Behavioral and Biological Assessment and Population Size Estimation for Men who have Sex with Men (MSM) in Kigali, Rwanda, 2018

Final Report

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Contents

Acknowledgements **4**

Abbreviations and Acronyms **5**

Background and Rationale **6**

Study aims **7**

Overview of the study **7**

Phase 1: Integrated behavioral and biological assessment and population size estimation *7*

Component 1: Behavioral and biological assessment 7

Component 2: Population size estimation 7

Phase 2. Site mapping *7*

Phase 1: Integrated behavioral and biological assessment and population size estimation **8**

Integrated Behavioral and Biological Assessment **8**

Overview *8*

Methods *8*

Recruitment procedures 8

Sample size 8

Table 1. Inclusion criteria 9

Data collection 10

Biological testing 10

Results *11*

Demographic Characteristics 11

Table 2. Demographic characteristic among men who have sex with men in Kigali, Rwanda 11

Respondent driven sampling recruitment map 12

Figure 1. RDS Map of men who have sex with men recruitment in Kigali, Rwanda 13

Mobile technology use 13

Table 3. Mobile technology among men who have sex with men 14

Disclosure, stigma, and exposure to violence 14

Table 4. Disclose of sexual behavior and sexual behavior related stigma among men who have sex with men 15

Mental health and substance use 16

Table 5. Mental health and substance use among men who have sex with men in Kigali, Rwanda 17

Sexual behavior 17

Table 6. Sexual behavior and condom use among men who have sex with men with male partners in Kigali, Rwanda 18

Table 7. Sexual behavior and condom use among men who have sex with men with female partners in Kigali, Rwanda 20

HIV Infection and uptake of services 21

Table 8. HIV infection by age group and district of residence 22
Table 9. HIV Infection and uptake of services among men who have sex with men in Kigali, Rwanda 22
Figure 2. HIV continuum of care among men who have sex with men in Kigali, Rwanda 23
Figure 3. HIV testing cascade among men who have sex with men in Kigali, Rwanda 23
Sexually transmitted infections 24
Table 10. . Sexually transmitted infections among men who have sex with men in Kigali, Rwanda 24
Figure 4. Prevalence of STIs by HIV status among MSM in Kigali, Rwanda 2018 25
Access to condom and lubricants 25
Table 11. Access to condom and lubricants among men who have sex with men in Kigali, Rwanda 26
HIV transmission related knowledge 27
Table 12. HIV transmission related knowledge among men who have sex with men in Kigali, Rwanda 28
Access to healthcare services 28
Table 13. Recent access to healthcare and HIV services among men who have sex with men in Kigali, Rwanda 29

Population size estimates 30

Estimate Use Disclaimer 30
Introduction 30
Methods 30
Unique object identifier 30
Service multiplier method 30
Social event 30
Wisdom of the masses 31
Validation of the size estimation methods 31
Results 32
Table 14. Method specific population size estimates of men who have sex with men in Kigali, Rwanda 32
Table 15. Population size estimate of men who have sex with men in Kigali, Rwanda 33
Discussion: Challenges and sources of errors 33

Phase 2: Mapping Healthcare and Hotspots sites frequented by Men who have sex with men in Kigali, Rwanda 33

Introduction 33
Methods 33
Preparatory Phase 34
Site Identification Phase 34
Verification and Validation Phase 34
Results 35
Healthcare Sites 35
Figure 5. Map of healthcare sites frequented by MSM in Kigali, Rwanda 36
Figure 6. Map of healthcare sites where staff have received training on MSM related services in Kigali, Rwanda 37
Figure 5. Map of hotspots (blue) and healthcare sites (red) frequented by MSM in Kigali, Rwanda 38
Hotspots 38

Figure 7. Map of sites where MSM report meeting new sexual partners (hotspots) in Kigali, Rwanda..... 39
Figure 8. Map of free condom distribution at MSM hotspots in Kigali, Rwanda 39
Figure 9. Map of hotspots that have conducted HIV sensitization activities in Kigali, Rwanda..... 40
..... 40
Figure 10. Map of hotspot that have conducted HIV testing activities in Kigali, Rwanda 40
Conclusions 41
References.....43

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Abbreviations and Acronyms

ART	Antiretroviral Treatment
CDC	Centers for Disease Control and Prevention
FRW	Francs Rwandais (Rwandan Francs)
HDI	Health Development initiative
IRB	Institutional Review Board
JHU	Johns Hopkins University
MSM	Men who have sex with men
NRLR	National Reference Laboratory of Rwanda
PSF	Projet San Francisco
RBC	Rwanda Biomedical Center
RDS	Respondent Driven Sampling
RNEC	Rwanda National Ethics Committee
SSA	Sub-Saharan Africa

Background and Rationale

The understanding of the epidemiology of HIV is evolving with consistent data highlighting the disproportionate burden of HIV among key populations such as MSM even in the context of generalized epidemics [1,2]. Fortunately, recent data have suggested that HIV incidence rates are decreasing among reproductive age adults with average acquisition and transmission risks in many parts of the world, resulting in falling global HIV incidence [3]. However, these declines have not been observed among key populations where the burden of HIV remains high and, in several places, infections have been shown to be increasing [4].

In Rwanda, the HIV prevalence in the general adult population has stabilized at 3% for the last decade[5]. However, as in many other sub-Saharan African countries, the epidemiological data of HIV infection among key populations including men who have sex with men (MSM) are limited; though the 2013-2018 National Strategic Plan on HIV and AIDS proposed to focus on HIV interventions targeting key populations including MSM [6]. Due to this lack of reliable epidemiological data, projects and information campaigns targeting these specific groups lack basic information for planning activities, such as information on population size, geographic distribution, socio-cultural representation at the population level, level of integration or exclusion, and HIV/STI prevalence. This prevents the adequate assessment and tailoring of interventions to the realities of the country. In response, Emory University through CDC/ PEPFAR funding, in collaboration with Project San Francisco (PSF), Health Development Initiative (HDI), Johns Hopkins University (JHU) and Rwanda Bio-Medical Center (RBC) conducted this study to better understand the epidemiology of HIV and STI among MSM with the aim to inform better interventions targeting MSM in Rwanda.

The conceptual framework used for this study was based on a modified social ecological model (MSEM) for HIV risk including individual, network, community, public policy, and HIV-prevalence levels [7]. This framework facilitates the contextualization of individual-level behaviors with network and community-level determinants of risk among MSM. Individual-level biological and behavioral risks among key populations are contextualized by higher order risk factors including size and density of social and sexual networks, as well as stigma operating at the community level and affecting public policies. Studies have consistently demonstrated that the manifestations of stigma targeting key populations in the Sub-Saharan African context limit both the provision and uptake of effective HIV prevention, treatment, and care programs.

The study had two main phases:

1. Phase one: Integrated behavioral and biological assessment and population size estimation
2. Phase two: Mapping of healthcare sites where MSM seek health services and of sites where they find sexual partners.

The primary objective of this study was to evaluate the biological, behavioral, and structural determinants that potentiate or reduce HIV risk among MSM in Kigali, Rwanda to inform HIV programming for MSM. Additionally, the findings are expected to allow organizations to establish a continuous HIV surveillance program to monitor the trends and behaviors of the epidemic among MSM.

Study aims

This study had the following aims:

- **Specific Aim 1:** Estimate the population size of MSM in Kigali city
- **Specific Aim 2:** Estimate the prevalence of HIV and STIs (gonorrhea, chlamydia, syphilis) among MSM in Kigali City
- **Specific Aim 3:** Understand the HIV risk and prevention behaviors as well as the barriers to accessing HIV treatment, care, and services for MSM in Kigali City
- **Specific Aim 4:** Map sites where MSM find sexual partners and locations where MSM receive HIV related prevention and care services in Kigali City

Overview of the study

This study was implemented by PSF in Kigali from January 2018 to August 2018. It included two main phases:

Phase 1: Integrated behavioral and biological assessment and population size estimation

Component 1: Behavioral and biological assessment

This was a cross-sectional IBBS using respondent driven sampling in Kigali city. The study procedures included an interviewer-administered structured questionnaire and biological testing for HIV, syphilis, gonorrhea and chlamydia.

Component 2: Population size estimation

In this component, several service multiplier methods and other methods were used to estimate the population size of MSM in Kigali and neighboring regions. These included the unique object identifier, service multiplier method, and social event.

Phase 2. Site mapping

Site mapping was conducted using the Priorities for Local AIDS Control Efforts (PLACE) Method. The objective of this component was to identify and evaluate venues where MSM meet male sexual partners (hotspots) and where MSM seek healthcare services in Kigali city.

Ethical considerations

Ethical review and approval were provided by the Emory University Institutional Review Board and the Rwanda National Ethics Committee.

Phase 1: Integrated behavioral and biological assessment and population size estimation

Integrated Behavioral and Biological Assessment

Overview

This phase aimed to describe and characterize HIV and HIV-related outcomes and estimate the population size of MSM in Kigali, Rwanda.

Methods

Recruitment procedures

Respondent Driven Sampling (RDS) recruitment was initiated in March 2018 with two MSM recruitment seeds. In June, a third seed was recruited to enhance recruitment in older MSM networks. Seeds are individuals who begin the recruitment chains and are selected to represent a range of characteristics as well as be well-networked within the MSM community. For this study, attention was made to recruit seeds with different socio-demographic characteristics to maximize chances to recruit a sample representative of the MSM population in Kigali. After signing the informed consent, seeds completed the interviewer administered questionnaire and underwent biological testing for HIV and other STI (gonorrhea, chlamydia and syphilis). Upon completion of the study procedures, they were given a maximum of 3 coupons with which to recruit other MSM they knew. Participants invited by the seeds had to present to the study office with their coupons for participation in the study. If eligible and after completing study activities, the recruited participants were in turn trained on the recruitment procedures and given a maximum of 3 coupons. This process continued until the sample size was reached. Coupons were developed for the RDS activities and were pre-numbered with a unique coupon number prior to distribution. Coupons contained other information including the study telephone number, site operating hours and expiration date. There was no information on the coupon that could be used to identify the holder as MSM and no personal information was recorded on the coupon. Coupons were collected from recruited participants at the study site at the time of eligibility screening because having a valid RDS coupon was an eligibility criterion for enrollment through RDS.

Sample size

We assumed that MSM HIV prevalence in Kigali is of similar levels to those observed elsewhere in the region such as in Uganda, where HIV prevalence among MSM is 13.7% [7.9-20.1] (Hladik et al., 2012).

From Salganik, 2006, the sample size for an RDS HIV prevalence study can be estimated using following formula:

$$n = deff.\frac{P_A(1-P_A)}{\left(se\left(\hat{P}_A\right)\right)^2}$$

Where n= sample size, deff= design effect and P= assumed prevalence.

We estimated the required sample size to detect HIV prevalence no less than 20.1%. Thus, we used HIV prevalence of 21%, design effect of 4, as suggested by Wejnert et al, 2012, and standard error no greater than 0.03. The resulting sample size estimate was 738 MSM.

Inclusion Criteria

MSM were defined as any male of 18 years of age or older who reported having had anal sex with another man in the 12 months preceding the study. Other eligibility criteria are summarized in table 1.

Table 1. Inclusion criteria

All participants
• Born male (assigned male sex at birth) • 18 years of age or older • Reports having had insertive and/or receptive anal sex with another man at least once within the past 12 months • Has lived primarily in Kigali for at least the past 3 months (of any nationality) • Is mentally sound and capable of giving consent • Has provided informed consent to participate in the study • Consents to blood draw and HIV testing

Eligibility of participants was not restricted by ethnicity or sexual identities. Also, participants did not need to provide documentation of residency.

All study data for each RDS and qualitative participant were linked only by a unique ID code that was constructed using information known only to the participants. The formula to create the unique ID code was a modified version of the one currently used by PSF and approved by Rwanda Biomedical Center (RBC), and currently being used for service provision in the key population project of PSF. During the process of creating the unique ID code with the participant, the study team member indicated that they only needed to respond with the appropriate number(s) or letter(s) to the question and did not need to give the full response (e.g. participant would only provide the first letter of the city

where s/he was born, rather than state the full name of the city). Doing so enabled a further sense of privacy for the participants.

Data collection

The phase 1 included an interviewer-administered questionnaire assessing demographic characteristics, access and uptake of HIV services, sexual history and behavior, mental health, substance use, and stigma and discrimination. Interviews lasted approximately two hours and participants were compensated for time and transport. Data were collected electronically using a tablet and sent to a password protected server at the end of the interview. Biological and behavioral data were linked using the unique ID specifically created for this study.

Biological testing

HIV testing was done using rapid tests and viral load testing was performed for those found to be living with HIV. STIs were also tested and these included: syphilis, gonorrhea and chlamydia.

Following consent, blood draws were conducted according to national procedures and respecting Best Laboratory Practices. 10mL of venous blood were drawn with 2 EDTA tubes for each participant. All samples were processed by the lab technicians of the study site laboratory and then transferred to PSF Laboratory on the same for storage and further testing. The study participants were also asked, as part of the consent process, for permission to freeze remaining plasma for future testing.

HIV and syphilis testing were performed at the study site. The screening test for HIV was Alere HIV Combo (Determine) and the confirmatory test was HIV ½ STAT-PAK for those who tested positive. The pre- and post-test counseling was conducted by the same nurse counselors administering the questionnaire. For participants with a discordant result (one positive test and one negative), their blood samples were sent to NRL for confirmatory tests. NRL also conducted viral load testing for all participants tested HIV positive. For syphilis, syphilis antibodies were screened using the syphilis rapid plasma reagin (RPR) test. If positive, TPHA was conducted. All HIV and syphilis testing procedures were completed within the timeframe of the first study visit. All tests used for the detection of HIV and syphilis had an internal quality control system that ensured the validity of results. All participants who were newly tested positive for HIV were referred to PSF or a health center of their choice to initiate antiretroviral treatment (ART).

For Gonorrhea and Chlamydia testing, participants self-collected urine and rectal swabs samples were tested using the Cepheid GeneXpert platform at the PSF laboratory. Results were made available to participants when they returned for their second visit (for coupon reimbursements) approximately 2 weeks later. Participants found to be positive for Chlamydia or gonorrhea were treated at the study site as per the national guidelines. They were also given referral cards to invite their sexual partners for free treatment as well.

Results

Demographic Characteristics

A total of 738 men who have sex with men were recruited in the study, but these results are for the 737 men who completed the study questionnaire. The mean age was 27.4 years [range:18-68]. Among participants, 85.6% (631) self-identified as cis-MSM and 14.4% (106) as transgender women. Overall, 25.2% (186) had completed primary education, 33.2% (245) had attended some secondary school, 38.3% (282) had completed secondary school or above. A total of 17.7% (130) were unemployed, 15.5% (115) were privately or publicly employed and 12.1% (89) were students. Overall, 88.7% (653) were single or never married. Among participants, 65.5% (482) reported a monthly income less than 50 000 Frw. Regarding sexual orientation, 64.6% (476) reported to be gay or homosexual, 30.8% (227) reported to be bisexual and 4.6 (34) reported to be heterosexual.

Table 2. Demographic characteristic among men who have sex with men in Kigali, Rwanda

MSM (N=737)	n	%
Age in years, mean (Range)	27.4 (18-68)	
Gender identity		
Male	631	85.6
Female/ Transgender	106	14.4
Education		
Never attended school	24	3.3
Primary school or less	186	25.2
Some secondary school	245	33.2
Secondary level or above	282	38.3
Employment status		
Unemployed	130	17.7
Self-employed	59	8.0
Private or public-sector employee	115	15.5
Student	89	12.1
Informal sector	333	45.2
Other unspecified jobs	11	1.5
Marriage status		
Single/never married	630	92.4
Currently married	41	6.0
Divorced/separated	11	4.3

Living arrangement in previous 12 months		
Renting place	445	60.4
Owner of place	36	4.9
Living with someone for free including parents	244	33.1
School dormitory	1	0.1
Jail or prison	6	0.8
Other	5	0.7
Monthly income		
Less than 50,000	482	65.5
50,000 - 100,000	178	24.2
Over 100,000	76	10.3
Sexual orientation		
Gay, homosexual, or MSM	476	64.6
Bisexual	227	30.8
Heterosexual or straight	34	4.6

Respondent driven sampling recruitment map

Participants were recruited using RDS as described in the methods section of this report. The recruitment chains are mapped out in Figure 1. The HIV status of recruited individuals are demonstrated with orange for individuals who tested negative for HIV, and blue for those who are living with HIV.

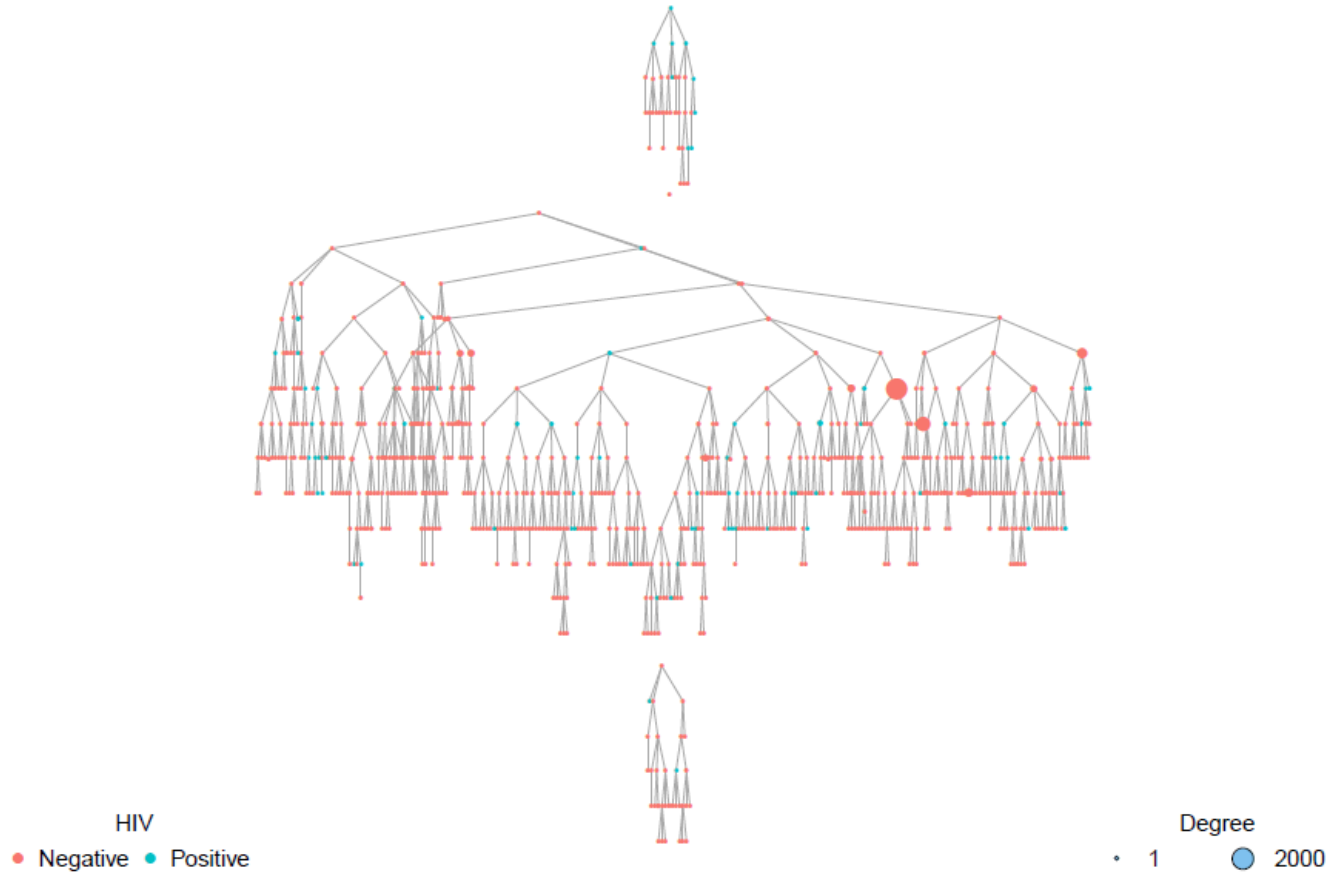

Figure 1. RDS Map of men who have sex with men recruitment in Kigali, Rwanda

Mobile technology use

Mobile technology use was assessed among MSM. Among MSM, 56% (413) reported not using a computing device. However, 90.6% (668) reported using a phone with 51% (376) of them reporting having a phone that can help them access internet. For meeting sexual partners, a mobile phone was the most preferred device to meet sexual partners as reported by 87.1% (642) of participants. The most popular mobile and social media apps were Facebook 43.6%(322) and WhatsApp 35.3%(260).

Table 3. Mobile technology among men who have sex with men

Men who have sex with men (N=737)	n/N	%
Primary type of computing device (other than a cell phone)		
Personal desktop computer or laptop	94	12.8
Shared desktop computer or laptop	87	11.8
Internet café	141	19.1
Doesn't use a computing device	413	56.0
Other/refusal	2	0.3
Mobile phone use		
Feature phone with internet	74	10.1
Feature phone without internet	292	39.6
Smartphone	302	40.9
Doesn't use a phone	67	9.1
Other/refusal	2	0.3
Mobile apps and social media use		
Participants reporting using SMS only	216	29.3
Participants reporting using WhatsApp	260	35.3
Participants reporting using Facebook	322	43.6
Participants reporting using Instagram	59	8.01
Preferred device for meeting sexual partners		
Desktop/Laptop	12	1.6
Mobile phone	642	87.1
Doesn't use an electronic device	83	11.3

Disclosure, stigma, and exposure to violence

Among the participants, 20.6% (152) reported ever telling any member of their family that they have sex with men, and 46.0% (339) reported to have disclosed their MSM status to a non-MSM friend. Overall, 35.1% (294) reported to have ever disclosed that they have sex with men to a health care provider.

Health care related stigma attributable to sexual behavior was reported by many MSM. Overall, 24.3% (179) reported fear of seeking health services and 18.9% (139) reported to have avoided seeking healthcare services because they are MSM. Perceived stigma was measured as feeling that they were mistreated in the health center because of their status as MSM, and 5% (36) of participants reported this. Enacted stigma was measured as hearing a health care provider make discriminatory remarks or

gossiping about MSM, and being denied or kept from received health services, which were 5.4% (40) and 2.6% (19) respectively.

Social and family related stigma attributable to sexual behavior was reported as well. Overall, 13% (96) reported ever feeling excluded from family activities and 20% (146) reported having heard family members make discriminatory remarks about MSM. In total, 26.3% (194) reported being rejected by their non-MSM friends.

Among participants, 8.3% (61) reported history of police harassment (verbal or physical) because they are MSM. Many MSM 48.4% (357) reported to have ever been arrested and 70.8% (253/357) of those who had ever been arrested had ever been in jail. Of those who had ever been arrested, 13.7% (49/357) reported the reason of their arrest to be related to their MSM status. Among the participants who had ever been to prison, 46.6% (118/253) reported to have had anal sex in prison. The majority 84.8% (100/118) of those who reported a history of anal sex in prison have never used a condom while in prison.

Overall, 27.7% (204) reported feeling scared to be in public places because they are MSM, 30.7% (226) had experienced verbal harassment due to being MSM, 15.5% (114) reported physical violence due to being MSM and 13.8% (102) had been forced to have sex when they did not want to.

Table 4. Disclose of sexual behavior and sexual behavior related stigma among men who have sex with men

Men who have sex with men	n/N	%
Disclosure of MSM status		
Ever told any member of your family that you have sex with men	152/737	20.6
Ever told any health care provider that you have sex with men	259/737	35.1
Ever told non MSM friend that you have sex with men	339/737	46.0
Health care related stigma		
Fear of seeking health services*	179/737	24.3
Avoided seeking health services*	139/737	18.9
Heard health care providers make discriminatory remarks*	40/737	5.4
Mistreated in the health center*	36/737	4.9
Denied or kept from receiving health services*	19/737	2.6
Stigma from family and friends		
Felt excluded from family activities*	96/737	13.0
Discriminatory remarks from family*	146/737	19.8
Felt rejected by non-MSM friends*	194/737	26.3
Community Stigma		

Felt that police refused to protect you*	17/737	2.3
Verbal or physical harassment from police officer	61/737	8.3
Felt scared to be in public places*	204/737	27.7
Verbal harassment*	226737	30.7
Physical violence*	114737	15.5
Forced sex	102/737	13.8
History of arrest and imprisonment [1]		
Ever been arrested	357/737	48.4
Ever been in jail	253/357	70.9
Arrested for charges related to homosexuality	49/357	13.7
Ever had anal sex in prison	118/253	46.6

**self-reported attributable to sexual behavior*

Mental health and substance use

Validated tools were used for mental health and alcohol consumption assessment. The Patient Health Questionnaire (PHQ9) was used mental health assessment and a PHQ9 score over 10 was used as cutoff for depression [8,9]. Among participants, 7.5% (55) reported depressive symptoms.

Ever injecting a drug was reported by 1.0% (7) of all MSM surveyed. Among those 7 MSM, three reported that they have ever shared a needle for injecting drugs. The alcohol consumption in the previous year was assessed using the AUDIT-C questionnaire. Overall, 13.4% (99) MSM reported no alcohol consumption in the last 12 months, 13.2% (97) reported monthly alcohol consumption, 19.3% (124) alcohol use 2-4 times per month, 29.4% (217) reported alcohol use 2-3 times per week, and the remaining 24.7% (182) reported alcohol consumption 4 or more times per week. Of the MSM who use alcohol, 18.8% (120) reported never drinking six or more drinks on one occasion, 36.2% (231) reported drinking six or more drinks on one occasion weekly, and 15.5% (99) reported drinking six or more drinks on one occasion daily.

[1] The denominators for this sub-section differ for different questions. The denominator for "Ever been in jail" and "Arrested for charges related to being homosexual" is all men who had ever been arrested. However, the one for "ever had sex in prison" is only men who have been in jail.

Table 5. Mental health and substance use among men who have sex with men in Kigali, Rwanda

Men who have sex with men	n/N	%
Mental Health		
Depressed (PHQ9 score over 10)	55/737	7.5
Injection drug use		
Ever used an injection drug	7/737	1.0
Ever shared a needle for injecting drugs	3/7	42.9
Alcohol use		
No alcohol consumption	99/737	13.4
Monthly alcohol use	97/737	13.2
Alcohol use 2-4 times per month	124/737	19.3
Alcohol use 2-3 times per week	217/737	29.4
Alcohol use 4+ times per week	182/737	24.7
Never consumes 6+ drinks on one occasion	120/638	18.8
Consumes 6+ drinks on one occasion less than monthly	80/638	12.5
Consumes 6+ drinks on one occasion monthly	108/638	16.9
Consumes 6+ drinks on one occasion weekly	231/638	36.2
Consumes 6+ drinks on one occasion daily	99/638	15.5

Sexual behavior

MSM reported history of sexual behavior and practices with both male and female sexual partners. Overall, 100% (737) reported ever having a male sex partner, and 74.2% (544) reported ever having a female sex partner. The median age at first vaginal or anal sex with a woman was 16 years (IQR: 14-18 years), the median age at first anal sex with a man was 19 years (IQR: 17-22 years). Among MSM with both regular and casual male partners, 93.2 (687) reported any insertive anal sex, and 63.0% (464) reported any receptive anal sex. 38.4% (283) reported that they have ever exchanged sex for money, of those MSM, 39.6% (112) said that selling sex has been their main source of income in the past 12 months. Of the MSM who reported exchanging sex for money in the past month, 35.4% (56) said they never or rarely used a condom with a man who paid them for sex.

Among MSM surveyed, 75.3% (555) reported ever having a regular male sexual partner such as a boyfriend, and 87.8% (487) of those MSM had a regular male sexual partner in the last 12 months, with a mean of 2.4 concurrent regular male partners. Overall, 85.5% (630) of MSM reported ever having a casual male sexual partner, 91.0% (573) reported having at least one casual male sexual partner in the past 12 months. Of those MSM with a regular male sexual partner, 62.8% (321) reported using a condom at last insertive anal sex and 61.0% (214) reported using a condom at last receptive anal sex.

Of those MSM with a casual male sexual partner, 66.5% (385) reported using a condom at last insertive anal sex and 62.6% (246) reported using a condom at last receptive anal sex.

When asked about how easy or difficult it was to suggest using condoms with regular male sexual partners, 75.4% (382) said that it was somewhat or very easy to suggest condom use, while 4.1% (21) said it was very difficult and 12.8% (65) said it was somewhat difficult. Among MSM who had a casual male sexual partner, 72.2% (416) said that it was somewhat or very easy to suggest using condoms with their partner, while 3.7% (21) said it was very difficult and 15.5% (89) said it was somewhat difficult. Regarding engagement in transactional sex, 38.4%(283) reported ever providing sexual acts in exchange of money and 15.2%(112) reported that sex work was their main source of income in the 12 months preceding the study.

Table 6. Sexual behavior and condom use among men who have sex with men with male partners in Kigali, Rwanda

	n/N	%
Male sexual partners		
Ever had a regular male sexual partner	555/737	75.3
Had any regular male sexual partners last 12 months	487/555	87.8
Number of regular male partners in past month (median, IQR)	2(IQR: 1-3)	-
Ever had a casual male sexual partner	630/737	85.5
Had any casual male sexual partners last 12 months	573/630	91.0
Number of casual male partners in past month (median, IQR)	1(IQR:0-3)	
Condom use with male partners		
Regular male partners		
Used a condom during last insertive anal sex with regular male partner	321/511	62.8
Never used condoms for insertive anal sex in past 6 months	75/437	17.2
Rarely used condoms for insertive anal sex in past 6 months	103/437	23.6
Sometimes used condoms for insertive anal sex in past 6 months	29/437	6.6
Often used condoms for insertive anal sex in past 6 months	67/437	15.3
Always used condoms for insertive anal sex in past 6 months	163/437	37.3
Used a condom during last receptive anal sex with regular male partner	214/351	61.0
Never used condoms for receptive anal sex in past 6 months	43/274	15.7
Rarely used condoms for receptive anal sex in past 6 months	82/274	29.9
Sometimes used condoms for receptive anal sex in past 6 months	22/274	8.0
Often used condoms for receptive anal sex in past 6 months	35/274	12.8
Always used condoms for receptive anal sex in past 6 months	92/274	33.6
Casual male partners	385/579	66.5

Used a condom during last insertive anal sex with casual male partner		
Never used condoms for insertive anal sex in past 6 months	84/491	17.1
Rarely used condoms for insertive anal sex in past 6 months	117/491	23.8
Sometimes used condoms for insertive anal sex in past 6 months	46/491	9.4
Often used condoms for insertive anal sex in past 6 months	59/491	12.0
Always used condoms for insertive anal sex in past 6 months	185/491	37.7
Used a condom during last receptive anal sex with casual male partner	246/393	62.6
Never used condoms for receptive anal sex in past 6 months	60/320	18.8
Rarely used condoms for receptive anal sex in past 6 months	70/320	21.9
Sometimes used condoms for receptive anal sex in past 6 months	38/320	11.9
Often used condoms for receptive anal sex in past 6 months	37/320	11.6
Always used condoms for receptive anal sex in past 6 months	115/320	35.9
Ease of suggesting condom use with a regular male partner		
Very difficult	21/507	4.1
Somewhat difficult	65/507	12.8
Neither difficult nor easy	39/507	7.7
Somewhat easy	193/507	38.1
Very easy	189/507	37.3
Ease of suggesting condom use with a casual male partner		
Very difficult	21/576	3.7
Somewhat difficult	89/576	15.5
Neither difficult nor easy	50/576	8.7
Somewhat easy	228/576	39.6
Very easy	188/576	32.6
Engagement in sex work		
Ever provided a sexual act in exchange of money	283/737	38.4
Sex work was the main source of income in the last year	112/737	15.2

Overall, 30.7% (226) of MSM reported ever having a regular female sexual partner such as a girlfriend or wife, and 54.4% (123) of those had a regular female sexual partner in the last 12 months. More MSM reported ever having a casual female sexual partner at 65.4% (482) of MSM surveyed, while 44.6% (215) of those reported having at least one casual female sexual partner in the past 12 months. Condom use was lower among MSM with female sexual partners compared to condom use with male sexual partners. Of those MSM who reported having a regular female sexual partner, 48.0% (108) reported using a condom at last vaginal sex and 49.4% (43) reported using a condom at last anal sex. Of those MSM with a casual female sexual partner, 59.0% (280) reported using a condom at last vaginal sex and 54.9% (79) reported using a condom at last anal sex.

When asked about how easy or difficult it was to suggest using condoms with regular female sexual partners, 75.7% (153) said that it was somewhat or very easy to suggest condom use, while 6.4% (13) said it was very difficult and 12.4% (45) said it was somewhat difficult. Among MSM who had a casual female sexual partner, 78.1% (331) said that it was somewhat or very easy to suggest using condoms with their partner, while 1.4% (6) said it was very difficult and 10.6% (45) said it was somewhat difficult.

Table 7. Sexual behavior and condom use among men who have sex with men with female partners in Kigali, Rwanda

	n/N	%
Female sexual partners		
Ever had a regular female sexual partner	226/737	30.7
Had any regular female sexual partners last 12 months	123/226	54.4
Number of regular female partners in the past month (median, IQR)	1 (IQR:0-2)	-
Ever had a casual female sexual partner	482/737	65.4
Had any casual female sexual partners last 12 months	215/482	44.6
Number of casual female partners in past month (median, IQR)	0 (IQR:0-1)	-
Condom use with female partners		
Regular female partners		
Used a condom during last vaginal sex with regular female partner	108/225	48.0
Never used condoms for vaginal sex in past 6 months	28/118	23.7
Rarely used condoms for vaginal sex in past 6 months	30/118	25.4
Sometimes used condoms for vaginal sex in past 6 months	13/118	11.0
Often used condoms for vaginal sex in past 6 months	14/118	11.9
Always used condoms for vaginal sex in past 6 months	33/118	28.0
Used a condom during last anal sex with regular female partner	43/87	49.4
Never used condoms for anal sex in past 6 months	10/46	21.7
Rarely used condoms for anal sex in past 6 months	12/46	26.1
Sometimes used condoms for anal sex in past 6 months	1/46	2.2
Often used condoms for anal sex in past 6 months	4/46	8.7
Always used condoms for anal sex in past 6 months	18/46	39.1
Casual female partners		
Used a condom during last vaginal sex with casual female partner	280/475	59.0
Never used condoms for vaginal sex in past 6 months	18/193	9.3
Rarely used condoms for vaginal sex in past 6 months	56/193	29.0
Sometimes used condoms for vaginal sex in past 6 months	19/193	9.8
Often used condoms for vaginal sex in past 6 months	28/193	14.5
Always used condoms for vaginal sex in past 6 months	72/193	37.3

Used a condom during last anal sex with casual female partner	79/144	54.9
Never used condoms for anal sex in past 6 months	6/54	11.1
Rarely used condoms for anal sex in past 6 months	16/54	29.6
Sometimes used condoms for anal sex in past 6 months	6/54	11.1
Often used condoms for anal sex in past 6 months	10/54	18.5
Always used condoms for anal sex in past 6 months	16/54	29.6
Ease of suggesting condom use with a regular female partner		
Very difficult	13/202	6.4
Somewhat difficult	25/202	12.4
Neither difficult nor easy	11/202	5.5
Somewhat easy	78/202	38.6
Very easy	75/202	37.1
Ease of suggesting condom use with a casual female partner		
Very difficult	6/424	1.4
Somewhat difficult	45/424	10.6
Neither difficult nor easy	41/424	9.7
Somewhat easy	209/424	49.3
Very easy	122/424	28.8

HIV Infection and uptake of services

The HIV prevalence among MSM participants was 10.05% (74). Using RDS-weighted calculations, the HIV prevalence was 9.2% (95%CI: 6.28-12.11). Age was found to be an important risk factor of HIV infection. In fact, each additional year increase in age was found to be associated with a 6% higher HIV prevalence PR:1.06(95%CI: 1.05-1.07). HIV prevalence was lowest among MSM in the youth age group (18-24 years old) 2.4%(8/335) and highest among MSM over 40 years old with a prevalence of 46.8%(22/47). There were no significant differences in the prevalence of HIV by district of residence (P: 0.388). (Table 8).

Additional factors that were positively associated with HIV infection in the unadjusted analyses were cohabitating or being married to a female PR: 3.46(1.76-6.79), being divorced or separated PR: 4.08(2.37-7.02), having a STI infection PR: 1.81(1.14-2.86), having initiated sex with males at high age (over 22 years) PR: 2.79(1.72-4.54) compared to early debut and having had sex with women in the year preceding the study PR: 1.88(1.00-3.55). Factors negatively associated with HIV infection were high education, higher income and being circumcised. In fact, having completed secondary education

or higher was associated with lower HIV infection PR:0.43(0.26-0.76) compared to primary education or less. MSM with an income over 50,000 Frw had lower HIV infection compared to those making less than 50, 000 PR: 0.61(0.36-1.01). Being circumcised was also associated with lower HIV infection PR: 0.43(0.28-0.67). In the multivariable analyses, factors that remained significantly positively associated with HIV infection were age, income, STI infection and multiple casual partners. High income remained negatively associated with HIV infection.

Among participants 90.6% (668) reported to have ever been tested for HIV. Overall, 61% (45) of MSM found to be living with HIV knew their HIV-positive status before enrolling in the study. Among those who were aware of living with HIV, 98% (44) reported to be on ART and 75% (33) of them were virally suppressed. However, among MSM who reported that they did not know their HIV status prior to the study and reported that they were not on ART, 11 were virally suppressed.

Table 8. HIV infection by age group and district of residence

Men who have sex with men	n/N	%
Overall HIV prevalence	74/736	10.1
HIV prevalence by age groups		
18-24 years old	8/335	2.4
25-29 years old	20/182	10.9
30-34 years old	15/114	13.2
35-39 years old	9/58	15.5
Over 40 years old	22/47	46.8
HIV prevalence by district of residence		
Gasabo	11/89	12.4
Kicukiro	12/162	7.4
Nyarugenge	51/485	10.5

Table 9. HIV Infection and uptake of services among men who have sex with men in Kigali, Rwanda

Men who have sex with men	n/N	%
Ever been tested for HIV	668/737	90.6
Ever been told by a health care provider that living with HIV	45/737	6.1
Current ART use among those who knew living with HIV	44/45	97.8
Total number of participants found to be living with HIV	74/736	10.05
Viral suppression among those who reported to be on ART	33/44	75
Viral suppression among all participants living with HIV [2]	44/74	59

[2] Eleven participants who had reported not knowing their HIV positive status and that they were not on ART were found to be virally suppressed.

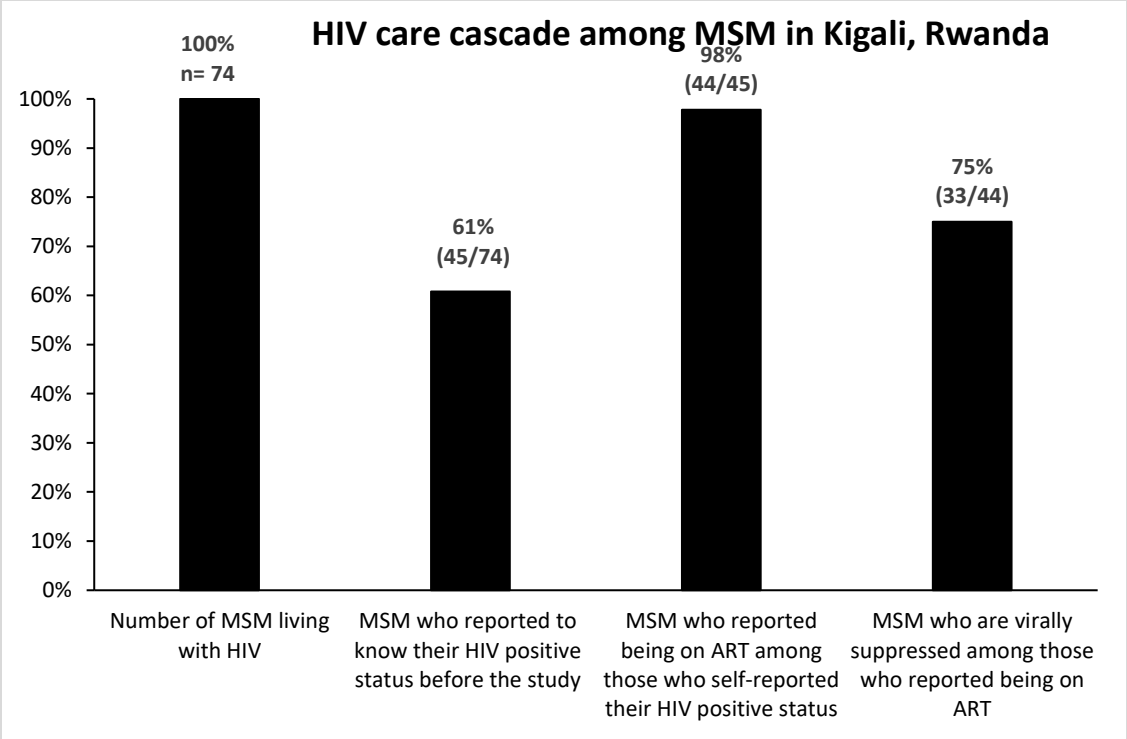

Figure 2. HIV continuum of care among men who have sex with men in Kigali, Rwanda

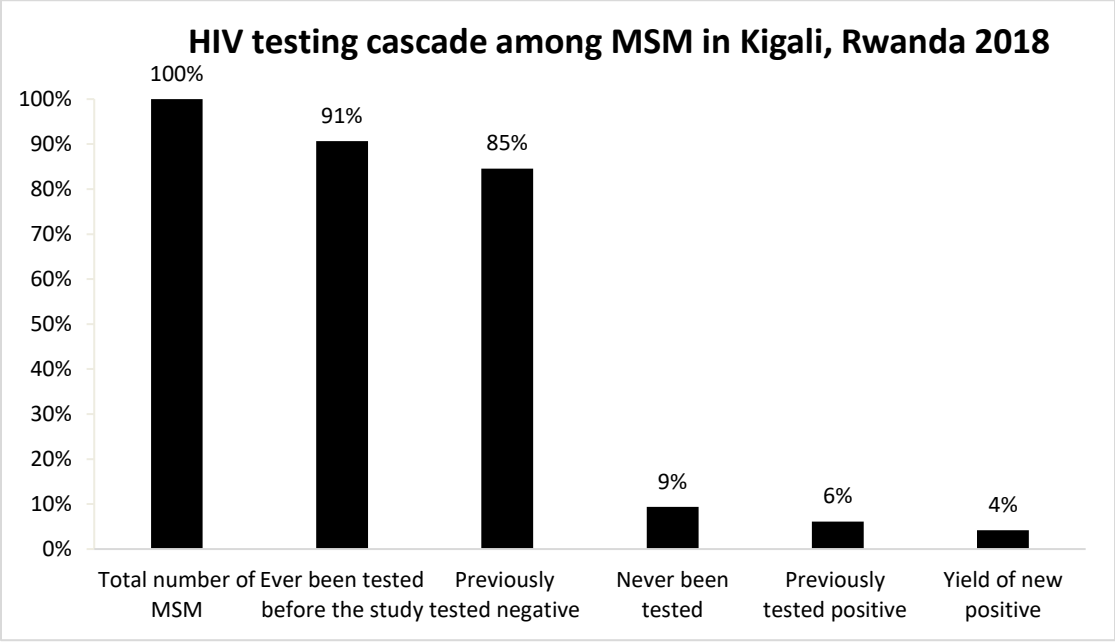

Figure 3. HIV testing cascade among men who have sex with men in Kigali, Rwanda[3]

[3] The denominator to calculate the yield of new positive was calculated by summing up the number of participants who had previously negative and the number of those who had never been tested (N=692). The numerator used is the number of participants who were newly diagnosed (n=29).

Sexually transmitted infections

Among participants enrolled in the study, 21% (148) reported an STI symptom in the 12 months preceding the survey. From the biological testing performed in the study, the prevalence of different STIs among MSM were as follow: syphilis 5.7% RDS adjusted: 6.8%(95%CI:4.3-9.4), Chlamydia 9.1% RDS adjusted: 6.1(95%CI:3.9-8.4), gonorrhea:8.8% RDS adjusted:7.1% (95%CI:4.9-9.2). Overall, the prevalence of any STI among MSM in Kigali was 19.9% (147). Among the 147 who had at one STI diagnosis, 60.5% (89) attended their second study visit and were given their STI results and 87 (98%) consented for the treatment. Among them, only 25.8% (23/89) had any STI symptom at the time of the first or second visit. Overall, MSM who were living with HIV had significantly higher prevalence of STIs compared to MSM who were HIV negative (31% vs 19%, P: 0.012). HIV positive MSM also had significantly higher prevalence of gonorrhea and syphilis (Fig 3). Regarding the distribution of STIs infections by anatomical site, most (67%) Chlamydia infections were genital while for gonorrhea, 52% were rectal infections (Table 10).

Table 10. . Sexually transmitted infections among men who have sex with men in Kigali, Rwanda

	n/N	%
Sexually transmitted infections		
Prevalence of Syphilis	42/737	5.7
Chlamydia	67/737	9.1
Gonorrhea	65/737	8.8
Any prevalent STI	147/737	19.9
Participants who came back for result	89/147	60.5
Participants who consented for STI treatment	87/89	98
Symptomatic participants	23/89	25.8
Sites of gonorrhea infections		
Genital	19/65	29.2
Rectal	34/65	52.3
Both genital and rectal	12/65	18.5
Sites of Chlamydia infections		
Genital	45/67	67.2
Rectal	18/67	26.8
Both genital and rectal	4/67	6
Sexually transmitted infections in the past 12 months		
Any STI symptoms in the past 12 months?	148/737	21.0
Ever been tested for an STI in the past 12 months?	313/737	42.4
Ever been diagnosed with an STI in the past 12 months?	55/237	23.2
Was treatment provided by a healthcare provider?	50/55	90.9

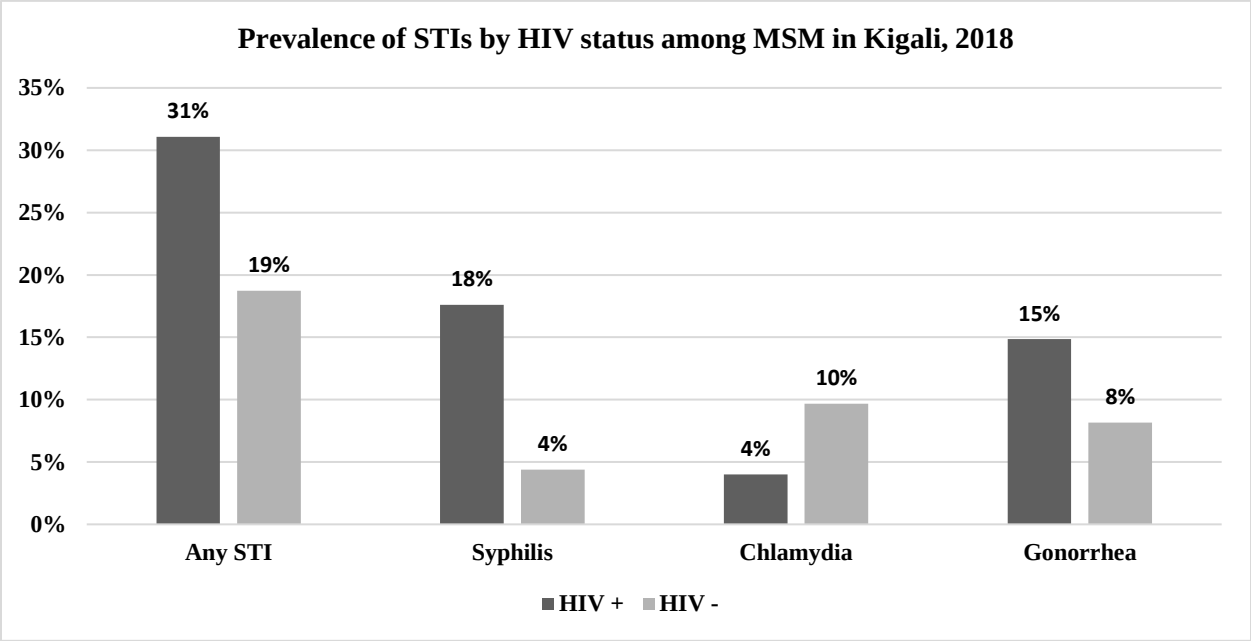

Figure 4. Prevalence of STIs by HIV status among MSM in Kigali, Rwanda 2018 [4]

Access to condom and lubricants

Of the MSM participating in this study, 14.6% (108) reported that getting condoms was difficult (very difficult or somewhat difficult) in the six months preceding the study. The main reason cited of why getting condoms was difficult was that they are expensive 45.4% (49/108), followed by fear of being seen buying condoms 20.4% (22/108). Additionally, 38.1% (243/638) reported that buying condoms was the only way they got condoms in the previous six months.

Regarding lubricants, 87% (642) reported ever using a lubricant during sex. The main types of lubricants used were commercial water-based lubricants 62.7% (341/544) and petroleum jelly/Vaseline 30% (161/544). Among participants who have ever used lubricants, 21.2% (136/642) reported that getting commercial water-based lubricants was difficult for them in the six months preceding the study. The main reasons of this difficult cited was to not know where to get lubricants 56.6% (77/136) and that they were too expensive 24.3% (33/136).

[4] Using Pearson's chi-squared tests, MSM living with HIV had statistically significantly higher prevalence of any STI (P:0.012), Syphilis (P:0.0001) and Gonorrhea (P:0.054). Chlamydia was more prevalent among HIV negative participants, but this difference was not statistically significant.

Table 11. Access to condom and lubricants among men who have sex with men in Kigali, Rwanda

	n/N	%
In the last six months how difficult or easy was it for you to get condoms?	N= 737	
Very difficult	17	2.3
Somewhat difficult	91	12.3
Neither easy nor difficult	29	3.9
Somewhat easy	274	37.1
Very easy	227	30.8
Has not tried to get condoms in the last 6 months	99	13.4
What was the main reason it was difficult?	N= 108	
Haven't thought about it	6	5.6
Don't know where to get it	14	13.0
Don't like condoms	3	2.8
Too expensive	49	45.4
My partner doesn't like condoms	4	3.7
Don't want people to see me buying it	22	20.4
Other	10	9.3
In the past six months have you bought or obtained condom for free?	N= 638	
Only bought condoms	243	38.1
Only got condoms for free	339	53.1
Bought condoms and got them for free	45	7.1
Neither bought or received condom	11	1.7
Have you ever used a lubricant during sex?	N=737	
No	95	12.9
Yes	642	87.0
What is the main reason you have not used lubricant?	N=95	
Haven't thought about it	40	42.1
Don't know where to get it	38	40.0
Don't like lubricants	6	6.3
Too expensive	4	4.2
My partner does not like lubricants	3	3.2
Other	4	4.2

What type of lubricant did you most often use with condom in the past six months?	N=544	
Petroleum jelly/Vaseline	161	29.6
Other oil- based lubricants	4	0.7
Body cream/ointments	33	6.1
commercial water-based lubricants	341	62.7
Saliva	3	0.6
Other	1	0.2
Refused	1	0.2
In the last 6 months, how difficult or easy was it for you to get commercial lubricants designed for sex when you needed them?	N = 642	
Very difficult	35	5.5
Somewhat difficult	101	15.7
Neither easy nor difficult	27	4.2
Somewhat easy	180	28.0
Very easy	192	29.9
Has no tried to get commercial lubricants in the past 6 months	106	16.5
Don't know	1	0.2
What was the main reason it was difficult?	N = 136	
Haven't thought about it	10	7.4
Don't know where to get it	77	56.6
Don't like condoms	3	2.2
Too expensive	33	24.3
my partner doesn't like lubricants	1	0.7
Don't want people to see me buying it	4	2.9
Other	8	5.9

HIV transmission related knowledge

When asked about which type of sex puts a person most at risk of HIV infection, more participants 39.3% (290) believed vaginal sex carries higher risk of HIV infection compared to other types. Regarding anal sex, 39.8% (294) believed receptive anal sex carries higher risk of HIV infections while 36.7% (271) thought both receptive and insertive anal sex carry the same risk. Among this group, 66.1% (488) reported that commercial water-based lubricants were the safest lubricant to use with a latex condom.

Table 12. HIV transmission related knowledge among men who have sex with men in Kigali, Rwanda

	n/N	%
What type of sex puts a person most at risk of HIV infection?	N =737	
Oral sex	25	3.4
Vaginal sex	290	39.3
Anal sex	214	29.0
Both have the same risk	203	27.5
Don't Know	5	0.7
What type of anal sex puts a person most at risk for HIV infection?	N= 737	%
Insertive anal sex	161	21.8
Receptive anal sex	294	39.8
Both have the same risk	271	36.7
Refusal	6	0.8
Don't know	5	0.7
Which is the safest type of lubricant to use with a latex condom?	N= 737	%
Petroleum Jelly/Vaseline	127	17.2
Other oil-based lubricant	3	0.4
Body creams/ointment	2	0.3
Water-based lubricant	488	66.1
Saliva	2	0.3
No lubricant use	59	8.0
Other	2	0.3
Refusal	3	0.4
Don't know	51	6.9

Access to healthcare services

Overall, 68.4% (365) of MSM reported that their last health center visit was within the past 6 months. Of the MSM who have ever been to a health center, 63.2% (438) reported seeking HIV-related services in the past 12 months, 46.3% (321) reported receiving HIV testing at their last healthcare visit and 7.6% (53) reported receiving STI testing at their last visit. Of them, 25.5% (177) of MSM reported that their health care provider knows they have sex with men. Among MSM who did not seek health services in the past 12 months, 55.3% (140) said they did not do so because they were not sick, 10.3% (26) said

they did not have enough time, and 5.9% (15) said they did not seek health services because they were afraid of others learning that they have sex with men.

Table 13. Recent access to healthcare and HIV services among men who have sex with men in Kigali, Rwanda

	n/N	%
Healthcare services		
Ever been to a health center	693/737	94.0
Most recent health center visit was within past 6 months	365/534	68.4
Most recent health center visit was within past 6-12 months	86/534	16.1
Most recent health center visit was more than 1 year ago	83/534	15.5
Provider knows they are MSM	177/693	25.5
HIV prevention, testing, treatment, or care services		
Sought HIV-related services in past 12 months	438/693	63.2
Received HIV testing at last healthcare visit	321/693	46.3
Received STI testing at last healthcare visit	53/693	7.6
Received HIV treatment at last healthcare visit	35/693	5.1
Received STI treatment at last healthcare visit	38/693	5.5
Reasons for not seeking health services in past 12 months		
Afraid of being outed as MSM	15/253	5.9
Not sick	140/253	55.3
Treating self	4/253	1.6
Not enough time	26/253	10.3
No medical insurance	2/253	0.8
Health center is too far	3/253	1.2
Other reason	62/253	24.5

Population size estimates

Estimate Use Disclaimer

The population size estimates presented in this document are not only for Kigali but inclusive of neighboring areas represented in the study sample. This is in recognition of the fact that the networks of MSM are not limited to city limits and they access services in these cities. Data users are strongly advised to include "and neighboring areas" when citing these numbers for a specific location i.e. "MSM population size estimate for Kigali and its neighboring areas."

Introduction

The reason for population size estimation is to characterize the current coverage of HIV prevention, treatment, and care services among men who have sex with men in Kigali, Rwanda. In fact, the size estimates can inform MSM programming as they can be used as targets for service provision.

Methods

In this component, the following methods were used:

Unique object identifier
In this multiplier method, a specific keychain designed by representatives of the 10 MSM associations that work in Kigali was distributed among MSM (one object per person) in different networks in Kigali. These keychains were distributed through MSM associations, PSF MSM follow up clinic, HDI MSM clinic and by other MSM recruited by the study team to reach more closeted groups of MSM in Kigali. In total, 730 unique objects were distributed in this study. During the RDS component of the study, participants were asked if they received the keychain. The proportion that did was used to produce a size estimate for Kigali.

Service multiplier method
The survey questionnaire of the RDS component of the study included questions asking participants if they had participated in different services offered to MSM in Kigali. These included mainly the PSF key population program, HDI key population program and MSM associations that work in Kigali.

Social event
PSF, in collaboration with HDI, MSM associations, and MSM outside of MSM association networks organized two parallel social events in Kigali. One was held in Nyamirambo at Heartland Hotel and another event was a house party organized for more closeted MSM in Kigali. These events were organized on the same day and same hours. During the RDS component of the study, participants were asked if they participated in either of the two events. The total number of participants in both social events was approximately 300. The proportion that did was used to produce a size estimate for the Kigali.

The formula to calculate the population size estimate in the three multiplier methods is the same.

N = 1/P * M = M/P

Where N is the estimated population size, P is the RDS-adjusted proportion of study participants who answered yes to questions related to each multiplier method (unique object, service multiplier, and social event), and M is the number of unique objects distributed/ number of people receiving services or total number of participants in the social events. The variance of the estimated population size was calculated using the Delta Method (Johnston et. al., 2013)

Wisdom of the masses

The survey questionnaire of the RDS component of the study included questions asking participants to estimate the size of the target population in Kigali. Specifically, participants were asked the following question: "How many men who have sex with men would you guess live in Kigali?" The median estimate provided by participants was the resulting size estimation. The standard errors were calculated using the following formula:

$$SE = \frac{\sqrt{var(s)}}{N} = \sigma/\sqrt{n}$$

$$\mathrm{N} \pm 1.96 * SE$$

Validation of the size estimation methods

We validated each method for inclusion in a final combined estimate using the following criteria:

Unique object method exclusion criteria states that the method will be excluded if over 90% of the objects were received by the study sample. Since we didn't have this problem, the method was kept for this analysis. Another potential problem with this method arises when the sample of MSM who receive the unique object is more likely to participate in the study. In this case, the resulting estimate is lower than the actual population. In this study, more than 80% of the study participants had not received the unique object, which means that the method was successfully implemented in Kigali.

The service multiplier method is excluded if the assumption that each sample must be independent is not met. The sample of MSM who use the service are more likely to participate in the study, the resulting estimate is lower than the actual population. In this study, the RDS adjusted proportions of study participants who received services at PSF in 2017 and of MSM who are members of MSM associations were 17% and 15% respectively. This shows that MSM who are enrolled in the PSF program or who are members of MSM associations were not more likely than others to participate in the study.

The wisdom of the masses estimate is excluded if the median estimate is lower than the number of individuals in the sample. The median estimate was lower than the total sample of MSM recruited, and thus, it was excluded.

The social event multiplier is excluded if more individuals reported attending the event than the event registration. Since we didn't have this problem, estimates from this method were included.

The final population size estimate of this study is a combined estimate based on the four methods used: PSF service multiplier, unique object identifier, service multiplier - Association and social event.

Results

Population size estimates are presented in tables 13 and 14 below. Results in Table 13 are for individual methods and presented here for completeness purposes but should not be used as official estimates from this study.

Results in Table 14; the average of individual method estimates; are the overall population size estimates and maybe used as final population size estimates in Kigali and neighboring areas.

Table 14. Method specific population size estimates of men who have sex with men in Kigali, Rwanda

Method	RDS adjusted proportion	Population Size estimate
Unique object		
RDS-adjusted upper 95%CI	0.16	4359
RDS-adjusted estimate	0.13	5,555
RDS-adjusted lower 95%CI	0.09	7,657
Social event		
RDS-adjusted upper 95%CI	0.17	1724
RDS-adjusted estimate	0.14	2155
RDS-adjusted lower 95%CI	0.10	2874
Service multiplier - PSF		
RDS-adjusted upper 95%CI	0.20	5949
RDS-adjusted estimate	0.17	7270
RDS-adjusted lower 95%CI	0.13	9347
Service multiplier - Association		
RDS-adjusted upper 95%CI	0.18	2556
RDS-adjusted estimate	0.15	3124
RDS-adjusted lower 95%CI	0.12	4016

Table 15. Population size estimate of men who have sex with men in Kigali, Rwanda

Location	Size estimate percent [95%CI]	Size estimate [95%CI]
Kigali	1.51% [1.21-1.99]	5937[4784 – 7835]

NB: Population estimates of men in Kigali were based on both the 2012 Census data and National Institute of statistics of Rwanda population size projections data.

Discussion: Challenges and sources of errors

1. Lack of newer census data for the study area: the last census was conducted in 2012. We relied a lot on the data from projections conducted by the National Institute of statistics of Rwanda (NISR) during these analyses. This may create an over or underestimate depending on the assumptions that were used in computing these estimates.
2. The assumption that the proportion of MSM is the same in the entire 15-49 age range. It is possible that the proportion of MSM is different from 15-17 or from 35-49. However, this probability is negligible.

Phase 2: Mapping Healthcare and Hotspots sites frequented by Men who have sex with men in Kigali, Rwanda

Introduction

The two primary objectives to the mapping phase of this study were:

- Map and verify sites where MSM find new sexual partners in Kigali.
- Map and verify sites where MSM receive HIV related prevention and care services in Kigali.

The secondary aim was to identify specific geographic areas of Kigali City that are most likely to have MSM HIV transmission networks i.e. priority prevention areas (PPAs) and provide specific and actionable recommendations for future prevention programming to address current gaps in HIV prevention needs among MSM.

Methods

Site mapping was conducted using the Priorities for Local AIDS Control Efforts (PLACE) Method. The PLACE Method seeks to provide rapid information for tailored prevention programs based on the

unique aspects of local key transmission networks where HIV infection is most likely to occur. Venues where MSM meet male sexual partners (hotspots) and sites where MSM seek healthcare services were identified and evaluated in three primary phases: preparatory, site identification, and verification and evaluation. The PLACE method also traditionally includes behavioral interviews with MSM at the identified venues, however these were not conducted during site verification visits as behavioral interviews with MSM had already been conducted in the behavioral and biological assessment phase of this study.

Preparatory Phase

The preparatory phase of the mapping portion of this study sought to establish the logistical and conceptual foundations needed for data collection. A review of existing literature was conducted to better understand the HIV epidemic among MSM in the unique structural and cultural context of Rwanda. Collaborative, trust- based relationships within the MSM community were established, with input and involvement from key MSM community members and associations throughout the study process. Key partners and stakeholders (NGOs, MoH, healthcare providers, etc.) were contacted and provided with information on the objectives and nature of both the overarching study and the mapping activities and were invited to participate in key informant interviews. Two MSM actively involved in the local community were recruited to be part of the data collection team, and were trained on the study methods, data collection tools, and human subjects research ethics. A study monitoring plan and mapping timeline were also developed during this phase of the mapping activities.

Site Identification Phase

The goal of the site identification phase was to create an exhaustive list of both sites where MSM meet male sexual partners (hotspots) and sites where MSM seek healthcare services. This step of the mapping activities included six key informant interviews, who provided names of hotspots and healthcare sites they knew MSM frequented, location information for sites, estimated number of MSM who frequent the sites, peak days and hours, etc. To reach saturation of venues and create the most exhaustive list of sites, hotspots and healthcare service sites were also identified from the concurrently-run MSM BSS survey results. The final list of venues to be visited, verified, and mapped included 50 healthcare sites and 73 hotspots. All healthcare sites mentioned in key informant interviews and the behavioral survey were included. Due to the logistical impossibility of visiting all hotspots named by MSM in the behavioral survey and key informant interviews, only hotspots that were mentioned at least twice were included in the final list of sites.

Verification and Validation Phase

The verification and validation phase were conducted to confirm the existence of each site, evaluate any current services provided at the site, and its relevance to future HIV/STI prevention, treatment, and care programming. During this step of the mapping phase, the research team visited all hotspots and healthcare sites, confirmed their existence and if they were currently open, noted the GPS coordinates of the site using Garmin GPS units, and evaluated the site with one site informant

(owner/manager, bouncer/security, staff member), and one MSM informant. If no MSM informant was easily identified by the research team, a second informant (FSW, client, or bouncer) who was knowledgeable about the MSM that frequent the sight was sought.

Healthcare sites included public and private hospitals and health centers, NGOs, MSM associations, condom kiosks, and youth associations. Hotspot venues primarily consisted of bars, restaurants, nightclubs, hotels, guesthouses, and saunas.

Information collected during these site verification interviews included a general description of the site, peak days and hours, estimate of number the of MSM who visit the site, characteristics of MSM who visit the site, previous HIV prevention activities, availability of condoms and lubricant, other sites frequented by MSM that were known to the site informant, and obstacles to healthcare service uptake for MSM at the site.

All data in the mapping phase of this study was collected electronically on Android tablets utilizing the SurveyCTO Collect platform. Data was sent to a password-protected, secure server at the end of each interview. Unique identification codes were used to identify key informants to maintain privacy and confidentiality; no identifying information was collected from site informants, and all sites visited were assigned a site number.

Results

Healthcare Sites

Of the 50 healthcare sites on our master list, one refused to participate in the mapping activities, one was temporarily closed, and eight were already visited under other names. 40 unique sites that provide health services to MSM were successfully located and participated in the mapping activities. 21 (52.5%) of the healthcare sites were public hospitals or clinics, 7 (17.5%) were private hospitals or clinics, 8 (20%) were NGOs, CBOs, or MSM associations, and 4 (10%) were free condom kiosks.

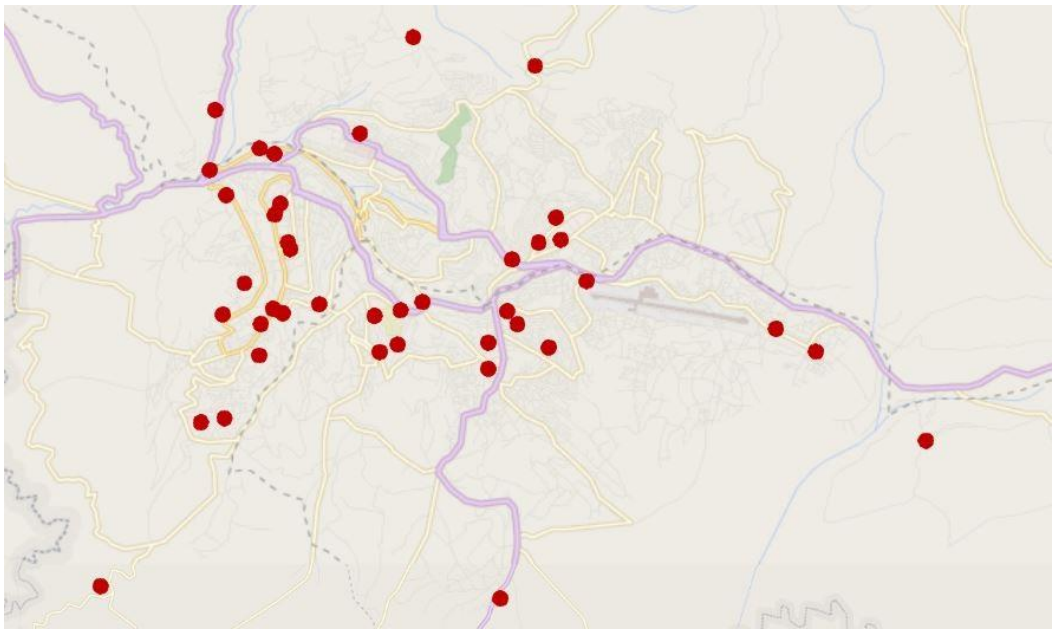

Figure 5. Map of healthcare sites frequented by MSM in Kigali, Rwanda [5]

Of the healthcare sites visited, 72.5% reported knowing that MSM go there for services, 12.5% reported that MSM do not go there for services, and the remaining 15% said they did not know if MSM go there. Of the 11 sites that said MSM do not go there or they did not know, seven sites said it would be okay if MSM go there, three said it would not be okay for MSM to go there, and one site did not know.

Nearly half (45%) of healthcare sites reported that some of their staff had received training in providing services to MSM, while another 45% said that none of their staff had received MSM training, and only 10% said all staff members had received training on MSM. Only 5 sites reporting having at least one MSM peer educator on staff. Many of the healthcare sites that reported no staff training on providing services to MSM are in the key priority prevention areas of Nyamirambo, Gikondo, and Remera. Half (50%) of sites said they had conducted HIV sensitization activities adapted to MSM.

[5] The complete list of all hotspots and healthcare sites is available at PSF in a password protected database.

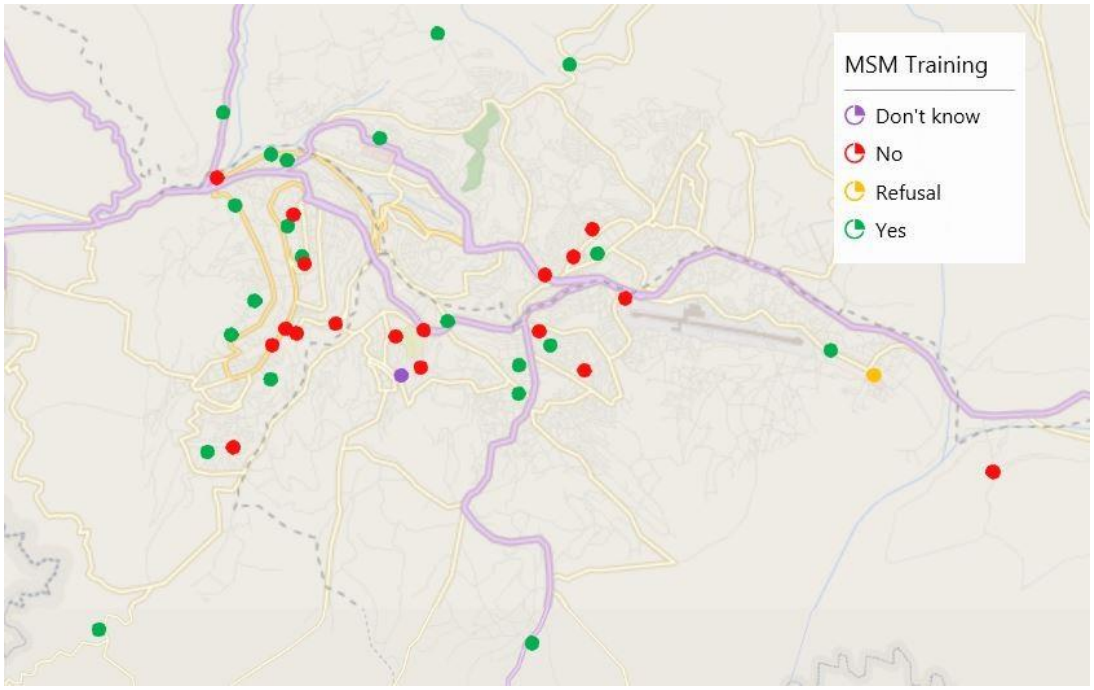

Figure 6. Map of healthcare sites where staff have received training on MSM related services in Kigali, Rwanda

Of the 40 healthcare sites visited and verified, 35 (87.5%) said that free condoms were distributed in the past 6 months. The study team saw condoms at 32 (91.4%) of these sites. All five sites that reported no distribution of free condoms said that they would not be okay with providing free condoms. Of those sites with free condoms, 45.7% said that free condoms were always available, while 31.4% said that condoms were never available and 22.9% said that condoms were only sometimes available.

Lubricants were not nearly as commonly available as condoms. Most sites (65%) said free lubricant was not distributed at site, while 12.5% said lubricant used to be available but had not been recently and 22.5% of sites said that free lubricant packets had been distributed during the past 6 months. Reports of lubricant stock-outs were very common at health sites, with only two sites reporting that free lubricants were always available (22% of sites that recently had lubricants), and only three sites being able to produce a lubricant packet to show to researchers. Of the sites that reported no free lubricant distribution, 24 (75%) said they would be okay with providing free lubricant packets.

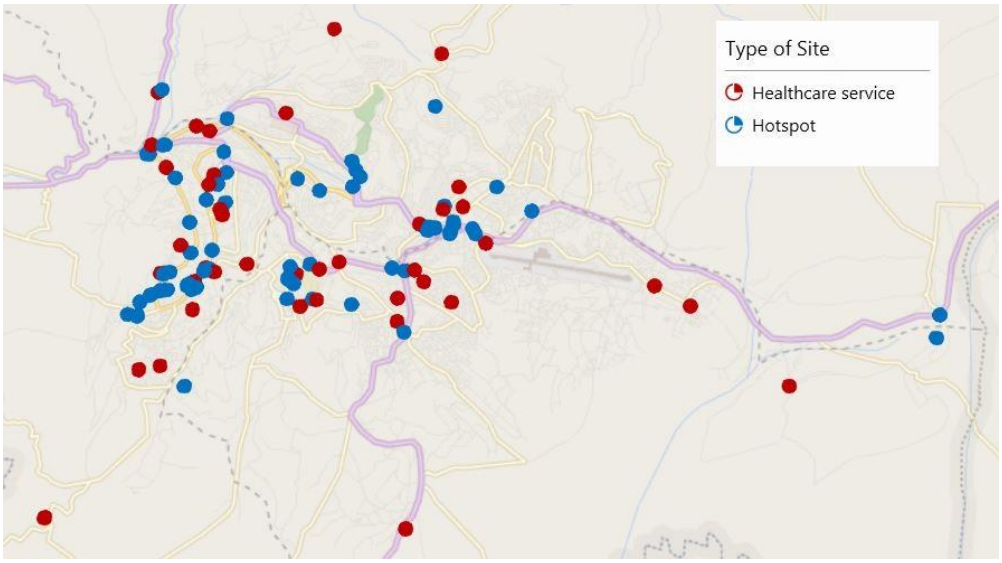

Figure 5. Map of hotspots (blue) and healthcare sites (red) frequented by MSM in Kigali, Rwanda

Hotspots

Of the 73 hotspot sites (venues where men meet new male sexual partners) on our master list, one refused to participate in the mapping activities, we were unable to locate two, one was permanently closed, one was temporarily closed, and two had already been visited under other names. In total, 66 unique hotspot sites where MSM meet new sexual partners were successfully located and participated in the mapping activities. The majority (69.7%) of hotspot sites were bars, restaurants, or nightclubs, followed by hotels and guesthouses (22.7%).

Of the hotspots visited, 86.4% said they know or guess that MSM come to their venue, while 6.1% said that MSM do not come to the site, and 7.6% said they were not sure. Of the nine sites that said that MSM do not go to the site or they were not sure, six of them said it would be okay if MSM go there, and two said it would not be okay. In the hotspots visited, 51 (77.3%) reported that male sex workers meet new clients at their venue, while 48 (72.7%) of sites said that men meet new sex partners at their venue. This could mean that male sex workers are finding both male and female clients at the hotspots visited. Twenty sites (30.3%) reported that they know people have sex at the site, most often in the toilets or in rooms at sites that also had guest houses or lodges.

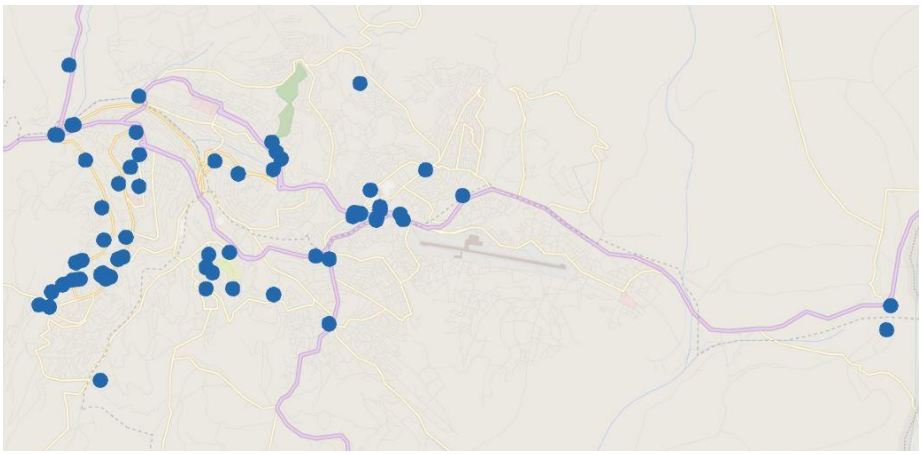

Figure 7. Map of sites where MSM report meeting new sexual partners (hotspots) in Kigali, Rwanda

Of the 66 hotspots that we were able to collect data on, only 5 (7.6%) said that free condoms were distributed in the past six months. An additional 15 (22.7%) of hotspot sites said that they had provided free condoms in the past, but not recently. Most sites (69.7%) have never provided free condoms though six of these sites said that they have sold condoms within the past six months. Fifty-two (85.3%) of the sites that have never distributed free condoms or have not distributed condoms recently said that they would be okay with providing free condoms. Of those sites with free condoms, 45.7% said that free condoms were always available, 31.4% said that condoms were never available and 22.9% said that condoms were only sometimes available. There were no hotspot sites that had ever distributed free lubricant packets or sold lubricants. However, 52 (78.8%) said that they would be okay with distributed free lube. Many of these sites requested that we bring them both condoms and lube to distribute at their venues.

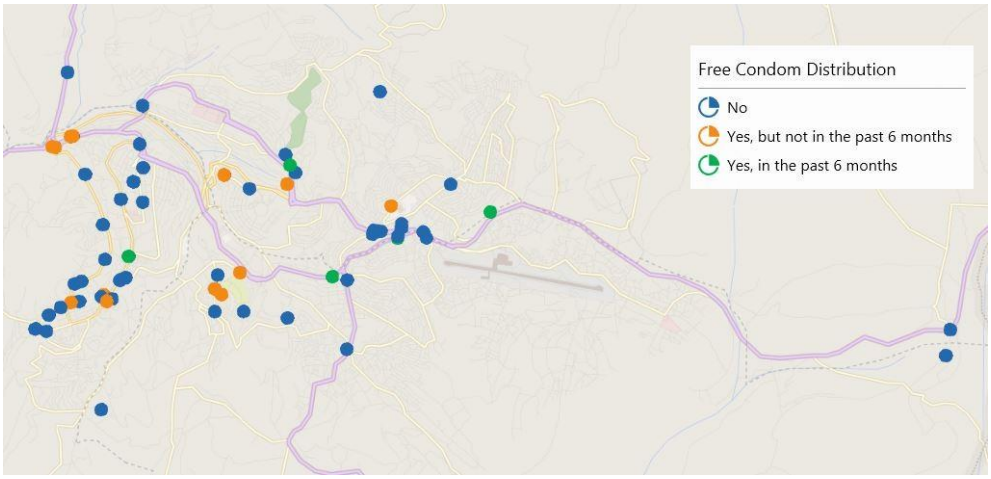

Figure 8. Map of free condom distribution at MSM hotspots in Kigali, Rwanda

Only 5 (7.6%) hotspot sites had ever conducted HIV sensitization activities, with only 3 of those sites have conducted HIV sensitization recently. One site had conducted HIV sensitization activities adapted

for MSM in the past six months. Similarly, only 4 (6%) sites reported ever having conducted HIV testing activities at their venues. However, we do know that some of the sites that said no to this question have had HIV self-test kits distributed by PSF during testing campaigns. We found MSM to corroborate site informant data and provide additional insight at 23 hotspot sites.

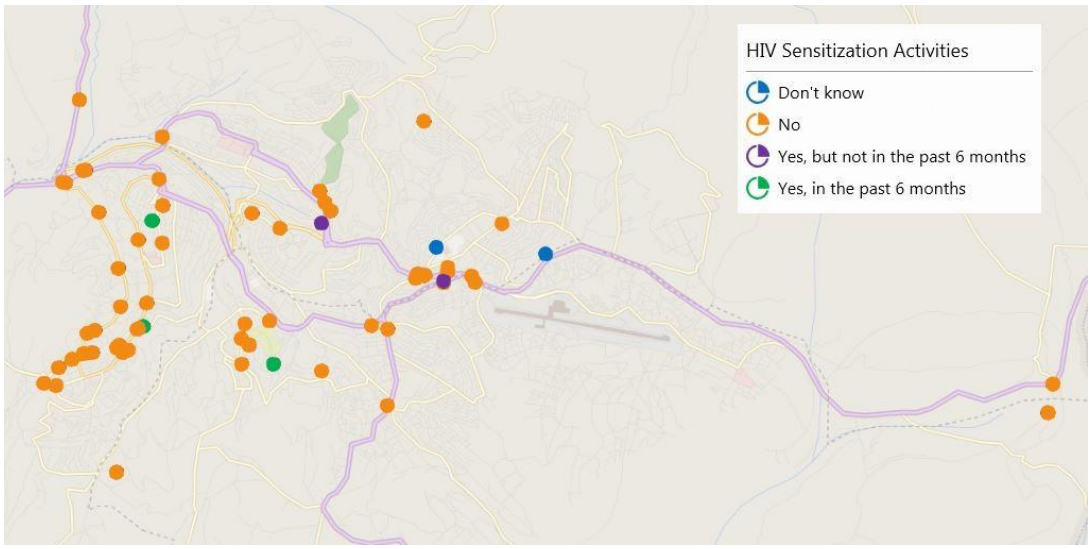

Figure 9. Map of hotspots that have conducted HIV sensitization activities in Kigali, Rwanda

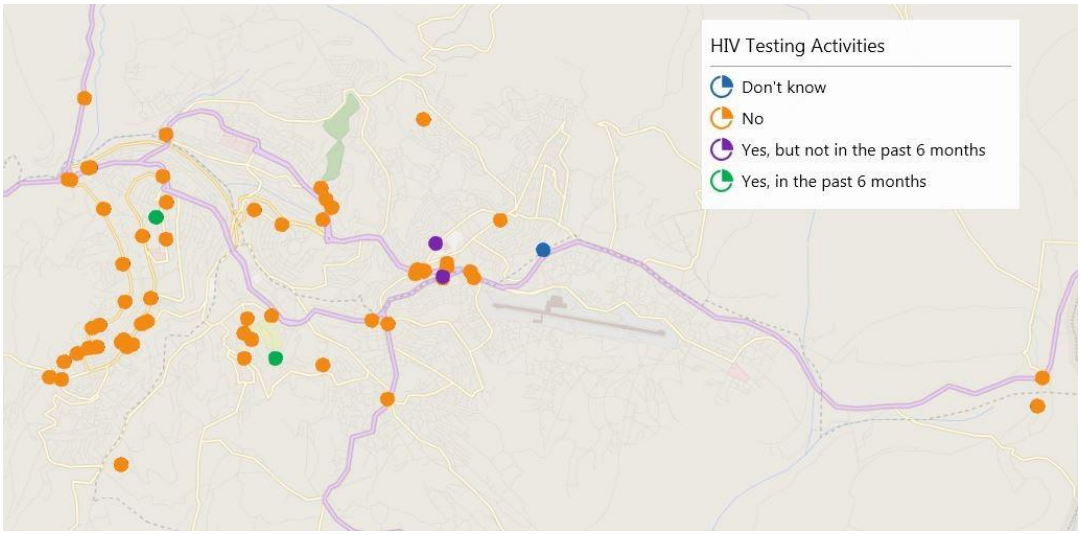

Figure 10. Map of hotspot that have conducted HIV testing activities in Kigali, Rwanda

Conclusions

These data are very are informative to the national HIV program as they provide valuable information for HIV programming for MSM in Kigali, and that could inform HIV programming for MSM in the whole country as well.

First, this study has demonstrated that men who have sex with men in Kigali have high HIV prevalence compared to the general adult male population in Kigali and Rwanda. In fact, the HIV prevalence among men aged 15-59 is around 2.2% in Rwanda and estimated to be 4.6% in urban areas including Kigali [5]. Additionally, these men face an even higher STI burden as 1 in 5 participants of this study was diagnosed with a prevalent STI infection. These findings coupled with the low consistent condom use found in the study are a strong evidence of high transmission and acquisition risk among MSM in Kigali, Rwanda.

The high proportion of participants in this study who report recent and current sexual encounters with women show that the epidemic of HIV among MSM in Kigali should not be considered as isolated. However, this suggests that HIV infections can spread from the MSM community to the broader population in Kigali and vice versa. Thus, optimizing HIV prevention and treatment services for MSM will not only be beneficial to the MSM community but to the overall HIV epidemic in Rwanda.

Another important contribution of this study is the estimation of HIV care cascade among MSM in Kigali. This study has demonstrated that the biggest gap in the care cascade is in the first 90 (of the 90-90-90 UNAIDS target) of the HIV care cascade that stipulates that 90% of all people living with HIV should know their status by 2020 [10]. In this study, only 61% of participants who live with HIV were aware of their status, which represents a gap of 29% to achieve the first 90 among the MSM population in Kigali. Fortunately, we have also found that when MSM are diagnosed; they successfully get linked and retained in care and treatment services as evidenced by the high level of ART uptake (98%) and viral suppression (75%) among participants who knew their HIV positive status before enrollment in the study. This suggests that optimization of HIV testing services for MSM will also be beneficial to the two other components of the care cascade among MSM in Kigali, Rwanda.

This study also contributes to better understanding of individual level and structural level determinants of HIV among MSM in Kigali. Key individual level factors identified include low levels of condom use during sex with both male and female partners. Proper lubricant use during anal sex is also still low, as a third of MSM reported using other forms of lubricants than the recommended commercial water-based lubricants. HIV transmission related knowledge is also another area that could be improved. The findings of this study show that HIV comprehensive knowledge is still suboptimal. As reported here, many MSM in Kigali think that vaginal sex carries higher HIV risk compared to anal sex; additionally, knowledge on proper lubricant use is low. This could be improved through HIV campaigns by leveraging existing services including PSF and HDI key population programs as well as MSM

associations. The high proportion of technology use among MSM in Kigali also provide an interesting potential route to reach MSM with messages HIV prevention and treatment. Regarding structural determinants, this study has demonstrated that MSM in Kigali face significant levels of perceived healthcare related stigma as well as stigma from families, friends and uniformed officers. We have also found high proportions of self-reported physical and sexual violence related to MSM identity. Given the known effects of structural level determinants on the HIV risk of MSM and key populations in general, these findings reinforce the need for structural interventions including stigma mitigation interventions to optimize HIV outcomes among MSM in Rwanda.

Finally, the data from the mapping phase of this study have identified areas where MSM hotspots are mainly located and that could be targeted with HIV prevention, treatment, and care services for MSM in Kigali. These are Nyamirambo (particularly in the Cosmos area), Nyabugogo, Gikondo, Remera and Kacyiru.

A large gap found during this mapping phase was in lubricant availability, both in healthcare and hotspot sites. Very few healthcare sites provide free lubricants, and those that do, suffer from frequent stock outs. They find themselves limiting the number of lubricant packets that someone can take, which means lubricants are likely not being used for every instance of sex. Along with widespread free lubricant distribution at healthcare sites and hotspots, condom availability is another important piece of a comprehensive HIV- prevention program for MSM. Currently, condoms are most often not available at sites where men meet new sexual partners, and where sex often occurs. We recommend optimization of condom and lubricant distribution in places where MSM meet with sexual partners and in healthcare sites. Lastly, we found that many of the health centers in Kigali where MSM frequently congregate have not received training on MSM. It would be a good step moving forward to ensure that the Ministry of Health and Rwanda Biomedical Center conduct MSM-specific training at all sites that provide healthcare services for MSM.

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