during vaginal sex, almost half of them have anal sex with non-regular male partners in the previous 6 months, 31% earned money by selling sex and 25% of those reporting anal sex with clients never used condom during anal sex with them (41). In 2004, Nguyen found the association between HIV risk factors with HIV infection among 600 MSM. This study showed that selling sex (OR = 8.61; 95% CI, 1.20–61.69) and having more than five male anal sex partners in the past month (OR = 2.43; 95% CI, 1.14–5.17) were two of five risk factors independently associated with HIV infection. In both Colby and Nguyen's studies, sexual risk

behaviors in heterosexual relationship among studied MSM were also reported; 4 of 53 MSM reported selling sex in Colby's study had both male and female clients. In Nguyen's study, the proportion of consistent condom use during the last 6 months with non-commercial female partners (26.3%) was much lower than with commercial sex workers (68.8%) (31).

Understanding MSM drug use behavior has grown since Colby's study in 2001 which indicated only 2% (5 of 219) participants reported recreational drug use (41). Findings from Nguyen's study in 2004 showed 6% of 600 participants ever used drugs, but higher proportions among bisexuals and heterosexual men selling sex (20.8% and 11.1% respectively). Injecting drug in the last 12 months (OR = 30.35; 95% CI, 6.49–141.90) was one of 5 risk factors independently associated with HIV infection (31). In 2002- 2005, a large scale (n= 1270) ethno-epidemiological study of out-of-treatment male heroin users in Hanoi, Vietnam was being conducted by Youth at Risk Project and Hanoi Medical University (42). Although the study did not target male sex workers, 79 male sex workers were found eligible for the study and included in a comparison of drug use and sexual behaviors between them and the non-sex worker group in the sample. Sex work in this study was defined as the exchange of oral or anal sex with another male with the expectation of payment in the form of money, drugs, clothing, shelter, or other types of material compensation. Although the survey instrument was not particularly designed to study high risk behaviors in the context of male sex work, findings of this study are critical. While the level of heroin dependence is relatively comparable between the two groups, male sex workers were significantly more likely to described their heroin smoking as their most frequent mode of administration (50.6% v. 31.4%, $P<0.01$). Interestingly, male sex workers were significantly more likely to be current users of a wide range of non-heroin drugs including MDMA, 7.6% v.s 2.7%,

P<0.05), amphetamines (12.7% v. 3.9%, P<0.001) and morphine (3.8% v. 1.0%, P<0.05), have partners who injected before sex (P<0.001), and have partners who injected during sex (P<0.01). More explanations are needed behind these figures to better justify actual overlapping risks crossing drug use and sexual behaviors and male sex workers in this study. The sample could not represent male sex work in Hanoi as well as MSM in Vietnam, but the findings here implied a relationship between drug use (including non-heroin use and non-injecting drug administration) and sexual behaviors among MSM.

The two rounds of IBBS in 2006 and 2009 were a step forward to understand more comprehensively the role of male-to-male transmission in the overall picture of HIV epidemic in Vietnam. Many indicators for drug use and sexual risk behaviors were compared between IBBS Round I and Round 2 (7). Particularly in HCMC, consistent condom use with male partners in the past month and with female partners in the last 12 months dropped precipitously from 2006 to 2009 [– Figure 34] (7). An increase in drug injection from 2006 to 2009 was also observed among both MSM who sold sex and MSM who did not report selling sex; drug injection increased from 5% in 2006 to 8% in 2009 among MSM who had sold sex [– Figure 37] (7). Furthermore, HIV prevalence among the injecting group is higher than that in non-injecting group, 23% and 19% respectively [– Figure 38] (7). The proportion of MSM ever tested for HIV was also lower in 2009 with 19% compared to 24% in 2006 [– Figure 41] (7). These data somehow raised a question on adequacy of interventions for MSM in HCMC as a converse trend between 2006 and 2009 was observed in many of these indicators for MSM in Hanoi.

Conclusions about knowledge gaps

Findings from current research on HIV prevalence and risk factors among MSM in Vietnam have been consistent with international evidence. HIV risk perception, sexual and drug use risk behaviors as well as the overlap between them and the bridge of HIV transmission through these behaviors from MSM to general population were the focus of most studies and research. The magnitude of male-to-male HIV transmission is now apparent in Vietnam, and it now draws more attention and efforts to address HIV epidemic among MSM.

Current interventions for MSM in Vietnam are mainly supported by PEPFAR and international donors and they have not been evaluated to define the effectiveness and impact in decreasing HIV prevalence among this population. However, as reviewed by Vietnam Administration for AIDS Control (VAAC), Ministry of health, "MSM targeted interventions are so low in coverage and scattered that few can access the interventions" and the current intervention is being implemented with "inconsistent direction" (43).UNAIDS representatives also highlighted the need to improve quality of MSM targeted interventions in Vietnam by prioritizing "MSM-specific strategies", promoting programs for "MSM particularly vulnerable to HIV infection such as sex workers, drug users, etc.", **and studying more about MSM sub-populations** (44). In addition, findings from studies and current interventions for MSM mostly covered the situation in major urban areas of Vietnam while HIV prevalence of 0% (95% CI: 0 – 1.25%) was found among MSM in a rural area of Vietnam in 2005 (45).

This contrast should be taken as a great opportunity for HIV prevention. More in-depth and updated understanding on risk behaviors and their trend of the population in the areas with high level of male homosexual visibility and HIV prevalence among MSM is extremely important to

design and test more adequate interventions, and in turn, the selected effective interventions should be scaled up as soon as possible in lower prevalence areas.

Despite the gradual growth in knowledge and understanding within the group, existing data still hold gaps in understating the MSM sub-populations that could be filled by future studies and research. Namely,

> Current studies and research on MSM in Vietnam have not only provided the overall picture of HIV epidemic among the population as a whole, but also looked at the issue at sub-population level. In many studies, MSM were categorized by many of their social and behavioral characteristics: level of their homosexual visibility (hidden or unhidden (46), transvestite or non-transvestite (31), types of sexual behavior – whether they sell sex or not (7), or whether they are bisexuals or homosexuals only (31). Taking IBBS 2009 as an example, while MSM were categorized by selling sex and non-selling sex groups, FSW is categorized by street-based and venue-based groups (7). Practical observation on the network of FSW in Vietnam has proved the difference between street-based and venue-based FSW groups that led to the respective difference in designing and implementing intervention for each group. And from intervention perspective, "sexual contact networks need to be used as networks to disseminate information about HIV/AIDS" (40) and deliver behavioral intervention. However, a summary of characteristics varied by locations/venues where MSM congregate their male partners and network with their peers is still missing for MSM population in Vietnam. Some studies reached MSM through their internet network and provided a description of its member's characteristics such as unpublished study "Implementation of Web-based RDS among MSM in Vietnam" by Bengttson L. *et* al.

But the question whether street-based MSM differ from venue-based MSM has not been answered. Using secondary data from TLS could provide a comparison of demographic and HIV-related characteristics between MSM recruited from street-based versus facility-based venues in HCMC.

Another possible comparison to examine is the difference in risk between HIV-negative MSM and HIV-positive MSM. IBBS 2009 provided findings on the greater HIV prevalence among MSM who inject drugs vs. MSM who do not inject drug and concluded that drug injection appeared to be associated with HIV infection among MSM (7). Conversely, it might be useful for intervention design if the prevalence of risk behaviors among HIV positive and negative MSM are defined and how they are differed between the groups. There might be a similar finding for MSM in Vietnam as was found in a study among MSM in Pakistan and another study in the US where positive respondents tend to have higher risks for HIV infection (2, 47) but also higher knowledge on HIV and STD (2); or the finding might be completely different for MSM in Vietnam. This comparison has not been investigated in Vietnam; and using given sub-dataset of the primary study with the results of HIV laboratory tests may be an opportunity for the thesis to study it.

The knowledge gained from the thesis will help design tailored messages and interventions for the three new MSM sub-populations studied, if there are differences in risk behaviors and HIV related characteristics found between them. Findings with no differences would support continuation of current interventions targeting other sub-populations such as selling sex or non-selling sex MSM; and current outreach methods (e.g., internet-based).

III. Method

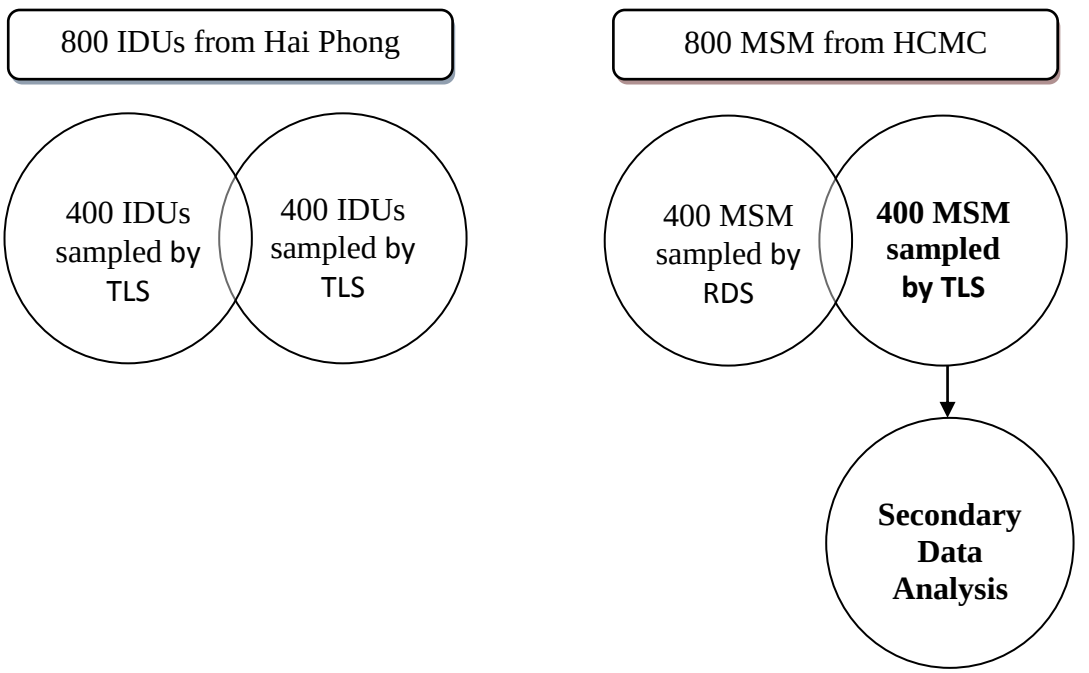
This is a secondary data analysis from the primary study "Comparison of Sampling Methods on MARPs used in Vietnam HIV Surveillance: Respondent Driven Sampling (RDS) vs. Time Location Sampling (TLS)" conducted by Partnership in Health Research (PHR) in 2011-2012. Ethical approvals for the primary study were obtained from the IRB of the Hanoi School of Public Health in Hanoi, FHI, and CDC (8). Ethical approval for the secondary data analysis using the sub-dataset of TLS of 400 MSM in HCMC was obtained from PHR and Emory University.

Study design and sample size

Primary study (8):

Four cross-sectional surveys among IDUs using TLS and RDS were concurrently implemented by separate study teams in Hai Phong and in HCMC among 800 MSM (400 by TLS and 400 by RDS) (Figure 1).

Figure 1. Diagram of Primary Study Design



For the survey on 400 MSM using TLS, geocoding of records identified a list of venues, including time, estimated number of eligible participants, and demographics characteristics. The size estimate was cross-checked between the geocoding mapping and interviews of study participants. After developing the sample frame using mapping data, the study team used probability proportionality to select recruitment clusters. An equal number of participants per cluster were invited to the study.

A mobile study center team recruited and interviewed participants at each cluster following the sampling calendar. The mobile center helped potential participants feel more comfortable (e.g., they did not need to travel a long distance to the study center). To track non-responders, log forms recorded reasons for refusal.

***Inclusion criteria**:*

- Self-reported sexual activities (i.e., manual, oral or anal) with other men at least once within the past 12 months
- At least 16 years old
- Willing and able to provide consent

***Exclusion criteria**:*

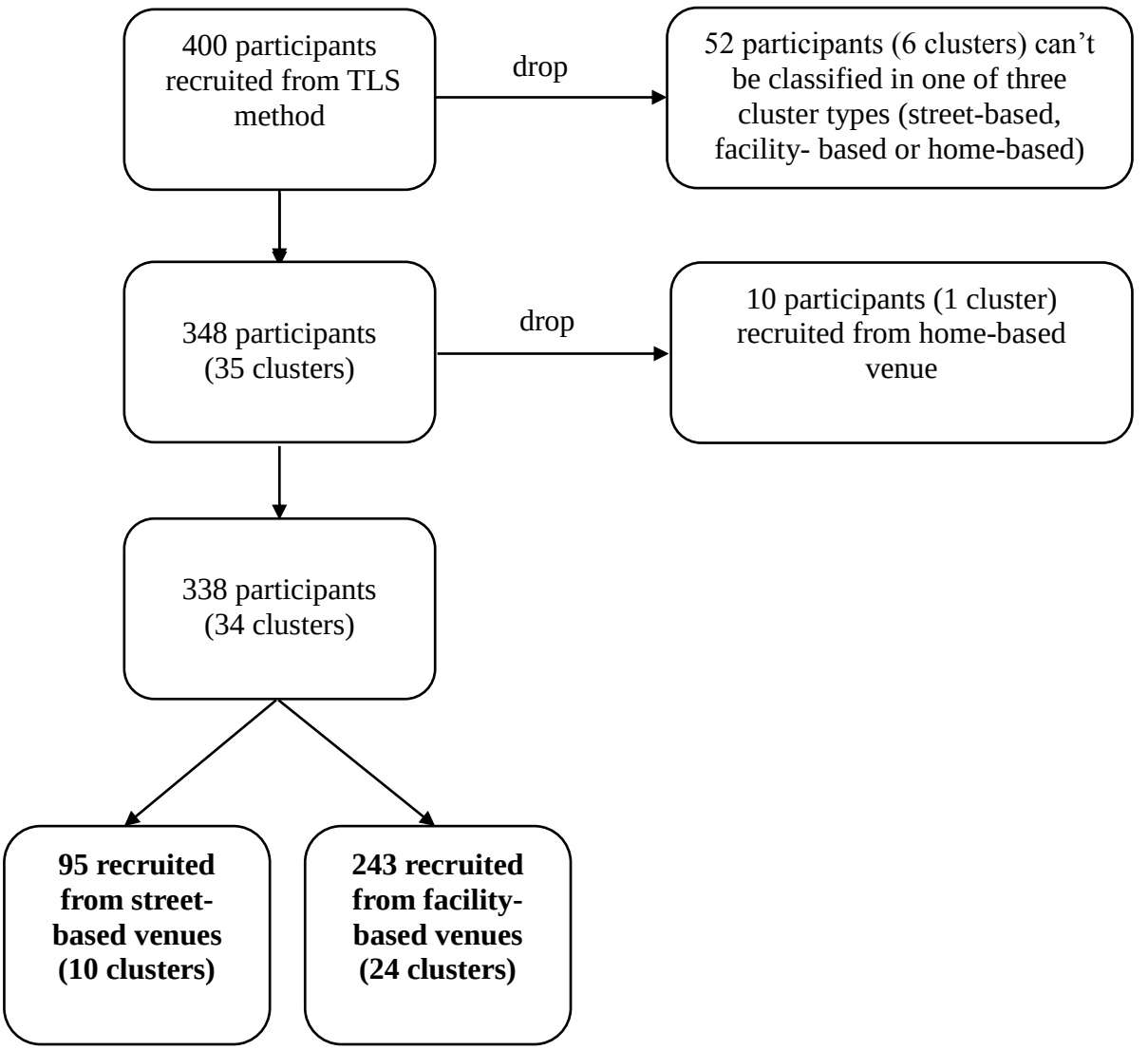
- have any other condition that would preclude provision of consent, make participation in the survey unsafe, complicate interpretation of survey outcome data, or otherwise interfere with survey objectives
- already participated in the survey

Forty-one clusters were defined from the list of 214 venues, including street-based, facility-based, and home-based venues (Table 1). Approximately 10 eligible participants were recruited per cluster to achieve the sample size of 400 participants for the TLS survey of MSM in HCMC.

<u>Secondary data analysis:</u>

To compare MSM recruited from street-based vs. facility-based venues, 52 participants from six clusters who cannot be classified into either one of the three type clusters (street-based, facility-based and home-based venues) and 10 participants from one home-based cluster were excluded from the secondary data analysis. The reason to exclude the cluster with home-based venues is that their being recruited at house/rent house/guesthouse cannot define where they actually congregate with their peers and networks, and the number of these participants was only 10 out of total 400. (Figure 2)

Figure 2. Participants Recruited in a Secondary Data Analysis of the Primary Study



Thirty-four clusters (338 participants) were analyzed of which 10 included 95 participants recruited from street-based venues only and 24 included 243 participants recruited from facility-based venues only (Figure 2).

Measurements

Primary study (8)

- Social and economic characteristics of IDUs/MSM (e.g., income, occupation)
- Drug use and needle sharing behavior (e.g., frequency and places to inject/buy drugs, time spent on injecting at home versus public settings)
- Sexual behavior (e.g. partners, condom use, attitude towards sexual risks and relationship's dynamic, frequency (how frequent) and places (how many) they go out to meet their friends/sex partners, amount of time on MSM website
- HIV knowledge and attitude
- Access to intervention programs
- Number of (non-health care) participants have disclosed their drug use/MSM behavior
- Proportion of participants overlap between 2 studies

Participants of TLS survey were also asked how frequently they attend the venue where they had been recruited and what other venues they had visited in the past month to inject/seek sex partners?

Laboratory tests

To determine HIV status according to national guidelines, blood samples were tested using a rapid test (Determine (Abbott, Japan)) to detect HIV infection. Confirmed was made by two EIA tests: Genscreen HIV 1/2 (Biorad, US) and Murex HIV 1/2 (Murex Biotech, UK).

Polymerase chain reaction (PCR) for *N. gonorrhea* and *C. trachomatis* was performed from urine and rectal swabs from MSM. These specimens were stored in a cool box until transported to the processing laboratories in Hanoi and HCMC. These specimens were frozen at –20ºC, batched, and tested according to the manufacturer's directions.

Syphilis serologic testings were processed using a quantitative rapid plasma reagin (RPR) screening test with a qualitative *Treponema palladium* hemagglutination assay (TPHA) confirmation test.

To detect the use of opiates and amphetamines, urine samples were tested using the SureStep OPI One Step Opiate Test Device kit (produced by Innovacon Inc., USA).

Secondary data analysis:

To compare MSM recruited from street-based vs. facility-based venues, key variables from the primary dataset were selected (Table 1).

Table 1. Variables Studied of MSM recruited from Street-based versus Facility-based Venues, HCMC 2011 – 2012

Variables	Definitions	Clarifications
Street-based MSM	Eligible MSM recruited in parks, streets, bus stations	Using definitions of the primary data
Facility-based MSM	Eligible MSM recruited in bars, massage, karaoke bars,	Using definitions of the primary data
Age	Years	Using definitions of the primary data
Education Level	1 = No schooling 2 = Primary (Grade 1-5) 3 = Secondary school (Grade 6-9) 4 = High school (Grade 10 – 12) 5 = College, university (> grade 12)	Using definitions of the primary data

Variables	Definitions	Clarifications
Status of marriage	1 = Single 2 = Married	Using definitions of the primary data
Living with partners	1 = Male partners 2 = Female partners	Using definitions of the primary data
Employment status	1 = Stable if being Government employee, Business person 2 = Unstable if being Farmer, Entertainment employee, Sales clerk, Self-employed 3 = Unemployment if being Student, Sex workers	
Income	1 = Low income if monthly salary is under 6 million VND 2 = Average income if monthly salary is equal or higher than 6 million VND	Re-categorized from primary data based on published figures (48)
Sexual Orientation	1 = “Prefer men as partners only” 2 = “Prefers men to women as partners” 3 = “Prefers women as much as men” 4 = “Prefers women to men as partners” 5 = “Prefer women as partners only”	Using definitions of the primary data
Type of sexual partners during the last month	1= Male partners 2 = Male clients 3 = Male sex workers 4 = Female partners 5 = Female clients 6 = Female partners	Using definitions of the primary data
Type of drug use by self-report	1 = used all types of drugs listed in the questionnaire 2 = used any type of opiate drugs: opium and heroin 3 = ever used ATS drugs over the last 30 days	Using definitions of the primary data (Self-report Data)

Variables	Definitions	Clarifications
Urine test Result for Opiate Drug Use Status	1 = Positive 2 = Negative	Result of laboratory test from the primary study
Combination of self-report on opiate drug use and urine test result for opiate drug use status	Either reported having ever used opiate drug over the last 30 days OR had positive result from urine test for drug use opiate	This is a new variable created from "Type of drug use by self-report" and "Urine test Result for Drug Use status" variables; and considered the most accurate measurement of drug use status using 2 assumptions: 1) those who reported using drug are actually used drug over the last 30 days; 2) Urine test result cannot provide accurate result if participants did not use drug 3-4 days before the survey conducted.
HIV knowledge	1 = Satisfactory if answering correctly 7/7 questions on HIV knowledge 2= Unsatisfactory if answering incorrectly 1 of 7 questions on HIV knowledge	Re-categorized based on regulation of Vietnam Ministry of Health (49).
HIV status by self-report	1= Positive 2 = Negative	Self-report Data from the primary study. Included those who had HIV test only to compare with test result
HIV status by test result	1 = Positive 2 = Negative	Result of laboratory test from the primary study
Access to HIV services	HIV services that participant received in the last including HIV knowledge, education, prevention supplies, and HIV test	Refer to questions 1201, 1301, 1210, 1211, 1308, 1310 and 905, Annex 1
Networking	The hot-spots/sites where participant contact/congregate peers during the last week	Refer to question 1407, Annex 1

HIV interventions targeting MARPs in Vietnam use person-to-person education through a peer-education approach as a key method to reach hidden populations and bridge them with knowledge about HIV services. It takes time for peer educators to build a rapport with the target population. Thus, it is necessary to understand the characteristics of the group (e.g., age, education level, income and employment status) and venues where the target population congregate to facilitate the rapport and build trust. In addition, understanding the level of HIV knowledge and risk behaviors (e.g., sexual orientation, sexual behavior, drug use behavior and HIV status) is critical to design HIV prevention strategies.

I tested the null hypothesis that "there is no difference in MSM recruited from street-based venues and versus facility-based venues". Outcomes will indicate if different prevention strategies are necessary.

To compare risk factors of HIV-negative MSM vs. HIV-positive MSM, key variables from the primary dataset were chosen (Table 2).

Table 2. Variables Chosen to Comparison of HIV-negative vs. HIV-positive MSM, HCMC, 2011 – 2012

Variables	Definitions	Clarifications
Risk Perception		
Self-Assessment of HIV acquiring risk	1 = Yes 2 = No/ Don't know	Using the definitions of primary data/study
The most reasons for self-assessment of having HIV acquiring risks	1 = Because I often change sex partners 2= Because I don't always use a condom 3= Because I inject drugs	Using the definitions of primary data/study

Variables	Definitions	Clarifications
	4 = I believe my partners may be infected 5 = I have anal sex 6 = I have sex with FSW 7 = My friends are infected 8 = Others	
The most reasons for self-assessment of not having HIV acquiring risks	1 = I am faithful 2 = I always use condoms 3 = I have never injected drugs 4 = I believe my partner is not infected 5 = I don't have anal sex 6 = I never have sex with FSW 7 = I have never had blood transfusion 8 = None of my friends are infected 9 = Others	Using the definitions of primary data/study
Opinion on an appropriate frequency of HIV test	Number of months (once/number of months) 00 = Others 88 = Don't know 99 = no response	Using the definitions of primary data/study
Sexual Behaviors		
Number of male partners having anal sex with during the last month	Number	Using the definitions of primary data/study
Being receivers in anal sex with male partners during the last 12 months	1 = Yes 2 = No	Using the definitions of primary data/study
Condom use in anal sex with male partners during the last month	1 = Always 2 = Others	"Others" meant all other options rather than "Always" included in the questionnaire of the primary study

Variables	Definitions	Clarifications
Condom use in anal sex with male clients during the last month	1 = Always 2 = Others	"Others" meant all other options rather than "Always" included in the questionnaire of the primary study
Condom use in anal sex with male sex workers	1 = Always 2 = Others	"Others" meant all other options rather than "Always" included in the questionnaire of the primary study
Drug use Risk Behaviors		
Self-reported ever used opioid drug	1 = Yes 2 = No	
Positive with urine test for opiate drug use	1 = Positive 2 = Negative	
Combination of self-report on opiate drug use and urine test result for opiate drug use status	Either reported having ever used opiate drug over the last 30 days OR had positive result from urine test for drug use opiate	Refer to the same variable in Table 1
Ever injected any type of drugs		Using the definitions of primary data/study
Ever injected needle & syringes used by others		Using the definitions of primary data/study
Overlap risk behaviors		
Ever have sex while high on drug		Using the definitions of primary data/study
No condom use in the last anal sex while high on drug		Using the definitions of primary data/study
Having low knowledge and risk perception AND injecting used syringe and needles	Interaction of either of (Q1203, 1204, 1208) AND Q1110	Refer to questionnaire of the primary study in Annex 1
No condom use in anal sex with male partners including male sex workers and male clients	Interaction of Q1309, 1409, and 1509	Refer to questionnaire of the primary study in Annex 1

Variables	Definitions	Clarifications
Having low knowledge and risk perception AND injecting used syringe and needles AND no condom use in anal sex with male partners including male sex workers OR male clients	Interaction of either of (Q1203, 1204, 1208) AND Q1110 AND either of (Q1309, 1409, 1509)	Refer to questionnaire of the primary study in Annex 1

To define HIV-risk behavior between HIV-negative and HIV-positive MSM, variables were placed into four categories: risk perception, sexual risk behavior, drug use risk behavior, and overlapping risk. These categories were determined based on the literature review and field experience.

I tested the second null hypothesis that "there is no differences between HIV negative and HIV positive MSM". Again, outcomes will indicate if different prevention strategies are necessary.

Analysis

Data weighting

Data were weighted to ensure that the probability of being recruited into the study was the same for each participant. Compulsory for the surveys using TLS methods, clusters were selected with the probability proportion of size and equal numbers of participant were recruited at each cluster. This means that, the probability proportion of participants in clusters with large numbers of eligible participants is smaller than those participants selected from clusters with fewer eligible participants. This strategy led to self-weighted samples and adjustments during the analysis should not be necessary.

However, enumeration during mapping may have been differed from the total count found at recruitment. The study team may have not recruited the same number of participants in each

cluster during data collection. Therefore, weighting was performed during analyses. Two indicators of each cluster were collected during data collection for weighting: (1) number of the target population during recruitment, and (2) number of participants completing the survey. A "p" weight for each cluster was calculated, and point estimates and standard errors were adjusted accordingly using STATA (StataCorp LP, 2011), (Annex 2).

Data analysis

Using STATA version 12.0 (StataCorp LP, 2011), univariate analysis was performed to compare: 1) characteristics of MSM recruited from street-based versus and facility-based venues (Table 1); and 2) risk factors of HIV-negative versus HIV-positive MSM (Table 2). An alpha of 0.05 was used as the level of significance. All continuous and categorical variables were checked to meet assumptions for the application of two-sample, independent t-test and chi-square test. Two sample independent T-tests were used to compare the means of continuous variables, and Chi-square was used to compare the proportions of categorical variables.

Univariate, unadjusted associations between HIV-positive status and each risk factor were calculated using logistic regression. An alpha of 0.20 was used as the level of significance. To calculate adjusted associations, all variables statistically significantly associated with HIV-positive status in the univariate analysis were loaded into a multivariable logistic regression model. Besides the independent variables found significantly associated with HIV status in the univariate analysis, variables of "Age" and "Recruited Venues" were loaded into the model for adjustment.

IV. Results

Comparison between MSM recruited from street-based versus facility-based venues

Demographic characteristics

There were no significant differences found between the two groups regarding demographic characteristics (Table 3). MSM in both groups were < 30 years old (range 27 – 28 years old). The education levels in both groups were greatest at the high school level (36% and 38%), followed by secondary (32% and 28%) and college levels (17% and 20%). Despite being insignificant, MSM recruited from facility-based venues had a higher proportion of "no schooling" compared to MSM recruited from street-based venues (2.5% vs. 0.7%). The prevalence of "single status" was high in both groups (94% and 84%). Only 8% – 10% MSM in both groups were living with a male partner. Both groups reported small numbers "living with a female partner" (1.2% and 4.5%). Employment status was unstable in both groups. Only 15% of street-based and 24% of facility-based MSM reported having stable jobs. More than half of both groups held unstable jobs. Thirty-one percent of street-based and 21% of facility-based MSM were unemployed. As a result, monthly income over the past year for both groups was quite low, most had monthly income < 6 million VND (75% and 81%).

Table 3. Comparison of demographic characteristics between MSM Recruited from HCMC Street-based versus Facility-based Venues, 2011 – 2012

Variables	Street-based (n = 95) Mean/% (SE) [95% CI)	Facility-based (n = 243) Mean/% (SE) [95% CI)	p-value	Missing Values
Age (years)	27.90 (1.04) [25.8 – 30.0]	27.36 (1.05) [25.2 – 29.5]	_	0
Education Level				
No schooling	2.47 (0.01) [0 – 5.0]	2.47 (0.01) [0 – 5.0]	0.224	0
Primary (Grade 1-5)	14.22 (0.05) [3.9 – 24.5]	11.06 (0.02) [6.5 – 15.7]	0.549	0
Secondary school (Grade 6-9)	31.88 (0.05) [22.4 – 41.4]	28.15 (0.03) [22.9 – 33.4]	0.482	0
High school (Grade 10 – 12)	36.46 (0.06) [24.8 – 48.1]	38.17 (0.03) [32.5 – 43.4]	0.791	0
College, university (>12)	16.79 (0.07) [2.0 – 31.5]	20.14 (0.04) [11.6 – 28.7]	0.703	0
Marital Status				
Single	94.44 (0.02) [90.5 – 8.4]	89.44 (0.03) [83.3 – 95.5]	0.1536	3
Married	5.56 (0.02) [1.6 – 9.5]	10.56 (0.03) [4.5 – 16.7]	0.1536	3
Living with partners				
Male partners	8.31 (0.02) [3.8 – 12.8]	9.87 (0.03) [3.5 – 16.2]	0.679	0
Wife/girl friends	1.20 (0.01) [0 – 3.2]	4.48 (0.02) [0.8 – 8.1]	0.132	0
Current Occupation				
Stable	14.89 (0.05) [5.0 – 24.7]	23.60 (0.05) [12.5 – 34.6]	0.247	0
Unstable	53.79 (0.05) [43.0 – 64.5]	55.69 (0.04) [46.8 – 64.4]	0.792	0
Unemployment	31.33 (0.05) [20.6 – 42.0]	20.80 (0.03) [13.8 – 27.8]	0.093	0
Income over the last 12 months				
Less than 6 million VND	75.22 (0.06) [63.6 – 86.9]	80.93 (0.03) [74.2 – 87.7]	0.377	0
Equal or more 6 million VND	24.78 (0.06) [13.1 – 36.4]	19.07 (0.03) [12.3 – 25.8]	0.377	0

HIV-related characteristics

Similarly, there were no significant differences found in many HIV-related characteristics between MSM from street-based versus facility-based venues (Tables 4 - 6). Homosexuality was the dominant sexual orientation among participants; approximately ⅔ of MSM in both groups reported preferring men as partners (67% and 66%). Similarly, responses to "Type of sexual partners during the last month" revealed ⅔ of MSM in both groups reported having male partners in the last month (70% and 73%). However, MSM recruited from facility-based venues reported a significant greater proportion of female partners in the last month (11% vs. 1.6%, p= 0.028). Only ⅓ of participants in both groups could provide correct answers for seven questions on HIV knowledge (31.7% and 30%). MSM recruited from street-based venues reported a greater proportion of condom and lubricant use in the past 12 months (49% vs. 35%), but this was not significant (p= 0.088).

Despite their openness in reporting sexual orientation, MSM in both groups were not opened about reporting their HIV status. Only 0.36% of MSM recruited from facility-based venues reported being HIV positive, while no MSM recruited from street-based venues reported the same. Results from HIV testing showed that 9.02% of MSM from total participants were HIV positive.

Table 4. Comparison of HIV-related Characteristics between MSM Recruited from HCMC Street-based versus Facility-based Venues, 2011 – 2012

Variables	Street based (n=95) Mean/% (SE) [95% CI)	Facility-based (n=243) Mean/% (SE) [95% CI)	p-value	Missing Values
Sexual Orientation				
Prefers men as partners	66.59 (0.11) [44.2 – 89.0]	65.56 (0.05) [55.8 –	0.878	0

Variables	Street based (n=95) Mean/% (SE) [95% CI)	Facility-based (n=243) Mean/% (SE) [95% CI)	p-value	Missing Values
only		75.3]		
Prefers men to women as partners	19.29 (0.08) [2.5 – 36.1]	10.85 (0.02) [6.0 – 15.7]		2
Prefers women as much as men	4.16 (0.02) [0 – 8.3]	9.73 (0.03) [3.0 – 16.5]	0.932	2
Prefers women to men as partners	8.40 (0.04) [0 – 17.2]	10.73 (0.01) [7.7 – 13.7]	0.250	2
Prefer women as partners only	1.56 (0.01) [0 – 4.5]	3.12 (0.02) [0 – 6.5]	0.151	2
Type of sexual partners during the last month				
Male partners	70.01 (0.06) [57.5 – 82.5]	73.03 (0.05) [62.2 – 83.9]	0.712	0
Male clients (selling sex)	24.37 (0.07) [9.7 – 39.0]	22.87 (0.04) [15.4 – 30.3]	0.852	0
Male sex workers (buying sex)	4.48 (0.02) [0.25 – 8.71]	5.42 (0.02) [2.01 – 8.84]	0.733	0
Female partners	1.63 (0.01) [0 – 3.73]	11.00 (0.03) [4.47 – 17.52]	0.028	0
Female clients (selling sex)	0	1.86 (0.01) [0 – 3.83]	0.297	0
Female sex workers (buying sex)	1.20 (0.01) [0 – 2.24]	2.38 (0.01) [0.33 – 4.64]	0.432	0
HIV Knowledge				
Correct answers to 7 questions	31.73 (0.05) [21.33 – 42.13]	29.96 (0.03) [23.71 – 36.20]	0.766	0
Consistency of Lubricant and condom use during the last 12 months				
Yes	49.44 (0.07) [35.73 – 62.16]	34.86 (0.05) [24.97 – 44.75]	0.088	19
Self-report HIV status (among those had HIV testing)				

Variables		Street based (n=95) Mean/% (SE) [95% CI)	Facility-based (n=243) Mean/% (SE) [95% CI)	p-value	Missing Values
	Positive	0	0.36 (0.00) [0 – 1.10]	0.571	198
HIV test result					
	Positive	9.50 (0.03) [4.31 – 14.69]	9.50 (0.02) [5.09 – 13.83]	0.800	0

There were no significant differences between the two groups in accessibility to HIV related services (Table 5). Both reported having heard about HIV/AIDS (94% and 96%), having HIV education sessions during the last 6 months (56% and 59%), knowing where to get HIV test (70% and 76%), and having got HIV test (45% and 44%). In contrast, both groups reported low proportion of receiving syringe and needles and condoms during the last month (<1% in both groups).

Interestingly, there were no significant differences in networking venues between the two groups. Both reported congregating with peers in the following venues (a mix of street-based and facility-based venues): Cafes (44.8% and 40.8%), Street, Park and Lakeside (40% and 40.8%), street beer vendors (29.8% and 23.1%), and at home (11.5% and 12.7%). Only three facility-based networking venues: Bar/Discotheque, Sauna/Massage, and hotels were reported more frequently by MSM recruited from facility-based venues (16.7% vs. 12.8%, 19% vs. 13.6% and 12.5% vs. 7.8% respectively). However these differences were not statistically significant (p=0.563, p=0.392 and p=0.265, respectively). Surprisingly, MSM recruited from street-based venues reported a greater proportion of congregating with peers in two facility-based networking venues: Karaoke Bar (15.7% vs. 11%) and Cinema (9% and 4.2%). The difference in the cinema networking venue was statistically significant (p=0.051).

Table 5. Comparison of HIV-related characteristics between MSM Recruited from HCMC Street-based versus Facility-based Venues, 2011 – 2012 (continued)

Variables	Street-based (n = 95) Mean/% (SE) [95% CI)	Venue-based (n = 243) Mean/% (SE) [95% CI)	p-value	Missing Values
Access to services				
Ever heard about HIV/AIDS	93.85 (0.02) [89.3– 98.4]	95.69 (0.01) [92.7 – 98.5]	0.494	1
Number of safe sex education sessions received during the last 6 months	55.67 (0.08) [39.3 – 72.0]	59.44 (0.05) [50.2 – 68.7]	0.685	1
Number of times received syringes and needles during the last month	0.03 (0.18) [0 – 0.7]	0.03 (0.14) [0 – 0.6]	_	1
Number of times received condoms during the last month	0.83 (0.16) [0.5 – 1.2]	0.81 (0.14) [0.5 – 1.1)	_	22
Know where to get HIV test	69.71 (0.03) [63.2 – 76.2]	76.12 (0.04) [89.0 – 83.3]	0.192	0
Ever get HIV test	45.17 (0.06) [33.1 – 57.2]	43.95 (0.04) [36.0 – 51.9]	0.864	0
Networking				
Number of MSM known	24.41 (2.44) [19.4 – 29.4]	30.02 (2.89) [24.2 – 36.0]		1
The hot-spots/sites to contact peers during the last week				
Street, park or lakeside	39.46 (0.04) [31.1 – 47.8]	40.78 (0.05) [30.9 – 50.6]	0.837	0
Internet	13.32 (0.05) [4.1 – 22.5]	8.42 (0.02) [4.1 – 12.8]	0.288	0
Bar or disco	12.81 (0.05) [1.8 – 23.9]	16.73 (0.03) [10.3 – 23.7]	0.563	0
Cinema	8.95 (0.02) [5.5 – 12.4]	4.26 (0.01) [1.4 – 7.1]	0.051	0
Swimming pool	8.41 (0.03) [3.2 – 13.7]	10.67(0.03) [5.0 – 16.4]	0.560	0
Sauna/massage parlor	13.69 (0.05) [4.5 – 22.9]	19.06 (0.04) [11.2 – 26.9]	0.392	0
At home	11.52 (0.04) [2.4 – 20.6]	12.72 (0.03) [6.3 – 19.1]	0.831	0

Variables	Street-based (n = 95) Mean/% (SE) [95% CI)	Venue-based (n = 243) Mean/% (SE) [95% CI)	p-value	Missing Values
Hotel, guesthouse	7.81 (0.03) [1.7 – 13.9]	12.52 (0.02) [7.8 – 17.2]	0.265	0
Cafe	44.81 (0.08) [27.7 – 62.0]	40.82 (0.04) [33.5 – 48.2]	0.665	0
Street beer vendor	29.83 (0.05) [18.9 – 40.7]	23.14 (0.04) [15.0 – 31.3]	0.319	0
Karaoke bar	15.66 (0.03) [9.9 – 21.5]	10.97 (0.02) [7.2 – 14.8]	0.163	0
Other	3.56 (0.02) [0 – 7.7]	4.43 (0.01) [2.1 – 6.74]	0.724	0

There were no significant differences between the two groups in self-reported ATS and opium use or a combination of the two (Table 6).

Table 6. Comparison of drug use behaviors between MSM recruited from street-based versus facility-based venues

Variables	Street based (n = 95) Mean/% (SE) [95% CI)	Facility-based (n = 243) Mean/% (SE) [95% CI)	p-value	Missing values
Use ATS (self-reported)	14.95 (0.01) [11.9 – 18.0]	15.75 (0.02) [10.9 – 20.6]	0.774	0
Use opium (self-reported)	2.87 (0.02) [0 – 6.0]	4.08 (0.01) [1.1 – 7.1]	0.589	0
Positive with urine test (opiate test)	1.62 (0.01) [0 – 3.7]	9.51 (0.03) [4.3 – 14.7]	0.005	0
Combine self-reported opium used and urine test result for opiate drug	4.08 (0.02) [0 – 8.5]	11.57 (0.03) [5.3 – 17.8]	0.07	0

However, there was a significant difference between the two groups in opium use behavior confirmed by urine test, p = 0.005 (Table 6).

Table 7. Opiate drug test result between MSM Recruited from HCMC Street-based versus Facility-based Venues, 2011 – 2012

Recruited venues	Opiate drug test result		
	Positive n (%)	Negative n (%)	TOTAL n (%)
Street-based	2 (1.6)	93 (98.38)	95
Facility-based	26 (9.51)	217 (90.49)	243
TOTAL	28 (7.24)	310 (92.76)	338

PR= 2.53, 95% CI: 1.23 – 5.16, p-value = 0.013

MSM recruited from facility-based venues were 2.5 times more likely to use opiate drug over the last 30 days than MSM recruited from street-based venues with p = 0.013 and 95% CI: 1.2 – 5.2.

Comparison between HIV-positive and HIV-negative MSM

Among 338 participants, 337 accepted to take an HIV test and 29 were HIV positive for a total, weighted percent of 9.02%. The proportion of participants reporting risk for HIV acquisition was not statistically different between HIV-negative and HIV-positive MSM (p=0.45) (Table 8). Only ⅓ participants from either group reported a risk of HIV acquisition. Most (72.9% of HIV-positive and 61.4% of HIV-positive MSM) claimed the reason for having HIV risks is “because I don’t always use condom”.

However, the reasons for having acquiring HIV risk were statistically different between the two groups for various reasons: 18.7% positive MSM reported “because I inject” while only 4% negative MSM reported the same (p= 0.019); 21.8% positive MSM reported “because I have sex with FSW” while only 0.024% negative MSM reported the same (p=0.000); 21.8% positive MSM

reported “because my friends infected” while only 3.3% negative MSM reported the same (p=0.002) (Table 8).

Participants reporting NOT having risk for HIV acquisition were not statistically different between HIV-negative and HIV-positive MSM (p=0.45). Two-thirds of participants from both groups reported NO risks of HIV acquisition. The strongest belief for not having HIV- acquiring risks was consistent between HIV positive and negative MSM: “because I always used condom” (65% and 58%), “because I have never injected drugs” (55% and 36%), “I believe my partner is not infected” (22% and 32.3%). However, no statistical differences existed in the way both groups perceived the most reasons for NOT having HIV-acquiring risks.

Table 8. Comparison of HIV risk perception between HCMC HIV-positive and HIV-negative MSM, 2011 -- 2012

Variables	Positive (n = 29) Mean/% (SE) [95% CI]	Negative (n = 308) Mean/% (SE) [95% CI]	p-value	Missing Values
Self-Assessment of HIV acquiring risk				
Yes	36.38 (0.07) [21.4 – 51.4]	29.96 (0.03) [23.8 – 36.1]	0.450	0
No/ Don’t know	63.62 (0.07) [48.7 – 78.6]	70.04 (0.03) [63.9 – 76.2]	0.450	0
The most reasons for self-assessment of having HIV acquiring risks				
Because I often change sex partners	33.43 (0.16) [0.6 – 66.3]	40.32 (0.05) [30.0 – 50.6]	0.685	237
Because I don’t always use a condom	72.86 (0.16) [40.4 – 100]	61.39 (0.09) [44.0 – 78.8]	0.568	237
Because I inject drugs	18.69 (0.17) [0 – 52.7]	3.98 (0.02) [0 – 8.3]	**0.019**	238
I believe my partners may be infected	29.25 (0.15) [0 – 59.2]	11.72 (0.04) [4.1 – 19.4]	0.093	238

Variables	Positive (n = 29) Mean/% (SE) [95% CI]	Negative (n = 308) Mean/% (SE) [95% CI]	p-value	Missing Values
I have anal sex	10.32 (0.07) [0 – 25.39]	6.45 (0.02) [1.5 – 11.4]	0.501	238
I have sex with FSW	21.76 (0.13) [0 – 48.1]	0.24 (0.00) [0 – 0.8]	**0.000**	238
My friends are infected	21.76 (0.13) [0 – 48.1]	3.52 (0.02) [0 – 7.4]	**0.002**	238
Others	24.88 (0.17) [0 – 60.9]	18.96 (0.05) [7.0 – 28.9]	0.690	236
The most reasons for self-assessment of not having HIV acquiring risks				
I am faithful	13.48 (0.09) [0 – 32.4]	38.51 (0.05) [27.8 – 49.9]	0.073	133
I always use condoms	65.07 (0.12) [40.1 – 90.1]	57.78 (0.04) [49.5 – 66.1]	0.574	132
I have never injected drugs	55.05 (0.15) [25.1 – 85.0]	36.06 (0.04) [28.8 – 43.3]	0.231	132
I believe my partner is not infected	22.02 (0.10) [0.7 – 43.3]	32.28 (0.05) [22.9 – 41.6]	0.388	134
I don't have anal sex	0	7.81 (0.03) [1.4 – 14.2]	0.329	134
I never have sex with FSW	4.68 (0.05) [0 – 13.9]	7.48 (0.02) [3.5 – 11.5]	0.604	134
I have never had blood transfusion	4.12 (0.04) [0 – 12.0]	11.11 (0.03) [5.2 – 12.0]	0.195	135
None of my friends are infected	0	7.37 (0.02) [3.9 – 10.9]	0.223	134
Others	39.15 (0.12) [14.2 – 64.1]	25.55 (0.04) [18.9 – 32.9]	0.195	128

Sexual and Drug-use Behavior

There was no statistical difference between the two groups in any single risk behaviors selected in Table 9.

Regarding anal sex, they both reported very low proportion of having anal sex during the last month (1.1% and 1.5%). But they both had high proportions of being receivers in anal sex with male partners over the last 12 months (62.9% and 65.9%), always using condom with male sex clients during the last month (44.9% and 47.6%). The negative group had slightly higher

proportion of always using condom with male sex workers (38.4% vs. 28.5%) and lower proportion of always using condom with male partners (44.4% vs. 60.4%). But as presented in Table 9, these differences were not statistical significant.

Regarding drug-use, the negative group had a slightly lower proportion of reporting using/injecting drugs and had positive results to the opiate drug urine test. But no positive MSM reported injecting used syringe and needles while this proportion was 0.6% among negative groups. All of differences were not statistical significant.

Table 9. Comparison of sexual and drug use behaviors between HCMC HIV-positive and HIV-negative MSM, 2011 – 2012

Variables	Positive (n = 29) Mean/% (SE) [95%CI]	Negative (n = 308) Mean/% (SE) [95% CI]	p-value	Missing Values
Sexual Risk Behaviors				
Number of male partners having anal sex with during the last month	1.13 (0.21) [0.7 – 1.6]	1.53 (0.15) [1.2 – 1.8]	_	2
Being receivers in anal sex with male partners during the last 12 months	62.86 (0.14) [35.2 – 90.6]	65.86 (0.04) [57.8 – 73.9]	0.845	78
Condom use in anal sex with male partners during the last month				
Always	60.40 (0.09) [41.2 – 79.6]	44.44 (0.05) [34.0 – 54.9]	0.175	77
Condom use in anal sex with male clients during the last month				
Always	44.97 (0.23) [0 – 93.3]	47.62 (0.08) [32.0 – 63.3]	0.912	247
Condom use in anal sex with male sex workers				

Variables	Positive (n = 29) Mean/% (SE) [95%CI]	Negative (n = 308) Mean/% (SE) [95% CI]	p-value	Missing Values
Always	28.25 (0.18) [0 – 67.7]	38.44 (0.17) [1.2 – 75.7]	0.682	322
Drug use Risk Behaviors				
Self-reported drug use	21.05 (0.09) [3.4- 38.7]	19.70 (0.02) [15.3 – 24.1]	0.889	1
Positive with urine test for opiate drug use	9.53 (0.07) [0 – 23.7]	7.02 (0.02) [3.6 – 10.5]	0.648	1
Combine self-reported opiate drug use and urine test result for opiate drug use	26.09 (0.10) [5.0 – 47.2]	24.33 (0.02) [19.5 – 29.2]	0.868	1
Ever inject drug	5.60 (0.05) [0 – 16.3]	4.43 (0.01) [2.0 – 6.9]	0.790	3
Ever injected needle & syringes used by others	0	0.59 (0.00) [0 – 1.5]	0.641	3

Overlapping Risks

Overlapping risks in this secondary analysis were a combination of two or three risk factors. A combination of two risk factors was composed of sexual risk behavior AND drug use, low risk perception AND drug use behaviors, and no condom use in relationship with partners AND in transaction (selling/buying) sex with male clients/male sex workers. There were no significant differences between groups for overlapping risks of two risk factors. A combination of three factors was composed of low risk perception, sexual behavior, and drug use behavior. There was no participant reporting the overlap risk of the three risk factors.

Table 10. Comparison of overlap risks HCMC HIV-positive and HIV-negative MSM, 2011 – 2012

Variables	Positive (n = 29) Mean/% (SE) [95%CI]	Negative (n = 308) Mean/% (SE) [95%CI]	p-value	Missing Values
Ever have sex while high on drug	23.46 (0.08) [7.5 – 39.4]	15.90 (0.02) [11.2 – 20.6]	0.334	0

No condom use in the last anal sex while high on drug	54.07 (0.22) [9.5 – 98.6]	54.01 (0.10) [33.0 – 75.0]	0.998	281
Having low knowledge and risk perception AND injecting used syringe and needles	37.98 (0.08) [22.5 – 53.4]	49.66 (0.03) [43.6 – 55.7]	0.216	1
No condom use in anal sex with male partners AND male sex workers/male clients	49.59 (0.10) [28.3 – 70.9]	56.38 (0.04) [48.4 – 64.3]	0.577	1
Having low knowledge and risk perception AND injecting used syringe and needles AND no condom use in anal sex with male partners OR male sex workers OR male clients	N= 0 in both groups			

Risk factors associated with HIV positive status

In multivariate analyses, the education variable was categorized to Low = No schooling; Primary (Grade 1-5); Secondary school (Grade 6-9); High = High school (grade 10-12); and College University.

Table 11. Result of Multivariate Analyses to define risk factors associated with HIV positive

	Odds Ratio	95% CI	P-value
Low Education	4.85	1.41 – 16.65	0.014
Correct HIV knowledge	- 3.36	1.24 – 9.10	0.019

Adjusted for age, sampled locations, marital status, employment and heroin use in the last month

After all risk factors were loaded into the model, only "Education" and "Correct HIV Knowledge" were statistically associated with HIV-positive status. MSM with low education levels were 5 times more likely to be HIV positive than MSM with higher education level (adjusted OR = 4.85; 95%CI=1.41 – 16.65, p-value = 0.01) (Table 11). MSM with correct HIV knowledge were 3 times more likely to be HIV positive than MSM who did not (adjusted OR = 3.36; 95% CI=1.24 – 9.10, p-value = 0.019).

V. Discussion

Conclusions

There were no significant differences in demographic characteristics between MSM recruited from street-based versus facility-based venues. All had the characteristics commonly seen among MARPs in Vietnam such as average age, unstable employment status, low incomes, and unmarried status (Tran Hien, IBBS 2006, 2009). However, compared to CSW and IDUs in Vietnam, MSM participated in this survey had a higher education Level (IBBS). Therefore, it might not be necessary to design specific outreach approach to develop network/rapport and build trust for each group. It is critical that education programs provide a broad range of information and knowledge to meet the understanding and education levels of MSM. Despite the average high-education level, HIV knowledge among the participants was not high. In addition, condom and lubricant use was low between the two groups.

There still remains a small proportion of the participants in both groups who reported having sexual relationships with female partners. So behavior change interventions with focus on condom use in every single sexual intercourse with any type of sexual partners, especially female partners, should be strengthened. Even as participants are now more open about their sexual orientation, they were not as open about their HIV status. In both groups, the results of HIV testing showed a higher proportion of HIV-positive MSM compared to their self-reported HIV status. This is important for strategies to promote HIV-testing. There were no statistically

significant differences in HIV knowledge and HIV prevalence and condom/lubricant use between street-based and facility-based groups.

Interestingly, even though the participants were recruited from street-based and facility-based venues, there was no significant difference between the two groups in the locations of networking. Both groups tended to congregate with their peers. This may raise a question about the sampling method used in the primary study (see Limitation).

Although no significant differences were found between the two groups, the proportion of opiate drug use (confirmed by urine tests) among MSM recruited from facility-based venues was significantly greater than those from street-based venues. One may assume that MSM from facility-based venues tend to be in a higher socio-economic class and more affordable to drug use. But in this secondary data analysis, there were no statistically significant differences in incomes or current occupation between the two groups. So it is hard to explain the differences in opiate drug use between the two groups. Within the framework of this secondary analysis, it might be early to answer the question whether MSM in Vietnam has two sub-populations, namely street-based and facility-based MSM. Therefore, the terms of "MSM recruited from street-based and facility-based venues" were used throughout the thesis with focus on the sampling locations where they were recruited. However, the difference in opiate drug use might provide a question for further research.

There were no significant differences in HIV knowledge, HIV risk perception, risky sexual and drug use behaviors, or HIV-positive overlapping risks between the two groups. This finding is inconsistent with the results of some studies mentioned in the Literature Review Section (2, 50) that showed HIV-positive MSM tend to have greater risk for HIV infection due to more intensive

drug use, sexual behavior. Moreover, multivariate logistic regression results indicated that only "Education level" and "HIV knowledge" were statistically associated with HIV positive status. It is contradictory that MSM with higher HIV knowledge were more likely to have HIV infection compared with those who have less HIV knowledge.

However, this finding did not run in contrary to several global studies that show HIV-positive people are committed to safer behaviors compared to their negative peers. In a meta-analytic Review of Published Research, 1985-1997, the authors concluded that HIV negative person did not modify their behavior more than untested person and HIV positive person did reduce risky behaviors (51). Another cluster randomized trail looking at the impact of HIV Voluntary and Testing (VCT) in reducing HIV incidence in Zimbabwe found that highly acceptable VCT ***did not*** reduce HIV incidence in a mostly male cohort in Harare, Zimbabwe. The incidence rate was 1.37 among those receiving intensive VCT and 0.95 among those receiving standard VCT (52). Another prospective population-based cohort study in Zimbabwe conducted by Sherr L, et al also showed that person received HIV negative test result adopted more risky behaviors such as having higher number of partners, women who tested HIV-positive increased condom use and the HIV incidence rate is not differed between HIV testers and non-testers (53).

The contradictory findings between the two set of studies may be explained by the level and duration of accessibility to HIV interventions. Participants of the studies showing higher HIV risk among positive MSM may have limited access or shorter period of accessibility to VCT and other HIV services. In the absence of HIV interventions, both HIV negative and positive may have maintained their own behaviors as a nature and the results of these studies may have reflected the true risk of risky behaviors that HIV positive MSM engaged and the association between

their HIV positive and these risky behaviors. And these studies may have targeted MSM who had strong barriers to access HIV interventions in many settings. On the other hand, participants in the other set of studies showed reverse consequences of VCT to HIV negative persons who had actually accessed HIV testing and counseling services. Effective interventions may have resulted in safer behaviors among HIV positive people. Ineffective post-test interventions may have resulted in reserve consequences among HIV negative people. In addition, this set of studies may have mostly targeted general populations in generalized epidemic (Zimbabwe) where HIV interventions are more or less universal and have been implementing since 1980s (54).

In Vietnam HIV interventions for MSM are designed mostly based on initial understanding about MSM and lessons learned from interventions for IDUs and CSWs (43). MSM who were reached by the interventions may have good access to HIV knowledge and behavior education programs targeting both MSM and other MARPs for quite long period of time. It is recognized from the fact that HIV positive MARPs who got access to services tend to have very high level of HIV knowledge, especially those who are in ARV treatment program including HIV positive MSM. At the same time they also have high access to HIV studies and research. That is why the primary study tried to compare two sampling methods to see which one is more efficient in reaching hidden MARPs.

While the final findings of the primary study is not published yet, it is very likely that participants of the study, both HIV negative and positive, may have had long term accessing HIV education program as well as experiencing with HIV studies questions. For instance, more than 60% of studied participants received education and materials on safe sexual behaviors and more than 44% of studied participants got HIV test at least once over the last 12 months. Therefore, it was

hard to detect a significant difference in many self-report risk factors between the two groups. In result, both groups are similar in high rate of condom use, high level of HIV risk perception, etc. These results may be attributable to the effectiveness of HIV intervention targeting MSM – but, it might be also attributable to social desirable responses from the participants who may have been familiar with HIV research/study questions. Evidently, positive results to HIV test and opiate drug test were much higher than result of self-report on HIV status and drug use behavior (e.g., 9.02% vs. 0.36% for HIV status). So, the big question for HIV intervention targeting MSM in Vietnam may not be about the effectiveness of the program, but may be about the **coverage** of the programs – whether the program has reached the most at risk MSM who are the most in need of HIV intervention and services.

Another possible implication from this result is that HIV negative MSM have very similar risk behavior pattern with their HIV positive peers. If that is the case, it is really an alert for intervention programs. It might be hypothesized that some HIV negative participants may be in or close to window period (3) when they participated in the study and therefore, they were not detected positive with HIV test. Nevertheless, that HIV prevalence among MSM in HCMC increased sharply in 2009 as reported by IBBS round II and risk behavior pattern is similar between HIV negative and HIV positive MSM in this study may strengthen the knowledge on emerging HIV infection risk among MSM and the need for more comprehensive and specific HIV intervention for this population in Vietnam. And HIV negative MSM should be a focus of the intervention.

Limitations

The goal and objectives of this thesis focused on developing an understanding of the general characteristics and HIV-risk behaviors of varied MSM sub-populations are quite different with the goals of the primary study which focused on comparing two sampling methods. Therefore, some risky behaviors might be critical for the purpose of the thesis were not included in the dataset. For instance, there were no data on sharing syringe and needles among MSM drug users, or the urine test was applicable to opiate drugs only while one of the most risky behaviors known among MSM is the interaction between using club drugs or ATS and sexual demand/behaviors (55-57).

AIDS is a longitudinal disease with long period of non-symptom infection. It is always difficult for infected people to track what point of time and due to what behaviors they got HIV infected. Theoretically, a cross-sectional design as used by the primary study is ideal to provide a snapshot of frequency of a health event, but it is difficult to interpret identified associations (58). Thus, it might not be best to use this dataset to measure the association between risk factors and HIV status among studied MSM.

At this point of time, the primary study did not disseminate results on which sampling method (TLS or RDS) is better in reaching hidden MARPs. Thus, question about coverage and whether this dataset reflected the true risk of MSM most at risk is still not answered either. Although mapping exercise was applied methodically to collect data for the primary study, but as shared by the research team, the key informants who assisted with the mapping development are mostly from MSM who are defined as “low class”. The primary study may not have had access to “high-class” entertainment venues where “actual” high-class MSM congregate and network. The

facility-based venues included in the sample frame may be a sub-type of street-based venues or vice versa. Therefore, using this dataset to define the difference between street-based MSM and facility-based MSM may not be optimal.

Recommendations

Further research and studies are needed to better understand opiate and ATS drug use and their respective HIV infection risk among MSM in Vietnam.

Anthropological studies are needed to better define MSM sub-populations based on venues where they congregate and do network with their peers. If these kinds of sub-populations do exist with their distinctive characteristics and risks, specific interventions for specific sub-populations are needed (59) to ensure the effectiveness of HIV interventions targeting MSM in Vietnam (60).

Higher uptake of HIV testing for MSM should be continued and expanded to detect more HIV positive MSM and link them with HIV interventions and services. At the same time, those get tested with negative result should receive more intensive post-test follow-ups to continue the adoption of safe behaviors and keep up their negative status over time.

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Annexes

Annex 1: Questionnaire for men who have sex with men (MSM)

001 QUESTIONNAIRE IDENTIFICATION NUMBER |___|___|___|___|___|___|___|

002 CITY CODE

003 INVITATION COUPON NUMBER : |___|___|___|___|___|___|___|___|___|___|

004. NAME OF INTERVIEWER: _____Signature _____

006. DATE OF INTERVIEW: __/ ____ / ____

007. CHECKED BY LOCAL SUPERVISOR: Name: _____Signature _____

DATE CHECKED: __/ ____ / ____

008. CHECKED BY NATIONAL SUPERVISOR: Name: _____Signature _____

DATE CHECKED: __/ ____ /____

DATA MANAGEMENT

For project staff only	Check and cleaning by	Coding by	1st data entry by	2nd data entry by	Check by
Name					
Date					

Section 1: BACKGROUND CHARACTERISTICS

No.	Questions	Coding of answers	Skip to
Q101	De-identified		
Q102	De-identified		
Q103	De-identified		
Q104	De-identified		
Q105	What is your highest level of education? ***Read out the possible answers and circle one***	No schooling 1 Primary (Grade 1-5) 2 Secondary school (Grade 6-9) 3 High school (Grade 10 – 12) 4 College, university (>12) 5	
Q106	Have you ever married with a woman?	Yes 1 No 2	→**108**
Q107	If you have children, how many children do you have?	[__|__]	
Q108	***Currently***, whom are you living with?	Alone 1 Male partner 2 With friends 3 With wife/girlfriend 4 With family (relatives) 5 unsettled 6 Others (describe) 7 ……	
Q109	***Currently***, what occupations do you have to support yourself? *(Probe: anything else? Explain self-employed: driver, road-side seller, etc.)* ***Don't read list. Only probe and circle all that apply***	**Yes No** Farmer 1 2 Government employee 1 2 Entertainment employee 1 2 Sales/office clerk 1 2 Business person 1 2 Student 1 2 Self-employed 1 2 Sex work 1 2 Currently unemployed 1 2 Others (specify) 1 2 ……	
Q110	***During the last 12 months***, what is your ***average*** monthly income? *(Income from all sources)*	|__|__|__|, |__|__|__|,|__|__|__| VNĐ	

No.	Questions	Coding of answers	Skip to
Q111	Which of the following statements best describe how you feel? ***Circle only one appropriate answer***	Prefers men as partners only 1 Prefers men to women as partners 2 Prefers women as much as men 3 Prefers women to men as partners 4 Prefer women as partners only 5	

The following questions are very private, as they concern sex and condom use. Please answer or provide explanations as honestly as possible. You do not need to worry, as we guarantee the confidentiality of your answers and no one would know about your answers.

SECTION 2: SEXUAL HISTORY: NUMBERS AND TYPES OF SEXUAL PARTNERS

I WILL NOW ASK YOU QUESTIONS RELATED TO YOUR SEXUAL ACTIVITIES.

No.	Questions	Coding of answers	Skip to
Q201	How old were you the first time you had sex (manual, oral, anal or vaginal)?	|__|__| years old Don't know/Don't remember 99	
Q202	***With whom*** did you have sex with the first time?	Male partner (consensual) 1 Male sex worker 2 Girlfriend/wife 3 Female sex worker 4 Transgender 5 Others (specify) 6 ……	
Q203	***During the last 1 month***, how many different partners did you have sexual intercourse with? This includes manual, oral, anal or vaginal sex. *(**Read aloud:** Please think about this question for a while in order to give us the most correct answer. Your answer will be kept confidential.)*	Number of sex partners in last month |__|__|__| *(If none, enter* 000) Don't remember 999	→**901**

No.	Questions	Coding of answers	Skip to
Q204	***<u>During the last 1 month</u>***, among your sexual partners, how many were: ***Interviewer must read the following:*** **Non-commercial Male/female partners** are those you have sex with where there was no exchange of money or goods **Male/female sex workers** are those who you have sex with and pay money **Male/female partners who pay you for sex (clients):** this includes payment by money or goods.	204.1 **Non-commercial male partners** |__|__|__| Don't remember 99 204.2 **Male partners who pay you for sex** (clients) |__|__|__| Don't remember 99 204.3 **Male sex workers** |__|__|__| Don't remember 99 204.4 **Non-commercial female partners** |__|__|__| Don't remember 99 204.5 **Female partners who pay you for sex (clients)** |__|__|__| Don't remember 99 204.6 **Female sex workers** |__|__|__| Don't remember 99 *(<u>Note</u>: Check number of sexual partners in Q203 & Q204 to ensure the numbers match)*	
Q205	***<u>The last time you had sex within the last month</u>,*** with whom did you have sex?	Non-commercial male partners 1 Male partners (clients) who paid you for sex 2 Male sex workers 3 Non-commercial female partners 4 Female partners (clients) who paid you for sex 5 Female sex workers 6 No response / don't remember 9	

SECTION 3: SEXUAL HISTORY: NON-COMMERCIAL MALE PARTNERS

This section is used if the answer 204.1 is 1 or more than 1 or Don't remember

I WILL ASK YOU ABOUT YOUR SEXUAL BEHAVIORS WITH MEN WHO YOU HAVE HAD SEX WITH AND THERE WAS NO EXCHANGE OF MONEY OR GOODS.

No.	Questions	Coding of answers	Skip to
Q301	***In the last 1 month,*** among your non-commercial male partners, how many have you had **anal** sex with?	|__|__|__|men Don't remember 999 If none, record 000	**999&000 →304**
Q302	Among these, how many are one time sex partners?	|__|__|__| men Don't remember 999	
Q303	***In the last 1 month,*** how many times have you had anal sex with non-commercial male partners?	|__|__|__| times Don't remember 999 If none, record 000	
Q304	**During the last 12 months**, when having anal sex with non-commercial male partners, are you a giver, receiver or both? ***Include both giving and receiving*** ***Giving: you insert penis into other man's anus*** ***Receiving: Other man inserts penis into your anus***	Always a giver 1 A giver 2 About half a giver and half a receiver 3 A receiver 4 Always a receiver 5 Have not had anal sex with non-commercial male partners during the last 12 months 6 No response 9	6 → **401**
Q305	***During the last 12 months***, where have you met your non-commercial male sex partner? ***(Do not read choices aloud, only probe and circle all that apply.)***	Y N Street, park or lakeside 1 2 Internet 1 2 Bar or disco 1 2 Cinema 1 2 Swimming pool 1 2 Cafe 1 2 Street beer vendor 1 2 Karaoke bar 1 2 Sauna/massage parlor 1 2 At home 1 2 Hotel, guesthouse 1 2 Other (specify)…….. 1 2	

No.	Questions	Coding of answers	Skip to
Q306	***The last time*** you had anal sex with a non-commercial male partner, where did you have sex?	Street, park or lakeside 1 Hotel 2 Bar or disco 3 Cinema 4 Swimming pool 5 Residential home 6 Sauna/massage parlor 7 Other (specify) 8	
Q307	At the location where you had anal sex **last** with a non-commercial male partner, were condoms available, but which you did not bring along?	Yes 1 No 2 Don't remember 9	
Q308	***The last time*** you had anal sex with a non-commercial male partner, did you and your partner use a condom from the beginning of sex act until after ejaculation?	Yes 1 No 2 Don't remember 9	
Q309	***During the last 1 month***, of all the times you have had anal sex with non-commercial male partners, how frequently did you and your partners use condoms?	Always 1 Occasionally 2 Never 3 No response 8 Don't remember 9	
Q310	**If not always**, what is the main reason you did NOT always use a condom during anal sex with this partner? ***(Circle one appropriate answer only)***	Reduces the pleasure 1 Condoms not easily available 2 My partners look healthy 3 Condoms are too expensive 4 Partner didn't want to 5 Trust my partners 6 Embarrassed to buy condoms 7 Not enough time to use 8 Other (specify) 9 …… No response 10	

SECTION 4: SEXUAL HISTORY: MALE PARTNERS WHO PAY YOU FOR SEX (CLIENTS)
This section is used if the answer 204.2 is 1 or more than 1 or Don't remember

I WILL ASK YOU ABOUT YOUR SEXUAL BEHAVIORS WITH MEN WHO YOU HAVE SEX WITH WHO PAYS YOU MONEY OR PROVIDE YOU GOODS IN EXCHANGE FOR SEX.

No.	Questions	Coding of answers	Skip to
Q401	***In the last 1 month,*** among your male partners who paid you for sex, how many have you had **anal** sex with?	|__|__|__| men Don't remember 999 If none, record 000	**999&000 →404**
Q402	Among these, how many are one time male clients?	|__|__|__| men Don't remember 999 If none, record 000	
Q403	***In the last 1 month,*** how many times have you had anal sex with male clients who paid you?	|__|__|__| times Don't remember 999 If none, record 000	**999&000 → 405**
Q404	During the last 12 months, when having anal sex with male partners who paid you for sex, are you a giver, receiver or both? ***Include both giving and receiving*** ***Giving: you insert penis into other man's anus*** ***Receiving: Other man inserts penis into your anus***	Always a giver 1 A giver 2 About half a giver and half a receiver 3 A receiver 4 Always a receiver 5 Have not had anal sex with male partners who paid you for sex during the last 12 months 6 No response 9	6 → **501**
Q405	***During the last 12 months***, where have you met your male sex partners who paid you? ***(Do not read choices aloud, only probe and circle all that apply.)***	Street, park or lakeside 1 2 Internet 1 2 Bar or disco 1 2 Cinema 1 2 Swimming pool 1 2 Cafe 1 2 Street beer vendor 1 2 Karaoke bar 1 2 Sauna/massage parlor 1 2 At home 1 2 Hotel, guesthouse 1 2 Other (specify)…… 1 2	

No.	Questions	Coding of answers	Skip to
Q406	***The last time*** you had anal sex with a male partner who paid you, where did you have sex?	Street, park or lakeside 1 Hotel 2 Bar or disco 3 Cinema 4 Swimming pool 5 Residential home 6 Sauna/massage parlor 7 Other (specify)…… 8	
Q407	At the location where you had anal sex **last** with a male partner who paid you, were condoms available, but which you did not bring along?	Yes 1 No 2 Don't remember 9	
Q408	***The last time*** you had anal sex with a male partner who paid you, did you and your partner use a condom from the beginning of the sex act until after ejaculation?	Yes 1 No 2 Don't remember 9	
Q409	***During the last 1 month***, of all the times you have had anal sex with male partners who paid you for sex, how frequently did you and your partners use condoms?	Always 1 Occasionally 2 Never 3 No response 8 Don't remember 9	1 → **501**
Q410	**If not always**, what is the main reason you did NOT always use a condom during anal sex with this partner? ***(Circle one appropriate answer only)***	Reduces the pleasure 1 Condoms not easily available 2 My partners look healthy 3 Condoms are too expensive 4 Partner didn't want to 5 Trust my partners 6 Embarrassed to buy condoms 7 Not enough time to use 8 Other (specify) 9 …… No response 10	

SECTION 5: SEXUAL HISTORY: MALE SEX WORKERS (Buying sex)
This section is used if the answer 204.3 is 1 or more than 1 or Don't remember

I WILL ASK YOU ABOUT YOUR SEXUAL BEHAVIORS WITH MEN WHO YOU PAY MONEY OR PROVIDE GOODS IN EXCHANGE FOR SEX.

No.	Questions	Coding of answers	Skip to
Q501	***In the last 1 month,*** among your male partners who you paid for sex, how many have you had **anal** sex with?	|__|__|__| men Don't remember 999 If none, record 000	**999&000 →504**
Q502	Among these, how many are one time sex partners?	|__|__|__|men Don't remember 999 If none, record 000	
Q503	***In the last 1 month,*** how many times have you had anal sex with male partners who you paid?	|__|__|__| times Don't remember 999 If none, record 000	**999&000 →504**
Q504	**During the last 12 months**, when having anal sex with male partners who you paid for sex, are you a giver, receiver or both? ***Include both giving and receiving*** ***Giving: you insert penis into other man's anus*** ***Receiving: Other man inserts penis into your anus***	Always a giver 1 A giver 2 About half a giver and half a receiver 3 A receiver 4 Always a receiver 5 Have not had anal sex with commercial male partners during the last 12 months 6 No response 9	6 → **601**
Q505	***During the last 12 months***, where have you met your male sex partners who you paid? ***(Do not read choices aloud, only probe and circle all that apply.)***	**Y N** Street, park or lakeside 1 2 Internet 1 2 Bar or disco 1 2 Cinema 1 2 Swimming pool 1 2 Cafe 1 2 Street beer vendor 1 2 Karaoke bar 1 2 Sauna/massage parlor 1 2 At home 1 2 Hotel, guesthouse 1 2 Other (specify)…… 1 2	

No.	Questions	Coding of answers	Skip to
Q506	***The last time*** you had anal sex with a male partner who you paid, where did you have sex?	Street, park or lakeside 1 Hotel 2 Bar or disco 3 Cinema 4 Swimming pool 5 Residential home 6 Sauna/massage parlor 7 Other (specify) 8	
Q507	At the location where you had anal sex **last** with a male partner who you paid, were condoms available, but which you did not bring along?	Yes 1 No 2 Don't remember 9	
Q508	***The last time*** you had anal sex with a male partner you paid, did you and your partner use a condom from the beginning of the sex act until after ejaculation?	Yes 1 No 2 Don't remember 9	
Q509	***During the last 1 month***, of all the times you have had anal sex with male partners who you paid, how frequently did you and your partners use condoms?	Always 1 Occasionally 2 Never 3 No response 8 Don't remember 9	**1→601**
Q510	**If not always**, what is the main reason you did NOT always use a condom during anal sex with this partner? (Circle one appropriate answer only)	Reduces the pleasure 1 Condoms not easily available 2 My partners look healthy 3 Condoms are too expensive 4 Partner didn't want to 5 Trust my partners 6 Embarrassed to buy condoms 7 Not enough time to use 8 Other (specify) 9 …… No response 10	

SECTION 6: SEXUAL HISTORY: NON-COMMERICAL FEMALE PARTNERS

This section is used if the answer 204.4 is 1 or more than 1 or Don't remember

I WILL ASK YOU ABOUT YOUR SEXUAL BEHAVIORS WITH WOMEN WHO YOU HAVE SEX WITH AND THERE IS NO EXCHANGE OF MONEY OR GOODS.

No.	Questions	Coding of answers	Skip to
Q601	***During the last 12 months***, have you had vaginal or anal sex with a female partner without payment?	Yes 1 No 2 Don't remember 9	**2→701** **9→701**
Q602	***The last time*** you had vaginal or anal sex with a female partner without payment, did you use a condom from the beginning of the sex act until after ejaculation?	Yes 1 No 2 Don't remember 9	
Q603	***During the last 1 month***, of all the times you have had anal or vaginal sex with female partners without payments, how frequently did you use condoms?	Always 1 Occasionally 2 Never 3 No response 8 Don't remember 9	**1→701**
Q604	**If not always**, what is the main reason you did NOT always use a condom during anal sex with this partner? (Circle one appropriate answer only)	Reduces the pleasure 1 Condoms not easily available 2 My partners look healthy 3 Condoms are too expensive 4 Partner didn't want to 5 Trust my partners 6 Embarrassed to buy condoms 7 Not enough time to use 8 Other (specify) 9 …… No response 10	

SECTION 7: SEXUAL HISTORY: FEMALE PARTNERS WHO PAY YOU FOR SEX (selling sex for female clients)

This section is used if the answer 204.5 is 1 or more than 1 or Don't remember

I WILL ASK YOU ABOUT YOUR SEXUAL BEHAVIORS WITH WOMEN WHO YOU HAVE SEX WITH AND WHO PAYS YOU FOR SEX WITH MONEY OR GOODS.

No.	Questions	Coding of answers	Skip to
Q701	***During the last 12 months***, have you had vaginal or anal sex with a woman who paid you for sex?	Yes 1 No 2 Don't remember 9	**1 →801** **2 → 801**
Q702	***The last time*** you had vaginal or anal sex with a woman who paid you for sex, did you use a condom from the beginning of the sex act until after ejaculation?	Yes 1 No 2 Don't remember 9	
Q703	***During the last 1 month***, of all the times you have had anal or vaginal sex with women who paid you for sex, how frequently did you use condoms?	Always 1 Occasionally 2 Never 3 No response 8 Don't remember 9	**1 -> 801**
Q704	**If not always**, what is the main reason you did NOT always use a condom during anal sex with this partner? (Circle one appropriate answer only)	Reduces the pleasure 1 Condoms not easily available 2 My partners look healthy 3 Condoms are too expensive 4 Partner didn't want to 5 Trust my partners 6 Embarrassed to buy condoms 7 Not enough time to use 8 Other (specify) 9 …… No response 10	

SECTION 8: SEXUAL HISTORY: FEMALE SEX WORKERS (buying sex with female commercial sex partners)

This section is used if the answer 204.6 is 1 or more than 1 or Don't remember

I WILL ASK YOU ABOUT YOUR SEXUAL BEHAVIORS WITH WOMEN WHO YOU PAY FOR SEX WITH MONEY OR GOODS.

No.	Questions	Coding of answers	Skip to
Q801	***During the last 12 months***, have you had vaginal or anal sex with female sex workers?	Yes 1 No 2 Don't remember 9	**1 →901** **2 →901**
Q802	***The last time*** you had vaginal or anal sex with a female sex worker, did you use a condom from the beginning of the sex act until after ejaculation?	Yes 1 No 2 Don't remember 9	
Q803	***During the last 1 month***, of all the times you have had anal or vaginal sex with female sex workers, how frequently did you use condoms?	Always 1 Occasionally 2 Never 3 No response 8 Don't remember 9	**1 →901**
Q804	**If not always**, what is the main reason you did NOT always use a condom during anal sex with this partner? (Circle one appropriate answer only)	Reduces the pleasure 1 Condoms not easily available 2 My partners look healthy 3 Condoms are too expensive 4 Partner didn't want to 5 Trust my partners 6 Embarrassed to buy condoms 7 Not enough time to use 8 Other (specify) 9 …… No response 10	

Section 9: Use of Condoms and Lubricants

No.	Questions	Coding of answers	Skip to
Q901	***During the last 12 months***, have you had anal sex with a man?	Yes 1 No 2 Don't remember 9	**2 →1001** **9 →1001**
Q902	When was the ***last time*** you bought condoms?	In the past1 month 1 In the past 6 months 2 In the past 12 months 3 Over 1 year 4 Never 5 Don't know/no response 9	**2 →904** **3 →904** **4 →904** **5 →904** **9 →904**
Q903	***If in the past 1 month***, how many times in the month?	[__|__|__] times Don't remember 999	
Q904	When was the ***last time*** you received free condoms?	In the past1 month 1 In the past 6 months 2 In the past 12 months 3 Over 1 year 4 Never 5 Don't know/no response 9	**2 →907** **3 →907** **4 →907** **5 →907** **9 →907**
Q905	***If in the past 1 month***, how many times in the month?	[__|__|__] times Don't remember 999	
Q906	From what source have you received free condoms? ***Read list and circle all that apply***	**Yes No** Pharmacies 1 2 Groceries 1 2 Health Centers/Clinics 1 2 Bar, Restaurant 1 2 Hotel 1 2 Health educators/Peer educators 1 2 Health clinic/hospital staff 1 2 Drop-in centers 1 2 Harm reduction box 1 2 Others (specify)_____ 1 2	
Q907	When was the ***last time*** you bought lubricant?	In the past1 month 1 In the past 6 months 2 In the past 12 months 3 Over 1 year 4 Never 5 Don't know/no response 9	**2 →909** **3 →909** **4 →909** **5 →909** **9 →909**

No.	Questions	Coding of answers	Skip to
Q908	***If in the past 1 month***, how many times in the month?	[__|__|__] times Don't remember 999	
Q909	When was the ***last time*** you received free lubricant?	In the past1 month 1 In the past 6 months 2 In the past 12 months 3 Over 1 year 4 Never 5 Don't know/no response 9	**2 →912** **3 →912** **4 →912** **5 →912** **9 →912**
Q910	***If in the past 1 month***, how many times in the month?	[__|__|__] times Don't remember 999	
Q911	From what source have you received free lubricant? ***Circle all that apply.***	**Yes No** Pharmacies 1 2 Groceries 1 2 Health Centers/Clinics 1 2 Bar, Restaurant 1 2 Hotel 1 2 Health educators/Peer educators 1 2 Health clinic/hospital staff 1 2 Drop-in centers 1 2 Harm reduction box 1 2 Others (specify)_____ 1 2	
Q912	***During the last 12 months***, how frequently do you and your male sex partner use lubricants in addition to condoms during anal sex?	Always 1 Sometimes 2 Never 3 Don't remember 8 No response 9	
Q913	***During the last 12 months***, how frequently do you and your male sex partner use lubricants without condoms during anal sex?	Always 1 Sometimes 2 Never 3 Don't remember 8 No response 9	
Q914	What type of lubricant do you usually use?	Cooking oil 1 Whip Cream, cold cream 2 Saliva 3 Motor oil 4 KY, OK, Durex, Number One Plus 5 Other cosmetics 6 Can't distinguish 7 Others (specify)…… 8	

No.	Questions	Coding of answers	Skip to
Q915	How long does it take you to get a condom when you need one?	< 15 minutes 1 15-60 minutes 2 > 1 hour 3	
Q916	Do you usually carry condoms with you?	Yes 1 No 2	**2→918**
Q917	Can you please tell me how many condoms do you usually carry with you?	|__|__| Condoms	
Q918	In the last ten times you acquired condoms, how many times did you purchase them and how times did you obtain them for free?	Number of times purchased |__|__| Number of times obtained |__|__|	
Q919	Where do you usually get condoms? ***(Do not read choices aloud. Only probe for more responses. Circle all that apply)***	Yes No Pharmacy 1 2 Grocery store 1 2 Healthcare establishment 1 2 Bar/restaurant/hotel 1 2 Shops for adult 1 2 Others (specify) 1 2 ……	

Section 11: Alcohol and Drug Use

No.	Questions	Coding of answers	Skip to
Q1101	***During the last 1 month,*** how many days have you had beer/alcoholic drinks?	|__|__| Number of days	
Q1102	Have you ever have sex when you were drunk?	Yes 1 No 2 Don't remember 9	**2& 9→1105**
Q1103	With whom have you had sex with while you were drunk?	Male partner (consensual) 1 Male you paid for sex 2 Girlfriend/wife 3 Women you paid for sex 4 Others (specify) 5 ……	
Q1104	***The last time*** you had vaginal or anal sex while drunk, did you use a condom?	Yes 1 No 2 Don't remember 9	
Q1105	Have you ever used any recreational drugs as listed here?	**Ever** **Yes No** Opium 1 2 Heroin 1 2 Marijuana 1 2 Ecstasy (etc.) 1 2 Ice (etc.) 1 2 Sniffing 1 2 Ketamine 1 2 Magic mushrooms 1 2 Cocaine 1 2 Sedatives (Valium, Seduxen, Benzoate) 1 2 1 2 Methamphetamine 1 2 Other 1 2 (Specify)……	**Past 1 month** **Yes No** 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2
Q1106	Have you ever have sex when you were high on recreational drugs?	Yes 1 No 2 Don't remember 9	**2&9 →1109**

No.	Questions	Coding of answers	Skip to
Q1107	With whom have you had sex with while you were high on recreational drugs??	Male partner (consensual) 1 Male you paid for sex 2 Girlfriend/wife 3 Women you paid for sex 4 Others (specify) 5 ……	
Q1108	***The last time*** you had vaginal or anal sex while high on recreational drugs, did you use a condom?	Yes 1 No 2 Don't remember 9	
Q1109	Have you ever injected recreational drugs (not prescription drugs)?	Yes 1 No 2 Don't remember 8 No response 10	**2→ 1111**
Q1110	When you injected, have you ever used needles/syringes that had previously been used by someone else?	Yes 1 No 2 Don't remember 8 No response 10	
Q1111	***During the last 1 month***, have you injected drugs?	Yes 1 No 2 Don't remember 9	2→ **1113**
Q1112	***During the last 12 months*** When you injected, have you ever used needles/syringes that had previously been used by someone else	All the times 1 Sometimes yes, sometimes No 2 Never 3 Don't remember 8 No response 9	
Q1113	***During the last 12 months***, have any of your sex partners ever injected drugs?	Yes 1 No 2 Don't know 8 No response 9	

Section 12: Knowledge of HIV/AIDS and Prevention

No.	Questions	Coding of answers			Skip to
Q1201	Have you ever heard of HIV/AIDS or SIDA before this interview?	Yes 1 No 2			**2 →1301**
Q1202	In your opinion, can you tell if someone is infected with HIV just by looking at him/her?	Yes 1 No 2 Don't know 9			
Q1203	***Now I am going to read some statements. Some of them are true and some are not true. These are general statements and do not refer to your own experience or behavior. Please tell me whether you agree or disagree with each of the statements.***				
	Statement	Response			
		Agree	Disagree	Don't Know	
A	Having sex with only one faithful, uninfected partner reduces the risk of HIV transmission.	1	2	9	
C	Correctly using a condom every time a person has sex can reduce HIV transmission.	1	2	9	
C1	It is possible for a person who looks healthy to be infected with HIV.	1	2	9	
D	Mosquitoes and other insect bites will transmit HIV.	1	2	9	
D1	Sharing food with an HIV infected person could cause HIV infection.	1	2	9	
E	Sharing needles when injecting drugs will increase the risk of HIV infection.	1	2	9	
G	Correctly using condom every time during anal intercourse can reduce HIV transmission.	1	2	9	
Q1204	Could you please assess your risk for infection with HIV? ***Interviewer to probe to understand the level of risk of the person.***	Have risk 1 Does not have risk 2 Don't know 9			→ 1206 → 1206

No.	Questions	Coding of answers	Skip to
Q1205	Why do you feel that you are at risk for HIV infection? ***Do not read choices aloud. Just prompt for more responses and circle all that apply.***	**Yes No** Because I often change sex partners 1 2 Because I don't always use a condom 1 2 Because I inject drugs 1 2 I believe my partners may be infected 1 2 I have anal sex 1 2 I have sex with FSW 1 2 My friends are infected 1 2 Others (Specify) 1 2	
Skip to 1207 after completing 1205			
Q1206	Why you feel that you don't have risk for HIV infection? ***Interviewer to probe to understand the level of risk of the person.***	**Yes No** I am faithful 1 2 I always use condoms 1 2 I have never injected drugs 1 2 I believe my partner is not infected 1 2 I don't have anal sex 1 2 I never have sex with FSW 1 2 I have never had blood transfusion 1 2 None of my friends are infected 1 2 Others, (specify) 1 2 ……	→1208 →1208
Q1207	Could you access your risk for HIV transmitting HIV?	Have risk 1 Does not have risk 2 Don't know 9	

No.	Questions	Coding of answers	Skip to
Q 1208	Why do you feel that you are not at risk for transmitting HIV?	**Yes No** Because I often change sex partners 1 2 Because I don't always use a condom 1 2 Because I inject drugs 1 2 I believe my partners may be infected 1 2 I have anal sex 1 2 My friends are infected 1 2 Others (specify) 1 2	
Q1209	Why do you feel that you are not at risk for transmitting HIV? ***Do not read choices aloud. Just prompt for more responses and circle all that apply.***	**Yes No** I am faithful 1 2 I always use condoms 1 2 I have never injected drugs 1 2 I don't have anal sex 1 2 I never have had blood transfusion 1 2 Others, (specify) 1 2 ……	
Q1210	Do you know of any place where you can get tested for HIV?	Yes 1 No 2 No answer 9	
Q1211	Have you ever had an HIV test ?	Yes 1 No 2 Don't know/No response 9	**2 →1220** **9 →1220**
Q1212	If you do not mind sharing, and this will be kept confidential, please tell us your test result that time?	Positive 1 Negative 2 Did not receive results 3 Don't know/No response 9	**2 →1215** **3 →1215** **9 →1215**
Q1213	If you had a positive result, have you registered in a clinic that specializes in HIV treatment?	Yes 1 No 2 Don't know/No response 9	

No.	Questions	Coding of answers	Skip to
Q1214	Have you ever been in ARV treatment, even just once?	Yes 1 Never 2 Don't know/No response 9	
Q1215	When did you ***last*** request an HIV test for which you got the results?	In the past 6 months 1 In the past 12 months 2 Over one year ago 3 Never 4 Don't know/no response 9	**3→1221** **4→1221** **9→1221**
Q1216	That time, where did you take that test?	Public facilities (Preventive Medicine Center, VCT, Provincial/District Hospital, Provincial AIDS Center) 1 Private Center 2 06 Center 3 Mobile testing center 4 Other (specify).....5	
Q1217	That time, did you pay for the test?	Yes 1 No 2 No response, Don't know	
Q1218	That time, who referred you to the testing center?	Community outreach worker 1 Healthcare worker 2 Sex partner 3 Injecting partner 4 Mass media 5 Other (specify).....6	
Q1219	That time, did you disclose your status to your regular sex partners?	Yes 1 No 2 No response, Don't know	
Q1220	When was the last time you encouraged your regular sex partners, either male or female, to get tested for HIV?	In the past1 month 1 In the past 6 months 2 In the past 12 months 3 Over 1 year 4 Never 5 Don't know/no response 9	

No.	Questions	Coding of answers	Skip to
Q1221	When was the last time your regular sex partners, either male or female, disclosed their HIV status to you?	In the past1 month 1 In the past 6 months 2 In the past 12 months 3 Over 1 year 4 Never 5 Don't know/no response 9	
Q1222	How often do you think you should get tested for HIV?	Every |__|__| months Others code 00 Don't know 88 No response 99	

SECTION 13: INTERVENTION ACCESS

No.	Questions	Coding of answers	Skip to
Q1301	When was the last time someone talked to you about safe sex?	In the past1 month 1 In the past 6 months 2 In the past 12 months 3 Over 1 year 4 Never 5 Don't know/no response 9	**3→1304** **4→1304** **5→1304** **9→1304**
Q1302	***If in the past 1 month***, how many times ***in the last month***?	[__|__|__] times Don't remember 999	
Q1303	Who have talked to you? ***Circle all that apply***	**Yes No** Health educators/Peer educators 1 2 Health clinic/hospital staff 1 2 Peer /Friends 1 2 Family members 1 2 VCT center 1 2 HIV Game shows/performanc 1 2 Sexual partners 1 2 Others (specify)_____ 1 2	
Q1304	***When was the last time*** you received information or materials directed at men who have sex with men on safe sex?	In the past1 month 1 In the past 6 months 2 In the past 12 months 3 Over 1 year 4 Never 5 Don't know/no response 92	**2→1304** **3→1304** **4→1304** **5→1304** **9→1304**
Q1305	If in the past 1 month, how many times in the last month?	[__|__|__] times Don't remember 999	
Q1306	***When was the last time*** you received information or materials directed at men who have sex with men on safe injection?	In the past1 month 1 In the past 6 months 2 In the past 12 months 3 Over 1 year 4 Never 5 Don't know/no response 92	**2→1309** **3→1309** **4→1309** **5→1309** **9→1309**
Q1307	If in the past 1 month, how many times in the last month?	[__|__|__] times Don't remember 999	

No.	Questions	Coding of answers	Skip to
Q1308	How have you received these information? ***Circle all that apply***	Y N Peer educators/Health educators 1 2 Health clinic/hospital staff 1 2 Fellow drug users 1 2 VCT center workers 1 2 Sexual partners 1 2 Mass media 1 2 Internet 1 2 Cultural events 1 2 Other (specify)_____ 1 2	
Q1309	When was the last time you received free syringes/needles?	In the past1 month 1 In the past 6 months 2 In the past 12 months 3 Over 1 year 4 Never 5 Don't know/no response 9	**2→1312** **3→1312** **4→1312** **5→1312** **9→1312**
Q1310	If in the past 1 month, how many times in the last month?	[__|__|__] times Don't remember 999	
Q1311	From whom have you received these? ***Circle all that apply***	**Yes No** Health educators/Peer educators 1 2 Health clinic/hospital staff 1 2 Peers /Friends 1 2 VCT center workers 1 2 Sexual partners 1 2 Harm reduction boxes 1 2 Others (specify)_____ 1 2	
Q1312	Do you know where you can get free care treatment services for people with HIV in the city where you're living?	Yes 1 No 2 No response 9	
C1313	Do you know if home-based care services are available for people living with HIV/AIDS?	Yes 1 No 2 No response 9	

No.	Questions	Coding of answers	Skip to
Q1314	Have you ever participated in support groups for men you have sex with men? *Support groups include groups of MSM who get together to share information on MSM issues and can be internet-based.*	Yes 1 No 2 No response 9	
Q1315	From what source or whom do you trust to receive information regarding your health?	MOH 1 2 Government doctors 1 2 Private doctors 1 2 Friends / Family 1 2 Peer educators 1 2 Pharmacists 1 2	
Q1316	What format do you prefer to receive this information?	Television 1 2 Radio 1 2 Newspapers 1 2 Government loudspeakers 1 2 Posters 1 2 Brochures/leaflets 1 2 Internet 1 2 Shows/performances 1 2 Other (specify) 1 2	

SECTION 14: NETWORK QUESTIONS

No.	Questions	Coding of answers	Skip to
Q1401	How many men who have sex with men (MSM) do you know and they know you?	|__|__|__| men	
Q1402	How many of the *(READ RESPONSE TO Q1401)* are 16 and over?	|__|__|__| men	
Q1403	***During the last 2 weeks***, how many of the *(READ RESPONSE TO Q1402)* have you met up with?	|__|__|__| men	
Q1404	Among all MSM who you know how many of them: a) Never meet partners in public places? b) Prefer men as partners only? c) Prefer women as partners only?	|__|__|__| persons Don't remember 999 |__|__|__| persons Don't remember 999 |__|__|__| persons Don't remember 999	
Q1405	***During the last week***, how many times have you come to the places where men who have sex with men usually meet?	|__|__|__| times Don't remember 999 No where 00	**00→1408**
Q1406	***If yes,*** how many places have you come in the last week?	|__|__|__| places Don't remember 999	
Q1407	***If yes,*** what the places are?	**Y N** Street, park or lakeside 1 2 Internet 1 2 Bar or disco 1 2 Cinema 1 2 Swimming pool 1 2 Sauna/massage parlor 1 2 At home 1 2 Hotel, guesthouse 1 2 Cafe 1 2 Street beer vendor 1 2 Karaoke bar 1 2 Other (specify)…… 1 2	

No.	Questions	Coding of answers	Skip to
Q1408	With whom have you ever disclosed that you are MSM?	**Y N** Family members 1 2 Colleagues 1 2 Wife/Girlfriends 1 2 People who are not MSM 1 2 People who are MSM 1 2 Male partners 1 2 Other (specify) 1 2	

The interview is completed here. Thank you very much for your help and time. Is there anything you want to discuss with us?
Please go to the next room for counseling and testing procedure.

Annex 2: Weighting in multi-stage sampling

Procedures for calculating sampling probabilities **(Pi)** – Using selection of clusters PPS, with equal number taken from each cluster at the second stage

$$P_i = (m * M_i/M) * (n_i/N_i)$$

Where:

P_i = probability that a target group member in cluster **i** chosen for the survey;
m = number of sample clusters chosen;
Mi = expected measure of size for cluster **i**;
M = total measure of size for the survey universe **(M = ΣMi)**;
ni = number of sub-population members in cluster **i**;
Ni = total number of sub-population members in cluster **i**.

Calculating weights from sampling probabilities

$$wi = 1/Pi$$

Where:

wi = sampling weight for elements in the i^{th} cluster; and
Pi = probability of selection for elements on the i^{th} cluster

Cluster No.	m	Mi	M	ni	Ni	Pi	wi
1	34	20	3063	10	35	0.063430	15.76544
2	34	24	3063	8	14	0.152232	6.56893
3	34	10	3063	12	26	0.051232	19.51912
4	34	75	3063	14	62	0.187988	5.31950
5	34	30	3063	7	21	0.111002	9.00882
6	34	25	3063	11	35	0.087216	11.46578
.							
.							
.							
Total		3036		338			