



**Ministry of Public Health
and Sanitation**

**2010–2011
Integrated Biological and
Behavioural Surveillance
Survey among
Key Populations in
Nairobi and Kisumu, Kenya**

©2014

Published by the National Key Populations Programme, National AIDS and STI Control Programme (NASCOP), Ministry of Health, Kenya

Suggested citation: National Key Populations Programme, NASCOP, Ministry of Health, Kenya. 2014. "2010–2011 Integrated biological and behavioural surveillance survey among key populations in Nairobi and Kisumu, Kenya." Nairobi: NASCOP, Ministry of Health, Kenya.

**2010–2011 Integrated Biological and
Behavioural Surveillance Survey among Key
Populations in Nairobi and Kisumu, Kenya**

ACKNOWLEDGEMENT

The launch of this report presents the major findings of the 2010–2011 Integrated Biological and Behavioural Surveillance (IBBS) survey. The 2010–2011 IBBS is the first population-based survey on HIV and STIs among key populations (KPs) including men who have sex with men (MSM), people who inject drugs (PWID), and female sex workers (FSWs) conducted in Kenya. MSM, FSW, and PWID populations were surveyed in Nairobi; and MSM in Kisumu. The primary objectives of the 2010–2011 IBBS survey were: to estimate the prevalence of and risk factors for HIV and STIs among KPs; identify and describe key characteristics of KPs which place them at risk for HIV; describe how KPs may be identified, reached, and served by various health programmes; and estimate the population sizes of these KPs.

Additionally, for the first time in a national seroprevalence survey, the IBBS survey covered KPs groups aged 18–64 years, typically considered to be at high risk and to have high burden of HIV. With this report, policymakers, programme planners and researchers will be able to plan HIV services and monitor and evaluate their efforts more effectively. The IBBS survey has provided the Government with valuable information as it continues to better understand, prevent and manage this disease for the well-being of Kenyans.

The surveillance survey was funded through the United States President's Emergency Plan for AIDS Relief (PEPFAR) through United States Centres for Disease Control (CDC) and Prevention-Kenya. The National AIDS/STI Control Programme (NAS COP) would like to thank the CDC through the Population Council for the financial support and the implementation of this project which include this IBBS survey report. We would also like to express our gratitude to the KPs Technical Working Group (TWG) for guidance and support and the compilation of the report and all the programme coordinators and staff of the various organisations in Nairobi and Kisumu who were involved during the study implementation, compilation of the study results and validation of the findings.

The Nairobi surveys were conducted by the Population Council in collaboration with NAS COP, the National AIDS Control Council (NACC), and CDC Kenya. The Kisumu MSM survey was conducted by the Nyanza Reproductive Health Society, in collaboration with the University of Illinois-Chicago, the Population Council, NAS COP, NACC, and CDC Kenya. The University of California (San Francisco) provided technical assistance for the implementation of all surveillance activities.

We wish to acknowledge the contributions of a number of organisations. The survey and report could not have been accomplished without including but not limited to the following: NACC, University of California San Francisco Department of Health, Gay and Lesbian Coalition of Kenya (GALCK), International AIDS Vaccine Initiative (IAVI), Kenya AIDS Vaccine Initiative (KAVI) and University of Manitoba. Lastly, we wish to thank the entire study team for their great contribution towards the success of the study and report writing: Scott Geibel, Jerry Okal, Waimar Tun, Meredith Sheehy, Joan Nyamu, Sam Kalibala, Helgar Musyoki, Davies Kimanga, Alloys Orago, Patrick Mureithi, Dita Broz, Reinhard Kaiser, Tom Oluoch, Andrea Kim, Anthony Waruru, Kipruto Chesang, Mercy Muthui, Jennifer Galbraith, Sufia Dadabhai, H. Fisher Raymond, Wanjiru Waruiru, Timothy Kellogg, Joy Mirjahangir, Amanda Viitanen, David Kuria, Nguru Karugu, Bonnie Bender, Helen Thomson, Omu Anzala, Gaudensia Mutua, Larry Gelmon, and Joshua Kimani.

We also wish to acknowledge the participants in this survey; who generously offered their time, personal information and provided blood samples to survey personnel, making this survey a success.



Dr. Martin Sirengo,
Head NAS COP

TABLE OF CONTENTS

ACKNOWLEDGEMENT.....	II
ABBREVIATIONS/ACRONYMS.....	VI
FOREWORD	VII
EXECUTIVE SUMMARY	1
Introduction and Objectives.....	1
Methods.....	1
Key Findings	2
Conclusions and Recommendations	5
BACKGROUND	7
The HIV Epidemic in Kenya.....	7
HIV Surveillance	7
Key Populations.....	7
Epidemiological Importance of KP groups in Kenya.....	8
RATIONALE AND OBJECTIVES	10
Primary Objectives	10
Secondary Objective	10
METHODS	11
Respondent-driven Sampling (RDS).....	11
Sample Size Calculation	11
Study Populations and Study Site	11
Data Collection	12
Visit Procedures	13
Laboratory procedures.....	14
Data Management and Analysis	16
Population Size Estimation Methods.....	16
Ethical Considerations	18
Limitations.....	18
RESULTS	19
Key findings	20
NAIROBI MEN WHO HAVE SEX WITH MEN	20
Enrolment	20
Socio-demographic Characteristics	21
Alcohol and Drug Use	23
Sexual Risk Behaviours	24
HIV Knowledge and HIV Testing	27
Discrimination and Violence.....	29
STI Symptoms.....	32

Exposure to HIV/STI Prevention and Other Services	32
HIV and STI Prevalence	33
Factors Associated with HIV Infection.....	34
Discussion and Recommendations	38
KISUMU MEN WHO HAVE SEX WITH MEN	40
Socio-demographic Characteristics	41
Alcohol and Drug Use.....	43
Sexual Activity.....	44
HIV Knowledge and HIV Testing	47
Discrimination and Violence.....	48
STI Symptoms	50
Exposure to HIV/STI Prevention and Other Services	50
HIV and STI Prevalence	51
Factors Associated with HIV Infection.....	52
Risk Behaviours.....	54
Discussion and Recommendations	56
NAIROBI FEMALE SEX WORKERS	58
Enrolment	58
Socio-demographic Characteristics	59
Reproductive Health and Contraception	60
Alcohol and Drug Use.....	61
Sexual Risk Behaviours	62
HIV Knowledge and HIV Testing	65
Discrimination and Violence.....	67
STI Symptoms	69
Exposure to HIV/STI Prevention and Other Services	69
HIV and STI Prevalence	70
Factors Associated with HIV Infection.....	71
Discussion and Recommendations	75
PEOPLE WHO INJECT DRUGS.....	78
Enrolment	78
Socio-demographic characteristics.....	79
Alcohol and Drug Use	79
Sexual Risk Behaviours	83
HIV and Hepatitis Knowledge and HIV Testing	84
Discrimination and Violence.....	86
Exposure to HIV/STI Prevention and Other Services	87
HIV and STI Prevalence among PWID	88
Factors Associated with HIV Infection.....	89
Discussion and Recommendations	91

POPULATION SIZE ESTIMATES.....	94
Service Multipliers	94
Wisdom of the Crowd	94
Literature Review	94
Stakeholder Feedback.....	94
Conclusions and Recommendations	98
REFERENCES	99

ABBREVIATIONS/ACRONYMS

ACASI	Audio computer-assisted self-interview
AIDS	Acquired immune deficiency syndrome
AUDIT	Alcohol Use Disorders Identification Test
CAPI	Computer-assisted personal interviews
CDC	United States Centers for Disease Control and Prevention
CI	Confidence interval
CT	Chlamydia trachomatis
FSW	Female sex worker
GALCK	Gay and Lesbian Coalition of Kenya
GFATM	Global Fund to Fight AIDS, Tuberculosis and Malaria
HBV	Hepatitis B virus
HIV	Human immunodeficiency virus
HSV-2	Herpes simplex virus 2
HTC	HIV testing and counselling
IQR	Interquartile range
KAIS	Kenya AIDS Indicator Survey
KEMRI	Kenya Medical Research Institute
KP	Key population
KNASP	Kenya National AIDS Strategic Plan
KNBS	Kenya National Bureau of Statistics
KNH-ERC	Kenyatta National Hospital-Ethics and Review Committee
MOH	Ministry of Health
MSM	Men who have sex with men
NACC	National AIDS Control Council
NASCOP	National AIDS/STI Control Programme
NG	Neisseria gonorrhoea
NSP	Needle and syringe programme
OST	Opiate substitution therapy
PCR	Polymerase chain reaction
PEPFAR	United States President's Emergency Plan for AIDS Relief
PWID	People who inject drugs
RDSAT	Respondent-driven sampling analysis tool
RPR	Rapid plasma reagin
STD	Sexually transmitted disease
STI	Sexually transmitted infection
SW	Sex worker
SWOP	Sex Worker Outreach Programme
TPHA	Treponema pallidum particle agglutination assay
TWG	Technical working group
VCT	Voluntary counselling and testing

FOREWORD

Globally, key populations (KPs) are a critical sub-population in the spread of HIV infection. People who inject drugs (PWID), sex workers (SWs), men who have sex with men (MSM) and their sex partners, truckers, fisherfolk are recognised as primary KPs in the Kenya National AIDS Strategic Plan 2009/10– 2012/13 (KNASP III) (National AIDS Control Council 2008). These are considered populations who engage frequently in behaviours (such as sharing needles, high numbers of sex partners, and unprotected anal intercourse), that put them at increased risk of HIV acquisition. Often these populations contribute disproportionately to the continued transmission of HIV in the general population, relative to their actual distribution in the general population (van Griensven 2007 and 2009). According to recent national household-based surveys (NAS COP 2009, Kenya National Bureau of Statistics (KNBS) and ICF Macro 2010), over 7 percent of the adult population is infected with HIV. HIV infection rates among some KPs may be double, triple or even quadruple the national rate. Of the estimated 75,000–100,000 new HIV infections annually, one-third of these infections occur among KPs. Scaling up HIV prevention strategies for these sub-populations is therefore a national priority.

Targeted interventions that aim to increase condom use, HIV testing and partner disclosure as well as reduce transmission of STIs and HIV infection among these populations are feasible, effective, and an essential component of the KNASP III. The benefits of these interventions depend not only on the efficacy of the methods but also on the appropriateness and coverage, or reach, of the services. Coverage of services within a population is a key parameter in the evaluation of any programme and requires a reasonable estimate of the target population size. Attempts have been made by independent research teams to map and count MSM and sex workers in just a few specific regions of the country. However, additional sites need to be covered to obtain more current national estimates. Encouragingly, awareness is growing at the national level as are resources and support for engaging these populations in the fight against HIV. The public sector has risen to the occasion and is demonstrating a real commitment to providing a more coordinated, integrated effort to roll out services to these vulnerable groups which is an important contribution to HIV prevention efforts in Kenya.

It is our expectation that the information gathered will help inform our understanding of future surveillance data; will aid in examining programme outcomes and programme effects; and will ultimately improve access to high quality, combination HIV prevention services which incorporate behavioural, structural, and biomedical interventions.



Dr. Nicholas Muraguri,
Director of Medical Services
Ministry of Health, Kenya.

Disclaimer

The content and views in this summary are solely the responsibility of the authors and do not necessarily represent the official views of the affiliated organisations, the US Centers for Disease Control and Prevention, United States Government, or Government of Kenya.

EXECUTIVE SUMMARY

Introduction and Objectives

The 2010–2011 Integrated Biological and Behavioural Surveillance (IBBS) survey is the first population-based survey on HIV and STIs among key populations (KPs) including: men who have sex with men (MSM), female sex workers (FSWs), and people who inject drugs (PWID), conducted in Kenya. MSM, FSW, and PWID populations were surveyed in Nairobi; and MSM in Kisumu. The primary objectives of the 2010–11 IBBS survey were to:

- Estimate the prevalence of and risk factors for HIV and STIs among KPs;
- Identify and describe key characteristics of KPs which place them at risk for HIV, and describe how KPs may be identified, reached, and served by various health programmes.
- Estimate the population sizes of these KPs.

Methods

The study took place in Nairobi for MSM, FSWs, and PWID and for MSM only in Kisumu. Respondent-driven sampling (RDS) was used to enrol participants from all three study populations. RDS is a chain referral sampling method designed to reduce the biases generally associated with sampling stigmatised or hard-to-reach populations to yield a probability-based sample. It is specifically designed to sample hard-to-reach and hidden populations such as MSM, FSWs, and PWID. MSM included in the study were men who reported sexual activity (oral or anal) with another man at least once in the last 6 months. FSWs included in the study were those who reported selling sex to a man in the past 3 months. PWID included in the study were men and women who used needles for injecting drug use in the past 3 months. The resulting numbers sampled were: 563 (MSM Nairobi), 415 (MSM Kisumu), 593 (FSWs Nairobi), and 263 (PWID Nairobi).

In Nairobi, face-to-face behavioural interviews were administered using computer-assisted personal interviews (CAPI) in private by trained nurse counsellors. In Kisumu, computer-based self-interviews were conducted using audio computer assisted self-interview (ACASI) systems. Upon completion of the behavioural interview, HIV testing and counselling (HTC) was offered to participants (using parallel rapid HIV testing), and specimens were collected for STI testing as specified in Table 1. All MSM were tested for rectal STIs, while FSWs and PWID were only tested for rectal STIs if they reported having anal sex or anal STI symptoms. Participants were asked to return after two weeks to receive their STI results.

Population-based prevalence estimates and 95% confidence intervals (CI) were estimated using the RDS Analysis Tool (RDSAT), which weights estimates to account for participant network size and homophily. For population size estimation, three methodologies were used to produce a range of estimates: the “multiplier method”, the “wisdom of the crowds” method, and an approach that drew on published literature. The median of the various estimates was hypothesised to be the most plausible size estimate, with the other results forming the upper and lower plausible bounds. These data were shared in consensus forums and with population community representatives to finalise “best” point estimates and plausible bounds based on the empirical data collected in Nairobi and Kisumu, a priori expectations from the global literature, and stakeholder input.

TABLE 1. STI tests conducted in the 2010–2011 IBBS survey

Agent	Specimen type	PWID	MSM	FSW
<i>T. pallidum</i> (syphilis)	Blood serology (RPR, TPHA)	All	All	All
<i>N. gonorrhoea</i> & <i>C. trachomatis</i>	Rectal swab	—	All	All reporting anal receptive sex or rectal STI symptoms
<i>N. gonorrhoea</i>	Urine PCR or Vaginal swab PCR	Male (Urine) Female (Vaginal swab)	Urine	Vaginal swab
<i>C. trachomatis</i> & <i>T. vaginalis</i>	Urine PCR or vaginal swab PCR	Male (Urine) Female (Urine or vaginal swab)	Urine	Urine or vaginal swab
<i>T. vaginalis</i>	Urine PCR or vaginal swab PCR	Male (Urine) Female (Urine or vaginal swab)	Urine (Kisumu only)	Urine or vaginal swab
<i>B. vaginosis</i>	Vaginal swab gram stain	Only females	—	All
Candidiasis	Gram Stain	Only females	—	All
HSV type 2	Blood serology (Kalon)	—	Blood (Kisumu only)	—

Key Findings

Weighted estimates generated by RDSAT software are reported in this document. HIV and STI results and population size estimates are summarised in Table 2. Overall, the HIV prevalence in Nairobi among MSM (18.2 percent), FSWs (29.3 percent), and PWID (18.7 percent) were notably higher than the general population in Nairobi (8.8 percent; Kenya National AIDS and STI Control Programme 2009).

For the population size estimates, stakeholder consensus forums discussed the median results and agreed on the plausible lower and upper ranges outlined in Table 2. However, it was agreed that these population estimates may be excluding segments of the MSM populations who were believed to be less likely to have participated in the survey or seek MSM-friendly services. These might have included MSM currently married to women, African MSM of higher socioeconomic status, and Asian-Kenyan MSM. For FSW, stakeholders believed that population size estimates presented were primarily of full-time or regular FSWs and did not capture part-time or wholly transactional FSWs.

TABLE 2 HIV and STI results (RDS weighted) and population size estimates

	MSM (Nairobi)	MSM (Kisumu)	FSWs (Nairobi)	PWID (Nairobi)
Number of participants	563	415	593	263
Dates of survey	July–Oct 2010	June–Oct 2010	Nov 2010–Jan 2011	Jan–Mar 2011
HIV and STI prevalence	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
HIV prevalence	18.2 (13.1–23.6)	11.1 (7.5–15.9)	29.3 (24.6–34.9)	18.7 (12.2–26.7)
Syphilis	0.7 (0.0–1.8)	1.7 (0.3–3.4)	0.9 (0.2–2.0)	1.8 (0–6.3)*
Gonorrhoea (any)	7.1 (4.4–10.1)	See Note 1	See Note 2	See Note 3
Gonorrhoea (genital)	4.4 (1.6–5.8)	0.9 (0.1–2.0)	1.1 (0.4–2.1)	1.2 (0–3.8)*
Gonorrhoea (rectal)	3.4 (1.8–5.4)	0.6 (0.0–1.2)	See Note 2	See Note 3
Chlamydia (any)	4.1 (1.7–7.2)	See Note 1	See Note 2	See Note 3
Chlamydia (genital)	2.2 (0.4–4.3)	2.2 (0.9–3.8)	3.1 (1.5–5.3)	3.0 (0.5–6.4)*
Chlamydia (rectal)	2.2 (0.6–4.1)	See Note 1	See Note 2	See Note 3
Trichomaniasis	NA	0 (0–0)	10.3 (6.9–14.5)	See Note 4
Candidiasis (score 1+)	NA	NA	28.1 (23.0–33.2)	See Note 4
Bacterial vaginosis	NA	NA	15.3 (11.6–19.5)	See Note 4
HSV-2	NA	21.9 (16.7–27.6)	NA	NA
Population size estimates	(n)	(n)	(n)	(n)
Median of estimates	10,000	3,706	29,494	6,107
Plausible lower to upper bounds**	10,000 to 22,222	1,797 to 4,493	10,000 to 54,467	5,031 to 10,937

NA: Not applicable or specimen not collected for this study population.

*STI result presented for 243 male PWID. See Note 4 for results from 20 female PWID.

**As determined by stakeholder review and consensus.

Note 1: Any gonorrhoea and/or chlamydia for Kisumu MSM estimated at 3.6% (95% CI: 1.7–6.0).

Note 2: 50 FSWs were tested for rectal STIs. 1/50 tested positive for rectal gonorrhoea and 2/50 tested positive for rectal chlamydia.

Note 3: 25 male PWID and 1 female PWID were tested for rectal STIs, and all tested negative.

Note 4: Crude results for 20 female PWID were: 2 of 20 tested positive for gonorrhoea, 3 of 20 for chlamydia, 7 of 20 for trichomaniasis, 2 of 20 for candidiasis, and 7 of 20 for bacterial vaginosis.

Other key findings are as follows:

Men who have sex with men

Nearly 40 percent of all MSM have ever been married to women and 13 percent of all MSM are still currently married to a woman. Many MSM in both Nairobi (62 percent) and Kisumu (52 percent) identified their sexual identity as gay.

It was very common for MSM in both Nairobi and Kisumu to report having regular male partners. Over 90 percent had at least one regular male partner in the past 12 months; over 60 percent reported two or more partners in the past 12 months in both cities. Among those who had anal sex with a regular male partner in the past 30 days, about three-quarters were inconsistent condom users in Nairobi. MSM also reported having regular female sex partners. Close to one-half of MSM reported having any regular female sex partners in the past 12 months in both Nairobi and Kisumu.

A larger proportion of MSM in Kisumu (83 percent) had non-regular male sex partners in the past 6 months than MSM in Nairobi (53 percent). Among those who had anal sex with non-regular male partners, 70 percent reported inconsistent condom use in the past 30 days (Nairobi). Having non-regular female partners in the last 6 months was less common in Nairobi than in Kisumu (24 percent versus 43 percent).

An estimated 40 percent of MSM in Nairobi and 67 percent in Kisumu reported receiving some form of payment from a male partner in the past 2 months. Among MSM who had sex with paying male partners in the past 30 days, 60 percent reported engaging in some unprotected sex.

Over 70 percent of MSM in Nairobi and Kisumu knew correct answers to HIV/AIDS knowledge questions. In both Nairobi and Kisumu, about 20–25 percent of MSM did not believe that they can get HIV from unprotected anal sex, 20–25 percent did not believe abstinence can protect them from HIV. While one-third of MSM in Nairobi (30 percent) did not know there is medical treatment for HIV, nearly one-half (44 percent) did not know so in Kisumu.

Over half of MSM in Nairobi (63 percent) and 76 percent in Kisumu were previously tested for HIV. In Nairobi, 8 percent of MSM who have had a previous HIV test and are willing to share their test results knew they were HIV-positive and only 33 percent of the MSM who tested HIV-positive in this study knew that they were infected with HIV.

In Nairobi, over one-third (37 percent) of MSM were verbally assaulted while 7 percent were physically assaulted and 6 percent were sexually assaulted in the past 12 months. These abuses were more commonly reported by MSM in Kisumu with 62 percent having experienced verbal assault, 29 percent having experienced physical assault, and 30 percent having experienced sexual assault.

Approximately 13 percent of MSM in Nairobi and 26 percent of MSM in Kisumu visited a MSM-friendly clinic or drop-in centre in the past year. A small proportion of MSM (17 percent in Nairobi and 28 percent in Kisumu) have had contact with a peer educator over the past 12 months.

HIV seroprevalence was slightly higher in Nairobi (18 percent; 95% CI: 13–24 percent) than in Kisumu (11 percent; 95% CI: 8–16 percent). However, the age distribution of MSM surveyed in Kisumu was significantly younger than those surveyed in Nairobi. Among the MSM in Kisumu over age 24 years, HIV prevalence was 25 percent. The most common STI among MSM in Nairobi was gonorrhoea (7 percent), followed by chlamydia (4 percent) and syphilis (<1 percent). In Kisumu, the most common STI was HSV-2 (22 percent); prevalence of any gonorrhoea or chlamydia was 4 percent. HSV-2 was not tested in Nairobi.

Female sex workers

The median age at first transactional sex was similar to the median age of sexual debut at 16 years (interquartile range (IQR) 13–21 years). A moderate proportion (17 percent) of first sexual acts were coerced or forced. The majority of FSWs reported engaging in sex work for 10 years or greater (61 percent). The most common location for meeting clients was at bars (77 percent) and in roadside areas (29 percent).

The median number of male clients in the past 7 days was 7 (IQR 4–18) and the median number of vaginal sex acts in the past 7 days with male clients was 11 (IQR 5–21). Anal sex with clients was not common. Most FSWs (60 percent) did not have a non-paying partner in the past year. The majority of FSWs (82.2 percent) reported sex work as their only source of income.

Condom use among FSWs differed between paying clients and non-paying partners. In the past 30 days, more FSWs reported using condoms consistently with paying clients compared to non-paying partners (62 percent versus 37 percent). The most commonly reported barrier to using condoms with both paying and non-paying partners was trust and familiarity with partners. The most commonly reported location for finding condoms was vendors (54 percent) and bars and nightclubs (30 percent).

There was high knowledge of HIV/AIDS among FSWs. Over 95 percent of FSWs correctly answered that condoms could prevent HIV infection, that HIV could be passed from mother to child, and that there were drugs to prevent mother-to-child transmission of HIV infection. However, there were still gaps in HIV

knowledge: 39 percent did not believe that abstaining from sex was protective, 23 percent did not believe that they could get HIV from unprotected anal sex, and 23 percent did not believe that there was a medical treatment for HIV.

Drug use was common among FSWs. Only 37 percent reported not using drugs in the past 12 months. The most commonly used drugs were mirraa/khat (40 percent) and marijuana (36 percent). Injecting drug use in the past 12 months was low (1.8 percent). Thirty-three percent reported consuming alcohol four or more times in the past week.

A total of 6.5 percent of FSWs were currently pregnant, and approximately 15 percent had ever had an abortion. Overall, 88.7 percent reported that they had ever used contraception and 75.4 percent used contraception in the past 30 days. The most common contraceptive method used in the past 30 days was an injectable contraceptive (e.g., Depo-Provera) followed by male condoms.

HIV prevalence among FSWs in Nairobi is very high (29.3 percent) and significantly higher among FSWs who report selling sex for 15 years or greater at 63.1 percent compared to those that had sold sex for 10–14 years (28.3 percent) and 4–9 years (23.3 percent). The prevalence of sexually transmitted infection (STI) ranged from 28.1 percent (95 percent) for candidiasis (score 1+), 15.3 percent for bacterial vaginosis, 10.3 percent for trichomoniasis, 3.1 percent for chlamydia, 1.1 percent for gonorrhoea, and 0.9 percent for syphilis infections. The proportion of FSWs with any of the above STI was 24.2 percent.

People who inject drugs

A total of 263 PWID were enrolled in under a three-month period for this study. Participants reported that initiation of either injecting or non-injecting drug use occurred at an early age (median age 11 years). Over 40 percent of PWID in the study initiated *injecting* drug use in the last 6 months preceding the study. Streets or parks and “drug bases” are the most common locations of drug use.

Only four out of ten PWID reported being sexually active in the past month. Additionally, casual and commercial types of partnerships were reported by only 5 percent and 6 percent, respectively. Condom use with the last sexual partner in the past month was reported by over two-thirds of PWID.

Few services for substance abuse and HIV prevention are targeted for PWID in Nairobi. Only one-third of PWID reported having received any kind of services from PWID-friendly facilities in the past year.

HIV prevalence for PWID who had ever shared needles and syringes was six times higher than for those who never shared (30 percent vs. 5 percent). Risky injecting practices are quite prevalent among the study population. Over two-thirds reported some form of risky injecting practice in the previous month. Close to a half (47 percent) reported sharing a needle or syringe in the past month. This practice was highly correlated with the probability of being HIV-positive. These risky practices were common despite the above-average comprehensive knowledge of HIV/AIDS they had. Almost all PWID (99.7 percent) were aware that a person can get HIV from a used needle, however only 18.9 percent reported knowledge about hepatitis B virus (HBV).

Conclusions and Recommendations

In summary, HIV prevalence among Nairobi MSM, FSWs, and PWID is higher than among Nairobi’s general population (8.8 percent; 2007 KAIS). Among the MSM in Kisumu older than 24 years, HIV prevalence was 25 percent. Health programmes need to prioritise these KPs and their sexual partners for HIV and STI prevention and care. MSM in both Nairobi and Kisumu particularly need to be targeted with non-stigmatising and sensitive services. FSWs engaged in high numbers of sex acts with multiple partners. FSWs were in particularly disadvantaged socioeconomic situations, and economic empowerment programmes should be

considered. PWID who used shared needles were especially vulnerable to HIV infection. This suggests that lack of access to clean needles and syringes among this population is a major contributor to unsafe injecting practices, and sterile needles and syringes should be made available through needle and syringe exchange programmes. We recommend continued, periodic surveillance to monitor HIV and STI prevalence and behavioural risks among KPs in Nairobi, and expansion to other areas in Kenya.

BACKGROUND

The HIV Epidemic in Kenya

Kenya has a severe, generalised HIV epidemic, but in recent years, the country has experienced a notable decline attributed mainly to rapid expansion of HIV preventative interventions. The 2007 Kenya AIDS Indicators Survey (KAIS) estimated the average HIV prevalence among the general population aged 15–49 at 7.4 percent (Kenya National AIDS and STI Control Programme 2010) while the Kenya Demographic and Health Survey (KDHS 2008–09) estimated prevalence for the same population at 6.3 percent. In terms of gender, data from both surveys shows that the HIV epidemic in Kenya disproportionately affects women. According to the KDHS report, women had a national HIV prevalence of 8.0 percent compared to 4.3 percent for men (KNBS and ICF Macro 2010). The KAIS and KDHS data also show geographical and population variation of HIV prevalence and incidences where key populations account for a third of all the new infections in the country (Ministry of Health and National AIDS Council 2009) while heterosexual sex continues to be the main mode of HIV transmission. The estimated number of people living with HIV is between 1.3 million–1.5 million in Kenya and HIV incidence remains high with an estimated 132,000 adults and 34,000 new paediatric infections per year. Data from the KAIS and KDHS surveys show prevalence has stabilised and the Mode of Transmission Studies show that Kenya has a mixed generalised and concentrated HIV epidemic.

HIV Surveillance

In Kenya, as in most of sub-Saharan Africa, national HIV prevalence estimates have been derived primarily from sentinel surveillance of pregnant women attending antenatal clinics and nationally representative population-based surveys with HIV testing, including the KDHS and the KAIS. In the 1990s, the national sentinel surveillance system acted as the main source of national HIV estimates. However, national population-based prevalence surveys with HIV testing components have since been conducted to derive national HIV prevalence data.

Three such surveillance surveys were conducted in 2003 (DHS; MOH, CBS, and ORC Macro 2004), 2007 (KAIS and NASCOP 2009) and 2008–9 (KNBS and ICF Macro 2009) measuring national prevalence at 6.7 percent, 7.4 percent and 6.3 percent, respectively. These surveys provided useful information regarding HIV prevalence in Kenya by region, gender, age, male circumcision, and other socioeconomic factors. While survey results provided valuable information about the HIV prevalence rates among the general population, there is little known about HIV infection rates among some KPs, and their prevention, care and treatment needs.

Key Populations

In Kenya, KPs include female sex workers (FSWs), men who have sex with men (MSM), and people who inject drugs (PWID), prison populations, and the fishing communities. In this report, we present study findings among three of these KP groups: FSWs, MSM and PWID in Kenya. While FSWs have been the subject of study for many years in Kenya, PWID and MSM are considered to be of increasing significance to Kenya's HIV epidemic. Current HIV prevalence information for these groups is drawn from a variety of exploratory, intervention, or cohort data. Most data comes from samples of KPs which are either narrowly focused geographically, or are sampled with limited or non-representative methodologies that are difficult to generalise to the broader KPs populations.

Female sex workers

In Kenya a number of prevalence estimates are available from various cross-sectional and cohort studies of FSWs; however, systematic data which determines their population size in Kenya are lacking. Recently, a capture-recapture enumeration was conducted in the central business district of Nairobi, where approximately 7,000 FSWs were estimated to be active (Kimani et al. 2013). Another study estimated the number of FSWs active on the Mombasa-Kampala (Uganda) highway corridor to be 8,000 (Morris and Ferguson 2007), which does not include FSWs in other city and town areas. It is widely assumed there are thousands of sex workers operating in Kenya, with especially large populations in larger cities such as Nairobi and Mombasa. Recent HIV prevalence estimates of FSWs in Nairobi's central business district are available from as yet unpublished data from the Sex Worker Outreach Programme (SWOP). Recent prevalence of FSWs utilising SWOP services is 33.5 percent (Joshua Kimani, personal communication). Among published data, HIV prevalence of FSWs in a cohort in the Kibera slum area was 24.0 percent (Fonck et al. 2000), and yearly HIV incidence was later estimated at 3.2 percent to 4.0 percent within the same cohort (Kaul et al. 2004).

Men who have sex with men

As with other KP groups in Kenya, HIV prevalence estimates among MSM are mainly derived from exploratory, cross-sectional or cohort data which may not be adequately representative or narrowly focused geographically. Additionally, systematic data which determines MSM population size is lacking. In 2007 a capture-recapture exercise estimated 739 MSM sell sex in and around Mombasa (Geibel et al. 2007). Available data also show that MSM carry a disproportionate burden of HIV in Kenya, with an average prevalence of approximately 15.2 percent as compared with HIV prevalence among all Kenyan men of approximately 6.1 percent (Beyrer et al. 2010). Higher prevalence estimates have been found along the coast region, where Sanders observed HIV prevalence of 43.0 percent for men who reported sex with men exclusively, and 12.3 percent for men who reported sex with both men and women (Sanders et al, 2007). Similar data from Nairobi and the Coast also observed an overall incidence of 6.8 cases per 100 person-years (95% confidence interval [CI]: 4.9 to 9.2) in a cohort study of over 5 years of accrual (Price et al. 2012).

People who inject drugs

In March 2007, the United Nations Office of Drugs and Crime and partner organisations conducted population size estimates of overall drug users in Nairobi and Mombasa, using a focus group multiplier method. This activity estimated over 6,500 users in Nairobi, and over 5,500 in Mombasa (Abdoul 2007). HIV testing data of PWID in Kenya is limited, but a recent analysis of 138 PWID seeking treatment in Mombasa showed that 31.2 percent were HIV-positive (Deveau et al. 2006). There is current debate over the actual size of PWID populations in Nairobi and Mombasa. No previous population-based HIV prevalence or incidence data exists on PWID in Kenya.

Epidemiological Importance of KP groups in Kenya

While absolute numbers of these KPs groups are small when compared to the general population, the overall contribution of these KPs to Kenya's HIV epidemic may be disproportionately large. Epidemiologically, a focused representative survey similar to the KAIS of the vulnerable groups of FSWs, PWID, and MSM is needed to provide a better profile and understanding of the HIV transmission dynamics in Kenya. Recently, modelling data from the Kenya Modes of Transmission Study presented by UNAIDS in August 2008 estimates that FSWs, PWID, and MSM may contribute as much as 2.2 percent, 6.2 percent, and 9.0 percent respectively of all new HIV infections in 2008 (NACC 2008). In the Nairobi urban area, incidence contribution estimates were respectively higher for FSWs (2.6 percent), PWID (15.6 percent), and MSM (11.3 percent);

signifying that these KPs alone may account for as much as 30 percent of all new HIV infections in Nairobi in 2008. With some KPs having sexual networks beyond their immediate peer groups, they may be important contributors to the HIV epidemic in the general population. The contribution of KPs to overall new infections may be even greater when their sexual partners are taken into consideration (e.g. FSW clients and non-paying partners, sexual partners of PWID, and female sexual partners of MSM).

While it is increasingly accepted that these populations contribute significantly to the pool of new infections, few programmes are designed to promote HIV prevention, treatment, and linkages to services. Few HIV prevention activities are tailored to the specific need of KPs although a growing number of pilot programmes in Kenya are providing targeted services. As in many other African countries, KPs—especially MSM and PWID—are highly stigmatised in Kenya and rarely prioritised by HIV programmes. Same-sex sexual activity, commercial sex work, and under-age sex are potentially punishable under the Kenya penal code (Government of Kenya 2011).

Given that estimates from the Kenya Modes of Transmission Study are based on published and unpublished data, as well as on a number of assumptions by experts, more data are required to inform such modelling activities, and to advise policymakers on KPs risk behaviours and how KPs may be reached with services. Existing data, however, indicates that (a) larger populations of these KPs groups exist than has been previously acknowledged by policymakers and (b) HIV prevalence rates are much higher than rates among the general population.

RATIONALE AND OBJECTIVES

The general objective of this project is to establish a periodic HIV surveillance system for KPs in Nairobi with the aim to expand surveillance to other Kenya cities, such as Kisumu. This surveillance system aims to facilitate, inform, and evaluate the impact of preventive interventions for KPs.

Primary Objectives

1. Monitor prevalence and risk factors for HIV and STIs in KPs.
2. Identify and describe key characteristics of KPs which place them at risk of HIV.
3. Describe how KPs—including highly vulnerable subgroups—may be identified, reached, and served by various health programmes.

Secondary Objective

1. Estimate population sizes of KPs, through programmatic multiplier methods, using a modified capture-recapture formula applied to KPs service data and responses to service utilisation data from the RDS behavioural surveys.

METHODS

Respondent-driven Sampling (RDS)

This study used RDS to enrol participants from all three study populations. RDS is a chain referral sampling method designed to reduce the biases generally associated with chain referral methods in order to yield a probability-based sample. It is specifically designed to sample hard-to-reach and hidden populations such as FSWs, PWID, and MSM.

Enrolment in RDS is initiated with a number of purposefully selected members of the study population referred to as “seeds”. Each seed is given a fixed number of uniquely coded coupons with which to enrol peers into the study. Enrolled peers who then enrol in the study are considered the first wave of participants. Each participant in the first wave who completes the survey is then provided a fixed number of coupons with which to enrol their peers into the study. Successive waves of enrolment continue until the sample size is reached.

The unique codes on each coupon enable linkage in RDS analysis of participants to participants they referred through coupon distribution and each participant to their questionnaire and biological test results.

Weekly monitoring of equilibrium in key variables ensured that samples contained sufficient diversity with respect to characteristics known to exist in the target population.

Sample Size Calculation

The study targeted a minimum sample size of 600 per KP group; this takes into account the RDS-related design effect of two (as proposed by Salganik et al. 2006). Table 3 shows HIV prevalence estimates from selected surveys described in the Background and Justification section (Kimani unpublished, Deveau 2006, and Sanders 2007), which are used as reference values to make working assumptions about HIV prevalence in the KPs to be surveyed.

Given the unavailability of standard errors from source data, binomial exact 95 percent CIs are used to generate assumed CIs, and were calculated in Stata using the *cii* command. The target sample size ($n = 600$) was divided by the assumed design effect (assumed to be 2); hence the computed 95 percent CIs reflect that of a random sample with the correspondingly smaller sample size ($600/2 = 300$).

TABLE 3. Sample size and estimated precision of estimates

	Female sex workers	Injecting drug users	Men who have sex with men
Estimated HIV prevalence	33.5%	32.0%	25.0%
Minimum sample size to be enrolled ($\alpha = 0.05$, $1-\beta = 0.80$, design effect =2)	600	600	600
95% CI range to be detected by sample size	28.3%–39.3%	26.8%–37.6%	20.2%–30.3%
Estimated precision (defined as half the width of the confidence intervals)	5.8%	5.6%	5.3%

Study Populations and Study Site

MSM included in the study were men who reported sexual activity (oral or anal) with another man at least once in the last six months. FSWs included were those who reported selling sex to a man in past three months. PWID included were men and women who used needles for injecting drug use in the past three

months. To avoid enrolment of non-MSM and non-PWID who were seeking to participate for the monetary compensation, additional screening tools were employed. PWID were asked to identify physical track marks which traditionally represent frequent needle use, but absence of these marks did not necessarily exclude them from participating. MSM were given a short screening interview to demonstrate and ensure that they were familiar with MSM sexual behaviour and have knowledge of MSM social networking. PWID were also given a short screening interview to ensure that they were familiar with injecting drug terminologies, procedures, and drug-seeking or networking behaviours. Similarly, FSWs were required to answer additional screening questions and demonstrate knowledge and terminologies used in sex work. MSM, and PWID participants were aged 18 years or over; resident of Kisumu (MSM only), Nairobi or adjacent urban areas, including but not limited to Limuru, Ngong, Kiambu, and Thika; able and willing to provide written informed consent to take part in the survey and able and willing to have laboratory specimens collected and tested for STIs. Participants who were unable to understand or provide informed consent; were mentally impaired from alcohol or drug use; were duplicate enrols or received a coupon from a stranger were not enrolled into the study. Study activities with all Nairobi KPs were conducted at NASCOP VCT centre located within Kenyatta National Hospital campus in Nairobi. Study activities for Kisumu MSM were conducted at a secure location in cooperation with a local Kenyan NGO.

Data Collection

Participants for this study were enrolled through RDS where peers enrol their peers into the study. This sampling strategy is typically used to enrol hard-to-reach populations (Heckathorn 1997; 2002). Potential seeds (initial participants) were identified primarily through formative research (focus group discussions, key informant interviews and in-depth interviews) with key study stakeholders and representatives of different KPs groups. Eligible seeds who consented to participate were familiarised with the study objectives and motivated to promote enthusiasm and personal investment in the project. Seeds were required to complete all study procedures; they were interviewed and underwent HIV and STI testing. These seeds were then asked to enrol their peers who belong to the same target population. Peers enrolled by seeds reported at the study site and were assessed for eligibility. Those found to be eligible were privately informed by study staff about the objectives, methods, risks, benefits, and compensation scheme of the study. Written informed consent was obtained from each eligible participant and they were registered. To confirm enrollees' ID and identify duplicate enrollees, a fingerprint scanner and software programme was used to issue a unique alphanumeric code to each participant.

In total, 563 MSM (Nairobi), 415 MSM (Kisumu), 593 FSWs (Nairobi), and 263 PWID (Nairobi) were enrolled over a 9 month period between July 2010 and March 2011. Details of the sample size and number of seeds are described in Table 4.

TABLE 4. RDS survey parameters by target population

Population	Target enrollment	Enrollment achieved	Seeds and maximum number of coupons
MSM (Nairobi)	600	563	6 (2 with no enrollees, 2 with only 1 enrol); 3 coupons
MSM (Kisumu)	600	415	11 (3 with no enrollees); 3 coupons
FSWs (Nairobi)	600	596	5 seeds; Started with 3 coupons, but quickly limited to 2 or 1, depending on area of residence
PWID (Nairobi)	600	269	6 seeds; 2 coupons

Tool development and staff training

Standardised surveys specific to each KP group were used for quantitative data collection (see Annexes). Questions were reviewed, translated and back-translated from English to Kiswahili. Questionnaires were further reviewed for consistency and comprehension during staff training. Adaptations were made to the questionnaires to fit the local context of the different population groups as needed. Questions included demographic characteristics and sexual behaviours—sexual history, use of condoms and lubricants, risk perception, awareness of HIV/AIDS/STIs, participation in HIV/AIDS awareness programmes, alcohol/drug habits and service use.

AUDIT score

Harmful/hazardous drinking was assessed by scoring individuals' responses across a series of questions outlined by AUDIT (Alcohol Use Disorders Identification Test). The AUDIT Score has been developed by the World Health Organization as a simple screening tool to pick up the early signs of hazardous and harmful drinking, and identify mild dependency. The study questionnaire prompted KPs to respond to various questions that relate to their drinking habits, and an AUDIT score is determined from their responses.

Enrolment and staff training

During staff selection, priority was given to interviewers and support staff who had previous experience working with MSM, FSWs and PWID or were members of these population groups. All staff underwent an intensive seven-day training prior to implementation of the MSM survey. Similar five-day training was conducted prior to commencement of FSWs and PWID surveys. Trainings focused on the objectives of the study, principles and ethics of research, administration of the questionnaire including characteristics of the target groups, standard operating procedures, STI specimen collection (urine, blood, and rectal swab), HIV and STI testing and counselling, rapport building techniques, and sensitising staff on the KPs groups. Training sessions used mock interviews and role-plays to prepare staff for various situations in the field. Informed consent, referrals and basic knowledge of HIV and STIs were also reviewed in training.

Visit Procedures

Visit procedures were conducted in a private setting to maintain participant privacy and confidentiality.

Behavioural survey

In Nairobi, face-to-face interviews were administered using CAPI in private by trained nurse counsellors. With CAPI, one survey staff read the questions from a hand-held computer and recorded the enrolees' replies electronically. In Kisumu, computer-based self-interviews were conducted using ACASI systems; systems were managed in a separate private room by study staff and respondents wore headphones while they entered their responses. Each interview took approximately 40–45 minutes to complete depending on the respondent's pace.

HIV testing and counselling

Upon completion of the behavioural interview, HIV testing and counselling was offered to participants who elected to be tested (using rapid HIV test). Kenya national HIV guidelines for HIV counselling and testing were followed (Ministry of Health 2008). Pre-test counselling included an explanation of HIV infection and transmission, the meaning of HIV test results, risks associated with sexual and injecting behaviours, as well as means to prevent HIV infection. Results from the rapid HIV test were given to respondents at the end

of the study visit with post-test counselling. Post-test counselling messages were tailored to enrollees' HIV results and risk profiles. Respondents who tested positive were provided referral to collaborating providers and government ART clinics for further management. Condoms, lubricants and sterile water for cleaning needles and syringes were provided free of charge.

STI testing, referral and treatment

Participants were tested for vaginal and rectal STIs (Table 5). FSWs were tested for additional reproductive tract infections, including bacterial vaginosis and candidiasis, which are not sexually transmitted, but can enhance HIV acquisition and transmission. Only MSM in Kisumu were test for HSV-2; stored samples for Nairobi MSM may be tested for HSV-2 in the future. After the initial study visit when samples were collected, participants were asked to return to the survey office to provide information about the number and characteristics of peers they approached, collect their secondary incentive, and receive their STI test results. The visit was scheduled after the expiry date of the referral coupon (usually two weeks). HIV-infected enrollees also received additional HIV post-test counselling as appropriate and follow-up on referrals to care and treatment. Study participants who tested positive for STIs were given the option to receive specialised follow-up treatment at the appropriate partner clinic, and were provided transport for immediate treatment following receipt of results and counselling at the follow-up visit. Study participants who did not wish to go to one of these clinics were given the option of being provided treatment at the study site. Any STI detected was treated according to the Kenya National STI Treatment Guidelines.

Laboratory procedures

HIV: Parallel testing was conducted using two rapid HIV tests, Unigold and Determine, where concordant positive or negative test results are confirmatory. In the event of discordant results, the Bioline test was conducted as a tie-breaker. Those who tested positive were referred to government clinics for further management.

Syphilis: Rapid plasma reagent (RPR) assays (Roche Amplicor CT/NG test) were used for screening, and Treponema palladium hemagglutination assay (TPHA) test was used for all positive RPR tests for confirmation.

Trichomoniasis vaginalis: Detection of *T. vaginalis* was performed using the InPouch™ system.

Bacterial vaginosis and candidiasis: A vaginal culture was evaluated for BV using Nugent's scoring criteria and the KOH test was used for candidiasis.

Chlamydia trachomatis and N. gonorrhoea: The rapid *C. trachomatis* PCR (Roche Amplicor CT/NG test) was used for the detection of antigens in vaginal/rectal swabs and urine for chlamydia and gonorrhoea.

Herpes simplex virus type 2: Detection of the HSV-2 antibody was conducted using the Kalon test.

Table 5 outlines the STIs tested for in the different KPs groups.

TABLE 5. STI tests conducted for the 2010–2011 IBBS survey

Agent	Specimen type	PWID	MSM	FSW
<i>T. pallidum</i> (syphilis)	Blood serology (RPR, TPHA)	All	All	All
<i>N. gonorrhoea</i> & <i>C. trachomatis</i>	Rectal swab	—	All	All reporting anal receptive sex or rectal STI symptoms
<i>Neisseria gonorrhoea</i>	Urine PCR or Vaginal swab PCR	Male (Urine) Female (Vaginal swab)	Urine	Vaginal swab
<i>C. trachomatis</i> & <i>T. vaginalis</i>	Urine PCR or vaginal swab PCR	Male (Urine) Female (Urine or vaginal swab)	Urine	Urine or vaginal swab
<i>T. vaginalis</i>	Urine PCR or vaginal swab PCR	Male (Urine) Female (Urine or vaginal swab)	Urine (Kisumu only)	Urine or vaginal swab
<i>B. vaginosis</i>	Vaginal swab gram stain	Only females	—	All
Candidiasis	Gram stain	Only females	—	All
HSV type 2	Blood serology (Kalon*)	—	Blood (Kisumu only)	—

Note: Among non-MSM and non-FSW KPs who neither reported anal receptive sex nor symptoms consistent with an anal STD (elicited through the main questionnaire) we offered rectal swabs and testing for NG and CT to a randomly selected 5–10 percent of enrollees. This was done to validate prevalence estimates of NG/CT in the respective groups.

*Early detection of herpes antibodies may have been limited using the Kalon Enzyme linked immunosorbent assay

Storage and transportation of samples

Blood specimens (collected in a 5 ml red-top tube) for STIs requiring blood serology were centrifuged at the study clinic to yield serum. In Nairobi, blood, swab, and urine specimens were stored at 2–8°C (for NG, CT, and TP) or room temperature (TV, BV and candidiasis) until collected for transport daily to the laboratory at University of Nairobi Institute of Tropical and Infectious Diseases (UNITID). For the Kisumu MSM study, all urine and swab specimens were transported routinely to the UNITID laboratory (for NG and CT) in Nairobi, while TV and HSV-2 testing was conducted on-site at the Lumumba Health Centre laboratory in Kisumu.

Quality control of laboratory tests

Quality control was strictly maintained throughout the process of the specimen collection, their handling, and testing stages. The rapid testing algorithm was repeated at UNITID laboratory for all HIV-positive results and for 5 percent of HIV-negative results. For NG and CT, quality control panels were provided prior to study implementation and every four months. For quality control of syphilis, all RPR positive specimens and 5 percent of negative specimens were retested with TPHA. All rectal swab specimens (from both Nairobi and Kisumu) which tested positive for NG were forwarded to a laboratory in Mombasa where confirmatory testing took place using the Gen-Probe Aptima test.

Storage of leftover blood specimens for future biological testing

Participants were asked to consent to storage and possible additional testing of leftover blood specimens which may include: 1) molecular sub-typing of HIV-positive specimens using PCR, multiple sequence alignments, and phylogenetic analysis methods and 2) testing for recent seroconversions in HIV-1 positive persons, using HIV-1 incidence assays (e.g., BED assay, avidity assay, or other assays currently under development). Leftover specimens will be stored for a period of up to five years. All future testing on stored specimens will be coordinated with study investigators and their partners. Leftover blood was collected from

participants who consented to having their leftover specimens used for long-term storage and future use. If additional testing is considered, a separate submission requesting proposed changes to the protocol will be submitted to the relevant research ethics committees.

Data Management and Analysis

We used MS Office, Perseus Mobile Survey (for CAPI interviewing), RDS Analysis Tool (RDSAT) (Versions 5.6, www.respondentdrivensampling.org), RDS Coupon Manager, SAS (Version 9.1, Cary, NC), Stata, (Version 10, College Station, TX) as well as electronic fingerprint software. RDSAT is a software programme developed for analysis of RDS data. RDSAT facilitates computation of prevalence point estimates for RDS data with 95% CIs; estimates are weighted to account for participant network size and homophily. Significant associations were assessed by comparing the 95% CIs of two point estimates that were stratified by a selected characteristic or risk factor. 95% CIs that did not overlap were considered significant at the $p < 0.05$ level. Because multivariate regression analysis was not conducted for this report, bivariate analyses are reported for the purposes of informing stakeholders and programme managers about characteristics of the target populations of this study. The RDSAT software does not test for adjusted statistical significance in outcome indicators between population groups.

RDS Coupon Manager was used to track enrolment processing and coupons; the electronic fingerprint software was used to: 1) identify duplicate enrollees, 2) confirm correct ownership of an enrollee's coupon (ID number), and 3) re-establish the ID number of enrollees who present themselves for follow-up without a coupon.

All interview data which were in the form of CAPI data were entered directly into handheld computers in Nairobi, and directly into computers through ACASI self-administered interview systems in Kisumu. Data entry checks in place during the interview as well as detection for and removal of illogical data values following the interviews were employed. All other survey-related data (paper-based interviews, laboratory data, etc.) were double-entered by survey staff using MS Access. Data errors and missing data was cross-checked against hard copy data where available.

Population Size Estimation Methods

A secondary objective of the study was to use available methods to calculate a range of population size estimates for each of the three KPs groups. In the absence of a gold standard such as a census, estimates of hidden and marginalised populations are imprecise and prone to severe biases. Therefore, our overall approach was to implement multiple methods simultaneously to: (a) minimise potential bias resulting from a single method; and (b) produce the most rigorous possible estimates of population sizes using available survey and service statistic data. Described in greater detail below, we used three practical methods which were determined feasible for each population and location during a formative assessment. These included variations of the “multiplier method”, the “wisdom of the crowds” method, and an approach that drew on published literature. In the process, the median of the three estimates was hypothesised to be the most plausible size estimate, with the other results forming the upper and lower plausible bounds. Data were also shared in a consensus forum and with population community representatives to finalise “best” point estimates and plausible bounds based on the empirical data collected in Nairobi, a priori expectations from the global literature and stakeholder input.

Service multipliers

Multiplier methods entail using two basic sources of data on the population in question (WHO 2010). First,

adding questions to the survey instrument asking about the use of specific services or facilities, membership in a group, or participation in a research study in a specific time-period (e.g., In the last 12 months did you receive sexually transmitted infection (STI) treatment at X clinic?). Secondly, obtaining the unduplicated counts of the population of interest at the corresponding service during the same specific period. Using these two data sources, the multiplier method provides a population size estimate by the formula: $N = n / p$; where N is the population size, n is the number of the population using a particular service in a specified time period, and p is the proportion of the survey population reporting using the particular service in the same time period. For example, if a specific HIV test site reached 533 MSM in city X in 2008 and 0.9 percent of survey respondents reported having an HIV test at that site in 2008, then there are an estimated 59,222 (= 533 / 0.009) MSM in city X.

Several multipliers were explored and, when possible, used simultaneously to minimise the potential influence of biases of any one multiplier and to produce upper and lower plausible bounds. The final choice of multipliers used in the present study was determined by the availability and quality of the unduplicated client counts available in each location during the formative phase of the project. Of note, the programme data need to have unduplicated individual contacts, be able to provide this number for a specific time period, and ascertain KP membership among their clients for the estimate to be unbiased. Moreover, the services and survey must be independent of one another, that is, sampling for the survey must be as representative of the population as possible and not simply a sample of a given service.

Wisdom of the crowds

The “Wisdom of the Crowds” method is based on the assumption that the central tendency in the response of a population on the number of members of a group approximates or is proportional to the actual number in that population (Lee et al. 2011; Nature 2005; Surowicki 2004). Assumptions are that persons in a large sample have unique information or perspectives about the population in question, that when asked individually their estimates are not influenced by others and that in aggregate the biases and extremes in estimates tend to cancel out. For example, the method entails asking respondents how many MSM they believe to be present in the particular location. Median, range and quartiles descriptive statistics of the reported answers to this question can be calculated.

Literature review

Our literature review began with a synthesis of local demographic data, local data on prevalence of high-risk populations and international data on high-risk population prevalence. The synthesis of data entailed an extensive review of the published and grey literature, searching for relevant data from similar cities and regions which can be used to calculate benchmark estimates. Literature-based methods drew on published population sizes for the general population, typically stratified by age and gender, and estimates of prevalence of KPs in various populations. After determining, for example, how many adult men are in a particular city or region, the prevalence of MSM from other studies in the same or similar places was used to calculate the number of MSM in the location of interest.

Stakeholder consensus

During the analysis phase, the Modified Delphi method was conducted with a convening of stakeholders to synthesise the new information and estimates gathered during the study, and to interpret results. Consulted stakeholders included representation from Kenyan government, research, HIV programming, and community advocacy sectors. This entailed the presentation of preliminary point estimates, identifying the median estimate (less influenced by outliers) of all methods used, and eliciting feedback and expert opinions from stakeholders. In addition to input on point estimates of the population size, a goal of this phase was to

establish upper and lower plausibility bounds for the estimates, based on the shared local and international data and on the expert opinion of our Delphi panel. Plausibility bounds are not the same as statistical CIs but rather bounds established that make “plausible sense” in our context. For example, if in city X it is known that there are at least 5,000 recorded HIV cases among MSM, a population size estimate of 4,000 MSM total would be implausible as it is lower than the known size of the population.

Ethical Considerations

A primary ethical concern of this study was that participation in the study may reveal that respondents were engaging in: (a) prostitution, (b) illegal drug use, and/or (c) same-sex sexual activity—all illegal under the Kenya penal code. Therefore, this study obtained necessary review and support from key government bodies, including NACC and the MOH.

Study participation was strictly voluntary and participants were informed that they were free to withdraw from the study at any time. Following careful explanation of the survey, study staff gave eligible participants the consent form to read or, if necessary, the consent form was read to the survey participant by project staff. All participants verbally stated that they understood and agreed to all of the items contained in the consent and signed the informed consent form in order to be enrolled in the survey.

All study data including behavioural and laboratory information were kept confidential. The survey team did not record names or other personal identifiers on the survey questionnaires nor on any of the laboratory specimens and results. In this survey, coupon identification numbers were assigned to each of the participants and used to link questionnaire responses to behavioural and laboratory test results. After data collection, forms and test results were kept in a locked metal cabinet at the study office and later stored at a separate secure location.

These study protocols were submitted for review and approved by the Kenyatta National Hospital Ethics and Research Committee (KNH-ERC), the Population Council Institutional Review Board (IRB), and to the Associate Director for Science, GAP, Kenya and Atlanta. The Kisumu study protocol was additionally reviewed and approved by the University of Illinois-Chicago IRB. Prior to the survey, consultation was organised with representatives of local KP interest groups. During these meetings the purpose and procedures of the survey were explained and input and cooperation from community members were solicited.

Limitations

This study had some limitations. There is a possible under-representation of some population subgroups, including: men/women of higher socio-economic status; Kenyan-Asian men/women and white men (MSM). Generally, Kenyan-Asians include persons of Indian descent who are the largest Asian subpopulation in Kenya. Attempts made by the study team to include men/women of higher socio-economic status and Kenyan-Asian men in the study produced little effect. Also despite cautionary measures, it is still possible that some participants may have misrepresented their membership in a KP to gain financial compensation. Similarly, some individuals may have participated more than once in the same survey to gain financial reward. However, the use of fingerprint recognition software during data collection may have prevented duplicate enrollees.

Furthermore, all behavioural data was self-reported and like all sexual behaviour surveys, there is a potential response bias such as underestimate of the proportion of the participants who engage in unprotected sex, number of sexual partners and a possible overestimate of condom use.

RESULTS

This chapter presents biological and behavioural findings for MSM, FSWs and PWID in separate sections. For each population, enrolment and socio-demographic characteristics are described, followed by risk behaviours, HIV knowledge and perception of risk, experience of stigma and violence, exposure to targeted interventions, prevalence of HIV, syphilis, and other STIs, and basic analysis of risk factors associated with HIV infection. Each section begins with key findings and concludes with a brief discussion of the findings and their programmatic and policy implications for HIV prevention and services among the population at risk. The text exclusively refers to RDSAT prevalence estimates that have been weighted for network size and homophily, unless specified. Most figures present the weighted prevalence estimates unless specified. Tables almost exclusively present RDS weighted prevalence estimates, with the exception of tables for demographic characteristics. Demographic tables present unadjusted or crude proportions in addition to RDS weighted estimates; the text describing the tables will only refer to adjusted prevalence estimates.

NAIROBI MEN WHO HAVE SEX WITH MEN

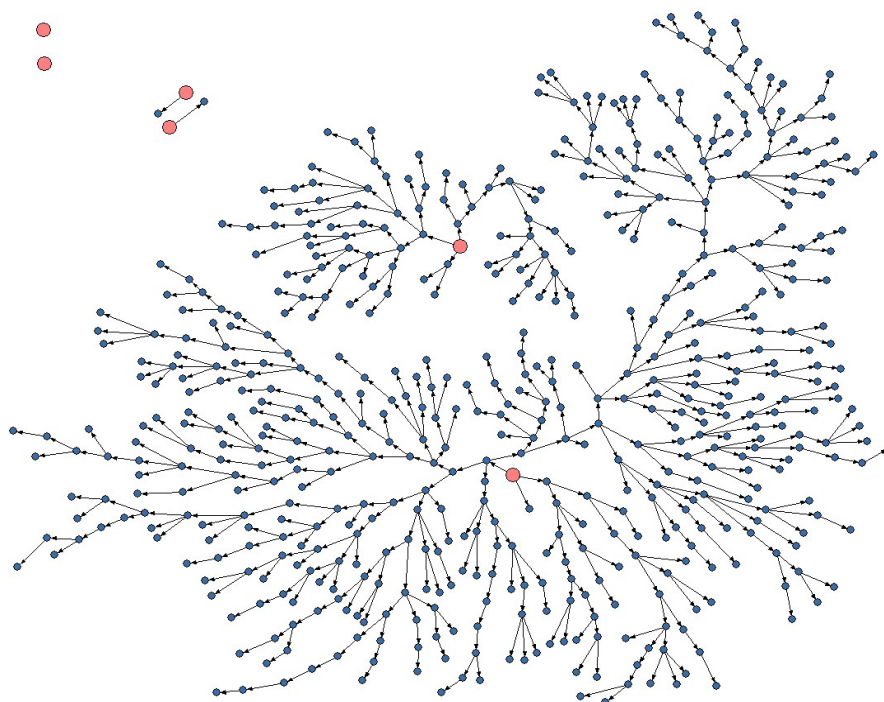
Key findings

- MSM in Nairobi represent a diverse demographic group in terms of age, education levels, occupation and ethnicity.
- The majority of MSM had multiple male partners and nearly half of MSM have a regular female partner.
- Inconsistent condom use is prevalent during anal sex among MSM.
- Two-thirds of MSM who tested positive for HIV did not know they were HIV-positive.
- HIV prevalence among MSM is 3 times higher than the general population and is highest among those 25–34 years old, those living with a man, those self-identified as gay, and those with high-risk sexual behaviours.

Enrolment

From July to October 2010, 563 MSM were enrolled in the study. Enrolment was initiated by six seeds selected based on results from formative assessments to represent regional, occupational, and educational diversity of the target populations. Of the 1,478 coupons issued, 691 were returned giving a coupon return rate of 46.7 percent. Of those who returned a coupon 563 met eligibility criteria for study participation and were enrolled in the study. The waves of enrolment per seed ranged from 1 to 23 (See Figure 1), and the mean network size was 77, while the median was 8 (interquartile range (IQR): 4, 20). Two seeds failed to enrol any of their peers successfully.

FIGURE 1. ENROLMENT OF MSM IN NAIROBI (N = 569 INCLUDING SEEDS)



Note: Larger circles indicate seed participants

Socio-demographic Characteristics

Table 6 presents both crude and adjusted estimates of the socio-demographic characteristics of MSM in Nairobi. The median age of the MSM enrollees is 28 years old (IQR 24–35). Over half of MSM in Nairobi are under age 30, with an estimated one-third of MSM age 18–24 (33.6 percent) and one-quarter age 25–29 (24.1 percent). More than 80 percent of MSM in Nairobi are estimated to have either primary or secondary education while about 14 percent have a tertiary education. About 80 percent of MSM are estimated to be Christians, 14.9 percent Muslims; and the remaining 6.7 percent of other religious backgrounds (including Hindu) or not holding any particular religious faith. Those with Kikuyu ethnic background are the most common (41.8 percent), followed by Luo (16.6 percent), and Luhya (14.7 percent). The ethnic distribution of MSM is largely similar to the population living in Nairobi (DHS 2008/9).

About 60 percent of MSM are single and have never been married. More than a quarter of MSM have ever been married to a woman and 13.0 percent are still currently married to a woman. Of all MSM, about a quarter are living with a male sex partner and 12.5 percent are living with a female sexual partner. MSM engage in a variety of occupations with about 13 percent engaging in sex work as their primary occupation. The majority of MSM in Nairobi self-identify their sexual identity as gay (61.9 percent) with 16 percent and 0.3 percent identifying as bisexual and heterosexual, respectively. Other self-identified sexual identities (21.9 percent) include homosexual, *shoga*, *basha*, *hanithi*, *kuchu*, queen, king, and transsexual.¹ Regarding sexual debut, with either men or women, just over one quarter of MSM initiated sexual activity before the age of 15.

¹Local language terminologies in italics. Respondents reporting their sexuality as king, *basha*, or bisexual were more likely to report being an insertive partner during anal sex than other partners.

TABLE 6. Socio-demographic characteristics of MSM, Nairobi 2010 (n=563)

Background characteristics	Unadjusted		Adjusted	
	%	n	%	95% CI
Age groups				
18-24	26.6	150	33.6	26.4-41.4
25-29	28.8	162	24.1	18.6-30.3
30-34	18.7	105	15.5	10.9-20.0
35+	25.9	146	26.8	20.2-33.7
Educational levels				
None/incomplete primary	31.3	120	17.7	13.0-22.6
Completed primary	14.9	84	27.4	20.7-33.5
Incomplete secondary	12.8	72	26.6	20.3-32.8
Completed secondary	28.1	158	10.8	7.4-14.6
Enrolled/completed post-secondary	22.9	129	17.5	13.5-23.0
Religious affiliation				
Christian	79.8	449	78.4	72.2-84.2
Muslim	13.5	76	14.9	9.6-20.1
Other	6.7	38	6.7	4.1-10.5
Ethnicity				
Kikuyu	43.3	244	41.8	35.1-49.1
Luo	11.7	66	16.6	10.7-21.5
Luhya	15.4	87	14.7	10.4-20.3
Kamba	10.6	60	8.3	5.3-12.3
Kisii	3.9	22	4.0	1.4-7.6
Meru	3.5	20	2.5	1.2-3.8
Other	11.2	64	12.1	7.7-17.0
Marital status				
Single, never married	59.1	333	60.3	53.3-67.0
Single, formerly married (to a woman)	26.8	151	26.7	20.6-33.1
Currently married (to a woman)	14.0	79	13.0	9.2-17.4
Living situation				
Living with a woman	12.4	70	12.5	8.3-17.6
Living with a man	24.2	136	23.8	18.0-28.9
Employment				
Unemployed/No income	9.8	55	13.8	8.8-19.1
Formal employment	32.3	181	28.8	23.8-35.1
Informal employment	31.9	179	34.3	27.8-40.1
Sex work	16.2	91	12.8	8.8-17.5
Security: Police, guards, military	3.4	19	3.1	1.5-5.1
Other	6.4	36	7.1	4.0-10.5
Self-identified sexual identity				
Gay	64.7	364	61.9	55.4-68.2
Bisexual	16.5	93	16.0	11.2-21.3
Heterosexual	0.5	3	0.3	0.0-0.8
Other	18.3	103	21.9	16.7-27.1
Sexual debut				
Before age 15	28.9	162	27.6	22.0-33.7
After age 15	71.1	398	72.4	66.3-78.0

Alcohol and Drug Use

Substance use has been documented widely among MSM populations worldwide. Overall 86.5 percent of MSM in Nairobi used some substances or alcohol in the past 12 months. (Table 7) An estimated 69.7 percent of MSM currently consume alcohol, and a little over one-third consume alcohol at least twice a week. About one-half (43.5 percent) of MSM are not considered harmful/hazardous drinkers per their AUDIT scores, one-quarter need simple advice on reducing hazardous drinking (23.0 percent), and 10.6 percent need brief counselling and continued monitoring. About one in five MSM (22.9 percent) need full diagnostic evaluation for alcohol dependence.

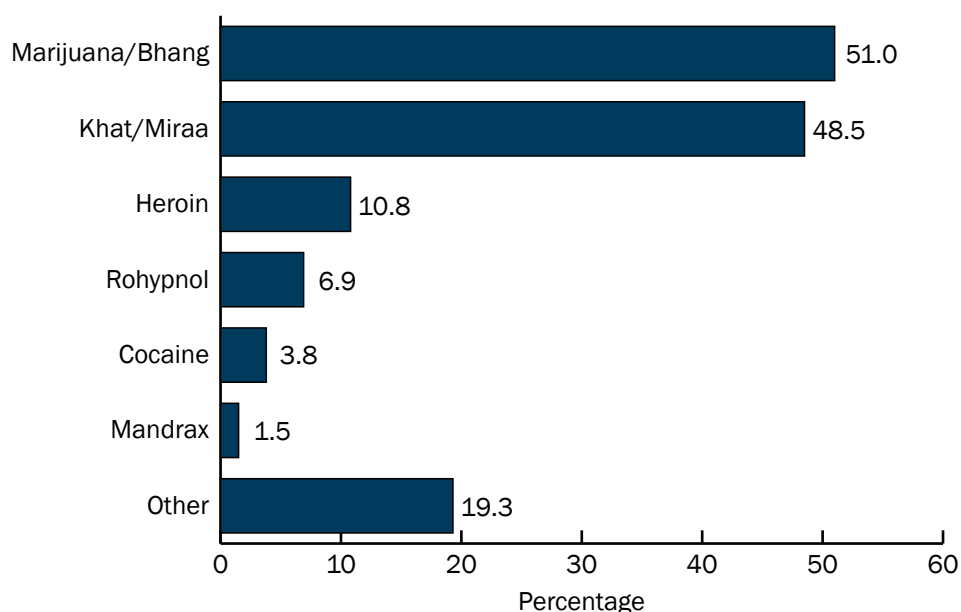
Marijuana/Bhang and khat/miraa were the most commonly used substances by MSM. About half of all MSM have used marijuana/bhang (51.0 percent) and/or khat/miraa (48.5 percent) in the past 12 months. Ten percent of MSM used heroin, 6.9 percent used rohypnol, and 3.8 percent used cocaine in the past 12 months. Very few MSM injected drugs (1.4 percent) in the past 12 months.

TABLE 7. Alcohol and drug use among MSM, Nairobi 2010 (n=563)

Alcohol and drug use (N = 563)	Adjusted	
	%	95% CI
Any alcohol/drug use	86.5	81.2–91.3
Any alcohol consumption (current)	69.7	63.4–75.7
Frequency of alcohol consumption		
Never	30.3	24.3–36.7
2–4 times per month or less	33.9	27.7–40.1
2+ times per week	35.8	29.7–42.4
AUDIT score		
Not harmful/hazardous drinker	43.5	36.6–50.2
Needs simple advice on reduction of hazardous drinking	23.0	18.1–29.2
Suggest brief counselling and continued monitoring	10.6	7.1–14.5
Warrants further diagnostic evaluation for alcohol dependence	22.9	17.3–28.3
Substance use in the past 12 months*		
Marijuana/bhang	51.0	44.1–58.1
Khat/miraa	48.5	41.5–54.6
Cocaine	3.8	2.2–5.8
Heroin	10.8	6.3–16.1
Rohypnol	6.9	4.1–10.5
Mandrax	1.5	0.4–2.9
Other drugs	19.3	14.4–24.1
No drug use at all during past 12 months	29.0	22.8–35.7
Injecting drug use past 12 months		
Yes	1.4	0.4–2.9
No/Never taken drugs	98.6	97.1–99.6

* Participants could respond to more than one category; therefore categories do not add to 100%.

FIGURE 2. SUBSTANCES OTHER THAN ALCOHOL USED BY MSM, NAIROBI 2010



*Other drugs include, for example, kuber, valium, tobacco, arten, and largatine.

Sexual Risk Behaviours

Regular male and female sex partners

MSM were asked about both regular male and female partners. A regular partner was defined as someone with whom the respondent had an ongoing or long-term intimate sexual relationship, including live-in partners and spouses (Table 8). One-third (32.5 percent) of MSM have one regular male partner and 59.6 percent had two or more regular partners in the past 12 months. While one-half (54.6 percent) of MSM did not have any regular female partners in the past 12 months, 27.6 percent have one regular female sex partner and 17.8 percent had two or more regular female sex partners in the past 12 months.

About half of MSM (51.6 percent) had receptive anal sex with a regular male partner, and 58.6 percent had insertive anal sex with a regular male partner in the past 30 days. Of those who had anal sex with a regular male partner in the past 30 days, about three-quarter (74.9 percent reported using a condom sometimes or never) engaged in some unprotected anal sex. Additionally, a little over one-half of MSM who engaged in anal sex in the past 30 days did not use condoms during their last anal sex episode.

Almost one-third of MSM (28.7 percent) engaged in vaginal sex with regular female partners in the past 30 days, and 6.7 percent engaged in insertive anal sex in the past 30 days.

TABLE 8. Sexual activity with regular male and female partners, MSM, Nairobi 2010 (n = 563)

	Regular male partners		Regular female partners	
	Adjusted %	95% CI	Adjusted %	95% CI
Number partners in past 12 months				
None	7.9	4.5–12.2	54.6	46.9–60.9
1	32.5	26.6–39.5	27.6	22.0–34.2
2+	59.6	52.2–65.7	17.8	13.2–23.4
Receptive anal sex in past 30 days				
Yes	51.6	44.6–58.0	NA	
No	48.4	41.9–55.5		
Vaginal sex in the past 30 days				
Yes	NA		28.7	22.9–35.3
No			71.3	64.7–77.1
Insertive anal sex in past 30 days				
Yes	58.6	52.2–65.6	6.7	3.9–10.3
No	36.6	34.4–47.8	93.3	89.7–96.1
Condom use during anal sex past 30 days* (n = 455)				
Always	25.1	20.8–33.7	—	—
Sometimes	30.0	22.8–35.7	—	—
Never	44.9	36.3–51.7	—	—
Condom use last time had anal sex* (n = 451)				
Yes	46.7	39.5–55.0	—	—
No	53.3	45.0–60.5	—	—

—: indicator not asked for female partners

NA: indicator not applicable

* Among those who had sex with a regular male partner in the past 30 days.

Non-regular male and female sex partners

Sexual activity with non-regular male and female partners is reported in Table 9. A non-regular partner was defined as a partner with whom the respondent did not have an ongoing or intimate sexual relationship. These partners may be casual sexual partners or “one-time” encounters, and may also include sex workers whom the respondent paid money for sex. An estimated 52.5 percent of MSM had one or more non-regular male partners in the past 6 months. One-quarter of MSM had receptive anal sex and 25.9 percent had insertive anal sex with non-regular male partners in the past 30 days. Among those who had anal sex with non-regular male partner(s), 70.0 percent had engaged in some unprotected anal sex with non-regular male partners in the past 30 days.

About three-quarters (76.4 percent) of MSM did not have any non-regular female partners in the past 6 months. An estimated 15.4 percent and 4.7 percent of the entire MSM population has had vaginal and anal sex, respectively, with non-regular female partners in the past 30 days.

TABLE 9. Sexual activity with non-regular male and female partners, MSM, Nairobi 2010 (n = 563)

	Non-regular male partners		Non-regular female partners	
	Adjusted %	95% CI	Adjusted %	95% CI
Number partners in past 6 months				
None	47.5	41.0–54.7	76.4	69.7–81.5
1	11.2	7.6–15.5	5.4	3.2–8.0
2+	41.3	34.5–47.4	18.2	13.3–24.6
Receptive anal sex in past 30 days				
Yes	25.2	19.6–80.4	NA	
No	74.8	69.4–80.4		
Vaginal sex in past 30 days				
Yes	NA		15.4	11.2–20.3
No			84.6	79.7–88.8
Insertive anal sex in past 30 days				
Yes	25.9	20.1–31.1	4.7	2.9–7.1
No	74.1	68.9–79.9	95.3	92.9–97.1
Condom use during intercourse in past 30 days* (n=351)				
Always	30.1	18.3–34.9	—	—
Sometimes	27.0	19.1–34.7	—	—
Never	43.0	37.8–56.2	—	—
Condom use last time had anal sex* (n=265)				
Yes	55.2	41.0–66.4	—	—
No	44.8	33.6–59.0	—	—

—: indicator not asked for female partners

NA: indicator not applicable

* Among those who had sex with a non-regular male partner in the past 30 days.

Paying male and female sex partners

Table 10 reports sexual activity with paying sex partners. Paying partners are defined as male or female partners who paid the respondent money in exchange for sexual acts. An estimated 40.2 percent of MSM in Nairobi engaged in sexual activity with paying male partners in the past 2 months. About two-thirds (64.2 percent) engaged in receptive anal sex and 39.1 percent engaged in insertive anal sex, respectively, with paying male partners in the past 30 days. Among MSM who had sex with paying male partner(s) in the past 30 days, over half (59.9 percent) engaged in unprotected anal sex with paying male partners.

A small proportion (10.1 percent) of MSM in Nairobi engaged in sexual activity with paying female partners in the past 2 months. An estimated 8.8 percent and 4.0 percent of MSM engaged in vaginal and insertive anal sex, respectively, with paying female partners in the past 30 days.

TABLE 10. Sexual activity with paying male and female partners, MSM, Nairobi 2010 (n = 563)

	Paying male partners		Paying female partners	
	Adjusted %	95% CI	Adjusted %	95% CI
Number partners in past 2 months				
None	59.8	53.3–67.0	89.9	85.9–93.9
1	10.1	6.7–13.8	4.7	2.2–7.3
2+	30.1	23.9–35.9	5.4	2.5–8.7
Receptive anal sex in past 30 days				
Yes	64.2	53.2–76.8	—	—
No	35.8	23.2–46.8	—	—
Vaginal sex in past 30 days				
Yes	—	—	8.8	5.0–13.1
No	—	—	91.2	86.9–95.0
Insertive anal sex in past 30 days				
Yes	39.1	24.2–50.4	4.0	1.8–6.8
No	60.9	49.6–75.8	96.0	93.2–98.2
Condom use during intercourse in past 30 days* (n=261)				
Always	40.1	25.7–48.9	—	—
Sometimes	27.8	19.9–41.6	—	—
Never/ Don't know	32.1	22.5–43.2	—	—
Condom use last time had anal sex* (n=258)				
Yes	67.1	55.7–77.8	—	—
No	32.9	22.2–44.3	—	—

—: indicator not asked for female partners

* Among those who had sex with a male paying partner in the past 30 days.

Overall, a little more than one-third (36.2 percent; 95% CI=30.0–42.5) of MSM reported recent bisexual behaviour defined as vaginal or anal sex in the past month with any female partner. Among these MSM, inconsistent condom use in the past month was high with male (80.5 percent, CI=74.7–85.2) and female (67.5 percent, CI=56.3–79.3) sex partners (data not shown).

HIV Knowledge and HIV Testing

Over 70 percent of MSM in Nairobi know the correct answers to seven HIV/AIDS knowledge questions (Table 11). However, one in five MSM do not believe that they can get HIV from unprotected anal sex, up to 19 percent do not believe abstinence can protect them from HIV, and almost one-third of MSM (29.7 percent) do not know there is medical treatment for HIV. Two thirds of MSM (66.5 percent) in Nairobi know someone with HIV infection and 73.9 percent of MSM have a close relative or friend who has HIV or has died of AIDS.

TABLE 11. HIV knowledge and attitudes among MSM, Nairobi 2010 (n = 563)

	Adjusted	
	%	95% CI
Knowledge and attitudes towards HIV/AIDS		
People can protect themselves by using condoms	95.2	92.2–97.7
A person cannot get HIV from mosquito	72.1	66.0–77.9
Having one uninfected faithful partner is protective	83.8	79.9–88.1
A person can get HIV from unprotected anal sex	79.6	73.8–84.7
A person can protect themselves by abstaining	81.0	76.5–85.2
A person can get HIV from a used needle	95.9	93.1–98.4
There is medical treatment for HIV	70.3	64.9–75.8
Awareness of HIV/AIDS		
Knows someone who is infected with HIV	66.5	61.0–73.3
I have a close relative or friend who is infected with HIV or has died of AIDS	73.9	68.6–79.5

Perception of risk and previous testing

Almost two-thirds of MSM (63.3 percent) had previously been tested for HIV infection (Table 12). Among MSM who previously tested, about half tested in the past year. All MSM who were tested for HIV received their test results (data not shown). A small proportion of MSM (8.3 percent) know they are HIV-positive from previous testing.

A total of 144 MSM who participated in the survey tested HIV-positive. Of those who tested positive for HIV, 28.6 percent (16.0–45.8) knew that they were HIV-positive from the results of their last HIV test, 36.5 percent (21.1–50.1) had never been tested for HIV, 33.3 percent (19.8–47.7) tested negative at their last test or did not receive their test result, and 1.6 percent (0.0–5.2) did not reveal the results of their last HIV test (Figure 3). Unrecognised HIV infection, namely when an individual does not know he or she is infected, is closely linked to ongoing transmission.

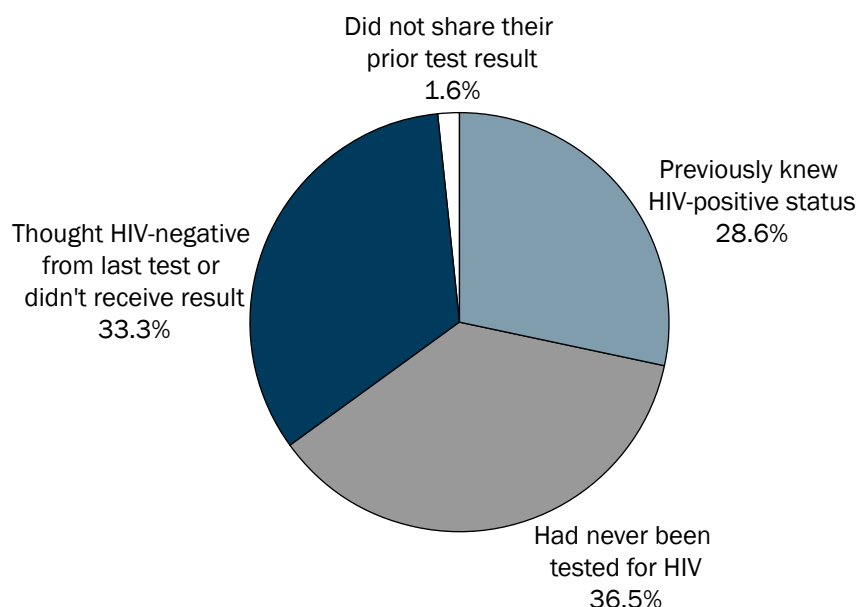
TABLE 12. HIV testing behaviours and self-reported HIV status among MSM, Nairobi 2010 (n = 563)

	Adjusted	
	%	95% CI
Ever tested for HIV		
Yes	63.3	56.7–69.9
No	36.7	30.4–43.3
Time since last HIV test* (n=431)		
Less than 1 year ago	53.5	43.4–62.7
1 year or more	46.5	37.3–56.6
Knows HIV status†		
Known negative	91.6	85.1–96.2
Known positive	8.3	3.6–14.8

*Among those that have had a previous HIV test.

†Among those who have had a previous HIV test and are willing to share their test results.

FIGURE 3. CORRECT KNOWLEDGE OF HIV-POSITIVE STATUS AMONG MSM, NAIROBI 2010



Discrimination and Violence

Almost one-quarter (23.8 percent) of MSM are regularly denied some type of service because a provider believes they have sex with men (Table 13). Details of types of services denied are illustrated in Figure 4.

Being denied service at a bar or restaurant (12.2 percent) is the largest source of service denial among MSM in Nairobi, followed by police assistance (6.9 percent), employment (6.2 percent) and housing (4.6 percent). Church (4.5 percent) was also a source of denial of services. Only an estimated 2.9 percent of MSM are denied healthcare in Nairobi.

Over one-third (37.3 percent) of MSM experienced verbal assault and 7.0 percent experienced physical assault during the previous 12 months (Table 13). Perpetrators of verbal and physical assault are illustrated in Figure 5. Perpetrators are most often friends of MSM who are not themselves MSM. Few MSM (5.7 percent) were sexually assaulted during the last 12 months.

The majority of verbal or physical abuse was directed at MSM by their friends and social acquaintances (19.5 percent), and by strangers (6.4 percent). Fewer instances of abuse come from family and relatives (2.1 percent) and from clients (1.0 percent). The “other” perpetrator group (8.2 percent) was comprised mostly of bouncers at clubs or bars and a few police officers (Figure 5).

TABLE 13. Verbal, physical, and sexual violence experienced by MSM, Nairobi 2010 (n = 563)

Self-reported discrimination and violence	Adjusted	
	%	95% CI
Refused services in the past 12 months		
Yes	23.8	17.4–27.9
No	76.2	72.1–82.6
Verbally assaulted in the past 12 months		
Yes	37.3	56.8–69.4
No	62.7	30.6–43.2
Who verbally assaulted you* (n=248)		
Do not know the person	11.3	5.9–18.8
Client	1.7	0.2–3.7
Another MSM	10.2	5.1–16.1
Friend (not MSM)	37.3	22.7–47.8
Social acquaintance	16.3	8.5–24.0
Family/relative	4.3	0.5–9.8
Other person	19.0	10.6–33.9
Physically assaulted in the past 12 months		
Yes	7.0	3.9–10.0
No	93.0	90.0–96.1
Who physically assaulted you* (n=63)		
Do not know the person	37.0	5.7–76.1
Client	10.9	0.0–15.2
Another MSM	0.4	0.0–1.2
Friend (not MSM)	13.5	0.0–56.1
Social acquaintance	7.7	0.0–18.9
Family/relative	3.6	0.0–5.7
Other person	26.8	0.6–63.0
Verbally or physically assaulted in the past 12 months		
Yes	37.6	30.9–43.4
No	62.4	56.6–69.1
Sexually assaulted in the past 12 months		
Yes	5.7	3.3–8.6
No	94.3	91.4–96.7

*Among those that were assaulted

FIGURE 4. SERVICES DENIED BECAUSE OF BEING MSM, NAIROBI 2010

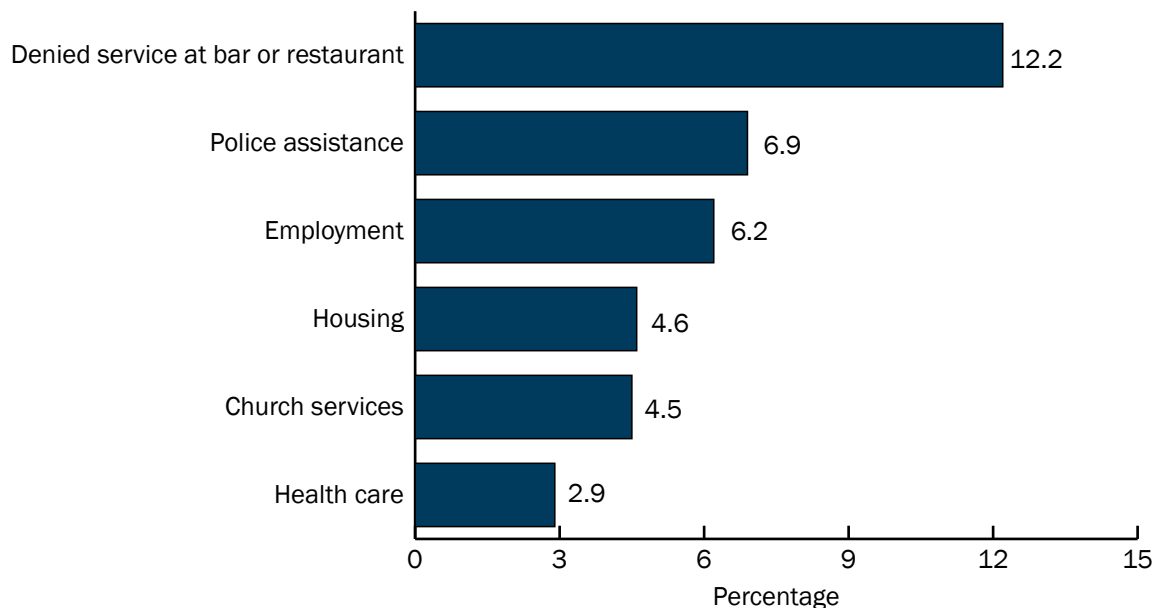
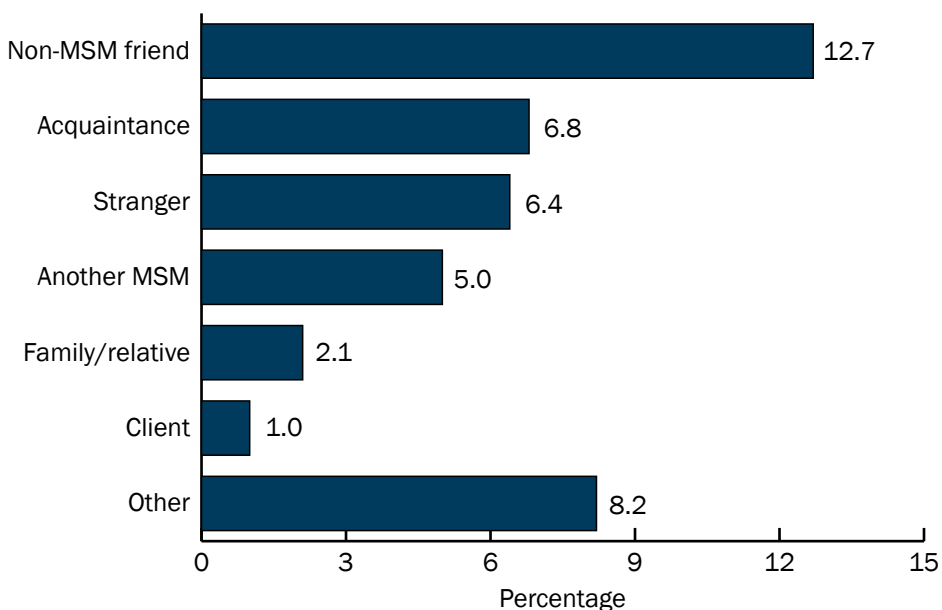


FIGURE 5. PERPETRATORS OF EITHER VERBAL OR PHYSICAL ABUSE TOWARD MSM, NAIROBI 2010



STI Symptoms

Almost half of MSM in Nairobi experienced an STI symptom in the previous 12 months (Table 14). Of those men, only one-quarter (25.0 percent) sought treatment and of those who sought treatment, over one-half (59.0 percent) informed their sexual partners of their symptoms and treatment.

Exposure to HIV/STI Prevention and Other Services

Only 13.1 percent of MSM visited an MSM-friendly clinic or drop-in centre in the past 12 months (Table 15). MSM receiving services at one of these locations most often receive condoms (70.4 percent), water-based lubricant (61.3 percent), and information on HIV/STI prevention and transmission (81.3 percent).

A small proportion of MSM (16.8 percent) in Nairobi had contact with a peer educator over the past 12 months. STI/HIV prevention information is the most common type of service received from peer educators (42.7 percent).

TABLE 14. STI symptoms, treatment and partner disclosure, MSM, Nairobi 2010 (n=563)

Characteristics	Adjusted	
	%	95% CI
STI symptom in past 12 months		
Yes	44.8	38.4–51.3
No	55.2	48.7–61.6
Sought treatment for STI symptom in past 12 months* (n=152)		
Yes	25.0	19.7–30.6
No	75.0	69.4–80.3
Disclosed STI symptom and treatment to sex partner** (n=152)		
Yes	59.0	47.6–88.0
No	41.0	12.0–52.5

*Among those with an STI symptom

**Among those receiving treatment for an STI

TABLE 15. Exposure to HIV and STI prevention services, MSM, Nairobi 2010 (n=563)

Characteristics	Adjusted	
	%	95% CI
Visited MSM-friendly clinic/drop-in centre past 12 months		
Yes	13.1	9.2–18.2
No	86.9	81.8–90.8
Services received at MSM-friendly clinic/drop-in centre* (n=169)		
Condoms	70.4	56.5–85.7
Water-based lubricant	61.3	48.7–75.7
HIV/STI prevention information	81.3	76.3–93.7
Counselling	37.6	29.6–55.9
VCT	45.8	30.2–55.7
HIV test	43.9	28.1–54.3
In contact with peer educator in past 12 months		
Yes	16.8	12.0–21.2
No	83.2	78.8–88.0
Services received from peer educators* (n=148)		
HIV/STI prevention information	42.7	17.3–48.0
Condoms	18.1	**
STI referral	11.2	0.2–22.2

*Among those receiving the previously mentioned service

**RDSAT unable to calculate CI

HIV and STI Prevalence

HIV seroprevalence

All respondents were tested for HIV using rapid test kits. HIV test results showed an estimated 18.2 percent (95 percent CI: 13.1–23.6 percent) of MSM in Nairobi are HIV-positive (Figure 6).

STI seroprevalence

All participants were tested for syphilis, rectal and penile gonorrhoea, and chlamydia. The most common STI was gonorrhoea (7.1 percent). The estimated overall population prevalence of gonorrhoea, chlamydia and syphilis is 7.1 percent, 4.1 percent and 0.7 percent, respectively (Figure 7).

FIGURE 6. HIV PREVALENCE AMONG MSM, NAIROBI 2010

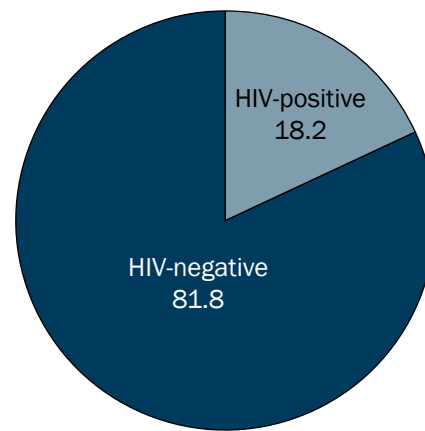
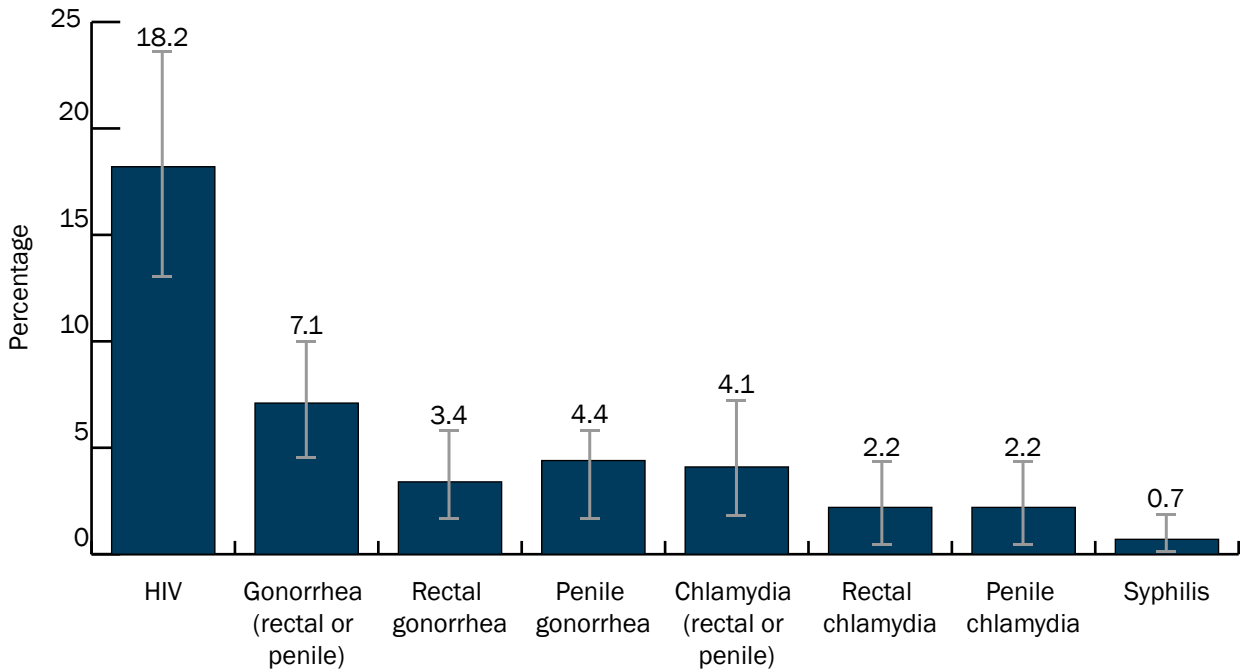


FIGURE 7. PREVALENCE OF HIV AND STIS AMONG MSM, NAIROBI 2010



When stratified by sex work (Table 16), prevalence of gonorrhoea and chlamydia is higher among those engaging in sex work as their main occupation (14.8 percent and 17.3 percent, respectively) compared to those who sell sex but not as their main occupation (5.8 percent and 2.7 percent, respectively) and those who do not sell sex (5.6 percent and 1.7 percent, respectively).

Among MSM who have had receptive anal sex within the last 30 days, STI prevalence is two to three times higher than among those who do not engage in receptive anal sex over the same period. Prevalence of gonorrhoea and chlamydia among those engaging in receptive anal sex is an estimated 9.6 percent and 5.7 percent respectively, compared to 3.7 percent and 2.2 percent respectively among those not engaging in receptive anal sex in the last 30 days.

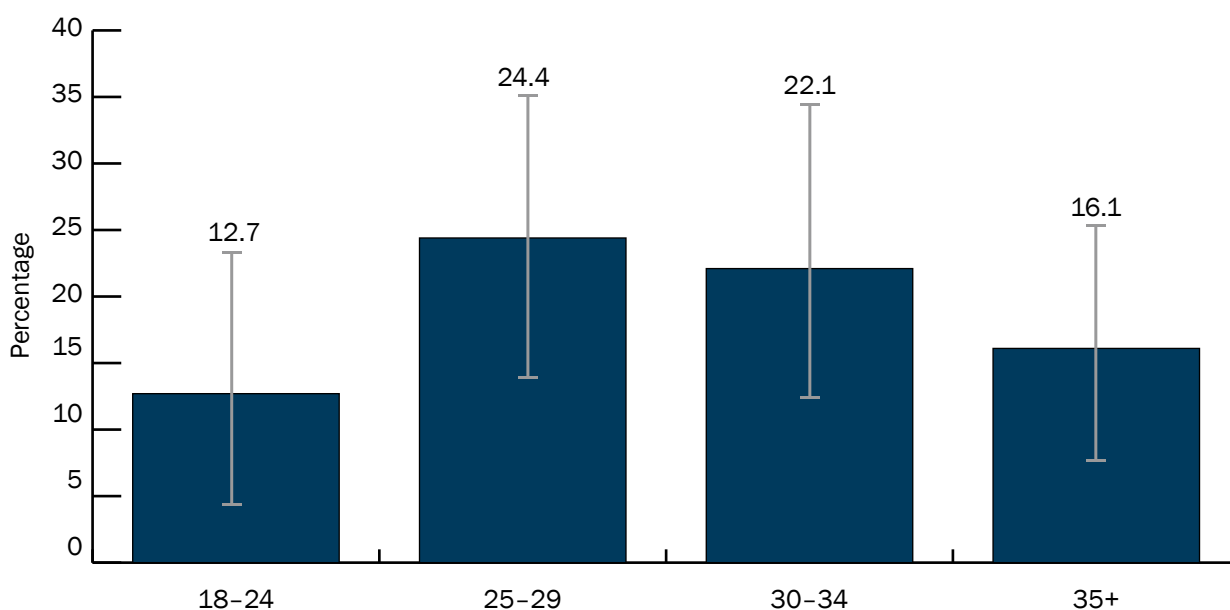
TABLE 16. STI prevalence by sex work and receptive anal sex among MSM, Nairobi 2010 (n=563)

	Gonorrhoea Adjusted		Chlamydia Adjusted	
	%	95% CI	%	95% CI
Sex work				
No sex work	5.6	3.0–8.8	1.7	0.5–3.3
Sold sex in past 2 months	5.8	2.6–9.6	2.7	0.7–6.3
Sex work as main occupation	14.8	3.1–26.7	17.3	1.0–35.0
Receptive anal sex in last 30 days				
No receptive anal sex	3.7	1.4–6.5	2.2	0.3–4.7
Receptive anal sex	9.6	5.6–14.7	5.7	1.8–10.9

Factors Associated with HIV Infection

Demographics

Overall, the estimated HIV prevalence among MSM in Nairobi was 18.2 percent. (Figure 7) HIV prevalence was highest among those aged 25–29 years (24.4 percent) and 30–34 years (22.1 percent) and lower among those 18–24 years old (12.7 percent) and 35 or older (16.1 percent) (Figure 8).

FIGURE 8. HIV PREVALENCE BY AGE AMONG MSM, NAIROBI 2010

When stratified by education and marital status, MSM with primary school education had higher HIV prevalence (27.5 percent), as did never married MSM (20.9 percent). MSM formerly married to a woman and those currently married have an HIV prevalence of 17.1 percent and 7.8 percent, respectively. Current living situations also illustrate differences in HIV prevalence where those living with a man have a higher HIV prevalence (27.5 percent) compared to those living with a woman (18.4 percent) and those living alone (17.2 percent).

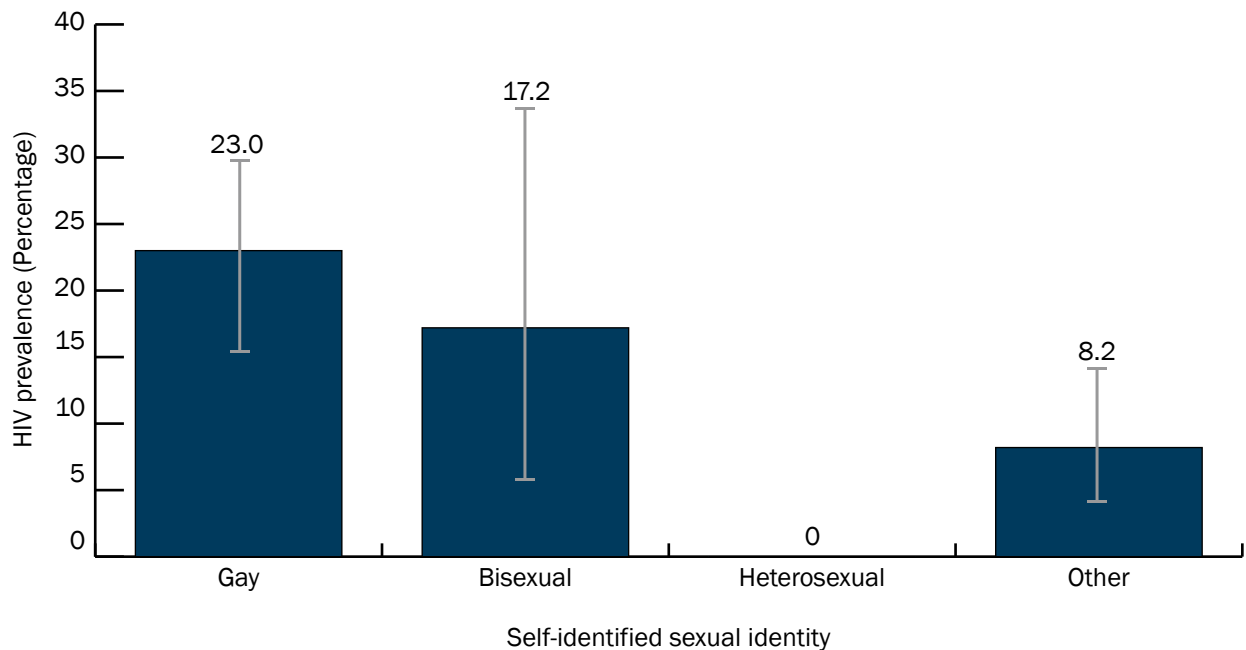
Modest differences exist when HIV prevalence was stratified by occupational status. Only an estimated 16.8 percent of unemployed MSM were HIV-positive while those engaging in sex work and other occupations have an estimated HIV prevalence of 28.4 percent and 35.5 percent, respectively (Table 17).

TABLE 17. HIV prevalence by demographic characteristics among MSM, Nairobi 2010

Prevalence of HIV infection	Adjusted	
	%	95% CI
Overall	18.2	13.1–23.6
Educational levels		
None/incomplete primary	19.2	11.3–29.3
Completed primary	27.5	13.0–41.9
Incomplete secondary	19.4	9.0–32.7
Completed secondary	12.4	6.7–20.2
Enrolled/completed post-secondary	17.9	9.1–31.3
Marital status		
Formerly married to a woman	17.1	8.2–27.3
Never married	20.9	14.4–28.9
Currently married	7.8	3.0–13.7
Living situation		
Married or living with a woman	18.4	13.1–23.7
Living with a man	27.5	15.2–40.3
Living with no one else	17.2	11.5–23.3
Occupation		
Unemployed/No income	16.8	5.2–32.2
Formal	18.8	9.5–29.7
Informal	17.8	9.1–24.0
Sex work	28.4	15.2–45.0
Security/police/guards/military	18.7	0.0–46.1
Other	35.5	9.2–56.5

When HIV prevalence was stratified by sexual identity, MSM who identified as gay have the highest prevalence (23.0 percent) while bisexual and heterosexual MSM had HIV prevalence of 17.2 percent and 8.2 percent, respectively. MSM with another sexual identity have an HIV prevalence of 8.2 percent (Figure 9).

FIGURE 9. HIV PREVALENCE BY SELF-IDENTIFIED SEXUAL IDENTITY AMONG MSM, NAIROBI 2010



Risk behaviours

HIV prevalence was also analysed by risk behaviours. When HIV prevalence is stratified by sex work status, MSM engaging in sex work as a main occupation have a prevalence of 27.3 percent compared to 26.4 percent among those who casually engage in sex work. HIV prevalence is significantly lower (12.7 percent) among those not engaging in sex work in the past two months. MSM who pay for sex (20.3 percent) and those who do not (17.7 percent) have similar HIV prevalence. However, those with multiple partners in the past year have significantly higher HIV prevalence (21.3 percent) compared to those who did not (2.8 percent). Additionally, those who test positive for STI have a higher HIV prevalence (40.6 percent) compared to those who do not (15.5 percent) (Table 18).

MSM with female partners in the past 12 months have a slightly lower HIV prevalence (14.2 percent) compared to who do not have female partners (23.1 percent) (Table 18).

Sexual debut before or after age 15 does not appear to be associated with differences in HIV prevalence among MSM in Nairobi. Nor does heavy drinking appear to be indicative of an HIV-positive status; however, MSM needing brief counselling and monitoring for their drinking have a higher HIV prevalence (Table 18).

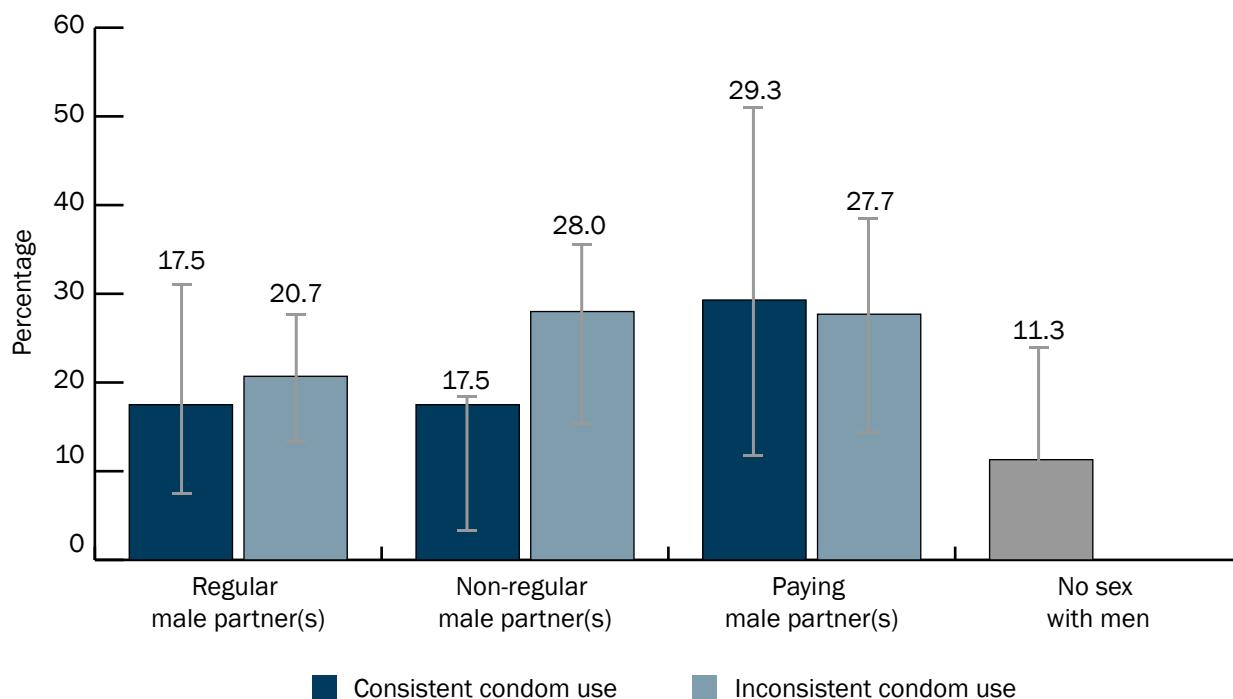
TABLE 18. HIV prevalence by risk behaviours among MSM, Nairobi 2010

Characteristic	Adjusted	
	%	95% CI
Sex work		
Reported sex work as main occupation	27.3	15.6–45.8
Sold sex in past 2 months [†]	26.4	18.5–37.1
No sex work reported in past 2 months	12.7	7.3–17.2
Paid someone for sex in past 6 months		
Yes	20.3	10.9–30.4
No	17.7	12.0–23.6
Multiple sex partners in past year		
Yes	21.3	15.5–27.3
No	2.8	0.5–5.6
Tested positive for STI		
Yes	40.6	24.5–58.7
No	15.5	10.7–21.3
Female sex partner in past year		
Yes	14.2	7.9–21.4
No	23.1	16.2–30.9
Sexual debut		
Before age 15	18.3	10.2–27.5
At age 15 or greater	18.1	12.0–24.3
AUDIT score		
Warrants further diagnostic evaluation for alcohol dependence	16.1	8.3–26.2
Suggest brief counselling and continued monitoring	25.0	9.8–46.3
Needs simple advice on reduction of hazardous drinking	18.4	9.4–25.4
Not harmful / hazardous drinker	17.6	10.5–25.8

[†]Sold sex in past two months, but did not report sex work as their main occupation

Figure 10 shows HIV prevalence by condom use with different types of partners. HIV prevalence is higher among MSM who engage in unprotected anal intercourse during the past 30 days with non-regular (28.0 percent) or paying partners (27.7 percent). HIV prevalence is equally high among those with paying partners even if they use condoms consistently (29.3 percent). HIV prevalence is lower among those with regular partners regardless of whether they consistently use condoms (17.5 percent) or not (20.7 percent), and is similar to those who have non-regular partners but use condoms consistently (17.5 percent). HIV prevalence is lowest among those who have not had sex with men in the past 30 days (11.3 percent).

FIGURE 10. HIV PREVALENCE BY CONSISTENT CONDOM USE AMONG MSM WHO HAD SEX WITH DIFFERENT TYPES OF MALE SEX PARTNERS IN THE PAST 30 DAYS, NAIROBI 2010



Discussion and Recommendations

MSM in Nairobi represent a diverse demographic group in terms of age, educational levels, occupation and ethnicity.

About two-thirds of MSM self-identify as gay, indicating high levels of acceptance of their sexual identity and perhaps low levels of internalised homophobia. MSM with lower internalised homophobia have higher self-efficacy for condoms and MSM-targeted health services. Sex work is relatively common among MSM and many paid sex acts are unprotected. While MSM characteristics overall are diverse, MSM age 25–34, never or not currently married, living with a man, engaging in sex work, and identifying as gay are characteristics associated with higher HIV prevalence. Prevention interventions for MSM should be designed to target a diverse audience; however, targeted programmes for sex workers, those who do and do not identify as and younger men are also needed to promote risk reduction among these sub-populations and those at very high-risk.

Alcohol and drug use is common among MSM in Nairobi; however, injecting drug use (an additional risk factor for HIV infection) is low.

According to AUDIT scores, which are used to assess alcohol use patterns, about half of MSM do not engage in problematic alcohol consumption; however, the remaining half may need some sort of assessment, counselling or treatment for problem alcohol use. MSM also commonly use marijuana and khat, which could lower inhibitions and increase risky behaviour during sex. HIV prevention interventions need to consider the role substance and alcohol use plays in HIV risk taking among MSM in Nairobi. Additionally, targeted prevention programmes should have services for assessment and linkage to programmes that treat alcohol and/or drug abuse and dependency.

Many MSM in Nairobi have multiple partners and engage in risky sexual behaviours.

Over half of MSM had two or more main partners and a little over half also had casual partners in the past year. The proportion of MSM who had female sexual partners in the past year is also high. Condom use during anal sex is relatively low; however, consistent condom use with non-regular partners is higher compared to condom use with regular partners. As noted previously, condom use with paying partners is particularly low, with only 40 percent of MSM using a condom consistently with paying partners in the past month. HIV prevention interventions need to focus on partner reduction and condom use for both male and female partnerships. In addition, existing programmes that target MSM sex workers must strengthen condom promotion programmes among this very high-risk group MSM.

HIV/AIDS knowledge is relatively high among MSM in Nairobi; however, only 70 percent of MSM know there is medical treatment for HIV and only 80 percent know that you can get HIV from unprotected anal sex.

With almost a third of MSM not knowing there is treatment for HIV, this is a clear barrier to uptake of testing and further linkage to treatment. Programmes targeting MSM and providing HTC services must focus on risk reduction counselling related to unprotected anal sex. Ongoing education about risk reduction and treatment issues specific to MSM is needed.

HIV seroprevalence among MSM is high, and a high proportion of HIV-positive MSM do not know they are infected.

HIV prevalence among MSM is 3 times higher than in the general population and is highest among MSM 25–34 years old, living with a man, self-identified as gay, and with high-risk sexual behaviours. Moreover, over half of MSM who are HIV-positive do not know they are infected with HIV. Targeted testing campaigns must be developed to encourage regular HIV testing to identify new HIV infections. Further analysis of factors related to testing should also be conducted to determine specific MSM characteristics related to low uptake of HIV testing.

Coverage of STI and HIV prevention services among MSM is low.

Future efforts must seek to expand coverage across all segments of the MSM population in Nairobi.

While all MSM in Nairobi appear to be in need of HIV and STI prevention services, there are particular segments of the population that already demonstrate a higher burden of HIV infection. Men aged 25–34, those with no more than a primary school education, never married MSM, those engaging in sex work or other occupations, and those who identify as gay should be prioritised for prevention interventions, and care and treatment services.

Finally, MSM in Nairobi who engage in higher-risk activities are more likely to be HIV infected. Risk factors common in other populations of MSM such as engaging in sex work, having unprotected anal sex, multiple sex partners and having STIs, are also associated with HIV infection among MSM in Nairobi. This may suggest that designing appropriate HIV prevention interventions for MSM in Nairobi can begin with a review of existing MSM interventions that focus on these risk factors and then adapting them to the local context.

KISUMU MEN WHO HAVE SEX WITH MEN

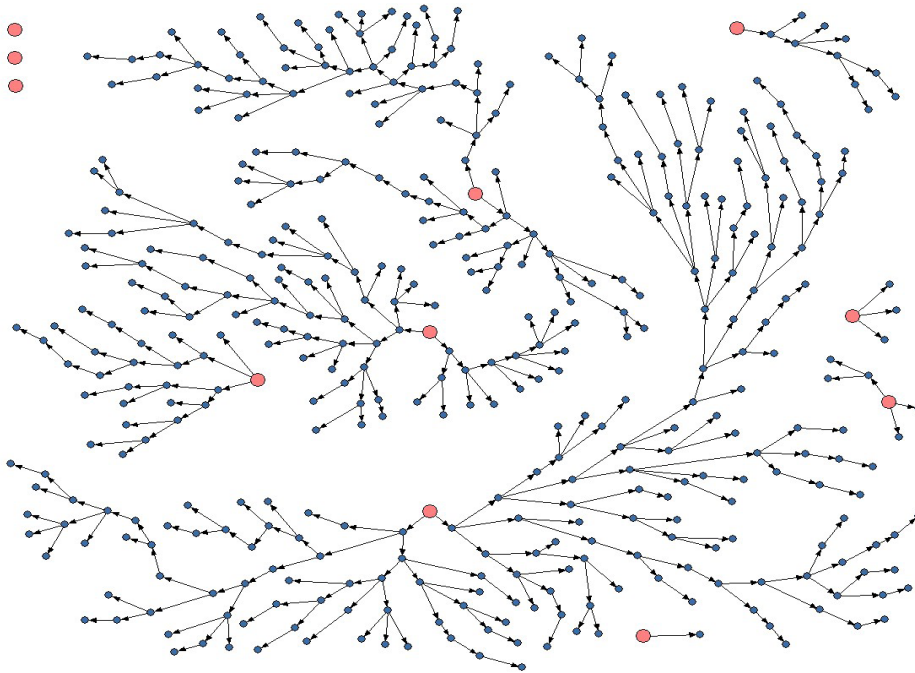
Key Findings

- MSM in Kisumu are a diverse group with regards to age, education, employment, sexual identity and sexual behaviours.
- Alcohol use is common, with many men reporting behaviour indicative of harmful drinking or alcohol dependence. Non-alcohol drug use is also common with marijuana and khat used most frequently; heroin and cocaine are also consumed.
- Sexually active MSM have multiple male and female partners across partner type, and they use condoms inconsistently.
- There is low knowledge of treatment for HIV among MSM in Kisumu.
- Physical and sexual assault are frequently experienced by MSM. MSM who experience both have higher HIV prevalence than MSM who do not.
- MSM experience unfriendly service delivery and are denied services.
- HSV-2 prevalence and past history of STI symptoms are high, but use of MSM-friendly HIV and STI prevention services is low.

ENROLMENT

From June to October 2010, 415 MSM were enrolled in the study. Eleven seeds were identified to initiate enrolment based on recommendations by community informants and selected after a standardised interview process. Seeds represented the age, ethnic, educational and regional diversity of the target population. Of the 1074 referral coupons issued, 639 were returned yielding a coupon return rate of 59.6 percent. Of those who returned a coupon, 415 met eligibility criteria for study participation and were enrolled. Enrolment waves per enrollee seed ranged from 1 to 15 (See Figure 11.) Three seeds did not enrol any participants and the average network size was 7.4.

FIGURE 11. ENROLLMENT OF MSM, KISUMU 2010



Note: Larger circles indicate seed participants.

Socio-demographic Characteristics

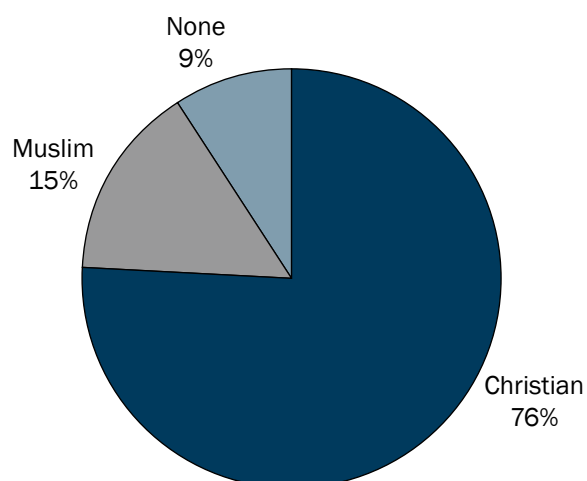
The median age of MSM is 21 years (IQR: 19–25 years) and approximately 77 percent of MSM are 18–24. About half of MSM completed some secondary education and over 80 percent (82.1 percent) have never been married. Half of Kisumu MSM reside in urban (Kisumu East) areas and half in rural (Kisumu West) areas. The majority of MSM in Kisumu are Luo (83.2 percent) (see Table 19); about three-quarters are Christian, 15 percent Muslim and the remaining 9 percent are not practicing a specific religion (Figure 12).

Almost one-third of MSM in Kisumu are not employed (30.1 percent) while one in five engage in sex work as their primary occupation (22.2 percent). MSM in Kisumu predominantly self-identify as gay (74.0 percent), bisexual (9.9 percent) and shoga (9.4 percent). Median age of sexual debut with a man is 17 years (IQR: 15–20 years) while the median age of sexual debut among MSM who have ever had sex with a woman is 15 years (IQR: 14–18 years). Nearly half (48.7 percent) of MSM initiated sexual activity with a man or woman before the age of 15.

TABLE 19. Socio-demographics characteristics of MSM, Kisumu 2010 (n=415)

Characteristic	Unadjusted % (No.)	Adjusted % (95% CI)
Age group		
18 to 19	29.7 (123/415)	33.0 (25.6–40.9)
20 to 24	44.8 (186/415)	43.7 (36.4–50.6)
≥ 25	25.5 (106/415)	23.3 (16.8–30.6)
Education level		
None/some primary	16.4 (67/408)	16.9 (11.2–22.6)
Complete primary	12.3 (50/408)	15.7 (11.2–21.4)
Some secondary	17.4 (71/408)	17.3 (12.1–22.9)
Complete secondary	31.1 (127/408)	28.9 (22.6–35.5)
Enrolled or completed post-secondary	22.8 (71/408)	21.1 (15.0–27.6)
Ethnicity		
Luo	84.4 (346/410)	83.2 (77.0–87.7)
Luhya	10.2 (42/410)	11.2 (7.3–16.5)
Kisii	2.2 (9/410)	1.9 (0.6–4.0)
Other	3.2 (13/410)	3.7 (1.4–6.6)
Residence		
Kisumu East	54.0 (218/404)	53.6 (47.2–59.6)
Kisumu West	46.0 (186/404)	46.4 (40.4–52.8)
Marital status		
Single, never married	83.2 (338/406)	82.1 (76.7–87.0)
Single, formerly married (to a woman)	10.1 (41/406)	10.6 (6.7–15.0)
Currently married (to a woman)	6.7 (27/406)	7.3 (4.2–10.9)
Employment		
Unemployed	29.6 (117/396)	30.1 (24.1–36.3)
Formal	31.1 (123/396)	31.4 (25.8–37.5)
Informal	15.2 (60/396)	14.1 (9.9–18.8)
Sex work	21.7 (86/396)	22.2 (16.8–27.7)
Other	2.5 (10/396)	2.2 (0.6–4.3)
Sexual identity		
Gay	71.2 (289/406)	74.0 (67.4–79.7)
Bisexual	11.1 (45/406)	9.9 (6.2–14.2)
Shoga	9.1 (37/406)	9.4 (5.5–14.0)
Heterosexual	1.7 (7/406)	1.0 (0.2–2.1)
Other	6.9 (28/406)	5.7 (2.8–9.2)
Age of sexual debut		
Female partner		
Age 15 and younger	50.8 (125/246)	48.6 (39.9–57.8)
Older than age 15	49.2 (121/246)	51.4 (42.2–60.1)
Male partner		
Age 15 and younger	31.6 (125/396)	31.2 (25.4–37.4)
Older than age 15	68.4 (271/396)	68.8 (62.6–74.6)

FIGURE 12. RDS-ADJUSTED ESTIMATES OF RELIGIOUS BACKGROUND AMONG MSM, KISUMU 2010



Alcohol and Drug Use

About 63 percent of MSM used some substance other than alcohol in the past 12 months; marijuana (24.9 percent) and khat (18.3 percent) were most commonly used. Other substances used were cocaine (3.3 percent), heroin (4.9 percent) and rohypnol (1.5 percent). About 10 percent of MSM reported ever injecting drugs in the past year, and 5.4 percent reported sharing syringes used to inject drugs.

Most MSM have consumed alcohol in the past year (74.8 percent). While 38.7 percent of MSM do not exhibit harmful drinking behaviour, 38.4 percent needed minor intervention, and 23 percent scored in the highest category warranting clinical evaluation for alcohol dependency.

TABLE 20. Alcohol and drug use among MSM, Kisumu 2010 (n=415)

Characteristic	RDS adjusted % (95% CI)
Any alcohol/drug use	84.8 (80.1–89.2)
Any alcohol consumption in past 12 months	74.8 (67.5–81.0)
AUDIT score	
Not harmful/hazardous drinker	38.7 (31.9–46.0)
Needs simple advice on reduction of hazardous drinking	26.8 (21.1–32.8)
Suggest brief counselling and continued monitoring	11.6 (7.8–15.0)
Warrants further diagnostic evaluation for alcohol dependence	23.0 (17.7–28.9)
Substance use in the past 12 months	
Marijuana	24.9 (19.3–31.1)
Khat	18.3 (14.0–22.8)
Cocaine	3.3 (1.3–6.0)
Heroin	4.9 (2.3–8.2)
Rohypnol/Bugizi	1.6 (0.2–3.6)
None	47.4 (41.2–53.7)
Injecting drug use in the past 12 months	
Yes	10.2 (6.7–13.8)
No/ Never taken drugs	89.8 (86.2–93.3)
Shared needle or syringe	
Yes	5.4 (2.7–8.4)
No/No injecting drug use	94.6 (91.6–97.3)

FIGURE 13. SUBSTANCES USED AMONG MSM, KISUMU 2010

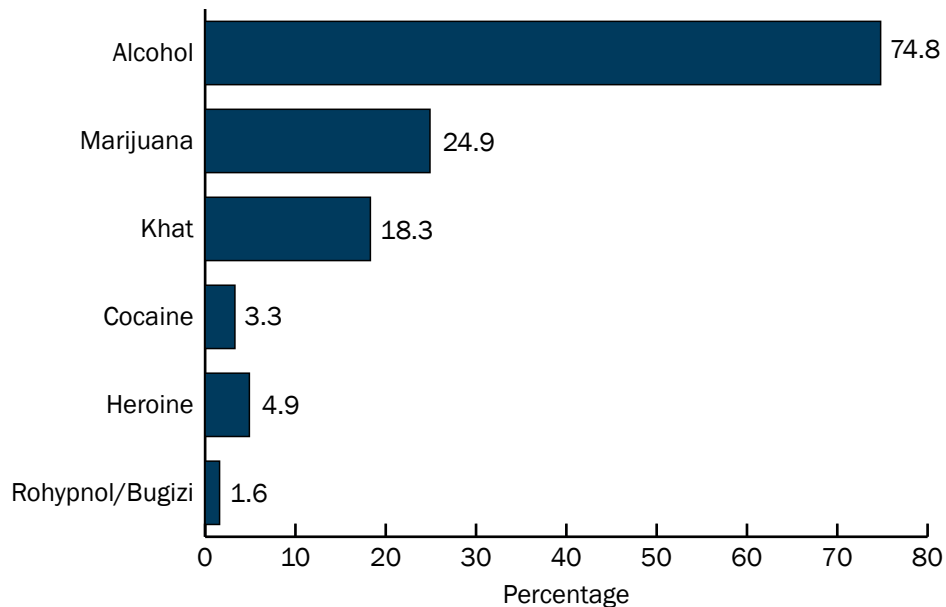
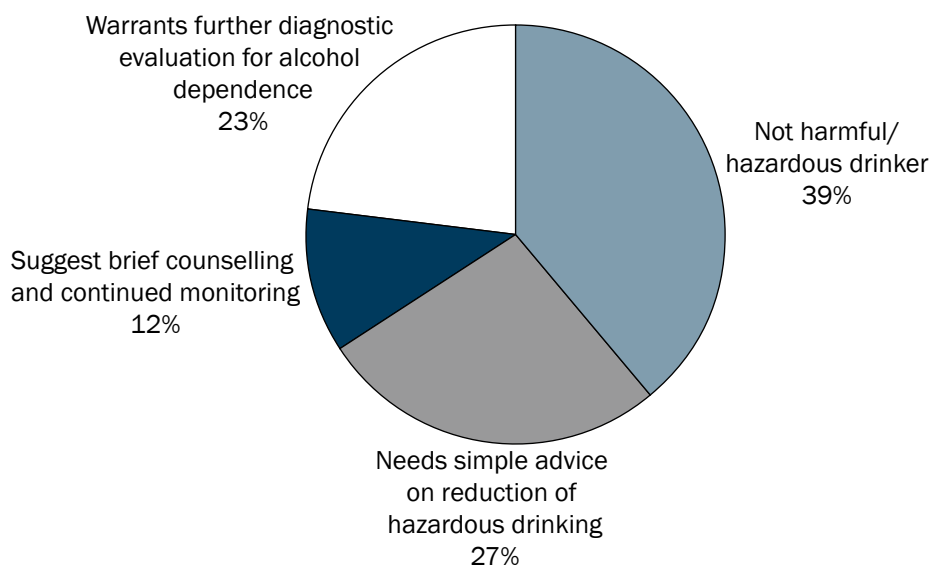


FIGURE 14. RDS-ADJUSTED ESTIMATES OF AUDIT SCORES AMONG MSM, KISUMU 2010



Sexual Activity

Regular partners

Almost all MSM had one or more regular male partners (98.6 percent) in the past 12 months. About half of MSM (47.6 percent) also had at least one regular female partner in the past 12 months. Two thirds of MSM (66.8 percent) had more than one regular male partner and a quarter (26.9 percent) had more than one regular female partner.

MSM engaged in both receptive (85.7 percent) and insertive (88.8 percent) anal sex with their regular male partners in the past 30 days. Among those who had anal sex with regular male partners in the past 30 days, 39.9 percent of the participants practiced consistent condom use and approximately the same proportion (40.7 percent) used a condom at their last anal sex with a regular male partner. Forty-one percent of MSM engaged in vaginal intercourse with at least one woman in the past 30 days. Results of sexual behaviours with regular partners are listed in Table 21.

TABLE 21. Sexual behaviours with regular male and female partners, MSM, Kisumu 2010 (n = 415)

	Regular male partners		Regular female partners	
	Adjusted %	95% CI	Adjusted %	95% CI
Number partners in past 12 months				
None	1.4	4.0–2.6	52.4	45.8–59.0
1	31.8	26.3–38.5	20.7	15.7–25.7
2+	66.8	60.1–72.4	26.9	21.1–33.3
Receptive anal sex in past 30 days				
Yes	85.7	81.1–89.9	NA	–
No	14.3	10.1–18.9	NA	–
Vaginal sex in the past 30 days				
Yes	NA	–	41.2	34.9–48.9
No	NA	–	58.8	52.0–65.1
Insertive anal sex in past 30 days				
Yes	88.8	84.6–92.8	–	–
No	11.2	7.2–15.4	–	–
Condom use during anal sex past 30 days (n=294)				
Always	39.9	32.2–47.2	–	–
Sometimes	37.7	30.6–44.8	–	–
Never	22.4	16.4–29.2	–	–
Condom use last time had anal sex (n=300)				
Yes	40.7	33.6–47.5	–	–
No	59.3	52.5–66.4	–	–

Non-regular partners

The majority of MSM (83.1 percent) had one or more non-regular male partners in the past 6 months, while 43.0 percent had one or more non-regular female partners in the past 6 months. MSM in Kisumu commonly engaged in both receptive and insertive anal sex with non-regular male partners in the previous 30 days (69.4 percent and 72.9 percent, respectively) and about half of MSM (50.4 percent) either never or inconsistently used condoms during anal sex with their non-regular partners during this time period. Additionally, a little over one-third (34.2 percent) of those who had anal sex with a non-regular male partner in the past 30 days used a condom at their last sex. An estimated 30.5 percent of Kisumu MSM also engaged in vaginal intercourse with non-regular female partners in the past 30 days (Table 22).

TABLE 22. Sexual behaviours among MSM with male and female non-regular partners MSM, Kisumu 2010 (n = 415)

	Non-regular male partners		Non-regular female partners	
	Adjusted %	95% CI	Adjusted %	95% CI
Number partners in past 6 months				
None	16.9	12.6–21.5	57.0	50.5–63.3
1	27.4	22.0–33.3	14.8	10.3–19.6
2+	55.7	48.8–61.9	28.2	22.3–34.6
Receptive anal sex in past 30 days				
Yes	69.4	64.2–74.6	NA	—
No	30.6	25.4–35.8	NA	—
Vaginal sex in the past 30 days				
Yes	NA	—	30.5	24.4–36.8
No	NA	—	69.5	63.2–75.6
Insertive anal sex in past 30 days				
Yes	72.9	67.4–78.1	—	—
No	27.1	21.9–32.6	—	—
Condom use during anal sex past 30 days* (n=331)				
Always	49.7	42.7–57.1	—	—
Sometimes	32.3	25.5–38.9	—	—
Never	18.1	12.1–24.6	—	—
Condom use last time had anal sex* (n=302)				
Yes	34.2	26.8–41.9	—	—
No	65.8	58.1–73.2	—	—

Paying partners

A large proportion of MSM (67 percent) in Kisumu engage in transactional sex, with 22.0 percent reporting sex work as their primary occupation. About 40 percent of MSM had 2 or more paying male partners and 17 percent had 2 or more paying female partners. Receptive anal sex and insertive anal sex with their paying male partners in the previous 30 days is estimated at 54.8 percent and 56.4 percent respectively. Over half (53.8 percent) of MSM who sold sex in the past 30 days either did not use or inconsistently used condoms with their paying male partners, and only a little over one-third of MSM (37.3 percent) used a condom with their last paying client. One-quarter (24.8 percent) of MSM also engaged in vaginal intercourse with paying female partners in the past 30 days (Table 23).

TABLE 23. Sexual behaviours among MSM with male and female paying partners, Kisumu 2010 (n = 415)

	Paying male partners		Paying female partners	
	Adjusted %	95% CI	Adjusted %	95% CI
Number partners in past 2 months				
None	37.1	31.2–43.3	72.8	66.2–78.7
1	22.0	16.6–27.5	10.2	6.3–14.6
2+	40.9	34.5–47.3	17.0	12.3–22.3
Receptive anal sex in past 30 days				
Yes	54.8	48.1–61.1	NA	–
No	45.2	38.9–51.9	NA	–
Vaginal sex in the past 30 days				
Yes	NA	–	24.8	18.8–31.2
No	NA	–	75.2	68.8–81.2
Insertive anal sex in past 30 days				
Yes	56.4	48.1–61.1	–	–
No	43.6	38.9–51.9	–	–
Condom use during anal sex past 30 days* (n=263)				
Always	46.1	38.1–54.4	–	–
Sometimes	31.2	23.9–39.1	–	–
Never	22.6	15.6–29.7	–	–
Condom use last time had anal sex* (n=224)				
Yes	37.3	28.7–45.7	–	–
No	62.7	54.3–71.3	–	–

HIV Knowledge and HIV Testing

AIDS knowledge

Over 75 percent of MSM in Kisumu correctly answered six of seven survey questions on HIV transmission and prevention; however, only a little more than half (55.7 percent) are aware that there is medical treatment for HIV. Additionally, almost 25 percent of MSM are unaware that they can get HIV from having unprotected anal sex; the same proportion of MSM also believes one cannot protect oneself from HIV by practicing abstinence or being faithful to one partner. Nearly two-thirds of MSM know someone with HIV (Table 24).

TABLE 24. HIV knowledge among MSM, Kisumu 2010 (n=415)

HIV/AIDS knowledge	RDS-adjusted % (95% CI)
Responses	
People can protect themselves by using condoms	84.8 (79.6–89.5)
A person cannot get HIV from mosquito	84.7 (80.4–89.0)
Having one uninfected faithful partner is protective	75.6 (69.9–81.2)
A person can get HIV from unprotected anal sex	75.4 (69.5–81.1)
A person can protect himself by abstaining	75.9 (70.4–80.9)
A person can get HIV from a used needle	93.6 (90.4–96.3)
There is medical treatment for HIV	55.7 (49.0–62.3)
Awareness of HIV/AIDS	
Knows someone who is infected with HIV	63.0 (56.0–69.1)

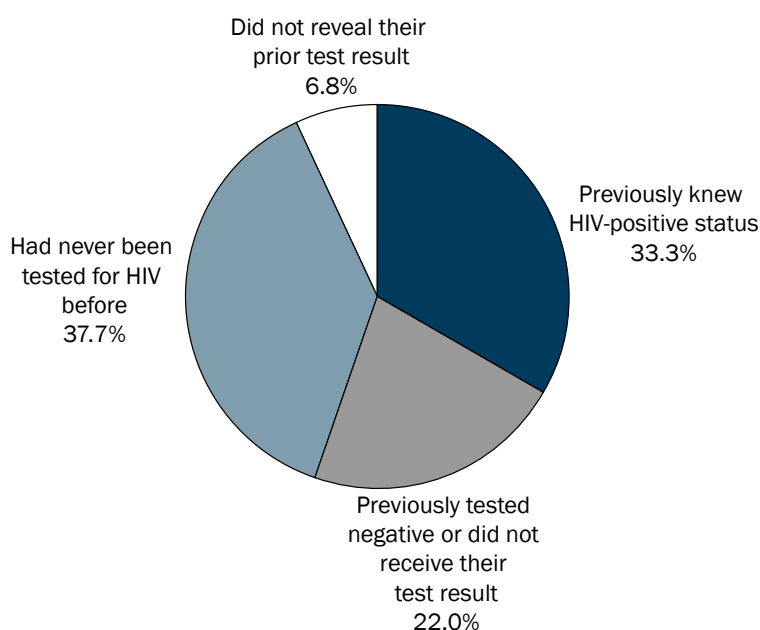
HIV testing, self-reported HIV status and unrecognised HIV infection

Three-quarters of men (75.8 percent) were tested for HIV at least once and 60.8 percent tested in the past year (Table 25). A total of 58 MSM (11.1 percent) who participated in the survey were HIV-positive, including the 18 who already knew their status. Of those who tested positive, 33.3 percent (95% CI: 13.3–51.3) knew they were positive from prior testing, 22.0 percent (95% CI: 8.9–40.7) tested negative or did not receive their test results, 37.7 percent (95% CI: 20.0–58.1) had not been tested for HIV before, and 6.8 percent (95% CI: 0.3–16.7) did not reveal the results from their last test.

TABLE 25. HIV testing behaviour in MSM, Kisumu 2010 (n=415)

Characteristic	RDS-adjusted % (95% CI)
Ever tested for HIV	
Yes	75.8 (69.1–81.6)
No	24.2 (18.4–30.9)
Time since last HIV test	
Less than 1 year	60.8 (54.0–67.1)
1 year or longer	6.2 (3.6–9.4)
Never/don't know	33.0 (26.6–39.6)

FIGURE 15. PERCEIVED HIV STATUS AMONG HIV-POSITIVE MSM, KISUMU 2010



Discrimination and Violence

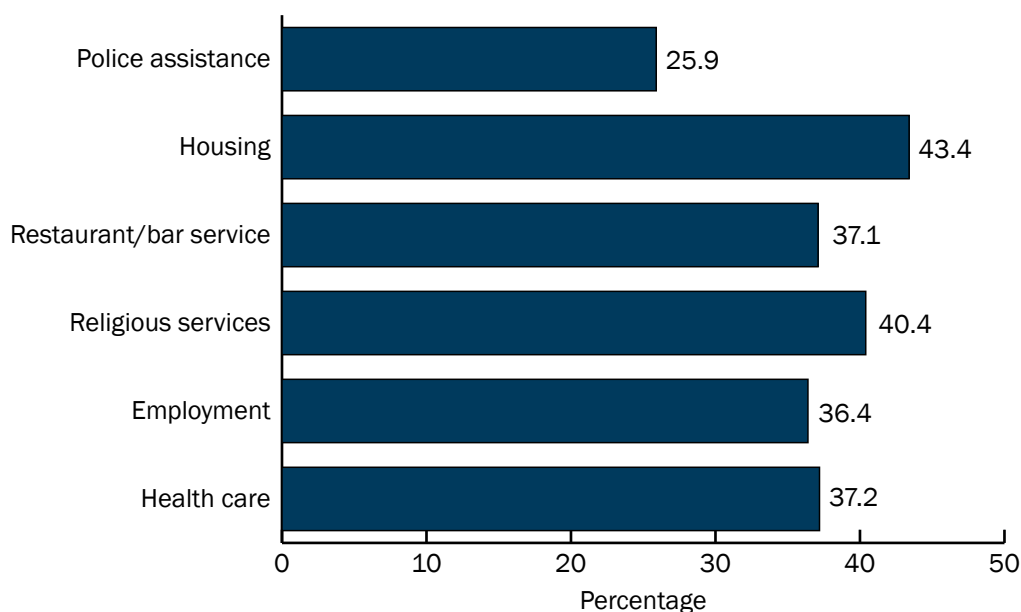
Approximately 62 percent of MSM are regularly denied some type of service because a provider believes they have sex with other men (Table 26). Details on types of services denied are illustrated in Figure 16.

Verbal abuse was the most common, with 61.5 percent experiencing some form of verbal assault in the past 12 months. Almost one-third of MSM experienced either physical (28.8 percent) or sexual (30.3 percent) abuse in the past year; furthermore 22.3 percent of MSM are victims of both physical and sexual violence. Perpetrators of physical violence were most commonly social acquaintances (26.5 percent) and non-MSM friends (24.3 percent). Perpetrators of sexual violence were most commonly other MSM (33.0 percent) and non-MSM friends (28.1 percent) (Table 26).

TABLE 26. Self-reported discrimination and violence among MSM, Kisumu 2010 (n=415)

Self-reported discrimination and violence	RDS-adjusted % (95% CI)
Refused services in the past 12 months because perceived to be MSM	61.7 (55.4–68.6)
Verbally assaulted in the past 12 months	
Yes	61.5 (55.3–67.4)
No	38.5 (32.6–44.7)
Last person who verbally assaulted participant (n=255)	
Do not know person	10.6 (5.9–17.2)
Client	8.1 (4.1–11.8)
Another MSM	9.9 (5.5–15.3)
Friend (Non-MSM)	48.5 (40.6–56.8)
Social acquaintance	15.5 (9.9–21.3)
Family/relative	5.4 (2.6–8.5)
Other person	2.0 (0.3–4.1)
Physically assaulted in the past 12 months	
Yes	28.8 (22.4–34.6)
No	71.2 (65.4–77.6)
Last person who physically assaulted participant (n=120)	
Do not know person	16.0 (8.0–25.3)
Client	4.7 (1.3–10.5)
Another MSM	11.8 (3.5–19.8)
Friend (Non-MSM)	24.3 (15.4–33.5)
Social acquaintance	26.5 (16.5–40.2)
Family/relative	15.6 (7.2–24.0)
Other person	1.1 (0.0–3.2)
Sexually assaulted in past 12 months	
Yes	30.3 (24.4–36.9)
No	69.7 (63.1–75.6)
Last person who sexually assaulted participant (n=118)	
Do not know person	15.1 (7.6–23.3)
Client	12.1 (4.8–20.8)
Another MSM	33.0 (22.3–44.5)
Friend (non-MSM)	28.1 (18.1–41.0)
Social acquaintance	6.2 (2.1–10.9)
Family/relative	4.0 (0.3–9.9)
Other person	1.5 (0.1–3.7)
Physically and sexually assaulted in the past 12 months	
Yes	22.3 (16.4–28.4)
No	77.7 (71.6–83.6)

FIGURE 16. SERVICE DENIAL BECAUSE PARTICIPANT WAS PERCEIVED TO BE MSM, KISUMU 2010 (N=282)



STI Symptoms

More than half of MSM experienced an STI symptom within the last 12 months. While only about one-third (36.7 percent) of MSM experiencing an STI symptom sought treatment, three-quarters (74.2 percent) of those seeking treatment disclosed their symptom to their sexual partner (Table 27).

Exposure to HIV/STI Prevention and Other Services

About one-quarter (26.0 percent) of MSM visited MSM-friendly clinics or drop-in centres in the past 12 months. Those who did reported mostly obtaining condoms (11.4 percent); a few also received VCT (4.4 percent), HIV/STI prevention information (4.8 percent), and lubricants (2.9 percent). In Kisumu, over one-quarter of MSM (27.5 percent) were also in contact with peer educators in the past year. MSM received HIV/STI prevention information (13.8 percent), VCT referrals (4.2 percent) and condoms (2.5 percent) from peer educators (Table 28).

TABLE 27. STI symptoms, treatment and partner notification, Kisumu 2010 (n=415)

Characteristic	RDS-adjusted, % (95% CI)
STI symptom in past 12 months	
Yes	52.9 (46.2–59.1)
No	47.1 (40.9–53.8)
Sought treatment for STI symptom in past 12 months (n = 126)*	
Yes	36.7 (28.3–45.3)
No	63.3 (54.7–71.7)
Disclosed STI symptom to sex partner (n = 87)**	
Yes	74.2 (59.2–87.9)
No	25.8 (12.1–40.9)

*Among those with an STI symptom

**Among those receiving tx for an STI

TABLE 28. Exposure to HIV and STI prevention services MSM, Kisumu 2010 (n=415)

Characteristic	RDS-adjusted % (95% CI)
Visited MSM clinic/drop-in centre in past 12 months	
Yes	26.0 (19.9–31.9)
No	74.0 (68.1–80.1)
Services received at clinic/drop-in centre (n=134)	
Condoms	11.4 (7.1–15.4)
Lubricants	2.9 (1.4–4.6)
HIV/STI prevention information	4.8 (2.3–7.3)
Counselling	3.5 (1.2–6.4)
VCT	4.4 (2.2–7.0)
In contact with peer educator in past 12 months	
Yes	27.5 (21.9–32.5)
No	72.5 (67.5–78.1)
Services received from peer educators (n=142)	
STI/HIV prevention information	13.8 (10.1–17.5)
Condoms	2.5 (1.1–4.1)
STI referral	1.2 (0.4–2.3)
VCT referral	4.2 (2.0–6.7)

HIV and STI Prevalence

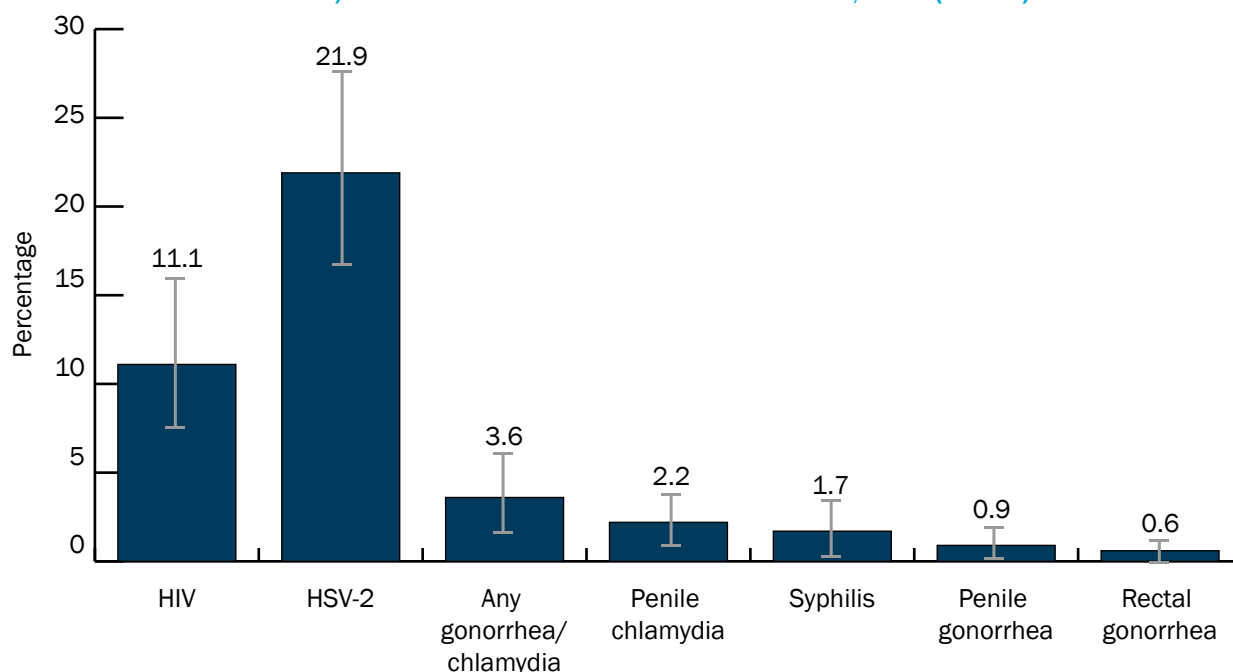
HIV prevalence

Of the 415 participants tested for HIV, 58 tested positive. The estimated HIV prevalence among MSM in Kisumu was 11.1 percent (95% CI: 7.5–15.9).

STI seroprevalence

All participants were tested for syphilis, trichomoniasis, rectal and penile gonorrhoea, chlamydia and HSV-2. The most common STI was HSV-2 (21.9 percent). The estimated overall prevalence of gonorrhoea or chlamydia and syphilis was 3.6 percent and 1.7 percent, respectively. There were no cases of trichomoniasis detected among the participants. Estimates of STI prevalence is provided in Figure 17.

FIGURE 17. ESTIMATED HIV/STI PREVALENCE AMONG MSM IN KISUMU, 2010 (N=415)



Factors Associated with HIV Infection

Demographics

The overall HIV prevalence among MSM in Kisumu is 11.1 percent. MSM ages 18 to 19 had the lowest HIV prevalence of 2 percent while MSM age 25 years and older had the highest HIV prevalence of about 25 percent (Figure 18).

HIV prevalence was lower among MSM with at least some secondary education compared to MSM with only primary education. (Table 29) Among MSM with some secondary education, completed secondary education and some post-secondary education, the HIV prevalence was 7.9 percent, 5.3 percent and 7.1 percent, respectively. MSM who received no or some primary education and completed primary education had HIV prevalence of 17.4 percent and 17.3 percent respectively. MSM currently or previously married had higher HIV prevalence estimates than men who never married (20.1 percent and 18.2 percent versus 9.7 percent). Those who engaged in sex work as a main occupation have the highest HIV prevalence (20.4 percent versus 7.5 percent). With regards to sexual identity, MSM who self-identify as Shoga have the highest HIV prevalence of 23.8 percent. In terms of alcohol use, those who drank more didn't necessarily have a higher HIV status; however heavier drinkers who need counselling had a higher HIV prevalence (17.9) than MSM who drank less frequently or in moderation.

FIGURE 18. HIV PREVALENCE BY AGE AMONG MSM, KISUMU 2010

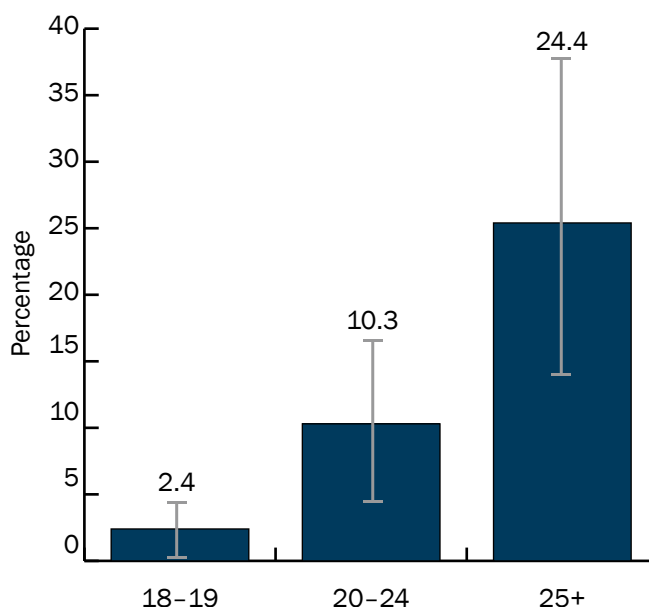
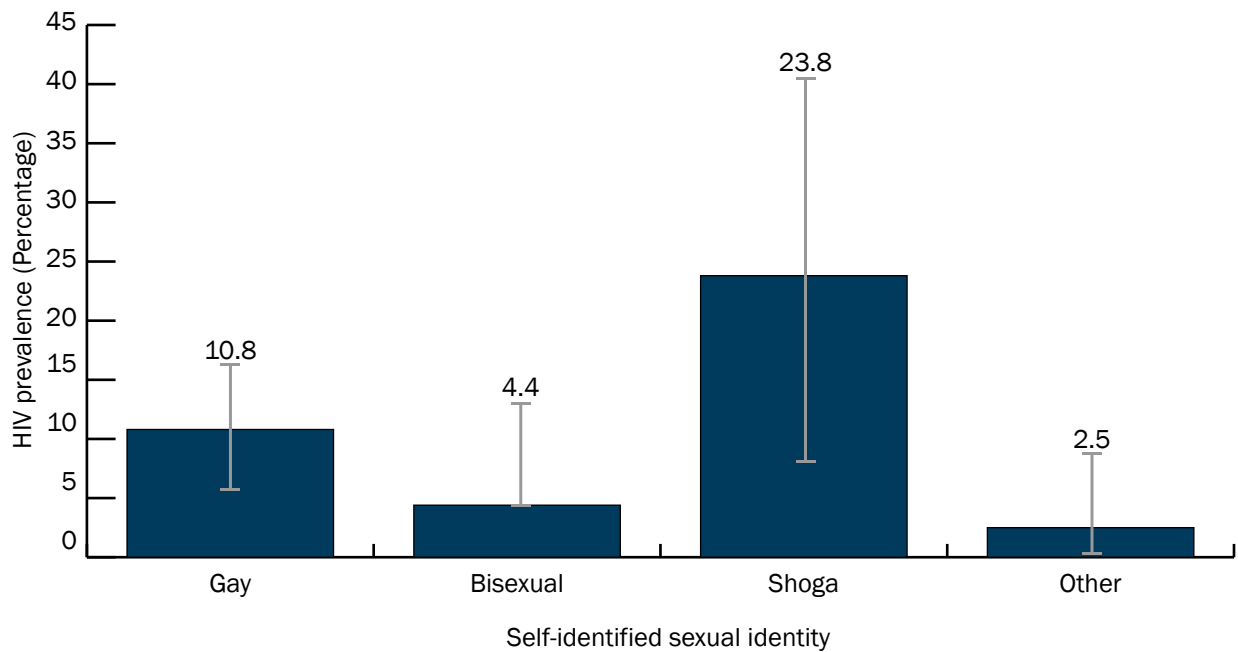


TABLE 29. HIV prevalence by demographic characteristics in MSM, Kisumu 2010

Characteristic	RDS-adjusted, % (95% CI)
Age group	
18 to 19	2.1 (0.1–4.4)
20 to 24	10.3 (4.5–16.4)
≥25	25.4 (13.9–37.7)
Education level	
None/Some primary	17.4 (6.9–27.6)
Complete primary	17.3 (5.8–31.0)
Some secondary	7.9 (2.8–16.0)
Complete secondary	5.3 (0.6–14.8)
Post-secondary	7.1 (1.4–20.2)
Marital status	
Never married	9.7 (6.2– 5.5)
Previously married	18.2 (5.3–37.3)
Currently married	20.1 (5.4–42.6)
Sex work (Main occupation)	
Yes	20.4 (10.0–33.7)
No	7.5 (4.6–12.8)
Sexual identity	
Gay	10.8 (6.4–17.0)
Bisexual	4.4 (4.0–12.7)
Shoga	23.8 (8.3–40.8)
Heterosexual*	82.9 (0.1–100.0)
Other	2.5 (0.0–8.6)
AUDIT score	
Not harmful/hazardous drinker	9.3 (3.6–16.9)
Needs simple advice on reduction of hazardous drinking	8.1 (2.8–18.1)
Suggest brief counselling and continued monitoring	17.9 (5.6–34.8)
Warrants further diagnostic evaluation for alcohol dependence	13.9 (5.7–24.6)

*Because cell size is smaller RDS cannot provide accurate estimates to reflect the HIV prevalence among heterosexual identifying MSM

FIGURE 19. HIV PREVALENCE BY SELF-IDENTIFIED SEXUAL IDENTITY AMONG MSM, KISUMU 2010



Risk Behaviours

MSM who initiated sexual activity with women at age 15 or older had a higher HIV prevalence (14.6 percent) compared to those initiating sexual activity with women before age 15 (6.0 percent). In contrast, the majority of MSM who initiated sexual activity with men at ages older than 15 had a lower HIV prevalence (9.6 percent) compared to MSM who first engaged in sexual activity with men at age 15 and younger (Table 30).

MSM who received money for sex in the past 2 months had a higher HIV prevalence (14.2 percent) compared to those who did not (4.5). HIV prevalence did not vary greatly between MSM who paid someone for sex and those who did not. No difference in HIV prevalence was found between those who engaged in unprotected anal sex at last sex with any of their most recent partners, but MSM who engaged in unprotected vaginal sex at last sex with their most recent female partner had an HIV prevalence of almost 28 percent (Table 30).

Those MSM who tested positive for any STI had a higher HIV prevalence (24.8 percent); however, most of the STI prevalence can be attributed to HSV-2. Those who tested positive for HSV-2 were significantly more likely to test positive for HIV (26.9 percent versus 6.7 percent). MSM who experienced both physical and sexual abuse had a higher HIV prevalence (19.1 percent) compared to those who experienced no abuse (9.6 percent) or either physical or sexual abuse only (8.7 percent) (Table 30).

TABLE 30. HIV prevalence by sexual behaviour in MSM, Kisumu 2010

Characteristic	RDS-adjusted, % (95% CI)
Age of sexual debut	
With female partner	
Age 15 and younger	6.0 (1.2–16.1)
Older than age 15	14.6 (7.5–23.8)
With male partner	
Age 15 and younger	13.2 (6.2–23.4)
Older than age 15	9.6 (6.0–16.0)
Paid someone for sex in past 6 months	
Yes	11.8 (6.9–17.6)
No	7.7 (3.0–15.5)
Received money for sex in past 2 months	
Yes	14.2 (9.2–21.1)
No	4.5 (1.0–11.8)
Unprotected vaginal sex with last partner in past 30 days	
Yes	27.7 (13.1–45.3)
No	9.5 (5.9–14.5)
Unprotected anal sex with last partner in past 30 days	
Yes	10.9 (5.8–18.6)
No	10.8 (6.3–17.9)
Multiple sex partners in past 12 months*	
Yes	NA
No	NA
Positive for any STI**	
Yes	24.8 (15.6–36.7)
No	6.0 (3.2–10.8)
Positive for HSV-2**	
Yes	26.9 (16.6–41.7)
No	6.7 (4.3–12.5)
Physical and sexual abuse in the past 12 months	
None	9.6 (5.5–15.5)
Physical or sexual abuse	8.7 (1.6–26.3)
Physical and sexual abuse	19.1 (7.8–31.8)

*All HIV-infected participants had multiple sex partners

**Most STI prevalence can be attributed to HSV-2

Discussion and Recommendations

MSM in Kisumu are a diverse group with regard to age, educational attainment, employment and sexual identity.

Ages of MSM ranged between 18 and 62, although 76 percent of MSM sampled were between the ages of 18–24 and as a result the overall HIV prevalence may have been underestimated. An older sample of MSM would likely have yielded higher HIV prevalence, which is indicated by greater than 25 percent HIV prevalence among MSM older than 24 years. MSM reported a diverse range of sexual identities including, gay, bisexual, shoga and heterosexual. About 20 percent of the MSM considered sex work to be their main occupation, but nearly two-thirds of the MSM engaged in transactional sex and 33 percent used condoms inconsistently with their paying partners. Increasing age groups, low educational attainment, ever being married, Shoga self-identity and sex worker status were associated with high HIV prevalence. Additionally, MSM who had unprotected vaginal sex were more likely to be HIV-positive. Prevention activities should target younger men, MSM who engage in transactional sex work and MSM who also engage in sex with women.

Common substance use includes alcohol, marijuana and khat, and about one in 10 MSM injected drugs in the past year.

AUDIT scoring indicates that one-third of MSM may have alcohol consumption and dependency problems that warrant counselling, monitoring and treatment. Over half of MSM use drugs other than alcohol, including marijuana, khat, cocaine and heroin. Ten percent have injected drugs in the last 12 months, and half of these have shared needles. HIV prevention programmes should include assessment and treatment for alcohol dependency and drug abuse. Further investigation may be required to assess the frequency and patterns of injecting drug use.

Sexually active MSM have multiple partners across partner type and gender, and they use condoms inconsistently.

Prevention activities should emphasise using condoms with both male and female partners during both anal and vaginal sex.

There is low knowledge of treatment for HIV among MSM in Kisumu: 44.3 percent of MSM were unaware of medical treatment for HIV, even though over 75 percent reported ever being tested for HIV in the past year.

Counselling sessions during VCT as well as general HIV/STI prevention information sessions should reinforce the availability of medical treatment for HIV. With one in four MSM not knowing that a person can get HIV from unprotected anal sex, targeted HTC services must emphasise the importance of using condoms during anal sex. General counselling services should also assess men for risky sexual behaviour such as engaging in unprotected anal and vaginal sex, and counsel them accordingly.

MSM who experienced both physical and sexual assault had higher HIV prevalence compared to MSM who experienced only physical or sexual abuse.

Non-MSM friends and social acquaintances were the two most common perpetrators of physical and sexual assault. MSM support groups should provide safe environments for MSM to communicate their personal problems and build self-esteem and empowerment. Also, MSM support groups should offer legal advice and legal information to MSM. Interventions to reduce violence between peers may be warranted.

MSM use of MSM-friendly HIV and STI prevention services is low. Many MSM (62 percent) in Kisumu experience service denial and 37.2 percent reported being denied healthcare services.

Fewer than one in three MSM reported going to an MSM-friendly clinic or seeing a peer educator in the past 12 months. Furthermore, of those who went, few (11.4 percent) reported receiving condoms and lubricants. There is a clear need to make MSM-friendly clinics an accessible alternative for MSM. MSM-friendly clinics should have the resources to provide condoms and lubricants to MSM and the capacity to provide comprehensive counselling and monitor the quality of the service they provide.

NAIROBI FEMALE SEX WORKERS

Key Findings

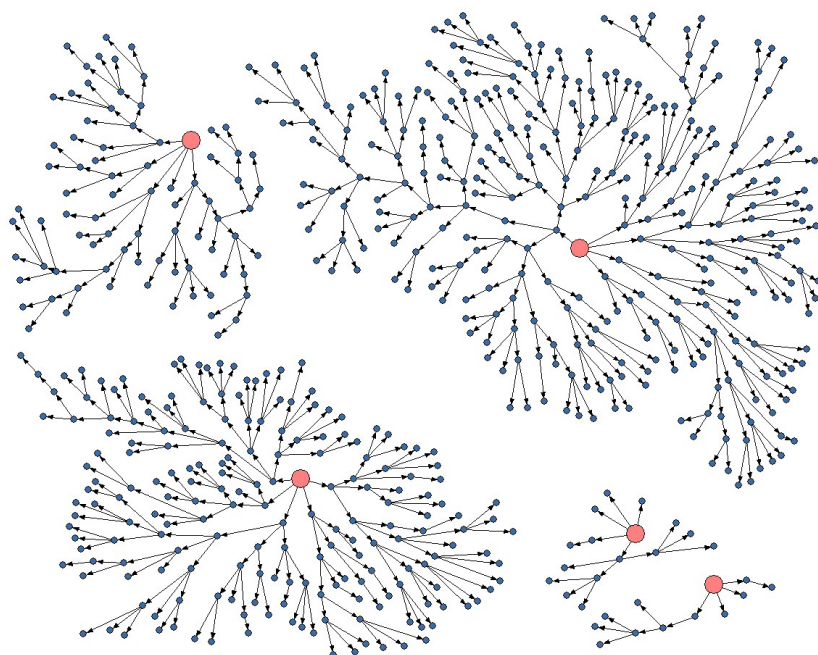
- FSWs have low levels of education, are not married, and rely on sex work to provide for their family.
- One-quarter of FSWs had not used contraceptives in the past 30 days.
- Most FSWs believe they are at high risk for HIV infection; yet condom use remains inconsistent with both paying and non-paying partners.
- High levels of HIV testing, knowledge of HIV status, and low STI prevalence suggest that FSWs may have access to HIV testing and STI treatment.
- The level of verbal and physical abuse among FSWs is high, and a substantial proportion of this abuse comes from clients of FSWs.
- HIV prevalence among FSWs is five times higher than in the general population and associated with increasing age, long duration of sex work, perception of being at great risk for HIV infection, not knowing one's risk for HIV infection, and never testing for HIV infection.

Enrolment

From November 2010 to January 2011, 596 FSWs were enrolled into the survey. Five seeds were selected based on results from formative assessments to initiate enrolment. Seeds represented the geographical, occupational (brothel- vs. street-based etc.), socioeconomic and educational diversity of the target populations. Only one seed did not enrol any participants. Of the 1219 coupons issued, 632 were returned giving a coupon return rate of 52 percent. Of those who returned the coupon, 596 met eligibility criteria and were enrolled in the study. The median network size was 8 FSWs (IQR 4–20). The waves of enrolment per seed ranged from 18 to 62.

FSWs were enrolled from all eight constituencies of Nairobi; however, enrolment of FSWs was concentrated in the eastern parts of Nairobi in Kamukunji and Kasarani areas. Figure 20 illustrates enrolment of FSWs in Nairobi.

FIGURE 20. ENROLMENT OF FSWs IN NAIROBI (N=601 INCLUDING SEEDS)



Note: Larger circles indicate seed participants.

Socio-demographic Characteristics

Table 31 presents the crude and adjusted estimates for socio-demographic characteristics of FSWs in Nairobi. The majority of FSWs in Nairobi are of Kenyan origin (97.7 percent) with only 2.3 percent from different nationalities (mainly communities in Eastern Africa). The median age of FSWs is 30 (IQR 24–38) years, with just over half (53.3 percent) under age 30. Virtually all FSWs (99.2 percent) are not currently married; however, over half (57.4 percent) have been previously married. A large proportion of FSWs have no education or an incomplete primary school education (44.0 percent). An additional 30.5 percent of FSWs completed primary school, 13.0 percent attended some secondary school, and 11.2 percent completed secondary school. The majority of FSWs (71.7 percent) own a mobile phone. For most FSWs (82.2 percent), sex work is their primary source of income and the vast majority (94.7 percent) of FSWs provide financial support to someone else. FSWs support a median of 3 people (IQR 2–4). Over three-quarters of FSWs (80.5 percent) live with their children. The median number of FSWs children is 2 (IQR 1–3).

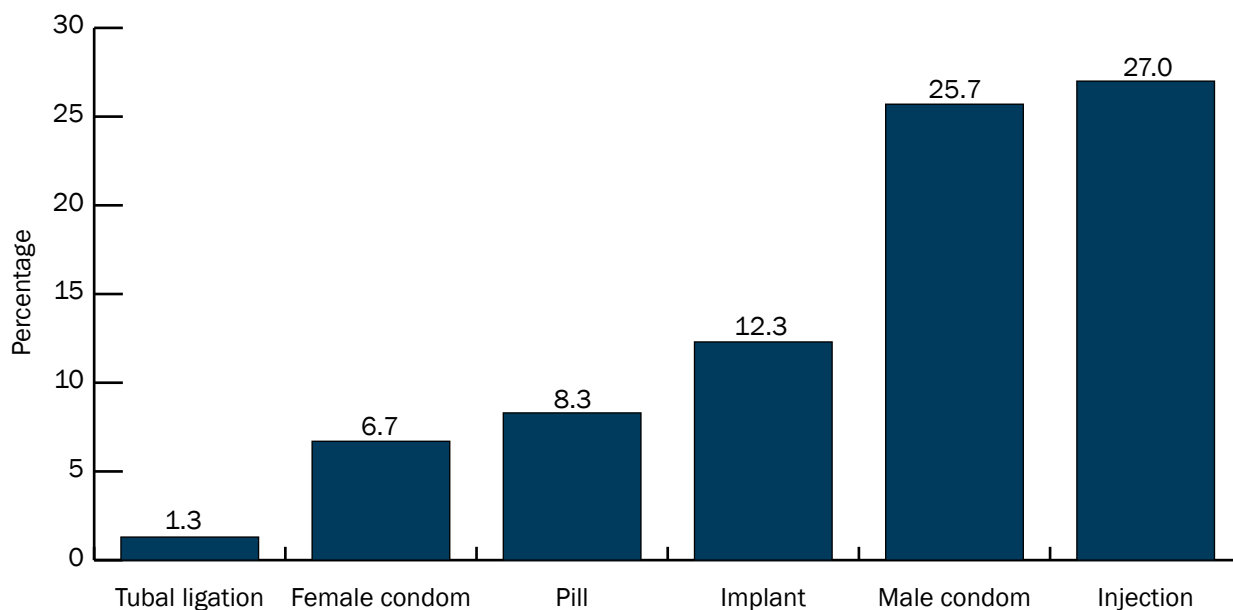
TABLE 31. Socio-demographic characteristics of FSWs, Nairobi 2010–11(n=596)

Respondent characteristics (N = 596)	Unadjusted		Adjusted	
	(n)	%	%	95% CI
Age group				
18–24	149	25.0	30.8	24.9–36.6
25–29	133	22.3	22.5	18.2–27.4
30–34	105	17.6	18.9	14.4–23.4
35+	209	35.1	27.9	22.3–33.6
Nationality				
Kenyan	(555)	93.1	97.7	95.4–98.8
Other nationality	(41)	6.9	2.3	1.2–4.6
Marital status				
Never been married	(225)	37.8	41.8	35.9–46.4
Previously married, currently not married	(365)	61.2	57.4	52.8–63.2
Currently married, living with husband	(2)	0.3	0.2	0.0–1.0
Currently married, not living with husband	(4)	0.7	0.6	0.0–1.3
Education level				
None/incomplete primary	(278)	46.6	44.0	38.1–50.1
Completed primary	(169)	28.4	30.5	25.4–35.8
Incomplete secondary	(85)	14.3	13.0	9.2–16.3
Completed secondary	(57)	9.6	11.2	7.5–16.6
Enrolled/completed post-secondary	(7)	1.2	1.3	0.2–2.7
Own a mobile phone				
Yes	438	73.5	71.7	65.9–76.9
No	158	26.5	28.3	23.1–34.1
Sex work as only source of income				
Yes	(485)	81.4	82.2	77.6–86.3
No	(111)	18.6	17.8	13.7–22.5
Provides financial support to someone else				
Yes	(571)	95.8	94.7	91.7–97.3
No	(25)	4.2	5.3	2.7–8.3
Currently living with child/children				
Yes	472	79.2	80.5	75.9–84.7
No	124	20.8	19.5	15.3–24.1
Median number (IQR) of children living with participant	2	1–3		

Reproductive Health and Contraception

FSWs received a pregnancy test and were asked about their reproductive health history and family planning methods. A total of 6.5 percent of FSWs were pregnant, and approximately 15 percent have had an abortion. Overall, 88.7 percent have ever used contraception, and 75.4 percent used contraception in the past 30 days. The most common contraceptive method used in the past 30 days was an injectable contraceptive (e.g., Depo-Provera) followed by male condoms (27.0 percent and 25.7 percent respectively). The least common methods for contraception are tubal ligation and female condoms (Figure 21). Among FSWs who did not use contraception in the past 30 days, 12.6 percent were currently pregnant. Emergency contraception in the past 30 days was used by 0.8 percent.

FIGURE 21. CONTRACEPTIVE METHODS USED BY FSWS IN THE PAST 30 DAYS, NAIROBI 2010–11*



*Participants could respond to more than one category; therefore categories do not add to 100%

Alcohol and Drug Use

Table 32 describes alcohol and drug use among FSWS in Nairobi. One-third of FSWS consumed alcohol four or more times a week. Based on the AUDIT, a score used to evaluate alcohol use, about half of the women (47 percent) had low-risk alcohol use, 37 percent had hazardous drinking behaviour and 16 percent had scores indicating possible alcohol dependence. Drug use was common among FSWS. Only 37 percent reported not using drugs in the past 12 months. The most commonly used drugs were mirraa/khat and marijuana. Injecting drug use in the past 12 months was low (1.8 percent) among FSWS.

TABLE 32. Alcohol and drug use among FSWs, Nairobi 2010 (n=596)

Alcohol and drug use (N = 563)	Adjusted	
	%	95% CI
Frequency of alcohol consumption		
Never	19.2	14.5–24.4
Monthly or less	8.9	6.0–12.8
2–4 times a month	10.9	7.4–14.4
2–3 times per week	27.7	22.7–33.6
4 or more times a week	33.2	27.2–38.4
AUDIT score		
Not harmful/hazardous drinker	47.0	41.1–52.6
Needs simple advice on reduction of hazardous drinking	29.5	24.4–35.2
Suggest brief counselling and continued mentoring	7.7	5.2–10.6
Possible dependent drinker, warrants further evaluation	15.8	11.7–20.0
Substance use in the past 12 months*		
Marijuana/bhang	35.9	31.3–42.1
Khat/miraa	39.8	34.2–45.8
Other drugs (<2% each)	28.8	23.8–34.1
No drug use at all during past 12 months	36.6	30.9–41.7
Injecting drug use past 12 months		
Yes	1.8	0.4–2.8
No	98.2	97.2–99.6

*Participants could respond to more than one category; therefore categories do not add to 100%.

Sexual Risk Behaviours

The median age of sexual debut for FSWs is 16 years (IQR 13–21 years), and 17.1 percent of first sexual acts for FSWs were coerced or forced. A quarter of all FSWs are circumcised and the median age of circumcision is 14 (IQR 12–15 years).

Table 33 describes characteristics of sex work among FSWs in Nairobi. The median age at first transactional sex was 16 years old (IQR 13–21 years), as was the median age of sexual debut (IQR 15–18 years). The median (IQR) amount received for a sex act was 300 Kenyan shillings (range 50–50,000). The majority of FSWs reported practicing sex work for 10 years or longer (60.9 percent). The type of locations where FSWs sought clients varied between venue-based and non-venue-based locations; the most common methods for meeting or finding clients were at bars (77.1 percent), on the roadside (29 percent), and by telephone call (20.0 percent).

TABLE 33. Characteristics of sex work among FSWs, Nairobi 2010–11 (n=596)

Respondent characteristics	Adjusted	
	%	95% CI
Duration of sex work		
4–9 years	39.1	33.6–45.1
10–14 years	27.8	22.8–33.0
15+ years	33.1	27.4–38.7
Top five client-seeking locations*		
Bar	77.1	70.7–82.2
Roadside	29.4	24.5–34.5
Receive summons or call from clients	20.0	15.7–24.7
At home	8.8	5.7–12.4
Rented stall or shed	4.0	2.3–5.9
Median age at first transactional sex (IQR)	16 (13–21)	
Median Kenyan shillings received from last client (Range)	300 (50–50,000)	

*Participants could respond to more than one category; therefore categories do not add to 100%.

Table 34 describes sexual behaviours of FSWs in Nairobi. The median number of male clients in the past 7 days was 7 (IQR 4–18). The median number of vaginal sex acts in the past 7 days with male clients was 11 acts (IQR 5–21). FSWs had few anal sex acts with clients in the past 7 days (1.7 percent). While 27.1 percent of FSWs had a non-paying partner in the past month, and 12.8 percent had two or more, over half of FSWs (60.1 percent) did not have non-paying partners in the past month.

In the past 30 days, more FSWs reported using condoms consistently with paying clients compared to non-paying partners (62.7 percent vs. 36.9 percent, respectively). Moreover, the vast majority of FSWs used a condom with their last paying client (86.8 percent) compared to only 46.4 percent with their last non-paying partner. The most commonly reported barrier to using condoms with both paying and non-paying partners was trust and familiarity with partners.

Approximately half of FSWs found condoms to be affordable and very easy to obtain (56.0 percent and 50.8 percent, respectively), but still nearly 1 in 10 FSWs reported that condoms were not affordable and not easy to obtain. The most common reported location for finding condoms was vendors (54.0 percent) and bars and nightclubs (13.0 percent).

TABLE 34. Sexual behaviours among FSWs, Nairobi 2010–11 (n=596)

Select behaviours	Adjusted	
	%	95% CI
Number of vaginal sex acts with paying clients in last 7 days		
0–10	57.0	50.8–62.6
11–20	21.7	17.5–26.6
21–30	11.7	8.1–15.2
31+	9.6	6.8–13.3
Number of non-paying sex partners in past 1 month		
No non-paying partners	60.1	54.5–65.6
1 non-paying partner	27.1	22.1–32.2
2 or more non-paying partners	12.8	9.3–16.7
Number of vaginal sex acts with non-paying partner(s) last 30 days		
0–10	85.6	70.4–90.6
11–20	5.9	1.6–12.5
21–30	—	—
31+	8.5	4.4–22.5
1+ anal sex acts with paying partner in last 7 days		
No	98.3	96.8–99.4
Yes	1.7	0.6–3.2
Condom use with paying partners in past 1 month		
Always	62.7	57.1–68.7
Sometimes/never	35.8	29.6–41.6
Never/Don't know	1.5	0.4–2.9
Condom use with non-paying partners in past 1 month* (n=258)		
Always	36.9	21.8–44.6
Sometimes/Never	23.0	14.3–36.6
Never/Don't know	40.2	29.5–55.4
Condom use at last vaginal sex with last paying client		
Yes	86.8	82.7–90.3
No	13.2	9.7–17.3
Condom use at last vaginal sex with last non-paying partner* (n=254)		
Yes	46.4	30.6–54.4
No	53.6	45.6–69.4
Number of paying male clients in past 7 days		
0 to 10	67.8	61.9–72.1
11 to 20	14.4	11.2–18.1
21 to 30	12.0	8.8–16.3
31+	5.8	3.7–8.6
Median number of male clients in the past 7 days (IQR)	7 (4–18)	
Median number of vaginal sex acts with paying clients in the last 7 days (IQR)	11 (5–21)	

A little over half of FSWs douche (51.8 percent). Of these, over three-quarters of FSWs douche more than once a day (77.1 percent). Water and soap (27.9 percent) and water only (15.1 percent) are the most common substances used for douching (Table 35). The most common reason for douching is cleaning (46.8 percent). A smaller proportion of FSWs reported that they douched to tighten their vagina (5.4 percent) or because a condom broke (0.7 percent). A little over half of the FSWs (55.6 percent) douched every day, with 19.8 percent douching after sex, and 15.5 percent douching before sex (Data not shown).

TABLE 35. Douching behaviour among FSWs, Nairobi 2010–11 (n=596)

	Adjusted	
	%	95%CI
Douching frequency		
Once per day	14.1	8.2–23.3
Twice a day or more	77.1	67.8–84.8
Once per week	0.2	0.0–0.5
One to six days per week	0.1	—
Other specify	8.5	0.04–12.3
Douching substances*		
Water	15.1	11.0–19.6
Water and soap	27.9	23.5–32.8
Water and lemon	4.4	2.7–6.5
Water and bleach	0.4	0.0–0.6
Herbals	0.1	0.0–0.4
Others	8.2	5.3–11.5

*Participants could respond to more than one category; therefore categories do not add to 100%.

HIV Knowledge and HIV Testing

FSWs were asked a series of eight questions to assess basic knowledge of HIV. FSWs generally have high HIV knowledge. Over 95 percent of FSWs know that condoms can prevent HIV infection, that HIV can be passed from mother to child, and that there are drugs to prevent mother-to-child transmission of HIV infection. However, there are still gaps in HIV knowledge: only 61.0 percent believed that abstaining from sex was protective, only 77.1 percent knew they could get HIV from unprotected anal sex, and only 77.0 percent believed there was a medical treatment for HIV. About two-thirds of FSWs know someone infected with HIV, and about three-quarters have a close relative or friend infected with HIV (Table 36).

TABLE 36. HIV knowledge and attitudes among FSWs, Nairobi 2010–11 (n=596)

	Adjusted	
	%	95% CI
Knowledge and attitudes towards HIV/AIDS		
People can protect themselves by using condoms	95.1	92.9–97.1
Having one uninfected faithful partner is protective	79.4	74.3–83.9
A person can get HIV from unprotected anal sex	77.1	71.9–82.0
A person can protect themselves by abstaining	61.0	55.5–66.2
A person can get HIV by getting injections with a needle that was already used by someone else	98.8	97.6–99.7
HIV can be passed from a mother to her child	97.5	96.0–98.8
There are special drugs that a doctor can give to a woman who is infected with HIV to reduce the risk of transmission of HIV to the child	96.2	93.8–98.2
There is medical treatment for HIV	77.0	72.3–81.5
Awareness of HIV/AIDS		
Knows someone who is infected with HIV	67.2	62.9–71.5
I have a close relative or friend who is infected with HIV or has died of AIDS	76.0	71.4–80.0

Perception of risk and previous testing

The majority of FSWs believed themselves to be at great risk for HIV (64.1 percent), while 18.1 percent stated that they have a small or moderate risk for HIV (Figure 22).

HIV testing was high (87.1 percent) among FSWs. Among those who were ever tested for HIV infection, approximately half (54.1 percent) tested within the past year. The most common location for HIV testing was Majengo clinic (14.8 percent) and SWOP (4.9 percent). FSWs also mentioned a variety of other places they tested

including: mobile testing, private clinics, door-to-door VCT, city council clinics, private hospitals, and religiously affiliated testing sites (Table 37). Almost all FSWs who had ever tested were willing to reveal the results of their last HIV test, regardless of the test result. Based on the results of their last HIV test, 17.3 percent reported that the result was HIV-positive and 82.5 percent reported that the result was HIV-negative. Only 0.2 percent of FSWs who were ever tested for HIV infection did not know their HIV status.

FIGURE 22. PERCEPTION OF RISK AMONG FSWs, NAIROBI 2010–11

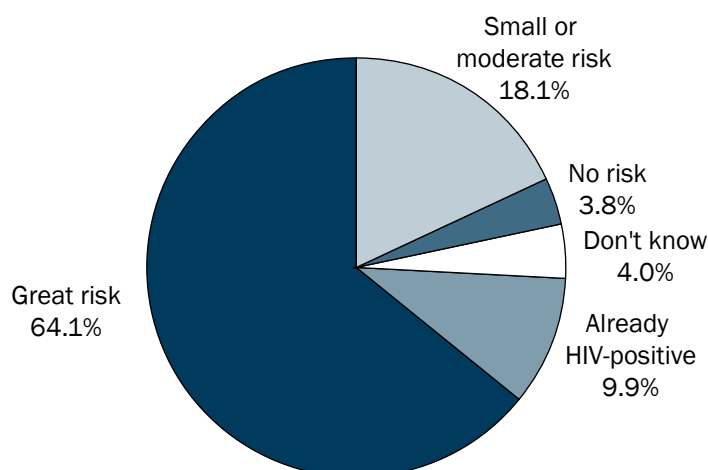


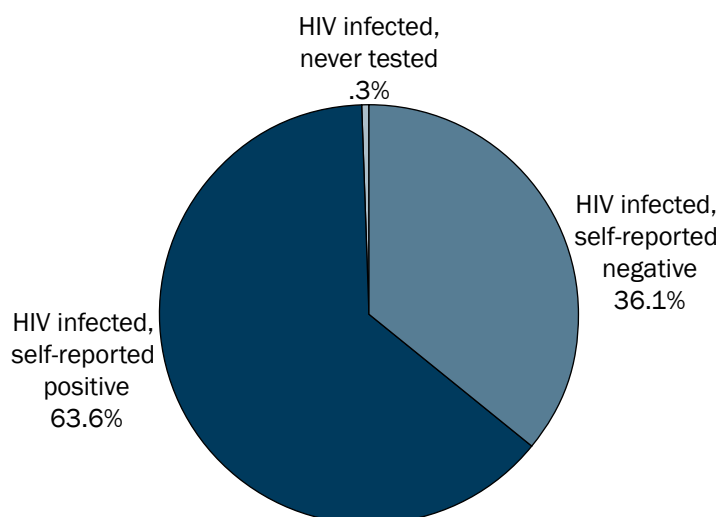
TABLE 37. HIV testing behaviours and self-reported HIV status among FSWs, Nairobi 2010–11 (n=596)

	%	Adjusted
		95% CI
Ever tested for HIV		
Yes	87.1	82.5–91.2
No	12.4	8.4–17.2
Last tested for HIV* (n=543)		
1–3 months ago	24.2	19.6–29.8
3–6 months ago	19.2	14.7–24.1
6–12 months ago	10.7	7.9–13.7
12+ months ago	30.4	24.8–35.6
Don't know/No answer	15.4	11.1–19.8
Place where FSWs received last HIV test and/or counselling* (n=543)		
Kenyatta Hospital	2.8	0.9–4.8
Casino VCT	0.3	0.0–0.9
Liverpool VCT	0.3	0.0–0.7
SWOP	4.9	2.2–8.4
KAVI	1.8	0.2–3.4
Majengo clinic	14.8	10.3–20.7
Other*	75.1	68.9–80.9

*Other testing sites mentioned by FSWs included a variety of mobile testing centres, city council clinics from various areas, maternity hospitals, private pharmacies, private clinics, church clinics, door-to-door testing, prison etc.

Among HIV-infected FSWs, 63.6 percent were aware of their HIV-positive status (Figure 23). Among those who knew their HIV-positive status, nearly half (48.8 percent) were currently on antiretroviral therapy. No information was collected on access to other HIV care services such as cotrimoxazole prophylaxis and treatment for tuberculosis (TB). Over one-third of those who tested positive for HIV (36.1 percent) did not know they were HIV-positive based on their last HIV test.

FIGURE 23. SELF-REPORTED HIV STATUS AMONG HIV-INFECTED FSWs, NAIROBI 2011



Discrimination and Violence

An estimated 67.1 percent of all FSWs have been verbally insulted in the past 12 months, and of those, approximately 15 percent reported their last verbal insult came from a client. Almost one-third (31.3 percent) of FSWs were physically assaulted in the past 12 months. Physical assault was defined as being hit, kicked, or beaten by someone. Among FSWs physically assaulted, 67.2 percent were assaulted by their clients. Almost one in ten (9.6 percent) FSWs were forced to have sex at least once in the past 12 months. Among these, 28.4 percent reported a client was the last person who forced them to have sex; 1.6 percent reported a police or other law enforcement officer as the perpetrator.

To measure stigma and discrimination against FSWs, FSWs were asked if they were refused services because someone thought they were a FSW. The most common service delivery points where services were refused were at restaurants (29.9 percent) and by police (25.3 percent) (Table 38).

TABLE 38. Stigma, discrimination, and violence against FSWs in the past 12 months, Nairobi 2010–11 (n=596)

Characteristics	Adjusted	
	%	(95% CI)
Verbally insulted in past 12 months		
Yes	67.1	61.7–72.6
No	32.9	27.4–38.3
Physically assaulted in past 12 months		
Yes	31.3	26.1–36.6
No	68.7	63.4–73.9
Sexually assaulted in past 12 months		
Yes	9.6	6.9–12.7
No	90.4	87.3–93.1
Person who last physically abused FSWs in the past 12 months (n=53)		
Client	67.2	48.5–82.0
FSW	7.7	0.7–17.4
Friend	0.8	0.0–3.1
Social acquaintance	8.6	1.4–21.7
Family/relative	4.3	0.0–10.8
Other*	11.4	2.6–25.9
Person who last sexually abused FSWs in the past 12 months (n=78)		
Don't know the person	5.8	11.4–71.3
Client	28.4	27.0–80.7
Friend	2.1	0.0–4.6
Social acquaintance	2.1	0.0–4.6
Family/relative	3.5	0.0–4.6
Pimp	2.1	0.0–4.6
Police/law officer	1.6	0.0–12.2
Strangers	2.3	0.0–4.6
Service delivery points where FSWs were refused services because someone believed them to be a FSW [‡]		
Healthcare	2.2	0.5–4.7
Education	3.6	1.3–6.4
Church/religion	7.2	4.3–10.5
Employment	6.4	3.8–9.7
Housing	13.0	9.7–16.5
Police	25.3	20.7–30.1
Restaurant	29.9	25.0–34.8

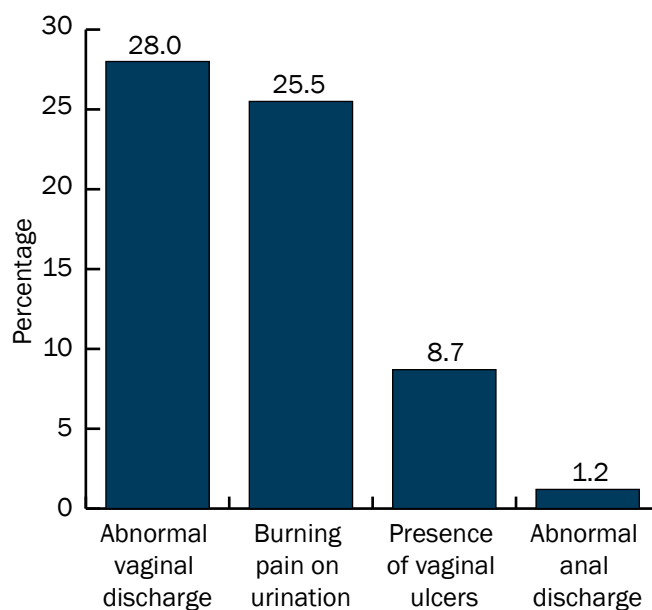
*Other included boyfriend, landlord, client's wife, neighbours, and police

[‡]Participants could respond to more than one category; therefore categories do not add to 100%

STI Symptoms

Reported STI symptoms in the past 12 months are presented in Figure 24. An STI symptom was defined as abnormal vaginal discharge, abnormal anal discharge, presence of vaginal or anal ulcers, or burning pain on urination. Overall, 28.0 percent of FSWs reported they had abnormal vaginal discharge, 1.2 percent reported abnormal anal discharge, 8.7 percent reported vaginal ulcers, and 25.5 percent reported burning pain on urination in the past 12 months. Of those who reported any STI symptom in the past 12 months, only approximated one in four (23.3 percent) received treatment.

FIGURE 24. REPORTED STIS SYMPTOMS IN THE PAST YEAR AMONG FSWs, NAIROBI 2010–11 (N=596)



Exposure to HIV/STI Prevention and Other Services

In Nairobi several established programmes provide FSWs access to information on STI, family planning, and HIV/AIDS. Common programmes for FSWs include FSW clinics or drop-in centres and FSW peer educators in the community.

In the past 12 months, 22.8 percent of FSWs visited a FSW clinic or drop-in centre and 18.2 percent were contacted by peer educators in the community.

FSWs who visited a FSW clinic or drop-in centre most commonly accessed the following: condoms (21.6 percent), information on STI or HIV prevention (22.7 percent), HIV testing services (13.6 percent), and lubricants (9.9 percent). Few FSWs received counselling for general health issues and voluntary counselling and testing, particularly from male counsellors, at clinics and drop-in centres.

FSWs visited by a peer educator in the past 12 months received general HIV/STI prevention information (100 percent), condoms (58 percent), and referrals for STI treatment (48 percent). FSWs did not receive any VCT referrals through peer educators (Table 39).

TABLE 39. Exposure to HIV and STI prevention services, FSW, Nairobi 2010 (n=596)

Location and intervention	Adjusted	
	%	95% CI
Visited a clinic/drop-in centre in the past 12 months		
Yes	22.8	17.5–28.6
No	77.2	71.4–82.5
Services received at FSW-friendly clinic/drop-in centre** (n=220)		
Condoms	21.6	16.1–26.2
Lubrication	9.9	6.5–12.7
Information on STI or HIV prevention	22.7	17.3–27.6
General counselling from female peer counsellor	8.7	5.2–12.6
General counselling from male peer counsellor	4.4	2.3–6.0
VCT counselling from female counsellor	5.5	3.2–7.7
VCT counselling from male counsellor	3.0	1.7–4.6
HIV test	13.6	9.9–17.8
Visited by a peer educator in the past 12 months		
Yes	18.2	14.1–22.1
No	81.8	77.9–85.9
Intervention accessed through peer educators* (n=130)		
Information on STI or HIV prevention	100.0	–
Condoms	58.2	0.0–1.0**
Referral for STI treatment	48.3	6.7–80.0
Referral for VCT	0.0	–
Other	21.2	0.0–25.6

*Participants could respond to more than one category; therefore categories do not add to 100%.

**Too few participants for RDSAT to generate a reasonable CI

HIV and STI Prevalence

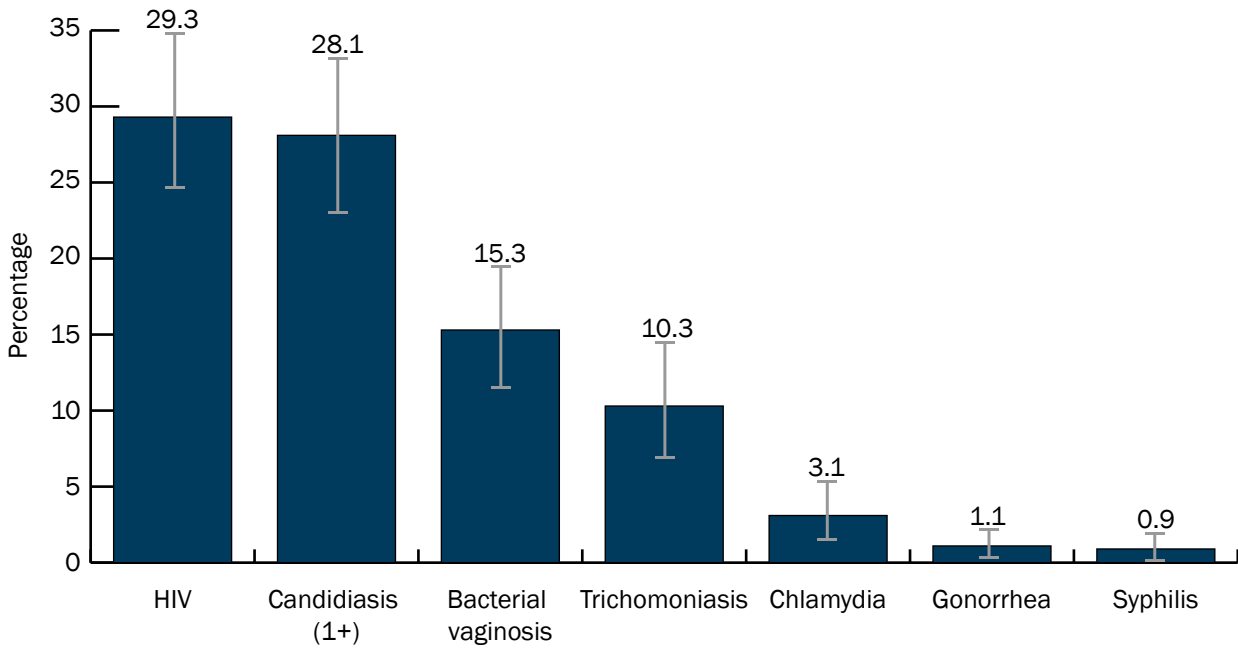
HIV seroprevalence

All FSW respondents (N=563) were tested for HIV using rapid test kits. The estimated prevalence of HIV infection among FSWs in Nairobi was 29.3 percent (95 percent CI 24.6–34.9), a level that is three times higher than in the general adult female population in Nairobi (KDHS 2008–2009) (Figure 25).

STI seroprevalence

The prevalence of sexually transmitted infection (STI) ranged from 28.1 percent (95 percent CI 23.0–33.2) for candidiasis (score 1+), 15.3 percent (95 percent CI 11.6–19.5) for bacterial vaginosis, 10.3 percent (95 percent CI 6.9–14.5) for trichomoniasis, 3.1 percent (95 percent CI 1.5–5.3) for chlamydia, 1.1 percent (95 percent CI 0.4–2.1 percent) for gonorrhoea, and 0.9 percent (95 percent CI 0.2–2.0) for syphilis. The proportion of FSWs with any of the above STI was 24.2 percent (95 percent CI 19.3–29.1 percent). Note, Candidiasis score 1+ is defined as colonisation of multiple sites (score=1) or severe sepsis (score=2). The proportion of HIV-infected FSWs who were co-infected with one of the above STI was 36.6 percent (95 percent CI 26.4–46.7) (Figure 27).

FIGURE 25. HIV AND STI PREVALENCE AMONG FSWS, NAIROBI 2010



Factors Associated with HIV Infection

Demographics

Overall HIV prevalence is an estimated 29.3 percent among Nairobi FSWs (Table 40). The prevalence of HIV infection among FSWs 30 years and older is even higher.

Figure 26 illustrates the linear increase in HIV prevalence by age among FSWs, suggesting a cumulative risk of HIV infection in this population over time. FSWs older than 30 years had significantly higher HIV prevalence than FSWs in the youngest age category (aged 18–24 years).

In addition, HIV prevalence appears to be highest among FSWs who had little or no education. Though HIV prevalence appears to be high among FSWs who were currently married, the number of currently married FSWs was too small for meaningful interpretation (Table 40).

FIGURE 26. HIV PREVALENCE AMONG FSWS BY AGE GROUP, NAIROBI 2011

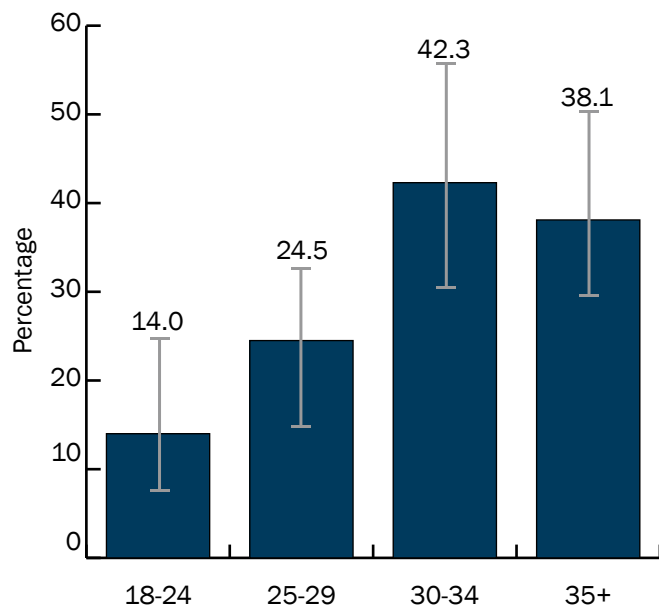


TABLE 40. HIV prevalence by socio-demographic characteristics among FSWs (n=596)

Respondent characteristics	Adjusted HIV prevalence	
	%	95% CI
Overall	29.3	24.6–34.9
Age		
18–24	14.0	8.0–25.0
25–29	24.5	15.0–32.7
30–34	42.3	30.7–56.0
35+	38.6	29.5–50.3
Marital status		
Never been married	26.3	18.8–35.6
Previously married, currently not married	30.9	24.7–37.9
Currently married*	43.2	0.0–1.0
Education level		
None/incomplete primary	36.2	29.2–45.3
Completed primary	19.5	13.1–27.2
Incomplete secondary	30.5	16.2–48.1
Completed secondary	24.0	7.9–42.7
Enrolled/completed post-secondary	0.0	0.0–0.0

*Sample sizes too small to make any inferences from these data

Table 41 stratifies HIV status by risk behaviour. No differences are observed in HIV prevalence by current contraceptive use, circumcision status, history of douching, frequency of douching among those who reported douching behaviour, number of partners, number of vaginal sex acts, and condom use with paying partners. History of douching and frequency of douching are also not found to be associated with bacterial vaginosis diagnosis.

TABLE 41. HIV prevalence by characteristics and risk behaviours among FSWs (N = 596)

Respondent characteristics	Adjusted	
	%	95% CI
Contraceptive use in the past 30 days		
Yes	29.0	22.2-34.4
No	28.0	15.6-40.5
Female genital mutilation		
Yes	34.4	25.9-44.7
No	27.8	22.1-34.1
Ever practiced vaginal douching		
Yes	31.4	24.9-39.3
No	27.2	20.4-34.3
Frequency of douching (n = 305)		
< once per day	38.2	13.3-69.1
1 time per day	14.1	2.4-35.8
≥ times per day	30.7	21.9-46.2
Number of male clients in past 7 days		
0 to 10	29.0	22.7-36.1
11 to 20	27.7	17.9-41.2
21 to 30	23.1	13.1-37.1
31 or more	30.8	16.3-48.5
Don't know	34.0	0.0-100.0
Number of vaginal sex acts with male clients in past 7 days	27.6	21.3-35.3
0 to 10		
11 to 20	33.0	21.9-44.0
21 to 30	24.1	13.9-36.5
31 or more	36.3	21.1-51.6
Don't know	27.8	0.0-50.0
Used condom with last male client?		
Yes	30.4	25.2-36.7
No	24.3	13.1-36.8
Frequency of condom use with paying clients in past 30 days		
Always	26.4	20.7-33.7
Sometimes	33.5	25.5-43.0
Never	21.0	0.0-71.5

HIV prevalence is significantly higher among FSWs who reported selling sex for 15 years or longer (63.1 percent) compared to those who had sold sex for 10–14 years (28.3 percent) and 4–9 years (23.3 percent) (Figure 27). No FSWs in the survey sold sex for less than 4 years.

In Table 42, we describe HIV prevalence by risk perception and HIV testing behaviour. FSWs who believe they are at no risk (7.4 percent) or small to moderate risk (8.2 percent) for HIV infection had significantly lower HIV prevalence compared to FSWs who believed they were at great risk (26.0 percent) and those who did not know what their risk was (36.2 percent). FSWs who believe they are at high-risk do not include those who previously knew they were HIV-positive. HIV prevalence is significantly higher among FSWs who have never been tested for HIV (55.3 percent) compared to those who were ever tested for HIV (25.0 percent).

FIGURE 27. HIV PREVALENCE BY DURATION OF SEX WORK AMONG FSW, NAIROBI 2010–11

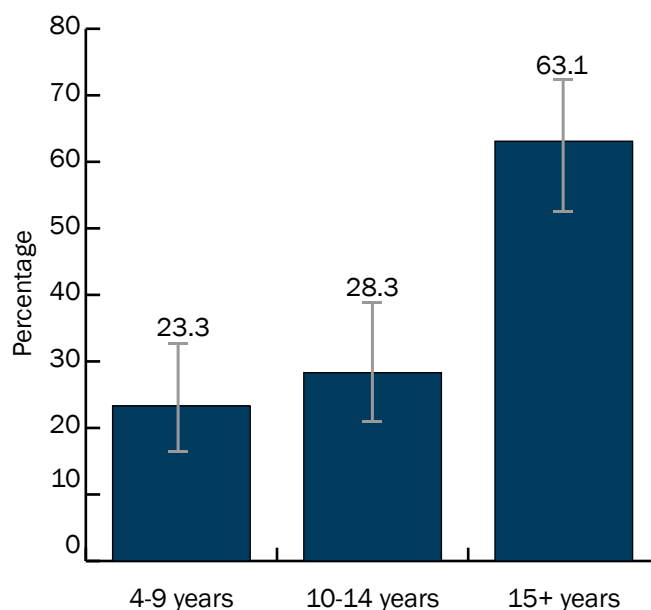


TABLE 42. HIV prevalence by HIV risk perception and HIV testing behaviour (N = 596)

Respondent characteristics	Adjusted	
	%	95% CI
HIV risk perception		
No risk	7.4	0.0–17.5
Small to moderate risk	8.2	3.1–15.8
Great risk	26.0	19.9–32.7
HIV-infected	100.0	100.0–100.0
Don't know	36.2	8.5–67.9
HIV testing status		
Never tested for HIV	55.3	40.1–74.9
Ever tested for HIV	25.0	20.0–30.3

Table 43 shows HIV prevalence by substance use behaviour and indicators of verbal, physical, and sexual abuse. HIV prevalence does not differ by alcohol use, frequency of alcohol use in the past month, or drug use in the past 12 months. Only 6 percent of the sample reported injecting drugs in the past 12 months; therefore the numbers were too small to estimate HIV prevalence in this sub-group. With respect to verbal, physical, and sexual abuse in the past 12 months, we did not observe any differences in HIV prevalence among those who experienced and did not experience this abuse.

TABLE 43. HIV prevalence by select characteristics among FSWs, Nairobi 2010–11 (n=296)

Respondent characteristics (N = 596)	Adjusted	
	%	95% CI
Frequency of drinking		
Never	33.1	24.4–47.5
Monthly or less	37.1	20.6–56.2
2–4 times a month	34.4	16.7–51.1
2–3 times per week	24.1	17.6–36.3
4 or more times a week	28.2	19.6–37.0
Drug use in the past 12 months		
Marijuana/bhang	24.3	18.8–32.2
Khat/miraa	28.4	21.2–37.2
Other drugs (<2% each)	30.2	21.4–38.8
No drug use at all during past 12 months	31.9	22.9–42.2
Indicators of verbal, physical, and sexual abuse		
Verbal insult >1 time in the past 12 months		
No	25.7	17.0–36.4
Yes	31.0	25.1–37.4
Physical assault >1 time the past 12 months		
No	28.0	22.7–34.7
Yes	31.5	21.5–42.5
Forced sex >1 time in the past 12 months		
No	29.2	24.0–34.9
Yes	32.5	19.4–48.2

Discussion and Recommendations

FSWs in Nairobi are a highly vulnerable population.

The majority of FSWs are unmarried, rely on sex work as their sole source of income, and are supporting others financially. Being older and working as a sex worker for a longer duration of time are associated with greater risk of HIV infection. Structural interventions and commitment from the Government of Kenya are needed to support single women to improve access to education, formal employment, or other sources of support that do not put them at risk for HIV infection. Findings from this survey also highlight the vulnerability of children of FSWs, with the majority of FSWs living with their children. Youth programmes that provide support and education for children of FSWs should be established to address this gap in service provision.

There is an unmet need for family planning among FSWs.

One-quarter of FSWs did not use any family planning method in the past 30 days, and of these about 12 percent were currently pregnant. Additionally, though condoms appear to be relatively easy to access among FSWs, they do not appear to be used widely for family planning or consistently for protection with either paying or non-paying sex partners. These data point to a possible gap in knowledge about family planning among FSWs or limited self-efficacy for condom use with paying and non-paying partners. Programmes for FSWs should include education on family planning, condom negotiation skills, and available and accessible low-cost contraceptive. In addition, with more than one in ten FSWs being pregnancy, targeted services should include linkages to antenatal services.

Alcohol and substance use is high among FSWs.

Over one-third of FSWs drink 4 or more times a week and 16 percent are potential dependent drinkers per their AUDIT score. Over one-third of FSWs used drugs in the past 12 months, with Khat being the most common drug of choice. Though our data did not show an association between substance abuse and HIV infection, substance abuse may still lead to high-risk behaviour and reduced judgment leaving FSWs vulnerable to other harmful situations, including physical or sexual abuse. Interventions should be developed to address substance use and to evaluate and treat substance abuse among FSWs.

Established interventions for FSWs exist in Nairobi but these programmes may need improvement.

Programmes are in place in Nairobi that target FSWs; however, the majority of FSWs remain unreached by these programmes. Current programmes should undergo evaluation to assess whether services are appropriate and appealing to FSWs. Operations research should explore reasons why FSWs may not be accessing these services. The unexpectedly few FSWs contacted through peer-educators highlights the significant challenge in using peers for delivering important health messages to FSWs. These programmes should be evaluated for cost-effectiveness, modified to meet the specific needs of FSWs, and regularly monitored.

Most FSWs meet their clients at bars, highlighting opportunities for targeted prevention.

Venues where FSWs meet clients should be mapped regularly to help inform outreach and communication activities. Accessing venues by engaging owners and managers may provide opportunities for expanded HIV testing, condom promotion, and distribution of educational material to FSWs and their clients.

FSWs have a high perception of risk but low rates of condom use.

The majority of FSWs believe they are at high-risk for HIV infection. Those who believe they are at higher risk have a significantly higher prevalence of HIV infection when compared with those who believed they were at no or low/moderate risk. This could indicate a thorough understanding of their risk behaviour. Still condom use was not consistent, and was extremely low among non-paying partners. Inconsistent condom use in this high-prevalence population is a cause for concern, and where condoms seem to be affordable and available additional information is needed to understand reasons that prevent FSWs from using condoms. There is an urgent need for prevention programmes to make condoms more accessible, improve messages concerning condom use and include practical approaches for improving condom use negotiation among clients and other sexual partners.

High rates of HIV testing and knowledge of HIV status.

Nearly 90 percent of all FSWs had ever had an HIV test, and over half tested in the past year. Among HIV-infected FSWs, knowledge of HIV-positive status (63 percent) is substantially higher than in the general population (15 percent) (KAIS 2007). Approximately half of HIV-infected FSWs are also currently on ARV treatment for their HIV infection.

Encouraging trends in HIV testing and ARV uptake among FSWs suggest that FSWs in Nairobi have knowledge of and access to prevention, care, and treatment services for HIV. This model can serve as a model to improve service delivery for other key populations where awareness of HIV status and access to care and treatment are low.

Among FSWs who were never tested for HIV infection, HIV prevalence was greater than 50 percent, indicating a larger proportion of undiagnosed HIV infection among those who have never tested. Continued support for promotion of HIV testing services for FSWs is urgently needed. HIV testing programmes should include messages concerning condom use and promote immediate linkages to care and treatment programmes.

Low STI prevalence.

Prevalence of gonorrhoea, chlamydia, and syphilis infections is estimated to be relatively low among FSWs, with the exception of candidiasis (1+). Among those FSWs who reported symptoms of STIs in the past year, only a quarter received treatment for these symptoms. Low rates of STI may highlight the availability and successful access of services through targeted programmes for FSWs in Nairobi. Programmes that target FSWs should continue to be supported and provide a package of prevention interventions, including HIV testing, condom promotion, syndromic management of STI treatment, and education on how to prevent HIV transmission and acquisition.

Verbal, physical and sexual abuse by male clients is common.

Among FSWs who reported verbal, physical, and sexual abuse in the past 12 months, abuse from male clients was high. Violence against sex workers may undermine HIV prevention efforts where FSWs do not have the autonomy to make protective decisions about issues such as condom use. HIV prevention efforts should include education or community mobilisation focused on reducing or responding to violence among FSWs.

PEOPLE WHO INJECT DRUGS

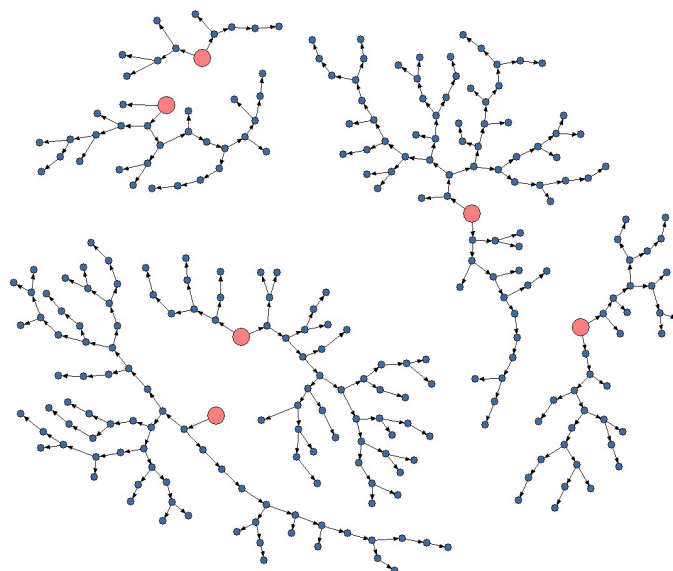
Key Findings

- PWID have low levels of education, are primarily male and not married, and engage primarily in illegal activity or informal work for employment.
- Drug use was initiated at a very young age (11 years old) with most PWID using marijuana. Drug injecting was initiated in their early 20s with most PWID injecting white heroin. Nearly one-half of PWID initiated injecting drugs within the past 6 months.
- About two-thirds of PWID engaged in some type of risky injecting practice in the past one month.
- While slightly more than one-half of PWID are sexually active, only about one in 4 sexually active PWID use condoms consistently.
- High levels of HIV testing, knowledge of HIV status, and low STI prevalence suggest that PWID may have good access to HIV testing and STI treatment. However, few have received any kind of services specifically for drug users.
- HIV prevalence among PWID is estimated at 18.5%, which is 2.5 times higher than in the general population.
- HIV prevalence is associated with greater duration of injecting drug use and with risky injecting practices.

Enrolment

Enrolment of PWID was initiated by six seed participants who were selected based on results from formative assessments to represent the four different geographic areas, and the age and gender diversity of PWID in Nairobi. Of the 473 coupons distributed over three months (January to March 2011), 352 were returned to the study site giving a coupon return rate of 74.4 percent. Of those who returned a coupon, a total of 269 individuals met eligibility criteria for study participation and were enrolled (76.4 percent eligibility rate of returned coupons). A large proportion of the 78 participants who were found ineligible were disqualified (31 before screening, 37 after screening) for strong suspicion of not being PWID. Figure 28 shows the enrolment of PWID in Nairobi.

FIGURE 28. ENROLMENT OF PWID IN NAIROBI (N=275 INCLUDING SEEDS)



Note: Larger circles indicate seed participants.

Socio-demographic characteristics

The median age of PWID is 31 (IQR: 27–37), and over half of participants were age 30 or older (28.5 percent, age 30–34; 35.9 percent age 35 or older). The majority of PWID are men (92.5 percent); however, there are some women PWID in Nairobi (7.5 percent). Almost half of PWID have only a primary education or less (51.6 percent). While only 16.9 percent of PWID are currently married, over half (58.6 percent) have been previously married, and about one-quarter (24.4 percent) have never been married. It is estimated that over two-thirds of PWID reside in Starehe (59.0 percent) and Kamukunji (9.7 percent) constituencies, which are located on the eastern side of Nairobi city. Some also reside in Dagoreti constituency (11.7 percent), which is located on the western side of Nairobi. The remaining 19.6 percent live in various other constituencies. PWID mainly earn money through informal or irregular employment, with only 11.5 percent reported being formally employed. Some PWID (18.1 percent) earn income through illegal activities, which includes stealing money or goods (Table 44).

TABLE 44. Socio-demographic characteristics of PWID, Nairobi 2011 (n=269)

Characteristics	Unadjusted % (n)	Adjusted % (95% CI)
Age (yrs)		
18–24	10.0 (27)	12.3 (7.3–18.1)
25–29	26.0 (70)	23.3 (16.0–29.7)
30–34	27.9 (75)	28.5 (21.1–36.3)
35+	36.1 (97)	35.9 (29.0–44.5)
Sex		
Men	92.2 (248)	92.5 (86.2–97.5)
Women	7.8 (21)	7.5 (2.5–13.8)
Education		
None/incomplete primary	47.6 (128)	51.6 (43.6–60.7)
Completed primary	17.8 (48)	17.1 (11.3–23.1)
Incomplete secondary	17.8 (48)	14.5 (9.4–20.0)
Completed secondary	12.6 (34)	11.0 (6.6–15.5)
Enrolled/completed post-secondary	4.1 (11)	5.8 (1.6–11.1)
Religion		
Christian	65.1 (175)	66.0 (57.5–73.8)
Muslim	25.7 (69)	24.1 (17.1–31.9)
Other	9.3 (25)	10.0 (5.5–15.0)
Current marital status		
Single, never been married	27.5 (74)	24.4 (17.1–32.1)
Single, formerly married	54.3 (146)	58.6 (50.7–66.3)
Currently married	18.2 (49)	16.9 (11.2–23.7)
Employment		
Unemployed/No income	4.5 (12)	2.9 (1.1–5.4)
Formal employment	10.8 (29)	11.5 (6.0–17.1)
Informal employment	38.7 (104)	36.5 (28.4–44.4)
Illegal activity (e.g. stealing)	16.4 (44)	18.1 (11.6–26.3)
Other	29.7 (80)	30.9 (23.4–39.7)

Alcohol and Drug Use

Alcohol consumption

The majority of PWID did not consume alcohol at the time of the survey (87.9 percent). Less than 10 percent of all PWID indicated possible need for alcohol-related interventions as measured by the Alcohol Use Disorders Identification Test (AUDIT); only 3 percent indicate possible alcohol dependence (Table 45).

Initiation, duration, and history of drug use

Table 46 presents characteristics of illicit drug use among PWID in Nairobi. PWID initiated drug use at an early age, with a median age of 11 years (IQR: 7–15 years). About 70 percent of all PWID have used illicit drugs (non-injecting or injecting) for at least 10 years. Marijuana (57.2 percent) was the most common illicit first used by PWID, though 22.5 percent of PWID used heroin as their first drug.

The median age at first injecting illicit drugs was 21 (IQR: 17–27 years). White heroin was the most common drug used at the first injecting episode (84.3 percent), followed by brown heroin (15.5 percent).² Figure 29 illustrates duration of injecting for PWID. Over 40 percent of PWID in Nairobi had initiated injecting drug use within the 6 months preceding their study participation. An estimated 21.3 percent had been injecting for five or more years (Table 46).

TABLE 45. Alcohol consumption among PWID, Nairobi 2011 (n = 269)

Characteristics	Adjusted % (95% CI)
Frequency of alcohol consumption	
Never	87.9 (82.5–92.9)
2–4 times per month or less	4.6 (2.0–8.0)
2+ times per week	7.5 (3.2–12.5)
AUDIT score	
Warrants further diagnostic evaluation for alcohol dependence	3.0 (1.1–5.4)
Suggest brief counselling and continued monitoring	1.6 (0.30–3.5)
Needs simple advice on reduction of hazardous drinking	4.2 (1.0–9.3)
Not harmful / hazardous drinker	91.1 (85.7–95.5)

TABLE 46. Illicit drug use among PWID, Nairobi 2011 (n = 269)

Characteristics	Adjusted % (95% CI)
Median age at first drug use [IQR]	11 (7–15)
Duration of illicit drug use	
<10 Years	30.6 (22.9–38.9)
10–19 years	53.2 (44.3–61.7)
20+ years	16.2 (10.9–22.0)
First illicit drug used	
Marijuana	57.2 (48.3–66.9)
Heroin	22.5 (15.0–30.0)
Other	20.3 (13.2–28.0)
Median age at first injecting [IQR]	21 (17–27)
First illicit drug injected	
White heroin	84.3 (79.3–89.9)
Brown heroin	15.5 (9.9–20.5)
Other	0.2 (0.0–0.5)
Duration of injecting drugs	
≤ 6 months	43.3 (33.4–54.1)
7 months–4 years	35.4 (27.0–44.4)
5 years or more	21.3 (14.2–28.4)

²White heroin, also known as “white crest,” is a more refined and easily soluble form of heroin, as compared to brown heroin (also known as “brown sugar” which more commonly smoked than injected).

Drug-injecting practices over lifetime and in the past month

Table 47 describes recent injecting behaviours of PWID in Nairobi. All respondents reportedly injected drugs during the month preceding the survey, with the majority of PWID injecting white heroin (96.5 percent). Multiple drug use was common with over two-thirds of PWID also using marijuana, 14.8 percent using khat, 6.0 percent using cocaine, and 50.1 percent using tranquilisers in addition to heroin.

The majority of PWID (77.3 percent) injected daily; three-quarter of whom injected twice or more on the last day they injected. The median number of injections on the last day PWID injected was 2 (IQR: 2-3).

PWID most commonly injected where they bought drugs (60.6 percent), in the street or parks (32.6 percent) and at home (24.9 percent).

FIGURE 29. DURATION OF DRUG INJECTING AMONG PWID, NAIROBI 2011 (N=269)

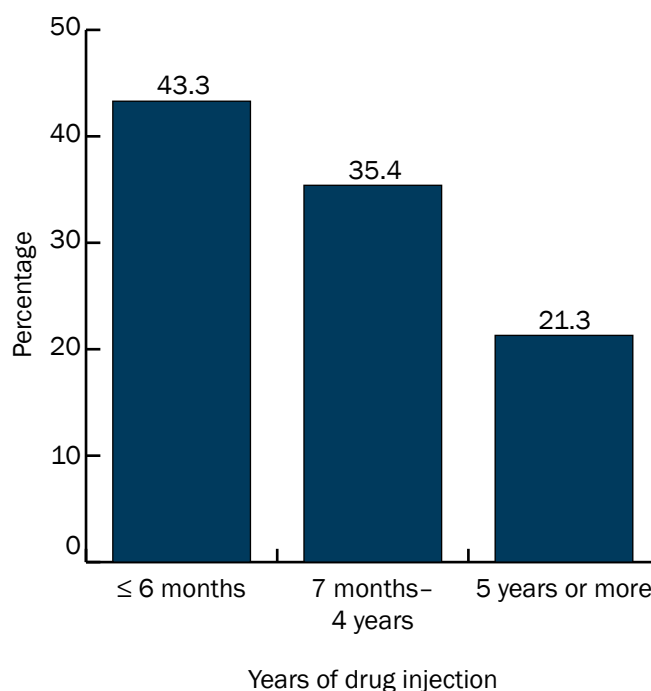


TABLE 47. Recent injecting behaviours among PWID, Nairobi 2011 (n=269)

Characteristics	Adjusted % (95% CI)
Drug injecting in the past 1 month	100.0 (99.9–100.0)
Type of drug injected currently	
White heroin	96.5 (93.2–99.0)
Other	3.5 (1.0–6.8)
Injecting practices in the past 1 month	
Other, or multiple drug, use in past 1 month [†]	
Marijuana	64.5 (56.2–72.5)
Khat	14.8 (8.9–21.3)
Cocaine	6.0 (1.4–11.3)
Tranquillisers	50.1 (41.9–58.7)
Injecting frequency in the past 1 month	
Everyday	77.3 (70.6–84.9)
Less than everyday	22.7 (15.1–29.4)
Number of injections on last day of injecting	
1	25.0 (17.7–31.9)
2	39.9 (32.1–48.8)
3 or more	35.0 (27.3–43.2)
Median number of injections last day of injecting [IQR]	2 [2, 3]
Most common location where PWID inject [†]	
At base where drugs were bought	60.6 (52.5–67.6)
Home	24.9 (19.3–31.1)
Street or park	32.6 (25.6–39.8)
In dealer/peddler's home	13.7 (8.6–19.3)
Any abandoned building	7.5 (3.8–11.5)
Used needle/syringe previously used by someone else in the past 1 month	47.4 (38.8–56.0)
Used prefilled needle/syringe in past 1 month	33.2 (25.5–41.6)
Lent needle/syringe in past 1 month	50.0 (42.2–58.2)
Front/ back loaded needle/syringe in past 1 month	46.3 (38.0–55.1)
Shared water used to prepare drugs in the past 1 month	57.1 (48.8–51.6)
Shared equipment in past 1 month	56.9 (48.5–64.7)
Drew drugs from common container in the past 1 month	37.9 (29.6–46.6)
Risky injecting in the past 1 month [§]	67.3 (58.8–75.4)
Lifetime injecting practices	
Ever used needle/syringe previously used by someone else	53.8 (45.5–62.2)
Ever used a prefilled syringe	33.2 (25.5–41.4)
Ever drew up from a common container	48.6 (40.7–57.0)
Ever shared water used to prepare drugs	53.8 (45.4–62.2)
Ever shared equipment	64.4 (56.3–71.9)
Risky injecting ever [§]	80.0 (73.8–85.3)

*Multiple responses possible.

[†]Concurrent drug use with at least one other injected drug in the past 1 month.

[§]Risky injecting practices includes using needles/syringe after someone else used, using a pre-filled needle/syringe, front- or back-loading injections, sharing of preparation water, sharing of other injection equipment such as spoons or cookers, or drawing drugs from a common container.

PWID engaged in various high-risk injecting practices over the past month, including using needles/syringes after someone else used them (47.4 percent), using a pre-filled needle/syringe (33.2 percent), front- or back-loading injections (46.3 percent), sharing of preparation water (57.1 percent), sharing of other injecting equipment such as spoons or cookers (56.9 percent), or drawing drugs from a common container (37.9 percent). Overall it is estimated that 67.3 percent engage in one or more of these risky injecting practices in a typical month.

In their lifetime, over half of PWID ever shared needles/syringes or other equipment (53.8 percent), 33.2 percent ever used a prefilled syringe, 48.6 percent ever drew up drugs from a common container, 53.8 percent ever share water used to prepare drugs, and 64.4 percent ever shared any injecting equipment. Overall it is estimated that 80.0 percent of PWID have ever engaged in any of these risky injecting practices in their lifetime.

Sexual Risk Behaviours

Table 48 describes the sexual behaviours of PWID in Nairobi. An estimated 41 percent of PWID were sexually active in the past month. While the majority of PWID (59.0 percent) had no sex partners in the past month, 29.5 percent reported having regular sex partners. PWID less often had casual and commercial partnerships in the past month (5.4 percent and 6.1 percent, respectively).

About one in three (29.8 percent) PWID had more than one sexual partner in the past year. Almost a quarter (24.4 percent) had a non-regular sexual partner/s in the past 6 months.

Among those who had sex in the past month (n = 105), about three out of ten (29.8 percent) had unprotected sex. Furthermore, only a quarter (24.7 percent) consistently used a condom during sex in the past month while over two-thirds (67.8 percent) reported they have never used condoms.

Among those who had sex in the past month, the majority (86.5 percent) used alcohol or drugs at their last sex. Over a third (36.3 percent) reported that their sexual partner/s in the past month also inject drugs.

In the past 6 months, 13.9 percent of PWID paid for sex while 6 percent received money for sex in the past 2 months.

TABLE 48. Sexual behaviours among PWID, Nairobi 2011 (N=269)

Characteristics	Adjusted % (95% CI)
Sexually active in the past month	40.7 (32.1–49.3)
Partner type in the past month	
No partner	59.0 (50.3–67.3)
Regular	29.5 (21.8–37.7)
Casual	5.4 (1.4–11.0)
Commercial	6.1 (2.8–10.2)
Unprotected sex with last partner in the past month (n=105)	
Yes	29.8 (22.2–37.4)
No	70.2 (62.6–77.8)
Condom use in the past month (n=102) ^a	
Always	24.7 (11.5–42.9)
Sometimes	7.5 (NA)
Never	67.8 (56.3–86.1)
Alcohol/drug use at last sex in the past month (n=106) [‡]	
Yes	86.5 (80.2–98.8)
No	13.5 (1.2–19.8)
Female sex partner in the past month injects drugs (n=86)	
Yes	36.3 (25.8–69.0)
No	63.7 (31.0–74.2)
Paid for sex in past 6 months	
Yes	13.9 (8.2–21.1)
No	86.1 (78.9–91.8)
Received money for sex in past 2 months	
Yes	6.0 (1.9–10.4)
No	94.0 (89.6–98.1)
Non-regular partner in past 6 months	
Yes	24.4 (17.1–32.8)
No	75.6 (67.2–82.9)
Multiple sex partners in past 12 months	
1 partner or no partners	70.2 (61.9–78.4)
More than one partner	29.8 (21.6–38.1)

^aCondom use in past 1 month included both male partners and female partners

[‡]Alcohol or drug use at last sex in last month includes both male and female partners

Given the low number of female PWID participants (n=21), it is difficult to describe sexual behaviour differences between the men and women in this survey. Of all men in the study (n=248), 34.3 percent (unadjusted) reported having sex in the past month, compared to 16 out of 21 women (71.4 percent, unadjusted). This suggests possible higher sexual activity among women in the total PWID population.

HIV and Hepatitis Knowledge and HIV Testing

PWID were asked a series of nine questions that assessed basic knowledge of HIV transmission. Most respondents were aware of the risks of mother-to-child transmission, unprotected anal sex, and needle sharing; as well as some common HIV prevention strategies including condom use, abstinence and faithfulness to one uninfected partner. Almost all PWID (99.7 percent) were aware that a person can get HIV

from a used needle; however, only 18.9 percent reported knowledge about hepatitis B virus (HBV). Over half of PWID (56.6 percent) know someone living with HIV; however, only about three-quarters (76.7 percent) are aware of available treatment options for those infected with HIV.

TABLE 49. HIV knowledge and attitudes among PWID, Nairobi 2011 (N=296)

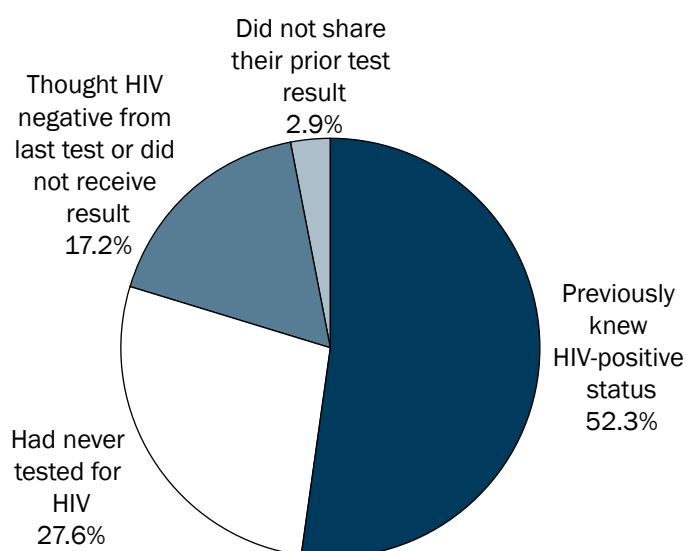
	Adjusted % (95% CI)
Knowledge and attitudes towards HIV/AIDS	
People can protect themselves by using condoms	88.8 (83.6–93.2)
A person cannot get HIV from mosquito	68.0 (58.6–76.3)
Having one uninfected faithful partner is protective	83.4 (76.8–89.3)
A person can get HIV from unprotected anal sex	93.4 (89.7–97.6)
People can protect themselves by abstaining	73.6 (66.1–80.7)
A person can get HIV from a used needle	99.7 (99.1–100.0)
HIV can be passed from mother to child	94.9 (89.4–98.8)
A pregnant woman can be given drugs to prevent passing HIV to baby	91.9 (84.2–97.7)
There is medical treatment for HIV	76.7 (68.7–83.6)
Awareness of HIV/AIDS	
Knows someone who is infected with HIV	56.6 (47.5–65.5)
Heard of HBV	18.9 (12.6–25.8)

Perception of risk and previous testing

Over three-quarters of PWID (79.4 percent) have ever taken an HIV test; most PWID who tested (76.5 percent) did so within the last one year (Table 50).

Of those who tested positive for HIV, 52.3 percent (29.1–65.6) knew that they were HIV-positive from the results of their last HIV test, 27.6 percent (13.7–46.2) had never been tested for HIV, 17.2 percent (7.5–36.7) tested negative at their last test or did not receive their test result, and 2.9 percent (0.0–10.8) did not reveal the results of their last HIV test (Figure 30). Unrecognised HIV infection, that is when an individual does not know they are infected, is closely linked to ongoing transmission.

FIGURE 30. CORRECT KNOWLEDGE OF HIV-POSITIVE STATUS AMONG PWID, NAIROBI 2011



Perception of personal risk was high, with more than half of PWID (54.4 percent) perceiving themselves to be at great risk of acquiring HIV. However, self-disclosure at VCT counselling sessions is low, with only 37.5 percent of PWID telling counsellors they are PWID (Table 50).

Locations in Nairobi where PWID reported having their last HIV test varied considerably. The most frequently reported individual testing sites were a PWID-friendly counselling centre in Ngara (19.1percent) and a private faith-based clinic/VCT in the Kawangware area (10.8 percent). The most commonly utilised VCT service was

through access to mobile or door-to-door outreach VCT services (21.4 percent). PWID also reported being tested at prison clinics (5.8 percent), while the remaining PWID reported a wide variety of public and private testing sites (Table 50).

TABLE 50. HIV testing behaviours and self-reported HIV status and HBV knowledge among PWID, Nairobi 2011 (N=269)

Characteristics	Adjusted % (95% CI)
Ever tested for HIV	
Yes	79.4 (73.0–86.2)
No	20.6 (13.8–27.0)
Previous knowledge of HIV-positive status (n=61)	
Knew HIV-positive from previous test	52.3 (29.1–65.6)
Never tested, didn't know HIV-positive status	27.6 (13.7–46.2)
Tested negative at last HIV test or didn't get result, doesn't know positive HIV status	17.2 (7.5–36.7)
Not willing to share the result of last HIV test	2.9 (0.0–10.8)
Perceived HIV risk	
No risk/small risk	34.7 (26.1–41.5)
Great risk	54.4 (48.2–65.0)
Already HIV-positive	10.8 (5.1–14.8)
Last tested for HIV (n=215)	
1 year ago or less	76.5 (69.0–83.5)
1+ years ago	23.5 (16.5–31.0)
Told VCT counsellor they were PWID (n=215)	
Yes	37.5 (27.6–47.5)
No	62.5 (52.6–72.4)
Place where PWID received last HIV test and/or counselling (n=215)	
PWID-friendly counselling centre in Ngara	19.1 (8.9–25.1)
Mobile or door-to-door VCT	21.4 (15.3–31.0)
Private faith-based clinic at Kawangware	10.8 (5.5–18.9)
Prison clinic	5.8 (2.7–11.7)
Other public clinic or hospital	6.9 (3.0–11.4)
Other private clinic or hospital	16.8 (7.4–27.3)
Other, or unspecified	19.3 (11.3–28.9)

Discrimination and Violence

Given that many PWID are informally employed and engaged in illegal activities, they may experience discrimination or violence. More than one-third (41.0 percent) of PWID have been victims of verbal assault in the past year, which include insults, degradation, or public ridicule. About one in five (22.9 percent) PWID have been victims of physical assault in the past year, which included being hit, beaten, kicked, or otherwise struck on the body. Only 1.4 percent of PWID have been victims of sexual assault in the past year (Table 51).

TABLE 51. Reported verbal, physical, and sexual violence by PWID in past 12 months, Nairobi 2011 (N=269)

Characteristics	Adjusted % (95% CI)
Verbally insulted	
Yes	41.0 (33.2–49.0)
No	59.0 (51.0–66.8)
Physically assaulted	
Yes	22.9 (16.2–30.0)
No	77.1 (70.0–83.8)
Sexually assaulted	
Yes	1.4 (0.0–3.5)
No	98.6 (96.5–100)

Exposure to HIV/STI Prevention and Other Services

PWID were asked several questions about access to the limited health services that currently target PWID in Nairobi, including health facility attendance and exposure (Table 52). About one-quarter (24.6 percent) of PWID visited PWID-friendly health facilities in the past year. Of the PWID who received services (n = 95), 22.8 percent had accessed services at Maisha House, which provides no-cost community-based VCT, counselling, and outreach services to PWID in Nairobi. Other facilities or programmes known to provide low- or no-cost services included Mathari Hospital (residential treatment for drug dependency), the Kenya AIDS Vaccine Initiative (KAVI; temporary research activities involving testing and services), and Asumbi (residential treatment). However, no more than 1.9 percent of PWID accessed services in any other facility besides Maisha House.

Among those who received services in the past year (n = 95), the two most common services received were abscess treatment (9.9 percent) and outpatient counselling (9.4 percent). Almost a quarter (23.1 percent) of respondents reported having been exposed to peer educators, the majority of which (14.7 percent) identified the peer educators as coming from the Maisha House outreach programmes.

When asked where they preferred to receive health services, 66.4 percent of PWID reported having no preference in regards to facilities, but 17.4 percent preferred Maisha House and 8.7 percent reported preferring

Kenyatta Hospital. To measure potential for reaching PWID with health messages through new technologies, participants were asked about their exposure to the internet and mobile phone use. Only 10 percent of PWID own a mobile phone and less than 1 percent uses the internet to obtain health information.

TABLE 52. Exposure and access to PWID services, PWID, Nairobi 2011 (n=269)

Characteristics	Adjusted % (95% CI)
Owns mobile phone	
Yes	11.1 (6.4–16.1)
No	88.9 (83.9–93.6)
Uses internet to obtain health info	
Yes	0.2 (0.0–0.6)
No	99.8 (99.4–100)
Visited PWID health service in past year	
Yes	24.6 (17.9–32.2)
No	75.4 (67.8–82.1)
Name of centre (n=95)	
Maisha House	22.8 (16.2–30.4)
Mathari Hospital	0.6 (0.0–1.7)
KAVI	0.0 (0.0–0.1)
Asumbi	0.0 (0.0–0.1)
Other	1.9 (0.5–3.8)
Services received past 12 months (n=95)	
Abscess treatment	9.9 (5.8–15.3)
Outpatient counselling	9.4 (5.6–14.0)
Overdose treatment	2.7 (0.9–4.9)
Rehabilitation	1.7 (0.3–3.5)
Self-help group	1.6 (0.5–3.2)
Detox/de-addiction	0.2 (0.0–0.4)
Drug substitution	0.0 (0.0–0.1)
In contact with peer educator in past year	23.1 (16.1–29.8)
Institution sponsoring peer educator (n=81)	
Maisha House	14.7 (10.0–20.0)
Other	0.6 (0.0–0.8)
Preference for health/drug treatment services	
No preference	66.4 (57.6–73.9)
Maisha House	17.4 (11.0–24.5)
Kenyatta Hospital	8.7 (5.4–12.8)
Other	7.5 (3.6–13.1)

HIV and STI Prevalence among PWID

HIV seroprevalence

Overall, estimated prevalence of HIV infection among PWID in Nairobi was 18.7 percent (95% CI: 12.2–26.7) (Figure 31). Female PWID had a higher crude HIV prevalence (9 out of 21 participants, 43.5 percent) compared to males (15.4 percent) (Figure 33).

STI seroprevalence

STI testing was conducted with male and female PWID. Only 1.8 percent of male PWID are estimated positive for syphilis and 1.2 percent positive for gonorrhoea. Chlamydia is the most prevalent STI among male PWID at 3.0 percent. Since only 20 female enrolees (not including seeds) were tested for HIV, ability to interpret even crude STI result data is limited, but crude STI rates were much higher compared to males, including gonorrhoea at 10.0 percent (2/20), and chlamydia at 15.0 percent (3/20). High crude rates of trichomoniasis (35.0 percent 7/20), candidiasis (10.0 percent 2/20), and bacterial vaginosis (40.0 percent 7/20) were also detected (Figure 32).

FIGURE 31. HIV PREVALENCE AMONG PWID, NAIROBI 2011 (N=269)

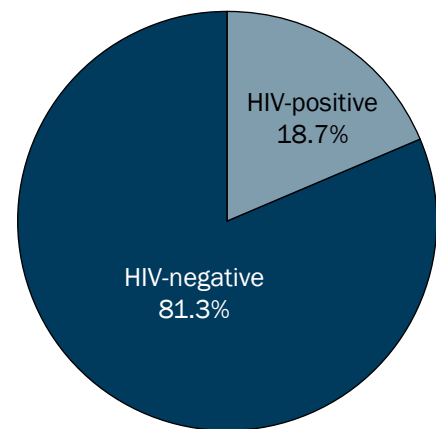
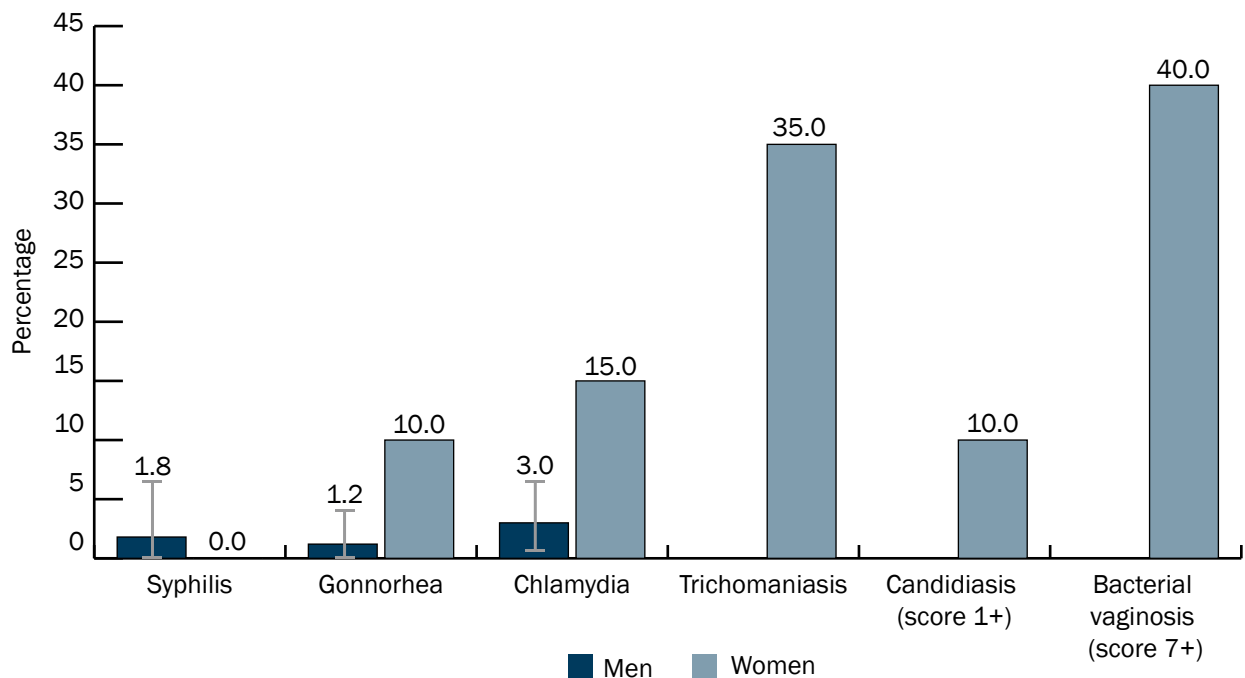


FIGURE 32. PREVALENCE OF HIV AND SEXUALLY TRANSMITTED INFECTIONS AMONG PWID, NAIROBI 2011 (N=296)



*STI results for men are RDS-adjusted with 95% CIs. STI prevalence for 20 female enrolees are unadjusted.

Factors Associated with HIV Infection

Demographics

Table 53 stratifies HIV-positive status by demographic and injecting behaviours. The peak HIV prevalence for PWID is among those age 30–34 years at 32.3 percent. This was followed by those ages 25–29 at 13.4 percent and those age 35+, who had a prevalence of 13.0 percent; those 18–24 years old had the lowest prevalence at 7.3 percent (Figure 33).

Respondents with any secondary education had a higher HIV prevalence (32.3 percent) compared to those with primary or less education and any post-secondary education (12.8 percent and 13.0 percent respectively).

Duration of injecting drug use was highly associated with HIV prevalence. Respondents with five or more years of drug use had the highest HIV prevalence of 39.9 percent. This was followed by those with duration of 7 months to 4 years (14.0 percent) while those with 6 months or less had the lowest HIV prevalence of 10.0 percent (Figure 34).

Respondents who reported risky injecting behaviours³ were more likely to be HIV-positive (21.9 percent) compared to those who reported no risky injecting behaviour (12.4 percent) (Table 53).

FIGURE 33. HIV PREVALENCE BY AGE AMONG PWID, NAIROBI 2011

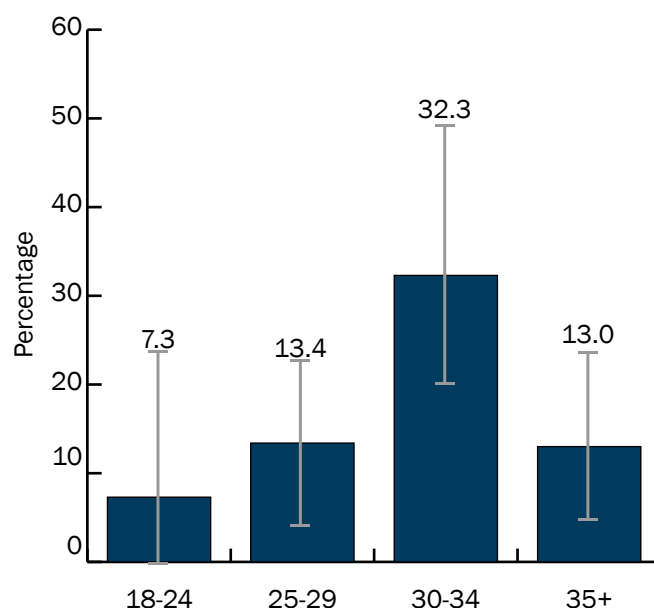
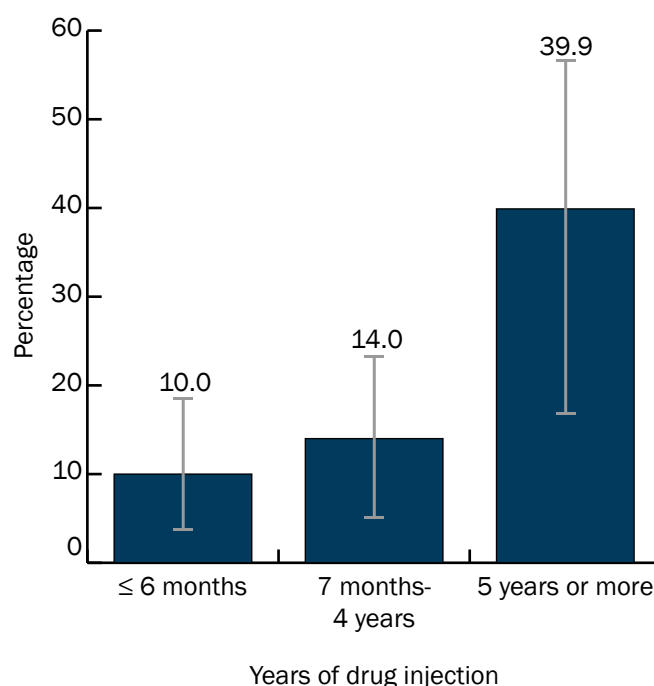


FIGURE 34. HIV PREVALENCE BY DURATION OF INJECTING DRUG USE AMONG PWID, NAIROBI 2011



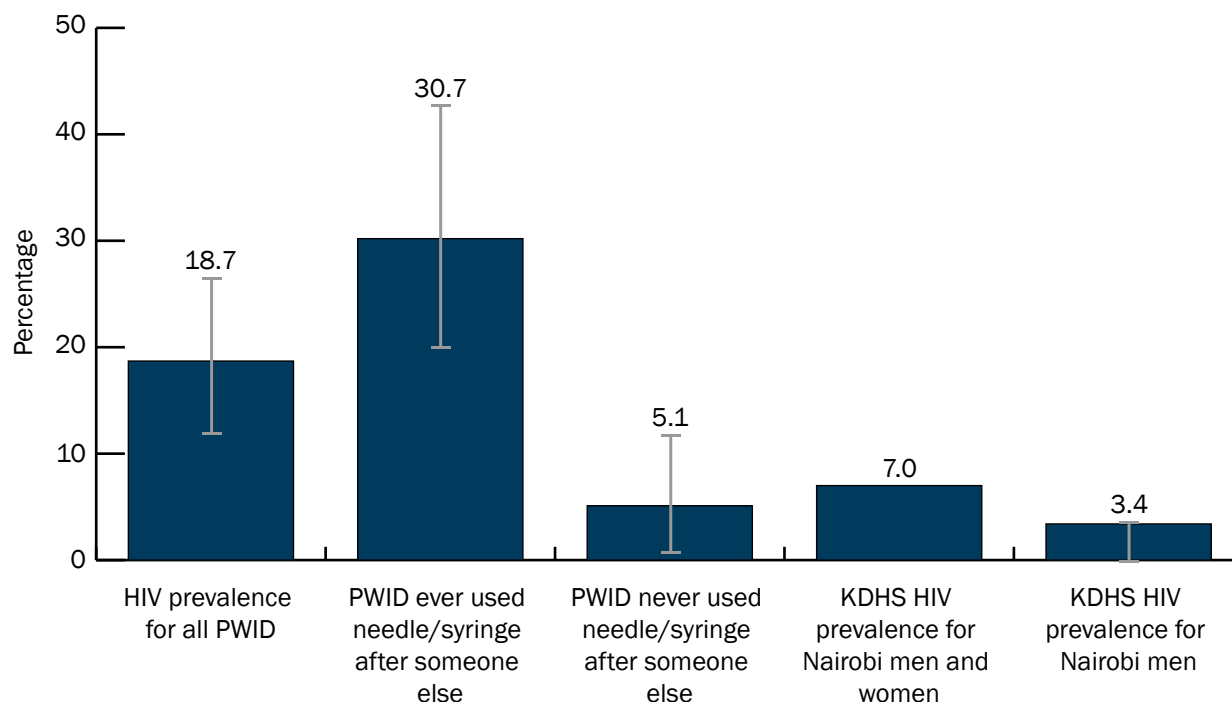
³Risky injecting in the past month was defined as those who reported using a syringe after someone else, lent a needle/syringe, used a pre-filled needle, used a front/back-loaded needle/syringe, share preparation water or shared injecting equipment in the past month.

TABLE 53. HIV prevalence by risk behaviours among PWID, Nairobi 2011

Prevalence of HIV infection	Adjusted % (95% CI)
Age (yrs)	
18–24	7.3 (0.0–24)
25–29	13.4 (4.3–22.9)
30–34	32.3 (20.3–49.5)
35+	13.0 (5.0–24.0)
Gender	
Male	15.4 (10.4–23.1)
Female	60.7 (14.6–87.2)
Education	
Primary or less	12.8 (4.2–22.0)
Any secondary	32.3 (20.1–48.6)
Any post-secondary	13.0 (5.1–24.1)
Duration of injecting drugs	
≤ 6 months	10.0 (3.9–18.7)
7 months – 4 years	14.0 (5.5–23.4)
5 years or more	39.9 (17.0–56.6)
Ever used needle/syringe after someone else in past month	
Yes	30.7 (20.4–42.7)
No	5.1 (1.2–11.7)
Used needle/syringe after someone else in past month	
Yes	25.0 (14.6–37.0)
No	13.3 (6.1–22.4)
Lent needle/syringe in past month	
Yes	23.7 (14.7–35.3)
No	14.5 (6.3–23.6)
Used prefilled needle/syringe in past month	
Yes	29.6 (17.0–44.6)
No	14.0 (7.7–22.1)
Front/back loaded needle/syringe in past month	
Yes	26.1 (15.6–38.2)
No	12.3 (5.5–21.6)
Shared prep water in past month	
Yes	24.1 (14.1–35.8)
No	11.7 (5.7–19.7)
Shared equipment in past month	
Yes	22.2 (12.8–33.2)
No	13.5 (6.2–21.9)
Drew drugs from common container in past month	
Yes	30.3 (17.4–43.9)
No	11.9 (6.3–19.3)
Risky injecting in past month	
Yes	21.9 (13.4–31.7)
No	12.4 (4.9–22.9)
Unprotected sex in past month	
Yes	20.1 (6.5–33.8)
No	17.4 (11.1–26.8)
Multiple sex partners in past year	
1 partner or no partners	18.7 (12.6–28.4)
More than one partner	17.7 (5.6–30.0)
Ever tested for HIV	
Yes	17.1 (10.3–26.1)
No	25.5 (12.5–44.3)

A review of findings from this study with KDHS 2008/09 results revealed that the overall HIV prevalence among PWID is more than double that for the general population in Nairobi (18.7 percent vs. 7.0 percent) and over 5 times the HIV prevalence for Nairobi adult men. HIV prevalence for PWID that had ever shared needles and syringes was six times higher than for those who never shared (30 percent vs. 5.1 percent). Thus, PWID who reported never sharing any needles had HIV prevalence roughly equivalent to the general population (5.1 percent versus 7.0 percent) (Figure 35).

FIGURE 35. COMPARING HIV PREVALENCE FOR PWID WITH GENERAL POPULATION IN NAIROBI



Discussion and Recommendations

High HIV prevalence correlated with risky injecting practices.

Overall, estimated HIV prevalence among PWID in Nairobi was high at 18.3 percent. This is markedly higher than in the general population in Nairobi (7 percent, KDHS 2009). HIV prevalence for PWID who ever shared needles and syringes was about 6 times higher than for those who never shared (30.7 percent vs. 5.1 percent). Risky injecting practices are quite prevalent among the study population. Over two-thirds reported some form of risky injecting practice in the previous month. Close to a half (47.4 percent) reported sharing a needle or syringe in the past month. This practice was highly correlated with the probability of being HIV-positive. These risky practices were common despite relatively high comprehensive knowledge of HIV/AIDS and the pervasive knowledge that a person can get HIV from sharing needles. This suggests that lack of access to clean needles and syringes among this population is a major contributor to unsafe injecting practices and that sterile needles and syringes should be made available through needle and syringe exchange programmes.

Drug use is initiated at a very young age.

In this study population, initiation of drug use was reported to occur at an early age (median age 11 years). This suggests that drug use is starting in childhood when the new users cannot comprehend the magnitude and implications of the practice. Drug use prevention programmes must be targeted for very young populations. There appears to be a window period between the start of non-injecting drug use and injecting drug use where programmes should target non-injectors to prevent this transition. Evidence of successful secondary prevention programmes for young drug users is also needed from developing countries.

A high percentage of PWID initiated injecting use within the past year.

Notably over 40 percent of PWID in the study initiated injecting drug use in the 6 months preceding the study. Though this could have been influenced by the study design, this may reflect a recent rise in injecting drug use. Drug abuse programmes must pay special attention to new injectors to establish and reinforce help-seeking behaviours and safe injecting practices and to prevent the transition from non-injecting to injecting drug use.

PWID exist in Nairobi.

The PWID enrolled in Nairobi during the survey over the 9-week period are evidence that injecting drug use is a social and public health problem in Nairobi and females are also affected. It is possible that compared to their male counterparts, female PWID have more severe consequences resulting from the practice of injecting drugs (even though their sample was small). Harm reduction programmes are very new in Africa and key policy and decision makers and programme managers need greater knowledge about the problem of drug abuse and treatment and harm reduction. Advocacy in this area is urgently needed in order to inform key people about the drug abuse problem and the need to introduce effective and targeted harm reduction measures.

Risky sexual behaviours are not as prevalent among PWID compared to other at-risk populations such as FSWs and MSM.

Only four out of ten PWID reported being sexually active in the past month. Additionally, only 5.4 percent and 6.1 percent of the PWID engaged in casual and commercial partnerships respectively. Condom use with the last sexual partner in the past month was reported by over two-thirds of PWID. These findings suggest that injections rather than sex may be the most important factor contributing to HIV transmission among this population. Although drug injecting behaviours should remain the focus of any harm reduction programmes, condom use and distribution should be part of a comprehensive HIV prevention programme for PWID.

Services for PWID are limited.

Few targeted services exist in Nairobi to address substance abuse and HIV prevention for PWID. Only one-quarter of PWID reported having received any kind of services from PWID-friendly facilities, and less than one-third were reached through a peer educator in the past year. Services available for PWID are primarily limited to community-based VCT, HIV prevention education, condom promotion, outpatient and residential treatment for drug dependency (primarily overdose management and detoxification), and through outreach and drop-in centres. Needle and syringe exchange programmes must be initiated and scaled up in Kenya. NASCOP and its partners are preparing to pilot through the Needle and Syringe programme as well as methadone-assisted therapy in Nairobi and elsewhere with support from the Global Fund to Fight AIDS, Tuberculosis and Malaria

(GFATM), US Government, Dutch Embassy and UNODC. A comprehensive HIV prevention package for PWID as recommended by the WHO should include:

- Outreach and peer education
- HIV testing and counselling
- HIV care including ARVs
- STI testing and treatment
- TB testing and treatment
- Condom use education and distribution
- Needle and syringe programme (NSP)
- Drug dependence treatment including opiate substitution therapy (OST)
- Viral hepatitis testing and treatment.

Streets or parks and “drug bases” are the most common locations of drug use.

Outreach programmes for PWID have been shown to be effective in many other parts of the world (Ball 1998; Coyle 1998; Kumar 1998; Latkin 1998; Needle 2005; NIDA 2000; WHO 2004). Programmes and peer educators must target these hot-spots to reach PWID with HIV prevention messages and services.

There is need for a more enabling environment for PWID interventions

Interventions for HIV prevention among drug users are limited due to lack of enabling policies. Possession of needles and syringes among drug users is still considered a crime, while the health system is not ready to offer opiate substitution therapy. Relapse rates among drug users are high as there is no livelihood support for recovering drug addicts. While harm reduction programmes have been successful in many developing countries, there is urgent need to review existing policies and regulations concerning drug users, to strengthen and integrate PWID interventions within existing health services, and to adapt other country programmes to the Kenyan socio-political and cultural context in collaboration with stakeholders from other sectors (police, justice, social welfare, education, youth, etc.).

POPULATION SIZE ESTIMATES

Service Multipliers

For MSM in Nairobi service data was collected from four sources. These included an MSM cohort study, clinical services and peer education services. Estimates for the MSM population size using the multipliers ranged from 3,261 to 22,222 in Nairobi. For MSM in Kisumu, service data was also gathered from ten separate sources. These included a peer education programmes, clinic services and MSM support group services. Kisumu estimates ranged from 194 to 374,000 with a median of 6,612. In terms of FSWs, three sources of service data were accessible for this exercise. These comprised HIV testing services, clinic services and peer education. Resulting estimates ranged from 16,550 to 649,000 FSWs living in Nairobi. For PWID, four sources of service data were accessible for estimation. These included STD services, HIV testing and drop-in services. Estimates for PWID living in Nairobi ranged from 5,031 to 22,727 using these multipliers.

Wisdom of the Crowd

Among MSM, opinions of how many MSM live in Nairobi produced a median of 10,000 (IQR 2,000 to 5,000). Among MSM, opinions of how many MSM live in Kisumu produced a median of 120 (IQR 9 to 986). Among FSWs, opinions of how many FSWs lived in Nairobi produced a median of 10,000 (IQR 4,000 to 500,000). Among PWID, opinions of how many PWID lived in Nairobi produced a median of 3,000 (IQR 300 to 5,000).

Literature Review

Two sources for the denominator of how many males aged 18 years and older existed for Nairobi. The prevalence of 1.2 percent of adult men for MSM in Kenya was obtained by synthesising the existing data in the literature for areas similar to Kenya (Cáceres et al. 2008). The median estimate from these two sources of demographic data and using the MSM prevalence of 1.2 percent was 12,645 MSM living in Nairobi, and 1,797 MSM living in Kisumu. Data from the 2009 Nairobi Census documenting the number of adult females (18 years and older) and a prevalence of FSWs among adult women of 2.8 percent from the literature were used to estimate 29,494 FSWs living in Nairobi (Vandepitte et al. 2006). Again the 2009 Nairobi Census data and an estimated 0.3 percent prevalence of PWID from the literature were used to estimate 6,562 PWID living in Nairobi (Acejias et al. 2006).

Stakeholder Feedback

Table 54 summarises estimates of the number of MSM living in Nairobi. Stakeholders decided that the median of 10,000 was both the best point estimate based on the available data and also the lower plausible boundary. Moreover, stakeholders felt that 22,222 (suggesting that approximately 3 percent of adult men in Nairobi are MSM) was the upper plausible boundary for MSM not “hidden” from survey and service activities (Figure 36). Kisumu stakeholders believed that the median of 3,706 was likely, and agreed with the plausible range of 1,797 to 4,493 (3 percent of adult men in Kisumu), although representatives of the MSM community in both Kisumu and Nairobi believed that men who were more socially isolated may not have been reached through the behavioural survey and thus had an effect on the service multiplier estimates (Figure 37). It was agreed that these population estimates may be excluding segments of the MSM populations who were believed to be less likely to have participated in the survey or to seek MSM-friendly services. These might have included MSM currently married to women, African MSM of higher socioeconomic status, and Asian-Kenyan MSM. Figure 38 summarises estimates for FSW. For FSW, stakeholders began by assuming

that all estimates presented were primarily of full-time or regular FSWs and did not capture part-time or wholly transactional FSW. With this assumption in mind, they found the median of 29,494 to be a plausible estimate, with 10,000 and 54,467 being the lower and upper plausible estimates, respectively. Stakeholders brought knowledge of previous size estimates of PWID to the discussion of the present estimates. Previous unpublished estimates ranged from 200 to over 12,000 PWID in Nairobi. With this context in mind, stakeholders were reasonably comfortable with a median estimate of 6,216, with 5,031 and 10,937 as the lower and upper plausibility bounds, respectively (Figure 39).

TABLE 54. KP population size estimates using service multipliers, wisdom of the crowd, and literature-based methods 2010/11

Population (n)	Service	a. Number of clients or one time visits	b. Percent who reported visiting*	Population size calculation a/b =
MSM Nairobi (563)	Cohort study participation	250	2.4	10,417
	Sex worker health clinic	150	4.6	3,261
	Peer education programme 1	400	1.8	22,222
	Peer education programme 2	140	1.2	11,667
	Wisdom of the crowd	—	—	10,000
	Literature-based	—	—	12,265
	Median	—	—	10,000
MSM Kisumu (563)	Clinic/drop-in centre 1	148	9.4	1,574
	Clinic/drop-in centre 2	515	6.2	8,306
	Clinic/drop-in centre 3	20	0.2	10,000
	Peer education programme 1	615	6.7	9,179
	Peer education programme 2	300	6.1	4,918
	Peer education programme 3	1,200	1.1	109,091
	Peer education programme 4	374	0.1	374,000
	MSM group 1	19	9.8	194
	MSM group 2	60	2.4	2,500
	MSM group 3	80	0.2	40,000
	Wisdom of the crowd	—	—	120
	Literature-based	—	—	1,797
	Median	—	—	3,706
FSWs Nairobi (465)	HIV testing site	1,634	3.0	54,467
	Sex worker study cohort clinic	331	2.0	16,550
	Peer education outreach programme	4,543	0.7	649,000
	Wisdom of the crowd	—	—	10,000
	Literature-based	—	—	29,494
	Median	—	—	29,494
PWID Nairobi (352)	HIV and STD service clinic	250	1.1	22,727
	PWID cohort assessment site	53	0.4	13,251
	PWID-friendly drop-in centre HIV testing data	893	17.75	5,031
	PWID friendly drop-in centre attendance data	1,526	27.0	5,652
	Wisdom of the crowd	—	—	3,000
	Literature-based	—	—	6,562
	Median	—	—	6,107

*RDS-adjusted population proportion

FIGURE 36. MSM POPULATION SIZE ESTIMATES, MEDIAN AND PLAUSIBILITY BOUNDS, NAIROBI 2010

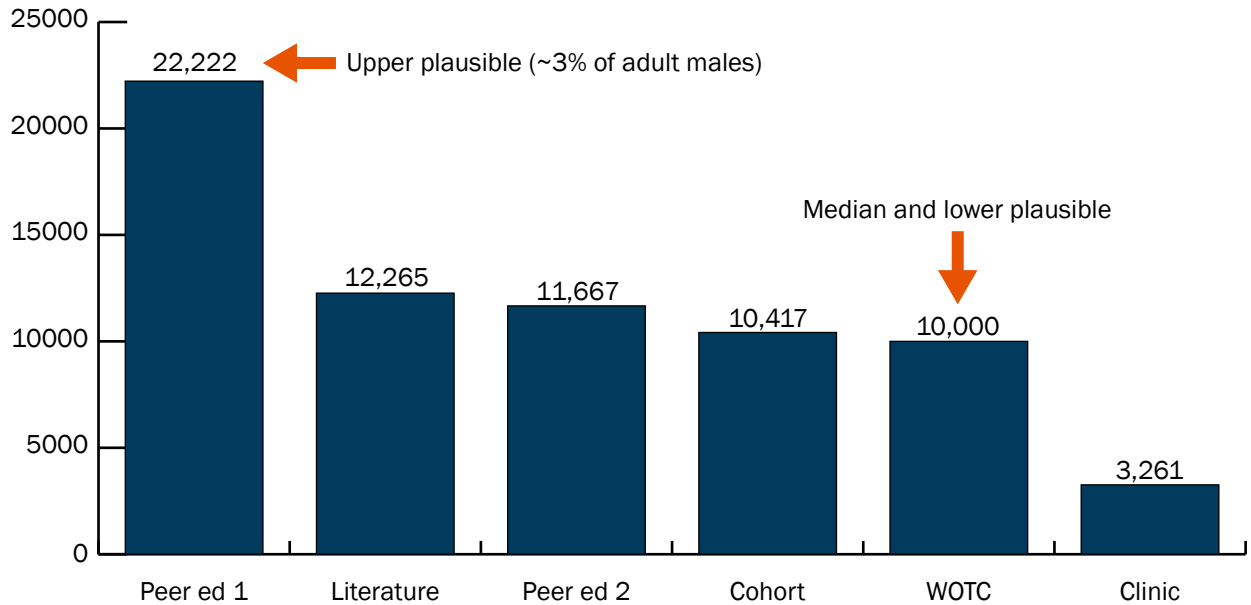


FIGURE 37. MSM POPULATION SIZE ESTIMATES, MEDIAN AND PLAUSIBILITY BOUNDS, KISUMU 2010

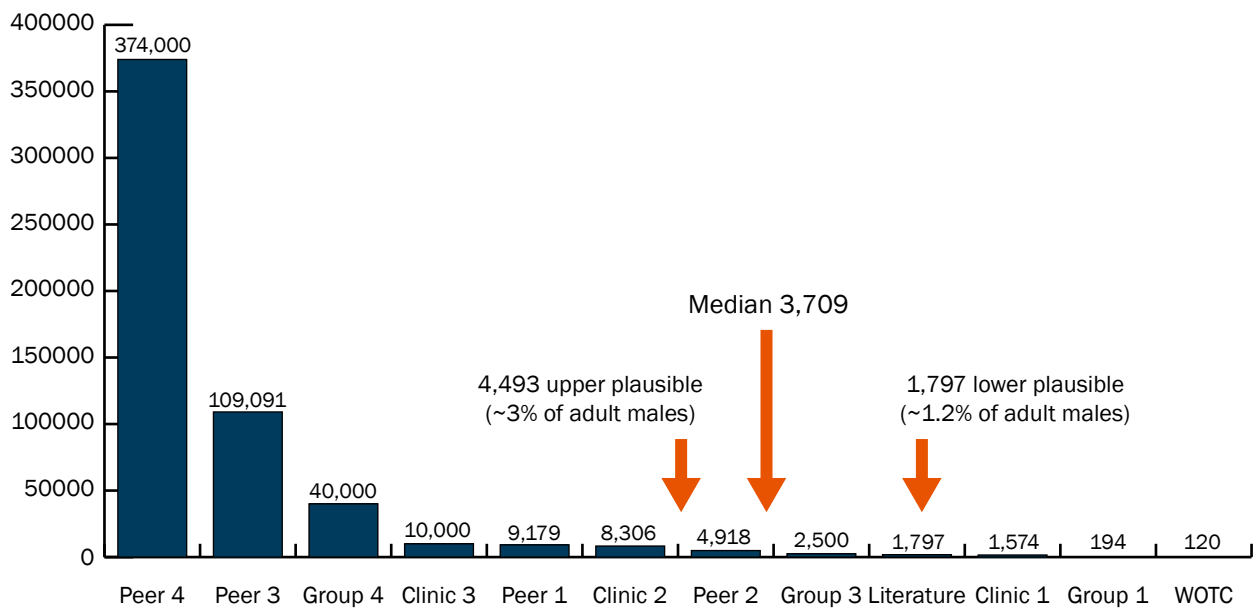


FIGURE 38. FSW POPULATION SIZE ESTIMATES, MEDIAN AND PLAUSIBILITY BOUNDS, NAIROBI 2010

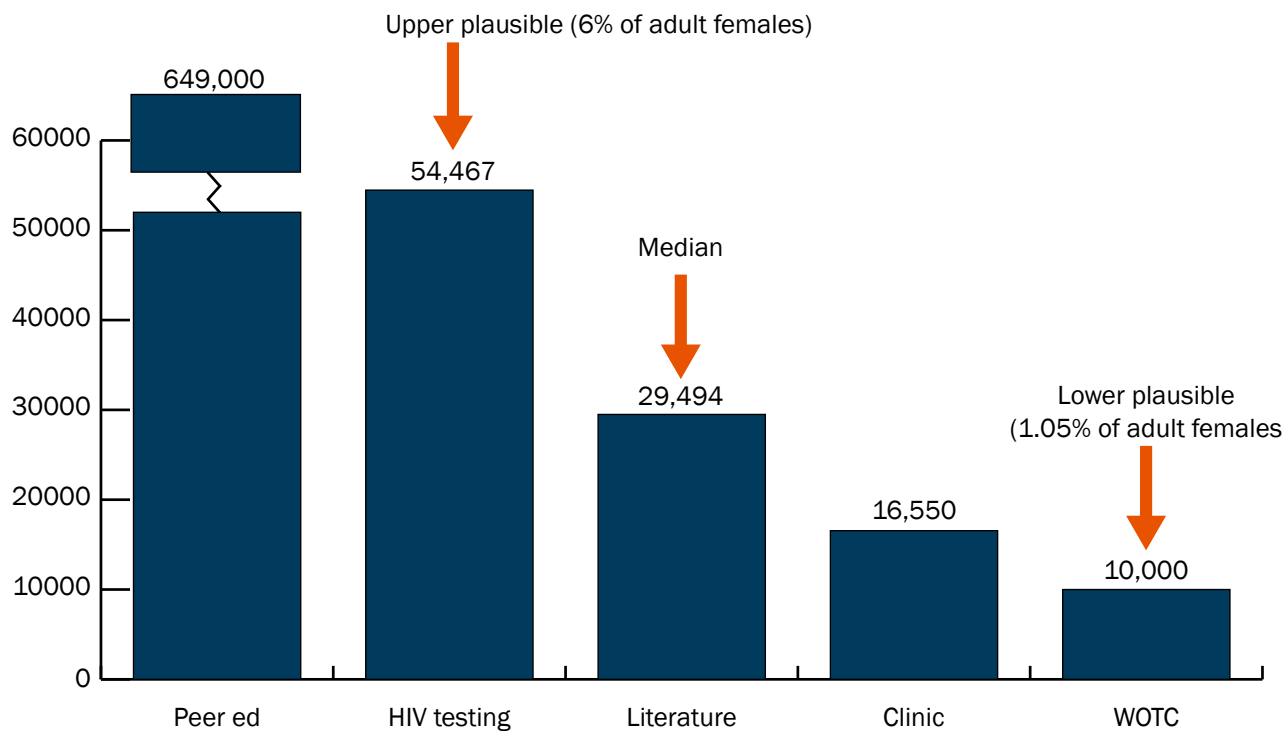
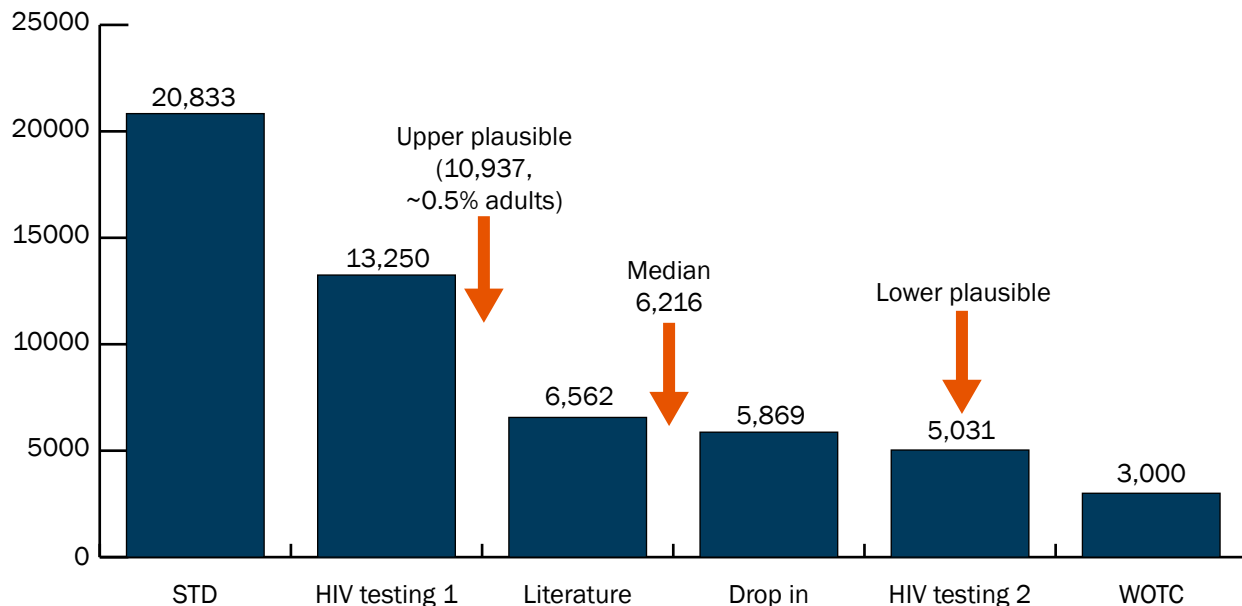


FIGURE 39. PWID POPULATION SIZE ESTIMATES, MEDIAN AND PLAUSIBILITY BOUNDS, NAIROBI 2011



CONCLUSIONS AND RECOMMENDATIONS

This is the first behavioural and biological surveillance among key populations in Kenya to estimate population-based HIV and STI prevalence using respondent-driven sampling. HIV prevalence among Nairobi MSM (18.2%), FSWs (29.3%), and PWID (18.7%) is higher than among Nairobi's general population (8.8 percent; KAIS 2007). Although overall HIV prevalence among the MSM in Kisumu was lower at 11.1%, prevalence among Kisumu MSM age 25 or older was 25%.

The overall estimated population sizes of these KP groups are relatively small compared to the overall Kenya population at risk of HIV. However, the substantially higher levels of HIV prevalence indicate possible higher rates of incidence—or new cases of HIV per year—among these groups. Results also show that there is risk of transmitting HIV infections beyond the social boundaries within these groups; MSM reported sexual relationships with women, FSWs have contact with both their clients and some non-paying partners, and some PWID also are having sexual relationships. Therefore, Kenya's national HIV response should consider KP programmes and services as part of an overall comprehensive HIV response and allocate resources accordingly.

Health programmes also need to prioritise these KPs and their sexual partners for HIV and STI prevention and care. MSM in both Nairobi and Kisumu particularly need to be targeted with non-stigmatising and sensitive services. FSWs were engaged in high numbers of sex acts with multiple partners. FSWs were in particularly disadvantaged socioeconomic situations, and economic as well as social empowerment programmes may be considered. PWID who shared needles were especially vulnerable to HIV infection. This suggests that lack of access to clean needles and syringes among this population is a major contributor to unsafe injecting practices and that sterile needles and syringes should be made available through needle and syringe exchange programmes.

We recommend continued, periodic surveillance to monitor HIV and STI prevalence and behavioural risks among KPs in Nairobi, and expansion to other areas in Kenya. Periodic surveillance would enhance monitoring and contribute to a broader understanding of the overall national HIV epidemic. Expanding KP surveillance surveys to the Coastal region and in other key areas of the country should be prioritised.

REFERENCES

- Abdool, Rey Chad. 2007. "HIV prevention among injecting drug users in Kenya," presentation at HIV Prevention Summit, Nairobi, Kenya, May 24.
- Aceijas, C. et al. 2006. "Estimates of injecting drug users at the national and local level in developing and transitional countries, and gender and age distribution," *Sex Transm Infect.* 82 Suppl 3: iii10–17.
- Ball, A. L. et al. 1998. "HIV prevention among injecting drug users: responses in developing and transitional countries," *Public Health Rep* 113 Suppl 1: 170–81.
- Beyrer, C., et al. 2010. "The expanding epidemics of HIV type 1 among men who have sex with men in low- and middle-income countries: diversity and consistency," *Epidemiology Reviews* 32(1): 137–151.
- Cáceres, C.F. et al. 2008. "Epidemiology of male same-sex behaviour and associated sexual health indicators in low- and middle-income countries: 2003–2007 estimates," *Sex Transm Infect.* 84 Suppl 1: i49–i56.
- Coyle, S. L. et al. 1998. "Outreach-based HIV prevention for injecting drug users: a review of published outcome data," *Public Health Rep* 113 Suppl 1: 19–30.
- Deveau, C. et al. 2006. "Heroin use in Kenya and findings from a community based outreach programme to reduce the spread of HIV/AIDS," *Afr J Drugs Alc Studies* 5(2): 95–107.
- Fonck, K. et al. 2000. "A randomized, placebo-controlled trial of monthly azithromycin prophylaxis to prevent sexually transmitted infections and HIV-1 in Kenyan sex workers: study design and baseline findings," *International Journal of STD & AIDS* 11: 804–811.
- Geibel, S. et al. 2007. "'Are you on the market?': a capture-recapture enumeration of men who sell sex to men in and around Mombasa, Kenya," *AIDS* 21(10): 1349–1354.
- Giles, J. 2005. "Wisdom of the crowd," *Nature* 438(7066): 281.
- Government of Kenya. 2011. Laws of Kenya, Penal Code, chapter 15: Offences against morality. National Council for Law Reporting. http://www.kenyalaw.org/kenyalaw/klr_app/view_cap.php?CapID=52
- Heckathorn, D. 1997. "Respondent-driven sampling: A new approach to the study of hidden populations," *Social Problems* 44(2): 174–99.
- Heckathorn, D. et al. 2002. "Extensions of respondent-driven sampling: A new approach to the study of injection drug users aged 18–25," *AIDS and Behavior* 6(1): 55–67.
- Kaul, R. et al. 2004. "Monthly antibiotic chemoprophylaxis and incidence of sexually transmitted infections and HIV-1 infection in Kenyan sex workers," *JAMA* 291: 2555–2562.
- Kenya National Bureau of Statistics (KNBS) and ICF Macro. 2010. *Kenya Demographic and Health Survey 2008–09*. Calverton, Maryland: KNBS and ICF Macro.
- Kimani, J. et al. 2013. "Enumeration of sex workers in the central business district of Nairobi, Kenya," *PLoS One* 8(1): e54354.
- Kumar, M. S. et al. 1998. "Community-based outreach HIV intervention for street-recruited drug users in Madras, India," *Public Health Rep* 113 Suppl 1: 58–66.
- Latkin, C. A. 1998. "Outreach in natural settings: the use of peer leaders for HIV prevention among injecting drug users' networks," *Public Health Rep* 113 Suppl 1: 151–9.

- Lee, M.D., S. Zhang, and J. Shi. 2011. "The wisdom of the crowd playing The Price Is Right," *Mem Cognit.* 39(5): 914–23.
- Ministry of Health (MOH) [Kenya], Central Bureau of Statistics (CBS) [Kenya], and ORC Macro. 2009. *Kenya Demographic and Health Survey 2009*. Calverton, Maryland.
- Ministry of Health and National AIDS Council. 2009. "Zambia HIV prevention response and modes of transmission analysis: Final report June 2009." Nairobi: MOH.
- Kenya National AIDS and STI Control Programme. 2009. *Kenya AIDS Indicator Survey 2007*. Nairobi, Kenya.
- Morris, C.N. and F.G. Ferguson. 2006. "Estimation of the sexual transmission of HIV in Kenya and Uganda on the trans-Africa highway: the continuing role for prevention in high risk groups," *Sexually Transmitted Infections* 82: 368–371.
- National AIDS Control Council. 2008. *Kenya National AIDS Strategic Plan III: 2009–2013*. Nairobi: NACC.
- National AIDS and STI Control Programme. 2009. "Management of sexually transmitted/reproductive tract infections." Nairobi: NACC. Retrieved from www.nascop.or.ke.
- Needle, H. R. et al. 2005. "Effectiveness of community-based outreach in preventing HIV/AIDS among injecting drug users," *International Journal of Drug Policy* 16(Supplement 1): 45–57.
- National Institute on Drug Abuse. 2000. *The NIDA Community-Based Outreach Model: A Manual To Reduce the Risk of HIV and Other Blood-Borne Infections in Drug Users*. Rockville, MD: NIDA.
- Price, M.A. et al. 2012. "Identifying at-risk populations in Kenya and South Africa: HIV incidence in cohorts of men who report sex with men, sex workers, and youth," *JAIDS* 59(2): 185–193.
- Salganik, M. J. 2006. "Variance estimation, design effects, and sample size calculations for respondent-driven sampling," *J Urban Health* 83(6 Suppl): i98–112.
- Sanders, E. J. et al. 2007. "HIV-1 infection in high risk men who have sex with men in Mombasa, Kenya," *AIDS* 21(18): 2513–20.
- Surowiecki, J. 2004. *The Wisdom of Crowds: Why the Many Are Smarter than the Few and How Collective Wisdom Shapes Business, Economies, Societies, and Nations*. New York: Doubleday Books.
- Vandepitte, J. et al. 2006. "Estimates of the number of female sex workers in different regions of the world," *Sex Transm Infect.* 82 Suppl 3: iii18–25.
- van Griensven, F. 2007. "Men who have sex with men and their HIV epidemics in Africa," *AIDS* 21(10): 1361–1362.
- van Griensven, F. et al. 2009. "The global epidemic of HIV infection among men who have sex with men," *Current Opinion in HIV and AIDS* 4(4): 300–307.
- WHO. 2004. *Evidence for Action: Effectiveness of Community-based Outreach in Preventing HIV/AIDS among Injecting Drug Users*. Geneva: World Health Organization.
- WHO. 2010. "Guidelines on estimating the size of populations most at risk to HIV." Geneva: WHO.



UNIVERSITY
OF MANITOBA



UIC
UNIVERSITY
OF ILLINOIS
AT CHICAGO

NRHS | Nyanza Reproductive
Health Society

National AIDS and STI
Control Programme (NASCOP)
Ministry of Health, Kenya
P.O BOX 19361 Code: 00202
Nairobi, Kenya
Telephone: +254 (0) 202630867
Email: head@nascop.or.ke
Website: <http://www.nascop.or.ke>