Programmatic Mapping and Size Estimation of Key Populations in South Africa: Sex Workers (male and female), Men who have Sex with Men, Persons Who Inject Drugs and Transgender People

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FINAL REPORT

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ABBREVIATIONS AND ACRONYMS

AIDS	Acquired immunodeficiency syndrome
CEP	Corridor Empowerment Project
CIs	Confidence Intervals
EAs	Enumeration areas
ECGLA	Eastern Cape Gay & Lesbian Association
FSRS	Free State Rainbow Seeds
FSWs	Female Sex workers
FWA	Federal-wide Assurance
GIS	Geographic Information System
GPS	Geographic Positioning System
HAST	HIV/AIDS, STIs and TB research programme
HCT	HIV Counselling and Testing
HIV	Human immunodeficiency virus
HSRC	Human Sciences Research Council
IBBSS	Integrated Biological and Behavioural Surveillance Surveys
IDU	Injecting Drug Use
LGBTI	Lesbian, Gay, Bisexual, Transgender and Intersex
MRA	Mapping readiness assessment
MSM	Men who have sex with men
MSWs	Male Sex Workers
NGOs	Non-governmental organisations
NSP	National Strategic Plan
OHRP	US Office for Human Research Protections
PEP	Post-Exposure Prophylaxis
PLACE	Priorities for Local AIDS Control Efforts
PMTCT	Prevention of Mother to Child Transmission
PPS	Probability Proportional to Population Size
PWIDs	Persons who inject drugs
RDS	Respondent Driven Sampling
REC	Research Ethics Committee
RMDC	Research Management and Data Centre
SANAC	South African National AIDS Council
SANCA	South African National Council on Alcoholism & Drug Dependence
SCM	Supply Chain Management
SHE	Social, Health and Empowerment Feminist Collective
STIs	Sexually Transmitted Infections
SOP	Standard Operating Procedures
SWEAT	Sex Worker Education and Advocacy Taskforce
SWs	Sex workers
TAC	Technical Advisory Committee
TG	Transgender
TIA	Transgender Intersex Africa
UK	United Kingdom
UCSF	University of California, San Francisco
UN	United Nations
USA	United States of America
VMMC	Voluntary Medical Male Circumcision

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EXECUTIVE SUMMARY

Introduction

Sex workers (SWs), men who have sex with men (MSM), transgender (TG) people and persons who inject drugs (PWIDs) are referred to as key populations. Key populations exist in every region of the world but their numbers are often unknown. Local evidence suggests that key populations are also greatly affected by HIV, and proportional to their size bear disproportionate burden of HIV infections – indicating that HIV preventions to date have not reached and benefited these individuals.

Aim

The overall aim of the programmatic mapping and population size estimate study was to provide a national size estimate for SWs, MSM, PWIDs and TG people as well as provide information on HIV service availability (e.g., condom distribution, HIV testing) in order to develop programs that address the needs of key populations as part of the National HIV response.

Methodology

Prior to the programmatic mapping and size estimate study, a mapping readiness assessment (MRA) was conducted. The overall purpose of a MRA was to guide the study design in order to protect the safety, well-being and confidentiality of individuals and key population groups from unintended consequences of programmatic mapping and size estimation.

The study adapted the Priorities for Local AIDS Control Efforts (PLACE) programmatic mapping methodology for estimating the size of key populations. The PLACE method involved the listing and consequent mapping of sites in selected geographic areas where key populations can be found.

The study participants included:

i. Members of key populations: MSM, SWs (male and female), PWIDs and TG people were (i.e. transmen and transwomen) consulted during formative phase of the study.
ii. Community informants were men and women aged 18 and older in the selected sub-districts/ zones that were knowledgeable about the area.
iii. Site informants were men or women aged 18 and older who were identified during visits to sites named by community informants (above). These were people knowledgeable about the sites and/or members of key populations at sites.

iv. Patrons and members of key populations were men or women aged 18 and older who visited the site on the day of the interview, and were primarily interviewed during the final phase of the study.

The PLACE protocol was implemented in four steps (see Figure 1, includes realized numbers at each step)

Step 1 involved selecting areas (or sub-districts) for study implementation, and demarcating study zones. A sample of 25 sub-districts were selected using systematic probability proportional to population size (PPS) method from a list of 264 sub-districts in South Africa.

Step 2 involved conducting interviews with community informants in the study zones to identify sites where people including members of key populations meet new sex partners.

Step 3 involved observation visits to sites identified in step 2 to conduct interviews with site informants. The sites informants were people knowledgeable about the sites and include site mangers or owners of bars, dance clubs as well as patrons and members of key populations. Site informants provided information on the number of key populations who visit the site, type of activities occurring at the sites, extent of HIV prevention activities onsite including condoms, posters and testing and willingness to offer HIV testing.

Step 4 involved interviewing patrons and members of key populations at selected sites verified in Step 3. During step 4, patrons who identified as any one of the following key populations (SWs, MSM, transwomen, transmen and PWIDs), were also asked to complete a Behavioural questionnaire. They also provided information about the frequency of visits to the sites and whether they visit multiple sites in a day.

The study validation was done through different procedures:

i. Conducting step 4 interviews with members of key populations onsite
ii. Indirect validation through asking key populations met during Step 3 interviews about other public places they had visited and/or were planning to visit in the same day to socialize, drink alcohol or look for a person to have sex with.
iii. Indirect validation through asking members of key populations met during step 3 interviews about their frequency of visits to sites.

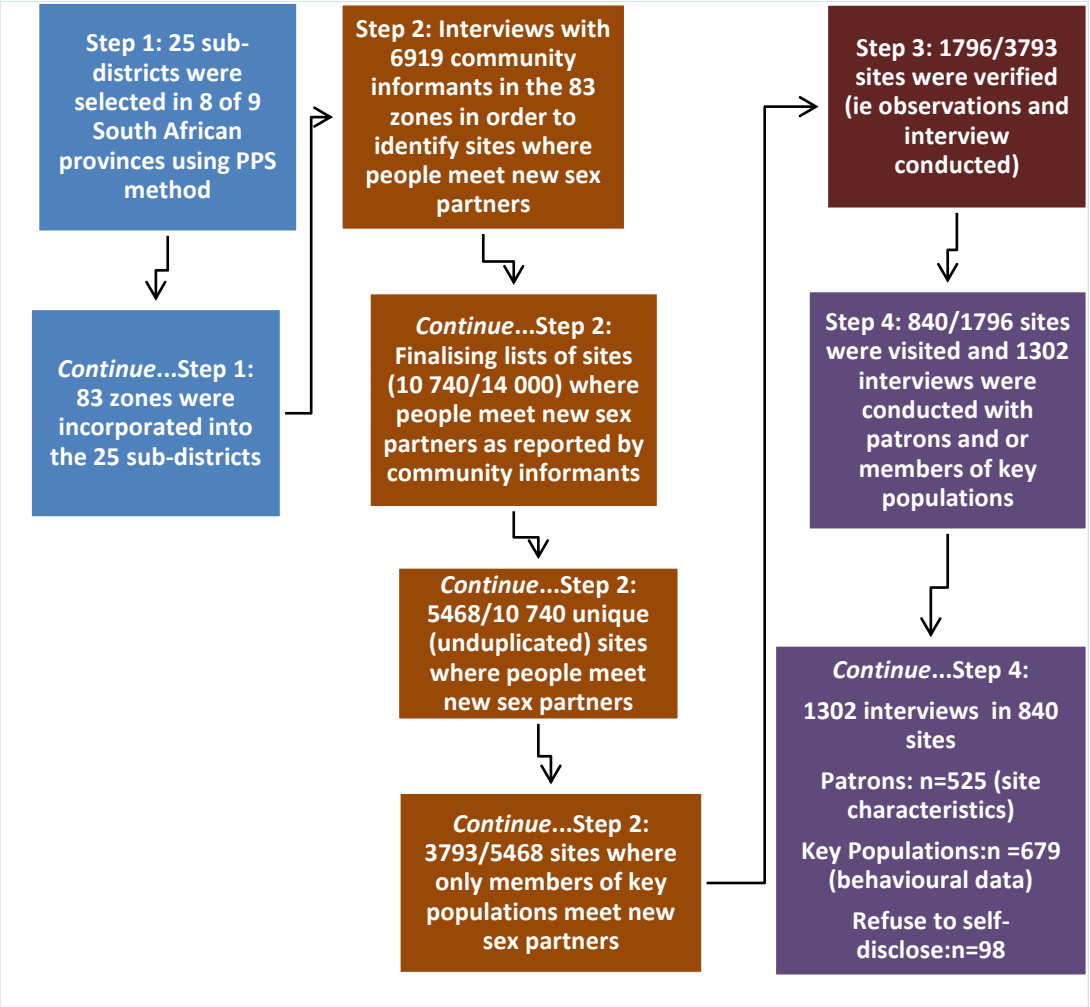

Figure 1. Summary of adopted PLACE protocol

Size estimation based on programmatic mapping data: Systematic programmatic mapping was used for estimating the number of patrons and/or key populations who visit identified sites in mapped sub-districts or areas. The method gives an estimated number that could be reached by service delivery providers working with key populations in the mapped areas.

For each key population, size estimates were derived as follows:

i. Obtain the average number of key populations per sites per sub - district based on the recorded number of key populations who visit the sites obtained during site verification. Cases where samples were too small for calculating the average were left out. In addition large outlying values were checked to avoid inflating the values.
ii. Multiply the average key population per site with the number of key population sites based on community informants. This resulted in an initial district estimate.
iii. Adjust the initial estimate for the frequency of visits to sites, multiple sites visits, and for estimates of key populations not visiting mapped sites (where necessary).

iv. Extrapolate the adjusted estimates in mapped districts to include unmapped districts by applying the sampling weight, and summing to get the final total size estimate.

v. Discussion on size estimates with TAC lead to final plausible size estimates for programming and monitoring and evaluation.

Adjustment for frequency of visits

Due to varying trends across sites, one would expect inconsistency in the number of key populations that visit all sites. The level of activity at a site also varies on different days of the week, and key populations may visit certain sites more infrequently than other sites on different times. If key populations visit sites less often than the period of recall during the period of observation, their probability of not visiting the site during the period of data collection is high.

In order to prevent undercounting of key populations, a formula was applied using data on the total number of key populations that were estimated during site verification and data on the frequency of visits to sites, which was derived from the Behavioural survey of key populations based on Form 3 (see appendix). Frequency of visits was restricted to seven categories: daily visits, 4 to 6 times per week, 2 to 3 times per week, once a week, 2 to 3 times per month, once per month and the first visit. Based on information on frequency of visits in Form 3 we assumed 12 busy days per month in developing a weight factor such that those who visit sites infrequently were given a greater weight compared to those who visit frequently. The formula applied for adjusting the frequency of visiting sites is:

$E_i = C_i \sum_{f=1}^{7} \left(P_f \times f_p \right)$, Where

E_i : Estimate total of key population in sub-district *(i)* after adjustment for the frequency

C_i : Estimated current key populations in sub-district *(i)* recorded during site verification

P_f : Proportion of key populations visiting the sites in sub-district (*i*) with the frequency f_p

Adjustment for multiple visits applied two approaches:

a) Size estimation formula from the University of Manitoba, adopted in programmatic guidelines by Global Fund (2010),

$S_i = E_i \left(1 - P_i\right) + \left(E_i * P_i / M_i\right)$ where

S_i : Adjusted estimated of the key population in a sub-district *(i)*

E_i : Frequency adjusted estimate summed in sub-district *(i)*

P_i : Proportion of key population who visit multiple sites in sub-district *(i)*

M_i : Mean number of places visited by key population who visit two or more sites

The formula is reasonable because it counts all of who are only at one place and for the ones who go to more places; the percentage of that group is reduced because the people might have counted at more than one place. This site based estimated reflect the number of people who visit sites and not the entire population.

b) Parallel adjustment approach used in Nepal size estimation study (HSCB and NCASA 2011, Saidel and colleagues (2010).

$S_i = E_i - 1/2(D_i)$ where

S_i : Adjusted estimated of the key population in a sub-district *(i)*

E_i : Frequency adjusted estimate summed in sub-district *(i)*

$D_i = (W_i * E_i)$: Estimate of key population who visits multiple sites in sub-district (i)

W_i *:* Weighted proportion of key population operating from multiple sites

Adjustment for estimates of populations not visiting mapped sites

We derived multipliers or inflation factors for correcting the sizes so as to account for those that remain online and hidden/ or do not visit the mapped sites. Maghsoudi et al.(2014) notes that underestimation of size of the hidden groups can be substantial (3 to 4 times). Such biases are more prominent in the size estimation of "hard-to-reach" population groups such as MSM, PWIDs and MSWs because of the stigma involved in MSM behaviours. This is particularly relevant to countries located in Africa.

Ideally, adjustments using multipliers should be made on the basis of the findings of a broader survey of key populations that would highlight the percentage (P) of key populations who would prefer visiting public places or meeting partners in private places. In absence of such a proportion, the proportion of reported key populations who say they accessed the services over the same time period, based on survey samples obtained from respondent driven sampling (RDS) surveys believed to be more representative of the venue-based key population can also be used (Yu et al. 2014). The inverse of that proportion is the multiplier (K=1/P).

The multiplier tells how many more key population members in a given area have not accessed services in the given time period, or how may more key populations members in a given area do not visit mappable sites. Caution is needed in interpretation of size estimates using multipliers based on service accessibility, as they are likely to lead to overestimation. The results should be considered an improvement upon on the original estimates.

Multiplier is a mathematically simple and straightforward method applied using ratio estimation techniques (Kish 1986), but it requires good benchmark data. In ratio estimation, national figures are used as benchmark to adjust for underestimation in national survey data analysis (Kish 1986). In this study, the key population estimates after adjusting for frequency of visits and multiple visits were taken as benchmark data. For details of applications using similar adjustments for hidden populations in size estimation studies in different countries see (Saidel, Loo, Salyuk, Emmanuel, Morineau, et al. 2010; Yu et al. 2014).

The following multipliers, for each key population, were derived based on the following assumptions:

- SWs: Multipliers based on assumed 95% of SWs visiting public venues were based on previous SW size estimates that excluded 5% that visit private venues.
- MSM: Multipliers based on 8% - 20% of MSM who never used condom based on a recent IBBSS RDS study on MSM in South Africa.
- PWIDs: Multipliers based on an assumed 80%, from UNAIDS (2012), country reports that showed that nearly 70 - 80% of PWIDs reached in surveys in 49 capital cities had access to safe injecting equipment.
- Transgender: No multiplier

The formula was applied to adjust for hidden population is provided below:

$R_i = S_i \times K$ Where

R_i : Adjusted estimate in sub-district (i), used as benchmark data

S_i : The total size of key population after previous adjustments for sub-district *(i)*

K : Multiplier or inflation factor based on assumed proportions representing those visiting mappable sites if known or proportion based on service accessibility. The multiplier or inflation factor is estimated at national level, to avoid large regional variations, and applied at district level.

Finally extrapolating adjusted estimates to obtain an overall estimate

To extrapolate the adjusted estimates in order to obtain a total size estimate we adjusted for the sampling structure. This involved multiplying previous adjustments sub-districts estimates with the sub-district sampling weights to scale up the estimate according to the size and structure of the sample frame. The final total estimate for each key population was obtained by summing across all values.

Results: Size estimates

The size estimates found for each key population included in our study are summarized in Table 1. The female sex workers (FSWs) estimates were disaggregated by FSWs for cash and FSWs for goods and favours. The male sex workers (MSWs) estimates were also disaggregated by MSWs for cash and MSWs for goods.

Table 1. Size estimates for key populations in South Africa

Key Population	Estimates
Sex workers	**237 717**
Female sex workers(FSWs)	195 299
Male sex workers (MSWs)	42 418
Men who have sex with men (MSM)	**1 095 527**
Persons who inject drugs (PWIDs)	**75701**
Men	42 755
Women	32 946
Transgender People (TG)*	**139 666**
Transwomen	72 156
Transmen	67 510

***No adjustment for hidden population for transgender. For detailed size estimate ranges and percentage of adult population see Table 17**

Results: Programmatic activities

We asked site informants if any HIV prevention activities were made available to patrons visiting the site in the last 12 months. In particular we focused on the availability of condoms onsite, and if condoms are for sale at the site. Results revealed that free distribution of condoms and lube rarely happens at verified sites. According to sub-district data, condoms are freely distributed monthly in the following sub-districts: Ekurhuleni South (53.6%); Ndlambe (47.1%) located in the Eastern Cape province, Elundini (45.7%), and Ulundi (47.7%) sub-districts, both located in the province of KwaZulu-Natal and Eastern sub-district of Cape Town (40%). With regards to visibility of condoms as reported by interviewers, almost 40% reported that they were able to observe that the site possessed male condoms, only one-tenth of interviewers reported having seen female condoms onsite. The majority of site informants reported that patrons visiting the establishment were never tested for HIV onsite. Similarly the majority of site informants interviewed indicated that there has never been safer sex education conducted by peer educators, nor any visits by peer outreach workers or visits by a mobile clinic.

Conclusion

This study adapted PLACE – a recognized operational research methodology to identify sites where key populations meet new partners, complemented by formulas to estimate the size estimates for MSWs, MSM and PWIDs. The study has achieved its aim of providing a national size estimate for key populations including SWs, MSM, PWIDs and TG people in South Africa.

Overall, the size estimate for FSWs in this study was higher than that of a previous study (205 240 vs. 182 000) conducted in South Africa in the past three years. As there was no previous study estimating the size of MSWs in South Africa, this study provided baseline estimates (45 772 and 55 868) for MSWs in exchange for cash and in exchange for goods and favours respectively.

The upper range of the size estimate for MSM in this study was slightly lower than that of a previous study (1.17 million vs. 1.2 million) conducted in this population in South Africa. The size estimate for PWIDs was derived by gender with women PWIDs estimates of 31 489-34 402 and men PWIDs estimate of 41 374 - 44 135. Overall these estimates are higher than that found in a previous size estimate of 67 000. As there was no previous study estimating the size of TG people in South Africa, hence this study provided baseline estimates (76 554 and 74 891 for transwomen and transmen respectively. This equates to 0.4% of the adult female and male population 15 years and older.

The study also provided programmatic data on HIV service availability for condom distribution and other HIV prevention services for key populations in selected sub-districts of South Africa. In conclusion, this study serves as an important tool to develop programmes that addresses the needs of key populations as part of the national HIV response in South Africa.

1. INTRODUCTION

1.1 HIV in South Africa

In South Africa, 6.4 million people currently live with HIV (Joint United Nations Programme on HIV/AIDS 2012, Shisana et al. 2014). This represents the largest number of people living with HIV (PLHIV) found in a single country in the world. As in many other countries found in the Southern African region, HIV is hyper endemic and generalized. In South Africa the HIV epidemic is heterogeneous with wide variations in HIV prevalence across age and sex (see Figure 1), race, socio-economic status, and geographical location (Shisana et al. 2014). Females have a much higher HIV prevalence than males (14.4% vs. 9.9%, p <0.001) (Shisana et al. 2014).

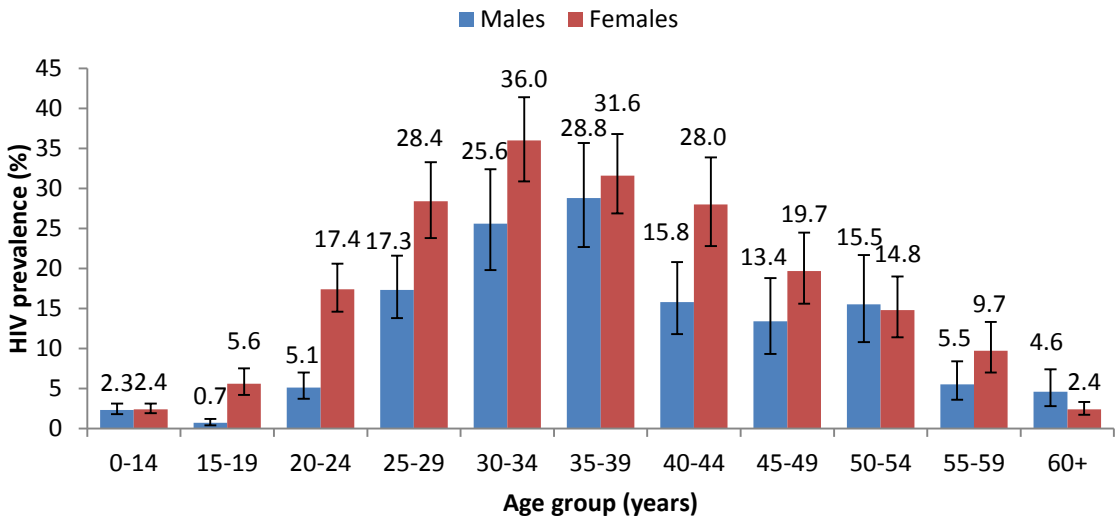

Figure 2. HIV prevalence by sex and age, South Africa 2012

(Source: Shisana et al. 2014)

In the South African National Strategic Plan (NSP) on HIV, STIs and TB for 2012-2016, up to 18 different groups of people were classified as key populations vulnerable to HIV infection and prioritized in the national response (SANAC 2011). These include, among others, young women aged 15 to 24 years, people who live in informal settlements, uncircumcised men, people with disabilities, MSM, SWs and their clients, people who abuse alcohol and drugs (SANAC 2011). According to UNAIDS (2011) guidelines, MSM, TG people, PWIDs, and SWs are known as key populations at higher risk of HIV exposure.

Key populations such as MSM, SWs, TG people and PWIDs exist in every region of the world, in every country, and are often marginalized by society and are greatly affected by discrimination and stigma (Desmond Tutu HIV Foundation 2011). In fact globally, key populations have been shown to be at disproportionate risk for HIV infection (SANAC 2011)

(p.25). In addition these populations are often neglected in terms of necessary HIV resource allocation.

High levels of prejudice and moral loading have been shown to create barriers for key populations to accessing prevention, treatment, care and support – increasing vulnerability to HIV (Desmond Tutu HIV Foundation 2011). On the contrary, the uptake, access and utilization of services focusing on these key, marginalized populations is significantly better within environments where non-discriminatory services are provided and legal frameworks and policy provide enabling environments (Desmond Tutu HIV Foundation 2011). Hence, in addition to being most likely to be exposed to, or to transmit, HIV and/or TB, most often, conventional key populations include those who lack access to services, and for whom the risk of HIV infection and TB infection is also driven by inadequate protection of human rights, and by prejudice (SANAC 2011). Often actions addressing their specific health needs are absent. It is for these reasons that key populations fall under the category of underserved populations (Baral et al. 2012, Batist et al. 2013).

1.2 South Africa strategy and HIV prevention approach

Much focus has been placed on the high HIV prevalence rates among women and youth in South Africa. Yet, local evidence suggests that key populations are also greatly affected by HIV, and proportional to their size these populations bear disproportionate burden of HIV infections – indicating that HIV preventions to date have not reached and benefited these individuals (Desmond Tutu HIV Foundation 2011) (See Table 2). Gouws and Cuchi (2012) estimated that key populations contribute to about 26% of new infections in South Africa.

Table 2. HIV prevalence in the general population compared to HIV prevalence estimates for key populations

Population group	HIV prevalence	Source
General population HIV prevalence estimate (men and women aged 15 –49)	12%	(Shisana et al. 2014)
MSM	10 - 50%	(Lane et al. 2014, Cloete et al. 2014, Baral et al. 2011, Burrell et al. 2010, Rispel et al. 2011)
SWs	56.2 - 63.1%	(Baral et al. 2012)
PWIDs	9 -19.4%	(Scheibe, Brown & dos Santos 2015, Petersen et al. 2013)

Hence, key populations need to be explicitly included in the National HIV response of South Africa. In order to manage the South African HIV epidemic, government and civil society

must not only respond to HIV within the general population but must also develop focused programmes that address the needs of key populations such as MSM, SWs, PWIDs and TG people (Cloete et al. 2014). Without considering these key populations, any response to HIV in South Africa will prove inadequate and fruitless.

The 2012-2016 National Strategic Plan (NSP) for HIV/AIDS, STIs and TB of South Africa calls for a more concerted action in our national response to include key populations such as MSM, SWs, TG people and PWIDs. However, we have been handicapped in both our policy-making and government - led programme development for key populations due to scant evidence-based information. Although in recent years there have been significant strides made with regards to research and appropriate services for MSM and SWs, research and HIV prevention programmes tailored to the specific HIV prevention needs for PWIDs and TG people remain few and far between. Hence this study was undertaken as a first step to direct the necessary HIV prevention resources to these often neglected (and often underserved) populations. These size estimates will be strategically used for the implementation and monitoring of HIV prevention programmes as well as treatment and counselling services.

1.3 Current size estimates of key populations in South Africa

To date, extrapolated data sourced from the national 2008 HIV Household Survey (Shisana et al. 2009) and the study conducted by Dunkle and colleagues (2013) has been used to estimate the size of the MSM population in South Africa. Size estimates based on extrapolated data estimated a national estimate of 1.2 million MSM (McIntyre et al. 2013). Similarly, Petersen et al. (2013) provided size estimates of 67 000 for PWIDs in South Africa using data extrapolated from the national 2008 HIV Household survey.

The validity of such estimates based on national population based surveys relies on the acceptance of talking about same sex experience. MSM in population based surveys are usually identified by self-reported sexual contact with other men, either during lifetime or during more recent time periods (Marcus et al. 2013). Men who are ambiguous about their desire to have sex with other men, who are sexually abstinent or who have predominantly heterosexual contacts will only partly self-identify as MSM in such surveys, and the willingness to report homosexual contacts or sexual preferences depends on the wording of questions, survey methods and settings(Marcus et al. 2013). Some level of underreporting of stigmatized behaviour will therefore inevitably persist, and the proportion of the male population that can be identified as MSM in surveys is strongly dependent on the social acceptance of same sex sexual relations and may thus change over time and differ between countries and regions.

Current sex work size estimate is based on rapid assessment study based on the “Wisdom of the Crowd” (UCSF, CDC, UCT & ANOVA 2013, Jonas, Patel) using multiple data collection

methods including mapping (Centre for Global Public Health 2012), focus group discussions and interviews, and mathematical modeling. The SW size was estimated at a minimum level of 132 000, at an intermediate level of 153 000 and at a maximum level of 182 000 (SWEAT/Impact Consulting 2013). The National Sex Worker Size Estimate Study was conducted together with the SANAC Secretariat and the SANAC Sex Worker Sector and various other organizations providing advocacy and services for SWs (Table 3).

Table 3. Current size estimates for key populations in South Africa

Key Population	National size estimates	Source
MSM	1.2 million	(McIntyre et al. 2013)
SWs	132 000-182 000	(SWEAT/Impact Consulting 2013)
PWIDs	67 000	(Petersen et al. 2013)

Source: (Global Fund. Terms of reference for size estimations and programmatic mapping of key populations in South Africa)

We currently do not know the number of TG people in South Africa. This study was undertaken to fill this information gap, not only for TG people, but also for MSM, SWs and PWIDs.

According to Weir and colleagues (2003, 2004) programmatic mapping can be used to generate key population size estimates. Key population size estimates can be used to determine resource needs, programme planning and resource allocation (Weir et al. 2003, Weir et al. 2004). This methodology, involves spatial data collection by systematically identifying sites (physical structures, public spaces, and internet-based) where key populations may be found, estimating the number of people that may be found at each site, and documenting health and wellness services in relation to these locations. As described by the Global Fund:

> "*The aim of this process is to improve program coverage by ensuring services are located where they are needed most". Programmatic mapping can be conducted using a variety of methods including the PLACE (Weir et al. 2003, Weir et al. 2004) methodology and time - location sampling (Sabin, Johnston 2014, Karon, Wejnert 2012, Csete, Cohen 2010, Ferreira et al. 2008). It should be noted that size estimation based on programmatic mapping does not estimate the total number of key populations in an area/sub-district/country. Size estimation based on programmatic mapping estimates the number that could be reached by service delivery providers working with key populations in the area.*

1.4 Overall aim of the study

The overall aim of the study was to provide a national size estimate for SWs, MSM, PWIDs and TG people as well as to provide programmatic data on HIV service availability (e.g., condom distribution, HIV testing) for key populations in each of the selected sub-districts in South Africa.

1.5 Objectives of the study

1. To describe where HIV prevention programmes for SWs, MSM, PWIDs and TG people in South Africa are located and lacking through systematic mapping of services in selected districts around identified sites.
2. To conduct the size estimation of SWs, MSM, PWIDs and TG people in South Africa based on programmatic mapping.

2. METHODOLOGY

2.1 Study setting and sampling of districts

This was a national study and all research activities took place at sub-district level. The sampling follows South Africa geographical structure organized into 9 provinces, 8 Metropolitan Municipalities (Metros) and 44 District Municipalities (non-metros). The district municipalities are subdivided into local municipalities. The metros and the local municipalities are further subdivided into wards.

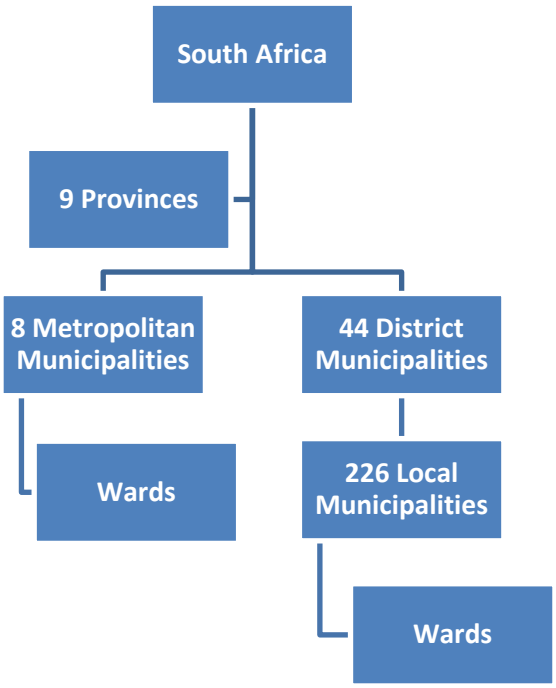

Figure 3. South African system of geographical hierarchy

The sampling frame consisted of 264 sub-districts, of which 226 are local municipalities and 38 are local-structures (larger than wards or consisting of several wards) within the 8 Metros. The sampling unit is the sub-district, selected because programs that will use the findings are organized at the sub-district level, as confirmed by the Technical Advisory Committee (TAC) of the study.

To ensure that the sample covered 15% to 20% (8 million to 10 million) of the South African population, a sample of 25 sub-districts was obtained using systematic probability proportional to population size (PPS) method. Population sizes for each sub-district, updated to reflect population sizes in 2014, were used for the sample selection. Stratification was done by category of the sub-district (Metro or Non-metro or Local municipality). This resulted in 11 Metros and 14 Non-metros, with a total population of approximately 11 million. It was reasonable to base sample selection on the population size because the main objective of the research is to estimate the size of key populations at the

national level. The weighted sample obtained via systematic PPS sampling will simplify extrapolation of sizes to include unmapped areas.

2.2 Study population

The following study populations were included in the study:

i. During the formative research phase, members of key populations were asked about the study in stakeholder meetings and consultations. Four key populations were consulted: MSM, SWs (male and female), PWIDs as well as TG people (i.e. transmen and transwomen).

The following working definitions recognized by United Nations (UN) agencies for four key populations (Global Fund/PEPFAR 2015)[1].

- PWIDs: Men or women who have injected any time within the past 12 months. Those who have self-injected medicines for medical purposes only are excluded.

- Sex worker (from the UNAIDS Guidance Note on HIV and Sex Work): "Female, male and transgender adults and young people who receive money or goods in exchange for sexual services, either regularly or occasionally". This definition includes those who occasionally exchange sex for gifts. It does not include people younger than 18.

  Operational definitions for SW in the study:
  Sex for cash:

  a. *Do women, aged 18 or older who sell sex for money come to this site?*
  b. *Do men, aged 18 or older who sell sex for money come to this site?*

  Sex for goods and favours:

  a. *Some women sell sex for money, some women sell sex for goods and favours. Have you seen any of the women here sell sex for goods or favours? By goods and favours' we mean for example selling sex for airtime, a ride home, drinks, etc.*

  b. *Some men sell sex for money, some men sell sex for goods and favours. Have you seen any of the men here sell sex for goods or favours? By goods and favours we mean for example selling sex for airtime, a ride home, drinks, etc.*

[1] See Appendix 10.3 (data collection forms used in the study) for definitions used of key populations during the

- MSM is an abbreviation used for ‘men who have sex with men’ or ‘males who have sex with males’. The term ‘men who have sex with men’ describes males who have sex with males, regardless of whether or not they have sex with women or have a personal or social gay or bisexual identity.

- Transgender people: Individuals whose gender identity and/or expression of their gender differ from social norms related to their gender of birth. The term transgender person describes a wide range of identities, roles and experiences which can vary considerably from one culture to another.

ii. Community informants in the selected sub-districts: These were men and women aged 18 and older in the selected sub-districts that were knowledgeable about the area. Community informants included members of key populations, taxi drivers, and hairdressers, bar owners, men and women on the street, police, and other groups who are likely to be knowledgeable about where people meet new sexual partners. Community informants were identified by interviewers. Targets were set for the number and type of community informants to be interviewed in each sub-district. Community informants were asked to name places in the area where people go to meet new sex partners.

iii. Site informants in the selected sub-districts were men or women aged 18 and older who were identified during visits to sites named by community informants (above). On the day of the interview, a person who was knowledgeable about the site was interviewed. These included the site manager or owner, a member of a key population and/or patron who was present on the day of the interview.

iv. Patrons and members of key populations interviewed during the validation study. These were men or women aged 18 and older who visited the site on the day of the interview (i.e. Step 4).

2.3 Mapping readiness assessment

A mapping readiness assessment (MRA) was conducted before implementation of the programmatic mapping and size estimate study. The MRA was aimed at providing information to guide the study in ensuring the safety, well-being and confidentiality of individuals and key population groups from unintended consequences of programmatic mapping. Stakeholder meetings and consultations were organized to gather perspectives from service providers and members of key populations regarding the programmatic mapping and size estimate study.

The specific objectives of the MRA were to:

1. Identify different subcategories of SWs, MSM, PWIDs and TG people that should be included in the size estimate study
2. Identify the risks involved with programmatic mapping and create a plan to address each risk identified
3. Identify the key community partners for the programmatic mapping and size estimate in each of the provinces
4. Assess what new relationships will need to be built to bring the community and mapping sites to the point of readiness

Hence, the overall purpose of the MRA was to help set the stage for a successful programmatic mapping study by identifying key people and places within the community and strengthening these partnerships. These relationships increases the likelihood that programmatic mapping data will be used in optimal ways once the mapping is completed to improve the availability of health services for key populations.

We used an MRA protocol, developed by Prof Sharon Weir and colleagues based at the University of North Carolina, in the United States of America (USA). The MRA was conducted in the provinces of the Western Cape, Gauteng, Free State, North West, KwaZulu-Natal, Mpumalanga, Eastern Cape and Limpopo. In these provinces we held consultations (i.e. informal discussions or stakeholder meetings) with the South African National Council on Alcoholism & Drug Dependence (SANCA), the Sex Workers Education & Advocacy Taskforce (SWEAT), Free State Rainbow Seeds (FSRS), Lesedi-Lechabile Primary Care, ICAP-SA, TB/HIV Care Association, United Community Projects, OUT Wellbeing, Transgender and Intersex Africa (TIA), Centre for Positive Care, Sisonke, Lifeline Durban and the Durban Lesbian and Gay Health Centre. Consultations also involved programme managers of service providers for key populations as well as their clients (SWs, MSM, PWIDs and TG people) who access such services (See Table 4).

In addition, organizations working with key populations such as TB/HIV Care Association, SWEAT, Social, Health and Empowerment Feminist Collective (SHE) and TIA provided inputs and advice with regards to definitions used in the size estimate items in the data collection tools and finalization of definitions of key populations used in the study. All inputs and proposed definitions provided by the aforementioned individuals and organizations were incorporated into the final data collection tools.

Table 4. List of organizations included in the Mapping Readiness Assessment

Province	SWs	MSM	PWIDs	TG
			SANCA	
Western Cape	SWEAT		City of Cape Town Health	
Gauteng	SWEAT	United Community Projects	OUT	TIA
Free State	ICAP-SA	ICAP-SA		
	FSRS	FSRS		
	Lesedi-Lechabile Primary Care			
North West	Centre for Positive Care			
KwaZulu-Natal	TB/HIV Care Association	Durban Lesbian and Gay Health Centre	TB/HIV Care Association	
	Sisonke			
	Lifeline Durban			
	Project Empower			
Limpopo		Limpopo Lesbian, Gay, Bisexual, Transgender, Intersex (LGBTI) "Proudly Out"		
Eastern Cape	Trucking wellness centre of the Corridor Empowerment Project (CEP)	ICAP-SA		
	TB/HIV Care Association	Eastern Cape Gay & Lesbian Association (ECGLA)		
		Rainbow Blood (University of Fort Hare)		

2.4 Priorities for Local AIDS Control Efforts (PLACE)

Identifying sites where people and/or key populations meet new sex partners and describing the context where this happens is an important tool in HIV prevention. To identify sites, the PLACE programmatic mapping methodology was used (Weir et al. 2003, Weir et al. 2004). PLACE ensures all stakeholders are part of planning and implementation of the research projects, including the communities. The methodology involves spatial data collection by systematically identifying sites (physical structures, public spaces, and internet-based) where key populations may be found, estimating the number of people that may be found at each site, and documenting health and wellness services in relation to these locations in order to assess whether there are gaps in services (Global Fund/PEPFAR 2015). In addition to identifying gaps in current prevention programs, PLACE also enhances the

local use of findings to improve program delivery, and monitors program coverage over time using easy-to-understand indicators and coverage maps (Weir et al. 2002).

Figure 4 shows the four steps in adapted PLACE methodology and the realized numbers at each step.

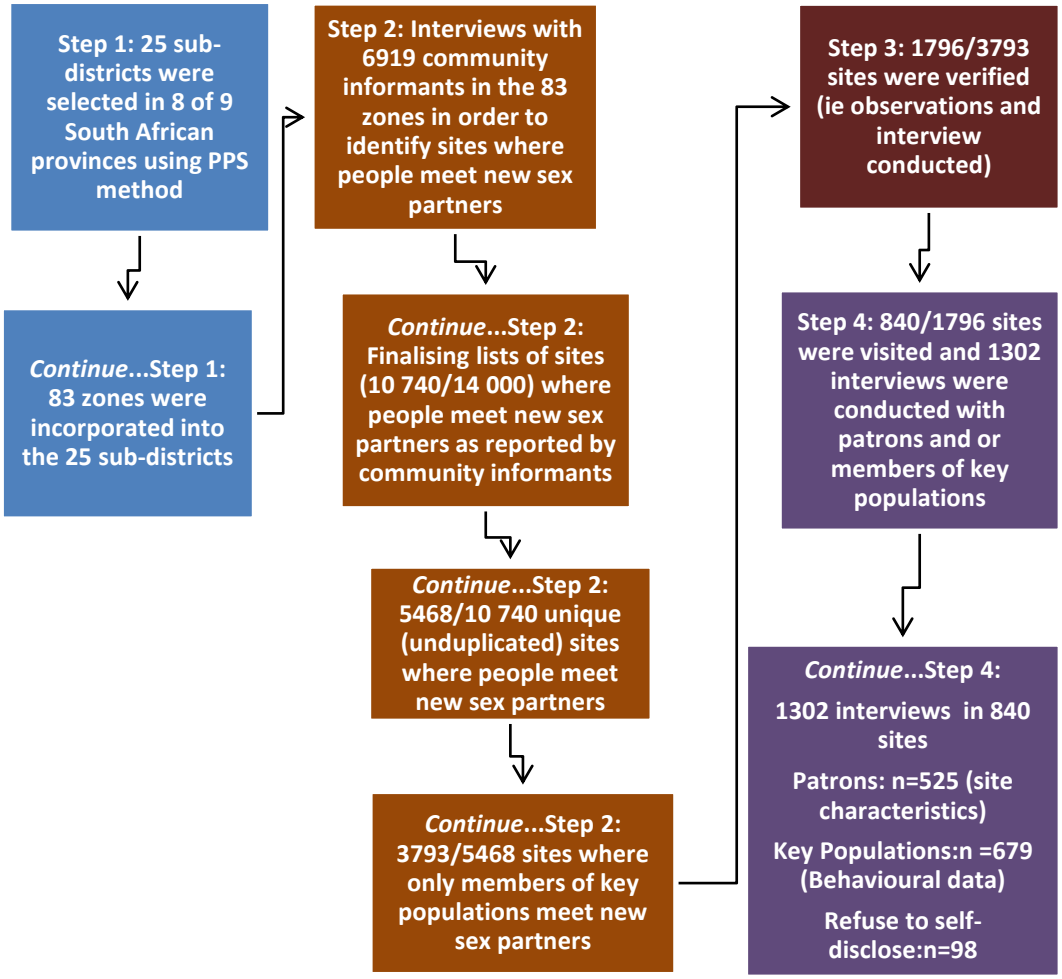

Figure 4. Summary of adopted PLACE protocol

Step 1: Selecting areas (or sub-districts) for study implementation, and demarcating study zones

Initial discussions regarding the programmatic mapping and size estimate study, estimated that we can map areas with a combined population of approximately 10 - 14 million. Fourteen areas were budgeted for with a population of a million people each. The objective was to sample areas that cover approximately 15% - 20% of the population of South Africa. Hence in order to map areas with a combined population of approximately 10-14 million people, it was estimated that interview data from approximately 14 000 community informant interviews had to be conducted in approximately 280 selected study zones (50 interviews per zone; each zone is comprised of a general population of 50 000 people). This may translate operationally into 20 – 30 urban, peri - urban, and rural municipalities.

Following these initial discussions, 25 sub-districts were sampled using systematic PPS method. Population sizes for each sub-district, updated to reflect population sizes in 2014, were used for the sample selection. Stratification was done by category of the sub-district (Metro or Non-metro or Local municipality). This resulted in 11 Metros and 14 Non-metros, with a total population of approximately 11 million. The 25 sub-districts were distributed across 8 of the 9 provinces in South Africa. These sub-districts cover large geographical areas; and they were further subdivided into zones. A zone was made up of 3 or 4 neighbouring wards with a total population of approximately 50 000 people. The selected sub-districts and zones were mapped using ArcGIS[2] to generate maps including the outline maps of each sub-district for fieldwork teams to use during site verification. The 25 sub-districts incorporated 83 zones. The number of zones for a sub-district was determined by the population in the selected sub-district (See Table 5).

Table 5. Selected sub-districts and number of zones determined by the population per sub-district

	Sub-district	Province	Sub-district Code	Population	Zones
1	Ba-Phalaborwa	LIM	LIM333	390095	2
2	Blouberg	LIM	LIM344	516031	2
3	CT Eastern SD	WC	CPT	423986	3
4	CT Southern SD	WC	CPT	544341	5
5	EThekwini South SD	KZN	ETH	1537668	8
6	EThekwini West SD	KZN	ETH	785304	5
7	Ekurhuleni E1 SD	GT	EKU	508082	5
8	Ekurhuleni S1 SD	GT	EKU	507707	5
9	Elundini	EC	EC141	138141	2
10	Emakhazeni	MP	MP313	229831	4
11	George	WC	WC044	193672	2
12	Johannesburg D SD	GT	JHB	1348147	4
13	Johannesburg F SD	GT	JHB	498341	5
14	Langeberg	WC	WC026	97724	2
15	Maluti a Phofung	FS	FS194	335784	3
16	Mbizana	EC	EC443	281905	2
17	Mogale City	GT	GT481	362422	3
18	N Mandela B SD	EC	NMA	265436	2
19	Ndlambe	EC	EC105	61176	2

[2]ArcGIS is a GIS for working with maps and geographic information. It is used for: creating and using maps; compiling geographic data; analyzing mapped information; sharing and discovering geographic information; using maps and geographic information in a range of applications; and managing geographic information in a database. The system provides an infrastructure for making maps and geographic information available throughout an organization, across a community, and openly on the Web.

	Sub-district	Province	Sub-district Code	Population	Zones
20	Ndwedwe	KZN	KZN292	231187	2
21	Rustenburg	NW	NW373	549575	3
22	The Msunduzi	KZN	MP325	541248	3
23	Tshwane 1 SD	GT	TSH	792230	3
24	Tshwane 6 SD	GT	TSH	581367	3
25	Ulundi	KZN	KZN265	194908	3
	Total Number of Zones				**83**

Step 2: Interviews with community informants to identify sites/venues

In order to reach the calculated sample size of 14 000 community informants, in the 83 selected zones, an approximate 170 community informant interviews had to be conducted in each one of the 83 selected zones.

During implementation of Step 2 (i.e. community informant interviews) however, the target of 14 000 was not reached. In each of the 25 sub-districts selected we visited each of the zones selected in the sub-district. Due to time-constraints, the project management team made a decision to start with implementation of fieldwork activities (i.e. Step 2) in the zones with high population density and more urbanized character. Once these zones were completed, fieldwork teams gradually moved to zones that are inaccessible with public transport or that can be characterized as semi-rural. In these zones, fieldwork teams were often required to overnight. Most of the zones that were inaccessible by public transport in order for the fieldwork teams to reach were located in the non-metros. In these non-metro areas, we on average spent one day conducting community informant interviews. Hence, all efforts were made to geographically cover all zones, despite the inaccessibility of some as well as the consequent financial implications that this incurred. In addition, fieldwork teams reported a saturation of sites mentioned by community informants in the second week of fieldwork implementation. Hence a decision was made to continue to the next step in the PLACE protocol.

Step 3: Interviews with site informants at identified sites/venues for site verification

This included observation visits to the sites identified by the community informants in Step 2. Site informants were managers and/or owners of the sites identified by community informants. Interviews with site informants included asking for counts of the patrons and/or key populations who visit the sites. They also provided information about HIV prevention materials (i.e. condoms; posters) that are available at the sites. Some of the site informants identified as members of key populations, and they were also interviewed in relation to their Behaviours. They also provided information on accessibility of HIV prevention

materials (i.e. condoms; posters) at the sites. Out of 1796 sites, 1425 were operational, 311 were not operation (found closed or duplicates) and in 60 sites could not be traced.

Step 4: Validation study: Interviews with members of key populations and patrons who frequent at the verified sites

In step 4, interviews were conducted with patrons and key population members at selected sites. Sites were purposively selected to cover 9 sub-districts (i.e. 5 metros: Cape Town Southern sub-district; Ekurhuleni E1 sub-district (Gauteng); EThekwini South and EThekwini West; Johannesburg D sub-district and 4 non-metros: Maluti a Phofong in the Free State, the Msunduzi in KwaZulu-Natal; Rustenburg in the North West and George in the Western Cape). Validation information was collected from patrons or members of key populations who indicated the number of key populations that typically visit the sites. All patrons and members of key population found at the sites during the day of interview were interviewed.

In addition, key populations at the site on the day of the interview were asked about use of the HIV prevention services and also the availability of the services (Form 3). Table 6 shows the selected sub-districts for validation, where the numbers are sites reported by community informants in each sub-district. Since site verification was shortened, we used this phase to also visit more of the sites not verified and have patrons who were not members of key population provide details of the sites.

Table 6. Selected sub-districts for validation study.

Sub-district Name	FSW _Cash	FSW _Goods & Services	MSW_Cash	MSW Goods & Services	MSM	PWID	Transwomen	Transmen
Cape Town Southern	78	91	29	45	60	59	85	82
Ekurhuleni E1	77	88	35	58	42	34	103	100
EThekwini South	422	464	247	237	325	327	371	403
EThekwini West	135	183	38	45	105	156	184	185
George	164	146	98	78	106	91	168	160
Johannesburg D	295	349	152	210	233	261	266	291
Maluti a Phofong	76	108	33	70	36	68	89	97
Msunduzi	120	119	52	43	92	69	86	89
Rustenburg	14	78	60	19	29	62	84	87

2.5 Fieldwork procedures, training and data collection procedures

The HSRC has regional offices in the provinces of Gauteng, Western Cape and KwaZulu-Natal which facilitated the management of fieldwork procedures for those sub-districts that were sampled in these provinces. In sub-districts where the HSRC does not have regional offices, temporary venues (i.e. community centres, local NGOs, libraries) were used for fieldwork teams to meet. Each sub-district had a supervisor who managed a fieldwork team of

interviewers (size of fieldwork teams depended on geographical coverage of a sub-district). Fieldwork staff consisted of 151 interviewers; 15 mobilisers (SWEAT, Sisonke); 23 supervisors and 15 assistant supervisors. It was mandatory that interviewers who were appointed were all resident in the sub-districts selected, located in each of the 8 provinces.

2.5.1 Fieldworker training

Training was carried out over four days with supervisors and assistant supervisors in Pretoria, South Africa. Supervisors and assistant supervisors were employed if they had either had an Honours or Master's Degree in any of the social sciences (i.e. psychology, anthropology etc.) The first day of training consisted of introducing the methodology to fieldwork staff that was used in our study. The topics covered included the ethics of conducting research; interviewing techniques used in a study of this nature, and specifically focusing on Step 1 of the PLACE protocol. The second day of the training focused on reviewing the questionnaires completed in the field, looking for completeness, legibility and accuracy, and in particular focusing on Step 2 of the PLACE methodology. In Day 2, all supervisors and assistant supervisors underwent sensitization training for working with key populations that was provided by OUT wellbeing. Day 3, focused on Step 3 & Step 4 of the PLACE protocol. Each training day, HSRC researchers demonstrated techniques of interviewing and this was followed by mandatory role plays by fieldwork staff. The last day of training, consisted of overall fieldwork logistics.

Training of interviewers and social mobilisers were carried out in each of the selected sub-districts by the supervisors and assistant supervisors before implementation of each step of the PLACE protocol. Supervisors were provided with a training package, training of interviewers and social mobilisers were supervised by HSRC staff.

2.5.2 Study quality control

Close supervision was conducted of fieldwork procedures throughout the study in order to prevent errors. Before and during the study, a range of quality control measures were put into place to ensure that analysis is based on data of a required high scientific standard. Measures implemented before the start of fieldwork include:

- Training of all fieldwork staff before the implementation of Step 1 and Step 2 using a Standard Operating Procedures (SOP) manual for the PLACE method

In all 8 provinces, provincial coordinators were responsible to ensure that fieldwork teams in a specific sub-district adhere to the overall principles of the study by:

- Checking that teams follow the stipulated study procedures
- Checking that teams follow the agreed administrative procedures
- Checking that teams follow fieldwork plans to ensure progress of fieldwork
- Conducting periodic checks in the field

As part of additional quality control measures, ad hoc training sessions were conducted by the HSRC research team with fieldworkers in the field as and when required. This was to ensure that the protocol was strictly adhered to. A team of HSRC researchers conducted a number of independent visits in each sub-district to check whether fieldwork staffs were implementing the study procedure.

Data was captured using CSPro system to ensure records were double captured, for further quality control. Further data processing and cleaning for any capturing errors and missed validation checks was done prior to estimations.

2.6 Size estimation methods based on programmatic mapping data

Size estimation under programmatic mapping was implemented by observing and recording key population at identified sites within the selected sub-districts. To obtain initial district estimates, we obtained the average number of key populations per site based on number of key population observed or reported during site verification. This was then multiplied by the number of key population sites. Adjustments were made for the frequency of visits to sites, and multiple sites visits.

For the MSM, SWs and PWIDs, additional adjustments using multipliers were made for inflating the sizes so as to account for those that remain hidden and or did not visit the mapped sites. Ideally, these adjustments should be made on the basis of the findings of a broader survey of key populations that would highlight the percentage (P) of key populations who would prefer visiting public places or meeting partners in private places. In absence of such a proportion, one could also use proportion of reported key populations who have or have not been exposed to interventions like HIV testing and condom use based on survey samples obtained from RDS surveys believed to be more representative of the venue-based key population are also used. It is argued that key population surveys, specifically those using respondent driven sampling (RDS), from which intervention coverage data are derived, are representative of those who are not hidden, either because of incentives to participate in the survey or because recruitment was done by trusted peers as in the case of RDS. (Saidel, Loo, Salyuk, Emmanuel, and Morineau 2010; UNAIDS 2015). The inverse of that proportion is the multiplier (M=1/P). Details of applications of such adjustments in size estimation studies in different countries is summarized by (Yu, Calleja, Zhao, Reddy, & Seguy, 2014).

The final estimate was adjusted for the sample structure by applying sampling weights to arrive at plausible final size estimates that include areas not mapped.

Optimizing the use of size estimates for programme planning and resource allocation requires different stakeholders to have consensus about the final estimate. This involves engaging stakeholders not only at data collection phases but also during the application of adjustments and extrapolation of results to reach at nationally and/or locally agreed

estimates for programming and monitoring and evaluation. The process applies regional or global benchmarks to ensure the estimate is a plausible proportion of the general population.

2.6.1 Adjustment for frequency for visits

Due to varying trends across sites, one would expect inconsistency in the number of key populations that visit all sites. The level of activity at a site also varies on different days of the week, and key populations may visit certain sites more infrequently than other sites on different times. If key populations visit sites less often than the period of recall during the period of observation, their probability of not visiting the site during the period of data collection is high.

In order to prevent undercounting of key populations, a formula was applied using data on the total number of key populations that were estimated during site verification and data on the frequency of visits to sites, which was derived from the behavioural survey of key populations based on Form 3 (see appendix). Frequency of visits was restricted to seven categories: daily visits, 4 to 6 times per week, 2 to 3 times per week, once a week, 2 to 3 times per month, once per month and the first visit. Based on information on frequency of visits in Form 3 we assumed 12 busy days per month in developing a weight factor such that those who visit sites infrequently were given a greater weight compared to those who visit frequently. The formula applied for adjusting the frequency of visiting sites is:

$$E_i = C_i \sum_{f=1}^{7} \left(P_f \times f_p \right), \quad \text{Where}$$

E_i : Estimate total of key population in sub-district *(i)* after adjustment for the frequency

C_i : Estimated current key populations in sub-district *(i)* recorded during site verification

P_f : Proportion of key populations visiting the sites in sub-district (*i*) with the frequency f_p

2.6.2 Adjustment for multiple visits applied two approaches:

The adjustments were made for multiple site visits per day, to avoid one being counted at multiple sites by the key informants estimating the sizes at the different sites. This helps to reduce duplication. Two formulas were used, allowing us to derive range of estimates:

a) Size estimation formula from the University of Manitoba, adopted in programmatic guidelines by Global Fund (2010),

$S_i = E_i(1-P_i)+(E_i * P_i / M_i)$ where

S_i : Adjusted estimated of the key population in a sub-district *(i)*

E_i : Frequency adjusted estimate summed in sub-district *(i)*

P_i : Proportion of key population who visit multiple sites in sub-district *(i)*

M_i : Mean number of places visited by key population who visit two or more sites

The formula is reasonable because it counts all of who are only at one place and for the ones who go to more places; the percentage of that group is reduced because the people might have counted at more than one place. This site based estimated reflect the number of people who visit sites and not the entire population.

b) Parallel adjustment approach used in the Nepal size estimation study (HSCB and NCASA 2011, Saidel and colleagues (2010).

$S_i = E_i - 1/2(D_i)$ where

S_i : Adjusted estimated of the key population in a sub-district *(i)*

E_i : Frequency adjusted estimate summed in sub-district *(i)*

$D_i = (W_i * E_i)$: Estimate of key population who visits multiple sites in sub-district (i)

W_i *:* Weighted proportion of key population operating from multiple sites

2.6.3 Adjustment for estimates of population not visiting mapped sites

We derived multipliers or inflation factors for correcting the sizes so as to account for those that remain online and hidden/ or do not visit the mapped sites. Maghsoudi et al.(2014) notes that underestimation of size of the hidden groups can be substantial (3 to 4 times). Such biases are more prominent in the size estimation of "hard-to-reach" population groups such as MSM, PWIDs and MSWs because of the stigma involved in MSM behaviours. This is particularly so in African countries. A summary of studies using similar adjustments for hidden populations in size estimation in different countries is provided by (Saidel, Loo, Salyuk, Emmanuel, Morineau, et al. (2010) and Yu et al. (2014)

Ideally, adjustments using multipliers should be made on the basis of the findings of a broader survey of key populations that would highlight the percentage (P) of key populations who would prefer visiting public places or meeting partners in private places. In absence of such a proportion, the proportion of reported key populations who say they accessed the services over the same time period, based on survey samples obtained from respondent driven sampling (RDS) surveys believed to be more representative of the venue-based key population can also be used (Yu et al. 2014). The inverse of that proportion is the multiplier (K=1/P). For example, an MSM size study in Indonesia (Heckathorn 1997) applied the multipliers/inflation factors of 5, 5.5, and 11.8 respectively based 20%, 10%, and 8% of reported MSM who never used condoms based on survey samples obtained from RDS

surveys believed to be more representative of the venue-based key population. Details of multipliers used in this study provided in section 2.6.6, page 27.

The multiplier tells how many more key population members in a given area have not accessed services in the given time period, or how may more key populations members in a given area do not visit mappable sites. Caution is needed in interpretation of size estimates using multipliers based on service accessibility, as they are likely to lead to overestimation. The results should be considered an improvement upon on the original estimates. Further improvements on size estimates can be done once new information becomes available.

Multiplier is a mathematically simple and straightforward method applied using ratio estimation techniques (Kish 1986), but it requires good benchmark data. In ratio estimation national figures are used as benchmark to adjust for underestimation in national survey data analysis (Kish 1986). In this study, the number of frequency and multiple visits adjusted estimates of the key population were taken as benchmark data. The formula used was applied to adjust for hidden population is provided below:

$R_i = S_i \times K$ Where

R_i : Adjusted estimate in sub-district (i), used as benchmark data

S_i : The total size of key population after previous adjustments for sub-district *(i)*

K : Multiplier or inflation factor based on assumed proportions representing those visiting mappable sites if known or proportion based on service accessibility. The multiplier or inflation factor is estimated at national level, to avoid large regional variations, and applied at district level.

2.6.4 Extrapolating adjusted estimates to obtain an overall estimate

To extrapolate the adjusted estimates in order to obtain a total size estimate we adjusted for the sampling structure. This involved multiplying previous adjustments sub-districts estimates with the sub-district sampling weights to scale up the estimate according to the size and structure of the sample frame. Final total estimate for each key population is obtained by summing across all values.

2.6.6 Multipliers/inflations factors for MSM, PWID and SWs

MSM Multipliers/ Inflation factors

In order to arrive to inflation factors for MSM, reference is also given for similar studies that have used similar approaches in estimating key population size estimates. First, an MSM size study in Indonesia (Heckathorn 1997) applied the multipliers/inflation factors of 5, 5.5, and 11.8 respectively based 20%, 10%, and 8% of reported MSM who never used condoms based on survey samples obtained from RDS surveys believed to be more representative of the venue-based key population. A mapping study in Swaziland estimated condom use

among MSM at 70% (The USAID | Project SEARCH 2013). According to UNAIDS (2012) while the majority of surveyed MSM indicate using a condom during their last sexual episode, only 13 countries reported more than 75% consistent condom use, while 58 countries reported between 50% - 75% condom use.

On the basis of information available in South Africa (based on a 2014 IBBSS RDS study of MSM conducted in three cities in south Africa), the estimated proportion of MSM that do not visits mappable sites is assumed, based on proportion of those who have never used a condom(Cloete et al. 2014). Only over 80% indicated access to condoms.

Based on these percentages, selected proportions between 8-20% of no condom use among the MSM were used to derive multipliers/inflation factor for an MSM size estimate.

Bolding and colleagues (2007) size estimate study that examined internet use among MSM indicated a significant increase in the percentage of young MSM who met their first male sexual partner through the Internet (2.6-61.0%), and a corresponding decrease in the percentage who met their first sexual partner at a gay venue (34.2-16.9%), and school (23.7-1.3%) environment However, between a quarter and a half of MSM in the USA and the United Kingdom (UK) who met new sex partners online met these new sex partners at physical sites or venues. A study in Mauritius found that 73% of the total MSM estimated connects with other MSM through virtual sites and only a quarter congregate on geographical sites. However, these MSM who are online and hidden often come to the physical locations to meet their partners and other MSM.

In South Africa, 28.62% of MSM reported using internet to connect with sexual partners compared to 51.08% that use physical venues to connect with sexual partners (Cloete et al. 2014). During this mapping study, a preliminary search of MSM using the internet indicated that many people go online but that many also meet up at public bars and public places. We were not able to verify the proportions that only meet sex partners online and hence could not adjust for internet use.

PWID Multiplier/inflation factors

The inadequacy of standard survey methods in relation to estimating the prevalence of injecting drug use arises principally in the following two areas: a) under coverage since injecting drug users occur in significant numbers outside household units, and there is therefore a failure to cover key drug-taking groups that are not included in survey sampling frames, for example, street-dwellers (the permanently homeless), those arrested and possibly those in residential treatment; b) underreporting of use as injecting drug users may simply decline to answer or answer in the negative. The problem is exacerbated by legal framework that criminalizes drug use.

Corrective factors can be applied using ratio estimation techniques. For example, in Ukraine, according to UNAIDS (2012), country reports show that nearly 70 - 80% of PWIDs reached in surveys in 49 capital cities have access to safe injecting equipment. To estimate the size of injecting drug users in Ukraine, a national data related to drug use, such as arrest information and treatment for drug use, or access to services was used to correct the enumeration and /or survey figures, by weighting up the number of enumerated respondents to what is known to be the correct figure (Aceijas et al. 2006). A multiplier/ inflation factor of 1.3 based on a proportion of 77% of IDU drug related hospitalizations in the 14 survey cities relative to the number of IDU drug-related hospitalizations in the whole country was used in size estimation. The assumption was that the proportion of IDU drug-related hospitalizations in areas that were not mapped is the same as in those places that were mapped. In Vietnam, a study on mapping and size estimation of PWIDs used the proportion of 71% of PWIDs that the police were able to track to define a multiplier/inflation factor of 1.4 (1/71%) for correcting the size estimate to arrive at the national size estimate of PWIDs. The Nepal PWID size estimates study used a similar inflation factors to estimate the size of PWIDs (HSCB/Nielsen/UNAIDS/World Bank 2011).

In South Africa there has been little information about the extent of PWIDs. National data on drug arrest is unavailable except for reported cases of drug related crimes, 0.51% of total population (SAPS Web site). However not all those who inject drugs commit crimes. A recent rapid assessment of HIV prevalence and HIV-related risks among PWIDs across five cities in South Africa recruited, in total 450 PWIDs and estimated a 14% HIV prevalence (Scheibe, Brown & dos Santos 2015).

To adjust for PWIDs in South Africa, 80% of access to safe injecting equipment among the PWIDs was assumed to derive the multipliers/inflation factor.

Sex workers Multipliers/ Inflation factors

The National Sex Worker Study of South Africa reported that the hidden, home-based and high cost SWs, assumed an additional 5% to the FSW estimate that were not captured in the size estimate(SWEAT/Impact Consulting 2013). Hence the proportion covered was 95% giving an inflation factor of 1.05(1/95%).

3. ETHICS APPROVAL

The protocol and research instruments together with consent forms were submitted to the HSRC Research Ethics Committee (REC) for ethics approval on the 6th of February 2015. This was the first REC meeting of the HSRC REC for 2015. The REC reviewed all applications on the 18th of February 2015. The application received comments from the REC which the HSRC addressed accordingly. The study protocol was approved by the REC of the HSRC on the 17thof March 2015. The HSRC REC is registered with the South African National Health

Research Ethics Council (REC-290808-015 and has US Office for Human Research Protections (OHRP) Federal-Wide Assurance (FWA Organization No. 0000 6347) clearance.

3.1 Voluntary participation

We informed potential respondents that their participation in this study was strictly voluntary and that they were free to withdraw from the study at any time.

3.2 Informed consent

Following careful explanation of the study in the language that the study participants were comfortable in, interviewers provided eligible respondents the consent form to read or, if necessary, the consent form was read to the potential respondents by interviewers.

The interviewers ensured that all questions and concerns were addressed before handing over a copy of the information sheet and the consent form. In this study, potential respondents had the option of giving consent in writing or verbal consent. In most cases the participants signed their consent forms and returned these to the interviewers. However, in some instances potential respondents opted to give verbal consent to take part in the study - in such instances the interviewer requested a study supervisor or another interviewer that was close by to serve as a witness that the respondent verbally consented to take part in the study.

3.3 Risks to respondents

We held consultations with relevant stakeholders prior to the start of the study in order to minimize any social risks. Furthermore, we also discussed the risks of participation, the voluntary character of the study and the applicability of the findings with both stakeholders and respondents. All respondents were given the name and telephone number of the supervisor should they have any questions about the study or believe they have been disadvantaged or not well treated as the result of being or not being part of this study.

There was a psychological risk in participating in the study due to the sensitive nature of the questions asked (sexual and injecting drug use (IDU) practices). We gave all respondents the name and telephone number of the project director should they have had any questions about the study, or believed they had been injured or not well treated because of being or not being part of this study.

3.4 Benefits to respondents

There were no direct benefits to the respondents in this study. However, we anticipated indirect benefits to members of key populations, as the study would inform future policy and programme implementation.

3.5 Protection of confidential information

We recorded no names or personal identifiers for individuals participating in the study.

4. RESULTS

4.1 Size estimates for key populations

4.1.1 Community, site informant and validation study data

A total of 6919 interviews were conducted with community informants across all 25 sub-districts. The 6919 community informants reported 10 740 sites and or venues where people meet new sex partners. Of the 10 740 sites and or venues where people meet new sex partners, a total of 5468 unique sites (i.e. unduplicated) were listed and from these a 3793 were reported as sites where members of key populations meet new sex partners (See Table 7. Community informant interviews per sub-district and sites where people meet new sex partners Table 7).

Table 7. Community informant interviews per sub-district and sites where people meet new sex partners

Sub-district #	Sub-district name	Number of interviews	Number of site	Unique Sites	Number of sites with any Key Population
1	Ba-Phalaborwa	345	456	124	62
2	Blouberg	356	572	225	121
3	CT Eastern SD	253	334	201	113
4	CT Southern SD	228	227	160	111
5	Ekurhuleni E1 SD	69	337	214	107
6	Ekurhuleni S1 SD	108	89	61	58
7	Elundini	159	160	112	98
8	Emakhazeni	327	383	61	60
9	EThekwini South SD	675	1366	829	565
10	EThekwini West SD	442	393	306	210
11	George	338	585	347	226
12	Johannesburg D SD	636	886	485	416
13	Johannesburg F SD	200	225	132	98
14	Langeberg	65	79	59	39
15	Maluti a Phofung	451	355	155	132
16	Mbizana	154	150	74	49
17	Mogale City	170	259	256	256
18	N Mandela B SD	169	197	104	103
19	Ndlambe	242	42	39	38
20	Ndwedwe	59	291	161	113
21	Rustenburg	267	1614	182	134
22	The Msunduzi	383	471	468	228
23	Tshwane 1 SD	222	362	242	208
24	Tshwane 6 SD	285	514	358	194
25	Ulundi	316	393	113	81
Total		**6919**	**10740**	**5468**	**3793**

Figure 5 shows the number of sites reported and the overall population. Overall the number of sites generally increases with the population size.

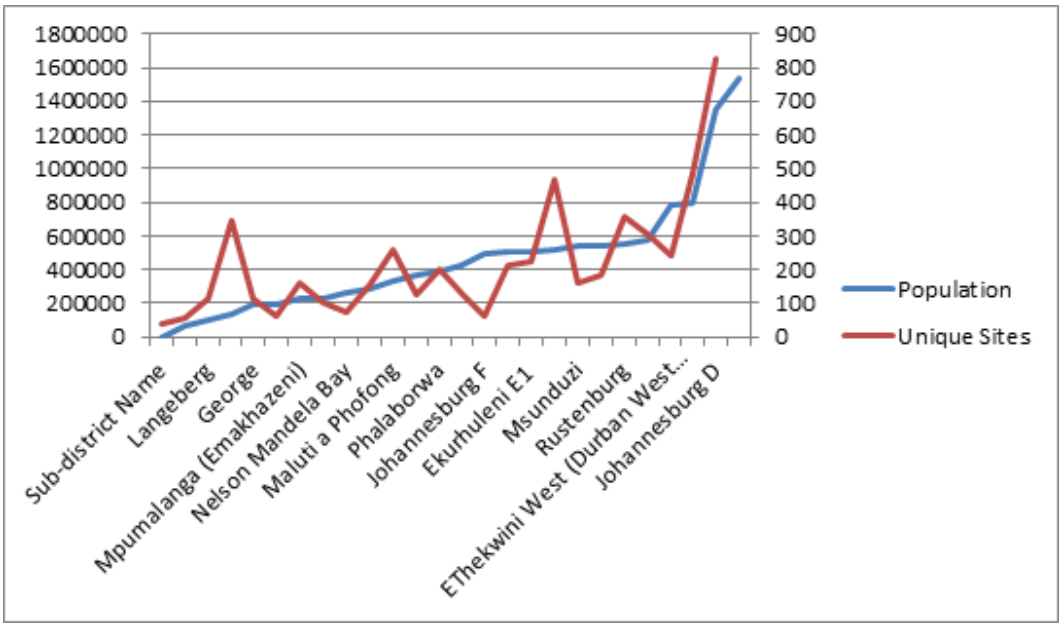

Figure 5. Reported sites and overall population

From the 3793 unique sites where members of key populations meet new sex partners we verified 1796 venues in total, in all 25 sub-districts (Table 8). The community informants however did not provide the estimated numbers of key populations at the sites. This though would be a further improvement of PLACE methodology which is slightly different from other geographic mapping approaches(National AIDS Secretariat Mauritius 2014). The main reason for verifying only 1796 venues was because of time constraints. A decision was made to verify those venues first that are in the urban areas, with high population density, and if time allows move to the often inaccessible areas that were located in the semi-rural areas of the sub-district.

Table 8. Total sites verified in selected sub-districts

SUB- DISTRICT	Sites verified
Ba-Phalaborwa	51
Blouberg	52
CT Eastern SD	90
CT Southern SD	41
Ekurhuleni E1 SD	62
Ekurhuleni S1 SD	52
Elundini	37
Emakhazeni	59
EThekwini South SD	24

EThekwini West SD	97
George	156
Johannesburg D SD	134
Johannesburg F SD	41
Langeberg	35
Maluti a Phofung	64
Mbizana	15
Mogale City	256
N Mandela B SD	102
Ndlambe	26
Ndwedwe	11
Rustenburg	91
The Msunduzi	24
Tshwane 1 SD	124
Tshwane 6 SD	89
Ulundi	63
Total	1796

The characteristics of the sites frequented by key populations are shown in Figure 6. Other site types comprise of events, Brothel, Beach/river, party, Porno/sex shop, Public toilet, Construction site, Tourist attraction, Gym, Sport event, Escort service. Appendix Table 18 shows the busiest times at the sites.

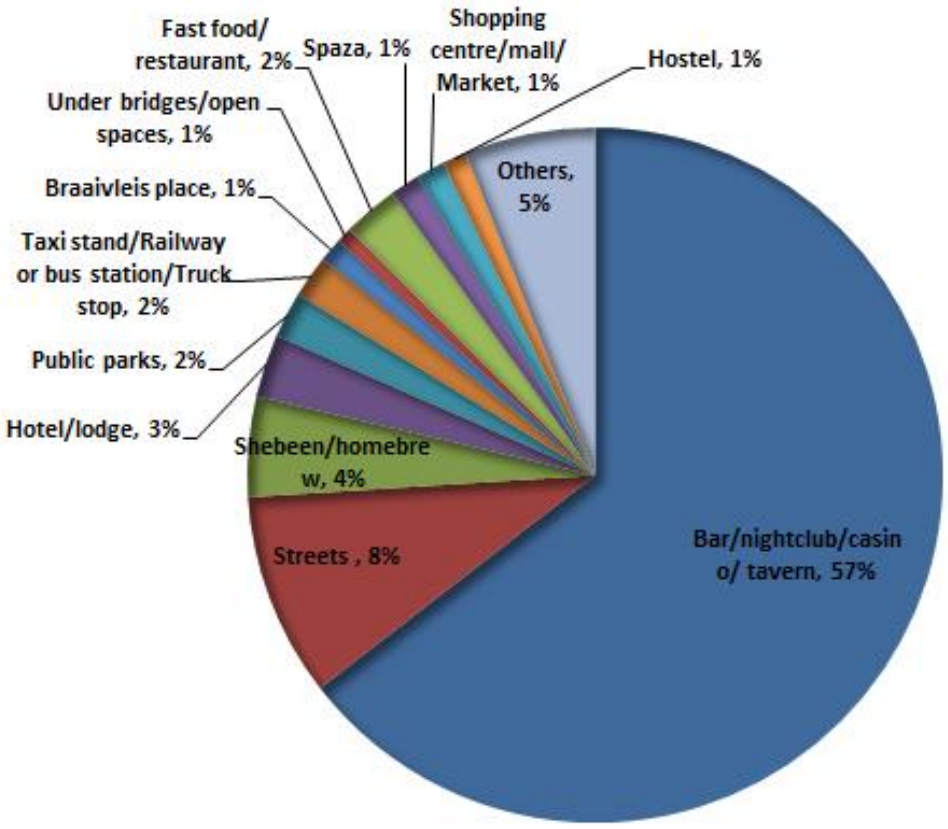

Figure 6. Types of sites frequented by key populations in South Africa

At the validation stage, a total of 1302 interviews were conducted with patrons and/or key population members across purposively selected 840 sites.

Data used for size estimation

1. Site verification phase (Appendix, Form 2A) provided the recorded number of key populations who visit the sites and was used to obtain the average number of key populations per sites per sub-district. Cases where samples were too small for calculating the average were excluded but later added up. In addition, large outlying values were also checked to avoid inflating the values.
2. Community informants provided the number of key population sites. This was multiplied with the average per site to obtain the initial sub-district estimate. The assumption was that the list of cited sites with key population was exhaustive.
3. Data on frequency of visits to sites, multiple sites visits (Form 3) to adjust for the frequency of visits to sites, multiple sites visits
4. Multipliers or inflation factors to correct for hidden populations (where necessary)
5. Sampling weights to extrapolate the adjusted estimates in mapped districts to include unmapped districts, and summing to get the final total size estimate.

Final discussion on size estimates with TAC to establish final plausible size estimates for programming and monitoring and evaluation.

4.1.2 Female Sex Workers Size Estimates

The study disaggregated by FSWs as those who exchange sex for cash and those who exchange sex for goods and favours. Distribution of the two groups across the selected sub-districts and they type of sites they visits are shown separately.

4.1.2.1 Distribution and type of sites for female sex workers who exchange sex for cash

Based on community informants, Figure 7 shows the distribution of FSWs who exchange sex for cash sites within the selected sub-districts. Data shows that FSWs were mostly reported to be found in the sub-districts of EThekwini South, Johannesburg D, Tshwane 6, George, and EThekwini west. The local sub-districts with lowest FSW sites include the local municipalities namely Ndlambe, Elundini, and Mbizana.

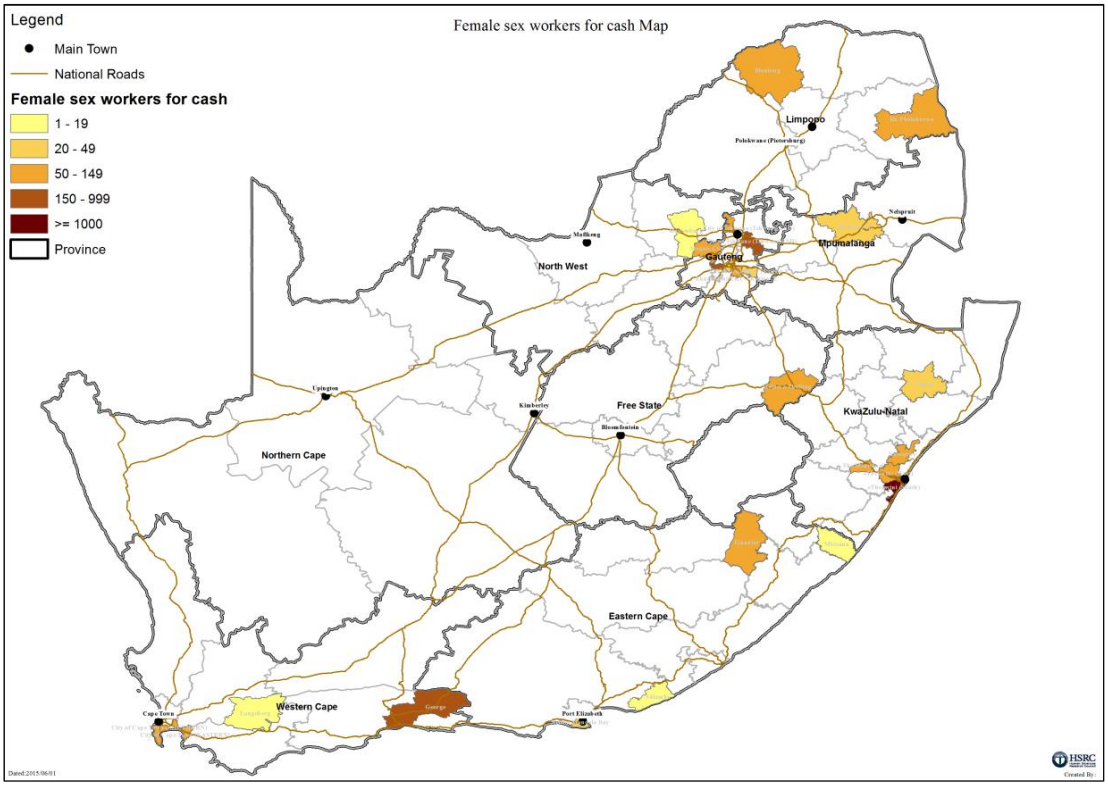

Figure 7. Concentration of sites FSWs who exchange sex for cash in selected sub-districts

**Yellow shows sub-districts with a fewer number of FSW for cash sites while brown shows sub-districts with a higher number of FSW for cash sites*

Following site verification we identified the type of sites frequented by FSWs who exchange sex for cash. This range from venues (Bar/nightclub/casino/tavern) approximately (54%,Figure 8), followed by streets (including sex worker streets) 18 % ,Taxi stands including railways and bust stops with 4 % and hotels , public parks, shebeen with 3% each. Other site types comprise of fast food/ restaurant, under bridges/open spaces, and shopping centre/mall/market.

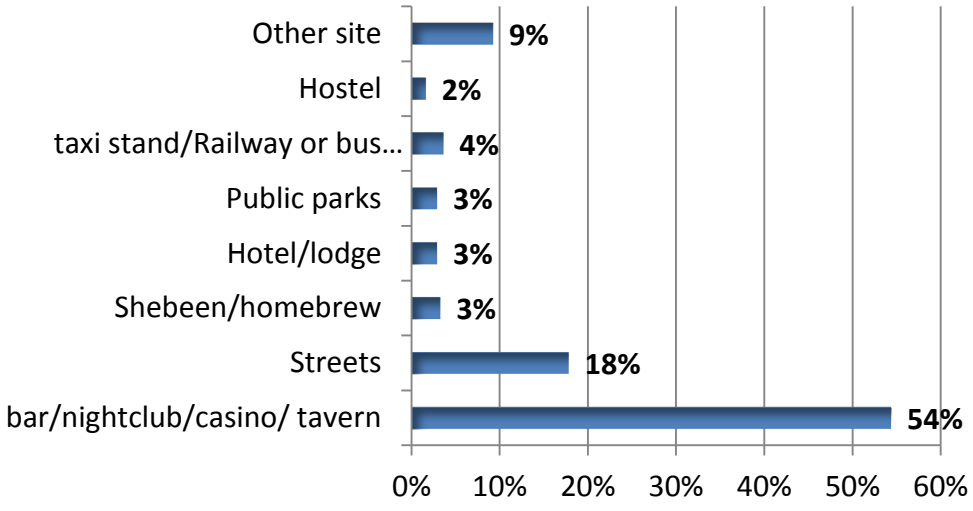

Figure 8. Types of Sites frequented by FSWs who exchange sex for cash

4.1.2.2 Size estimates for female sex workers for cash in South Africa

The size estimates for FSWs who exchange sex for cash 185 357 and 205 240, respectively based on programmatic mapping guidelines (Global fund 2010) multiple visit adjust formula and alternative parallel adjustment approach as used in the Nepal size estimation study (HSCB and NCASA 2011, Saidel et al. (2010). Respectively these align to the 0.97% and 1.07% of the adult female population 15 years and older. The estimates confirm the current size between 131 000 and 182 000 SWs in South Africa, or between 0.76 and 1% of the adult female population (SWEAT/Impact Consulting 2013).

EThekwini South has the highest number of FSWs who exchange sex for cash (16 059) followed by Tshwane 1 (6254), Johannesburg D sub-district (6170) and the George local municipality (3637). These estimates exclude Ndlambe and Ndwedwe sub-districts where very few sites reported the number of FSWs.

4.1.2.3 Distribution and type of sites for FSWs who exchange sex for good and favours

Figure 9 shows the distribution of FSWs who exchange sex for goods and favours sites in the selected sub-districts, based on community informants. EThekwini South, Johannesburg D, Tshwane 6, George, Cape Town Eastern and EThekwini west sub-districts recorded the highest numbers of FSW for goods and favour sites. The local municipality sub-districts, Langeberg, Mbizana, and Ndlambe recorded the lowest number of sites where FSWs for goods and favours are concentrated.

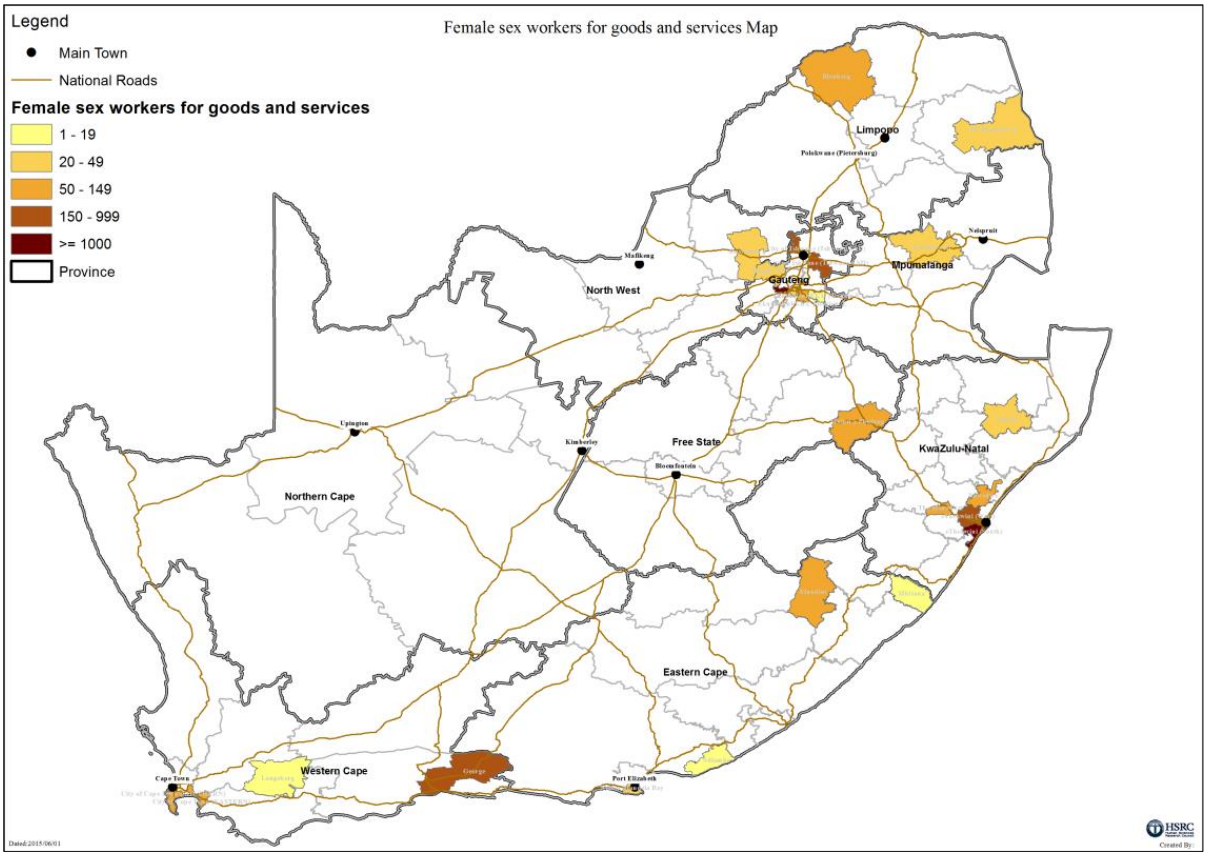

Figure 9. Concentration of sites with FSWs who exchange sex for goods and favours in mapped sub-districts

We also looked at the type of sites frequented by FSWs for goods and favours. Following site verification, FSWs who exchange sex for goods and favours frequent venue site types more (65%, Figure 10) compared to those who exchange sex for cash (54%, Figure 8), and are less on streets. The FSWs for goods and favours also visited shebeens more compared to FSWs for cash but less in hotels and lodges.

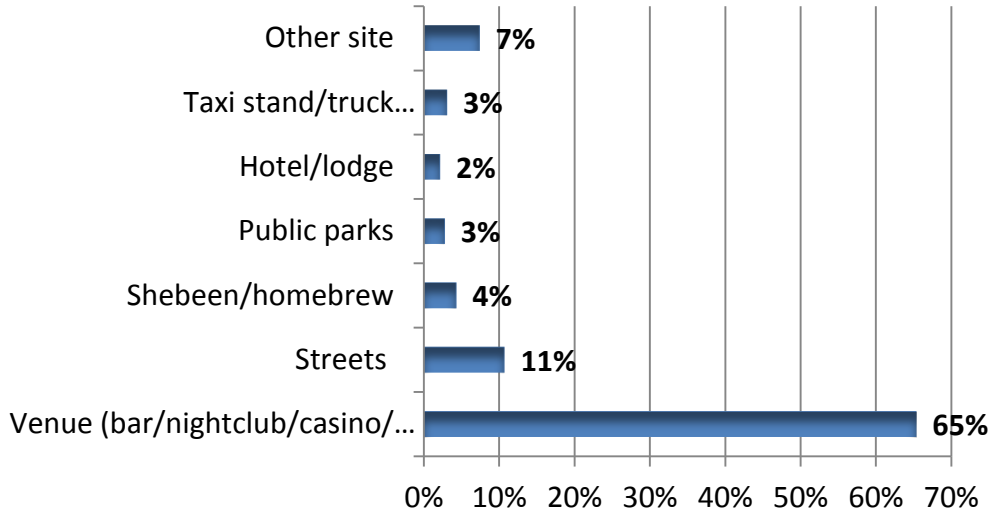

Figure 10. Types of sites frequented by FSW who exchange sex for goods and favours in South Africa

4.1.2.4 Size estimates for FSWs who exchange sex for goods and favours in South Africa

The size estimates for FSWs who exchange sex for goods and favours is between 128 253 and 192 218 respectively following two approaches adjusting for multiple visits. Respectively these align to the 0.67% and 1.01% of the adult female population 15 years and above. Compared to FSWs for cash, there are more FSWs soliciting for goods and favours. Districts with high numbers are Johannesburg D (10515), EThekwini South (7872), and Tshwane 6 (3981).

We need to note that there is likely to be an overlap between the two categories of SWs, although care was taken to ensure that respondents were asked the estimated numbers of each SW category separately. Figure 11 shows the location of sites for both FSWs who exchange sex for cash and those who exchange sex for goods and favours in the mapped sub-districts. The locations for the two categories overlap for most of the metro sub-districts compared to the local municipality sub-districts.

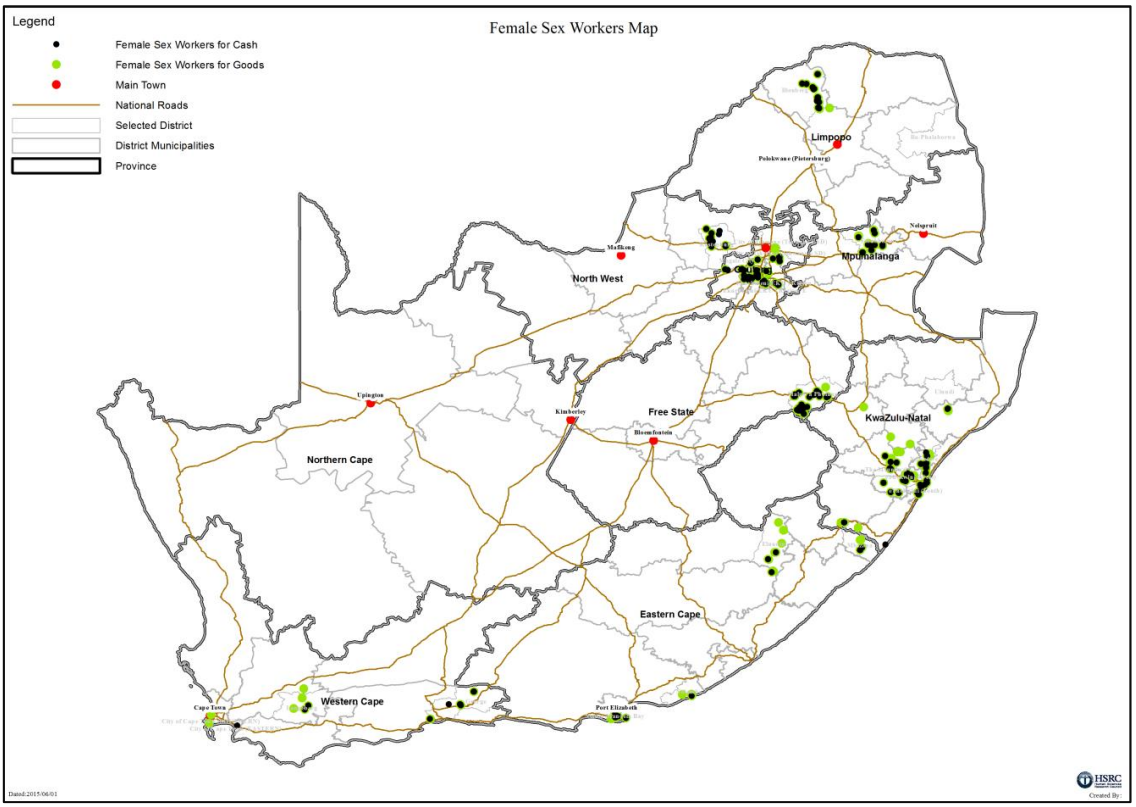

Figure 11. Distribution of site locations for FSWs

4.1.3 Male Sex Workers (MSW) size estimates

The study disaggregated by MSWs into those who exchange sex for cash and those who exchange sex for goods and favours. Distribution of the two groups across the selected sub-districts and the type of sites they visit are shown below.

4.1.3.1 Distribution and type of sites for male sex workers for cash sites

MSWs remain a "hard-to-reach" population group because of the stigma involved in MSW behaviours prevalent in many African countries. Based on community informants, Figure 12 shows the distribution of MSWs who exchange sex for cash sites within the selected sub-districts. EThekwini South, Johannesburg D, and George sub-districts have the highest number of recorded sites. Ekurhuleni S1, Johannesburg F, and Ndlambe have the lowest number of sites.

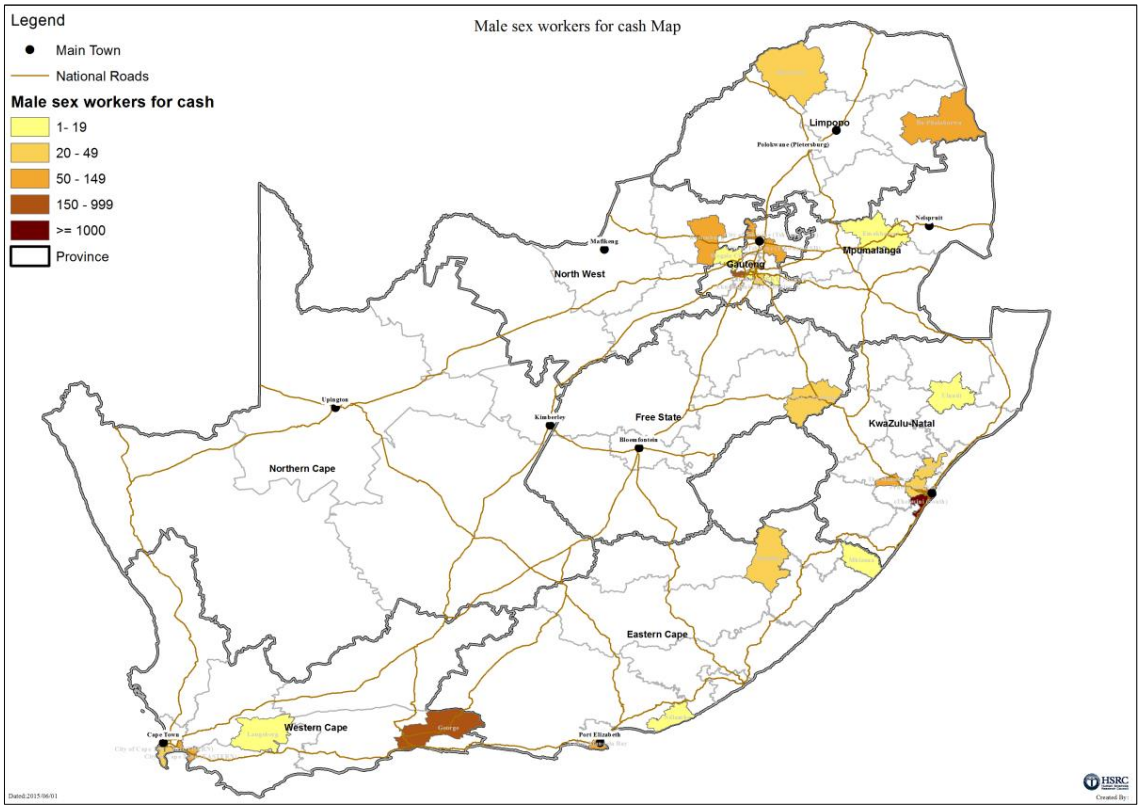

Figure 12. Concentration of sites of MSWs who exchange sex for cash in selected sub-districts

We also looked at the distribution of the type of sites that MSWs for cash frequent based on verified sites. MSWs for cash frequent venue site types more (58%, Figure 13) compared to FSW for Cash (54%, Figure 8), and are also less on streets.

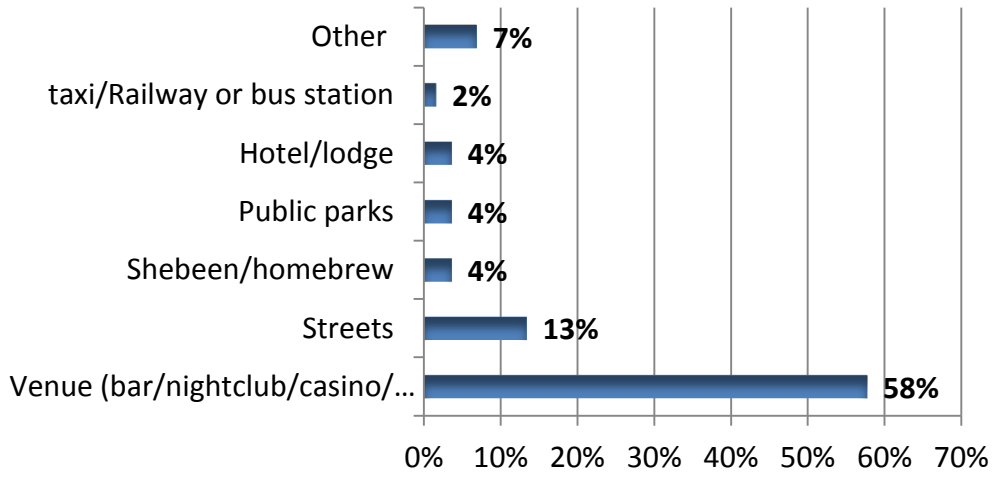

Figure 13. Types of Sites frequented by MSWs who exchange for cash in South Africa

4.1.3.2 Size estimates of MSWs who exchange sex for cash

The size estimates for MSWs who exchange sex for cash are between 39 064 and 45 772, after adjusting for 5% hidden. Respectively these align to the 0.22% and 0.26% of the all adult male population 15 years and above (Census 2011). Districts with high numbers are Johannesburg D (3792), NMB (1912), Tshwane 1 (969), and the George (903) local municipality.

4.1.3.3 Distribution and type of sites for MSWs who exchange sex for goods and favours

Based on community informants, Figure 14 shows the distribution of MSWs who exchange sex for goods and favours sites within the selected sub-districts. EThekwini South, Johannesburg D, and Tshwane 6, and George sub-districts had the highest number of recorded sites.

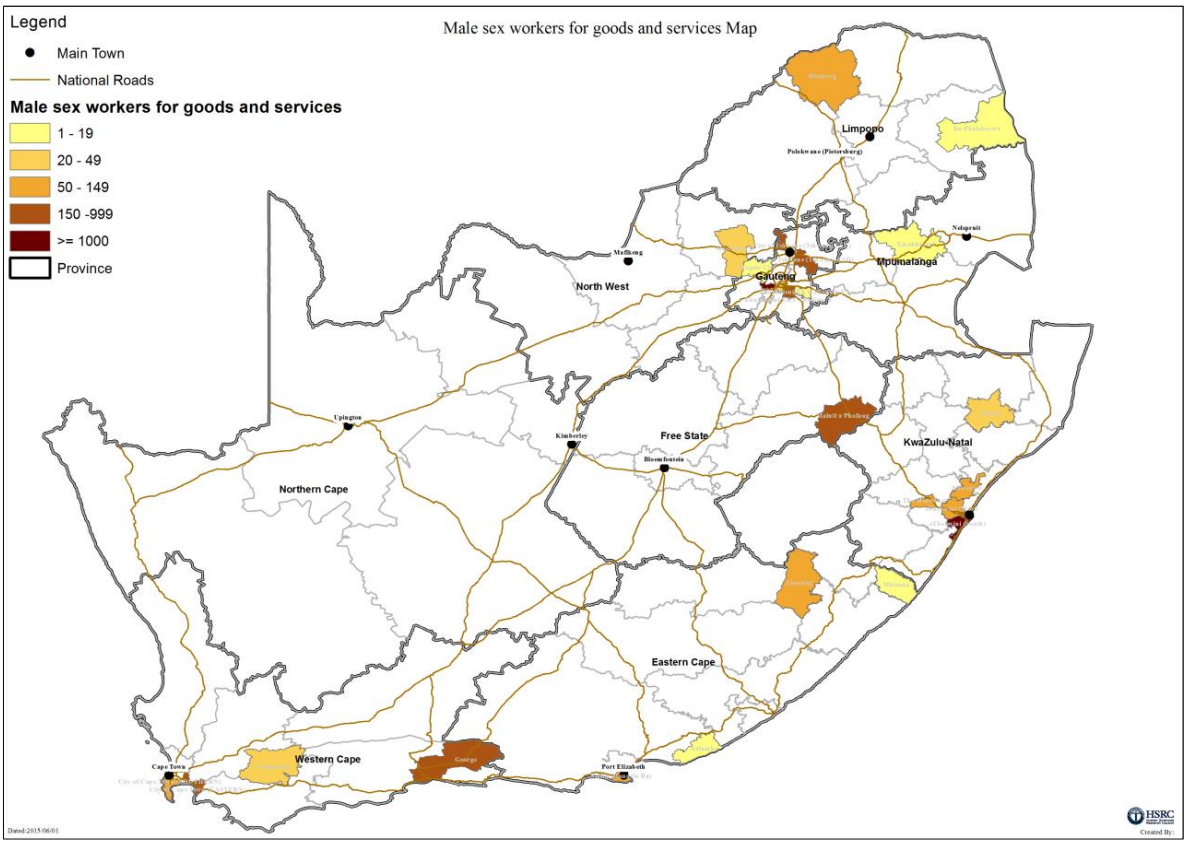

Figure 14. Concentration of sites with MSWs who exchange sex for goods and favours

We also looked at the type of sites that MSWs for cash frequent based on verified sites. MSWs for cash goods and favours frequent venue site types more (69%, Figure 15) compared to MSWs for Cash (58%, Figure 13), and much more compared to FSWs for cash (54%, Figure 8). They are less frequent on the streets (11%) compared to MSWs for cash (13 %).

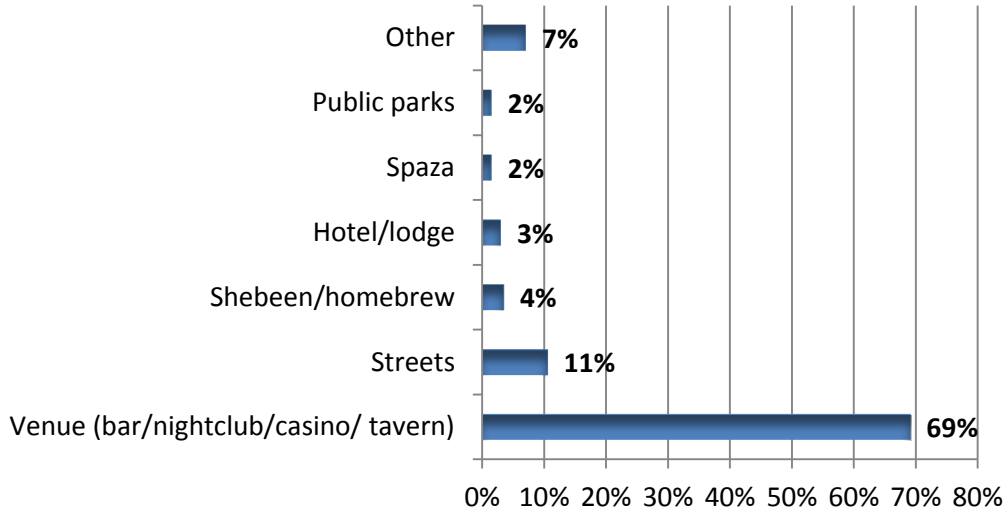

Figure 15. Types of sites frequented by MSWs who exchange sex for goods and favours in South Africa

Figure 16 shows the overlap in site locations for both MSWs who exchange sex for cash and those who exchange sex for goods and favours. In some of the local sub-districts there are no overlaps.

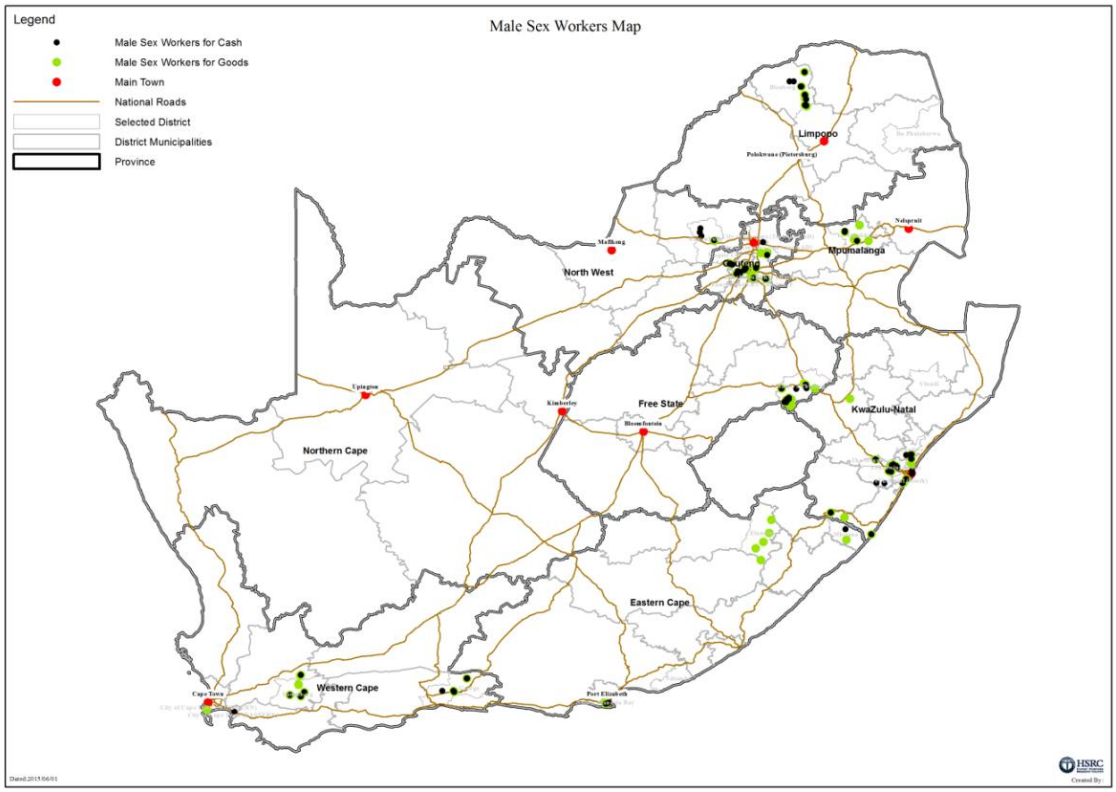

Figure 16. Distribution of site locations for MSWs who exchange sex for cash and those for goods and favours

4.1.3.4 Size estimates for MSWs who exchange sex for goods and favours

The size estimates for MSWs are between 55 199 and 55 868. Respectively these align to the 0.31% and 0.32% of the all adult male population 15 years and older (Census 2011).

Districts with high numbers are Johannesburg D (7485), followed by Cape Town eastern sub-district (1103), Cape town southern sub- district (841), George (745), Tshwane 6 (687), and NMA (681).

4.1.4 Men who have sex with men size estimates

4.1.4.1 Distribution and type of sites for men who have sex with men in South Africa

Figure 17 shows the distribution of MSM sites in the mapped sub-districts, based on identified sites by the community informants. Respectively, EThekwini South and Johannesburg D sub-districts have the highest number of MSM sites followed by followed by Cape Town Eastern sub-district, Rustenburg and Ekurhuleni E1 sub-districts. Except for Ekurhuleni S1 with very few sites for MSM, most of the local sub-districts had few MSM sites identified.

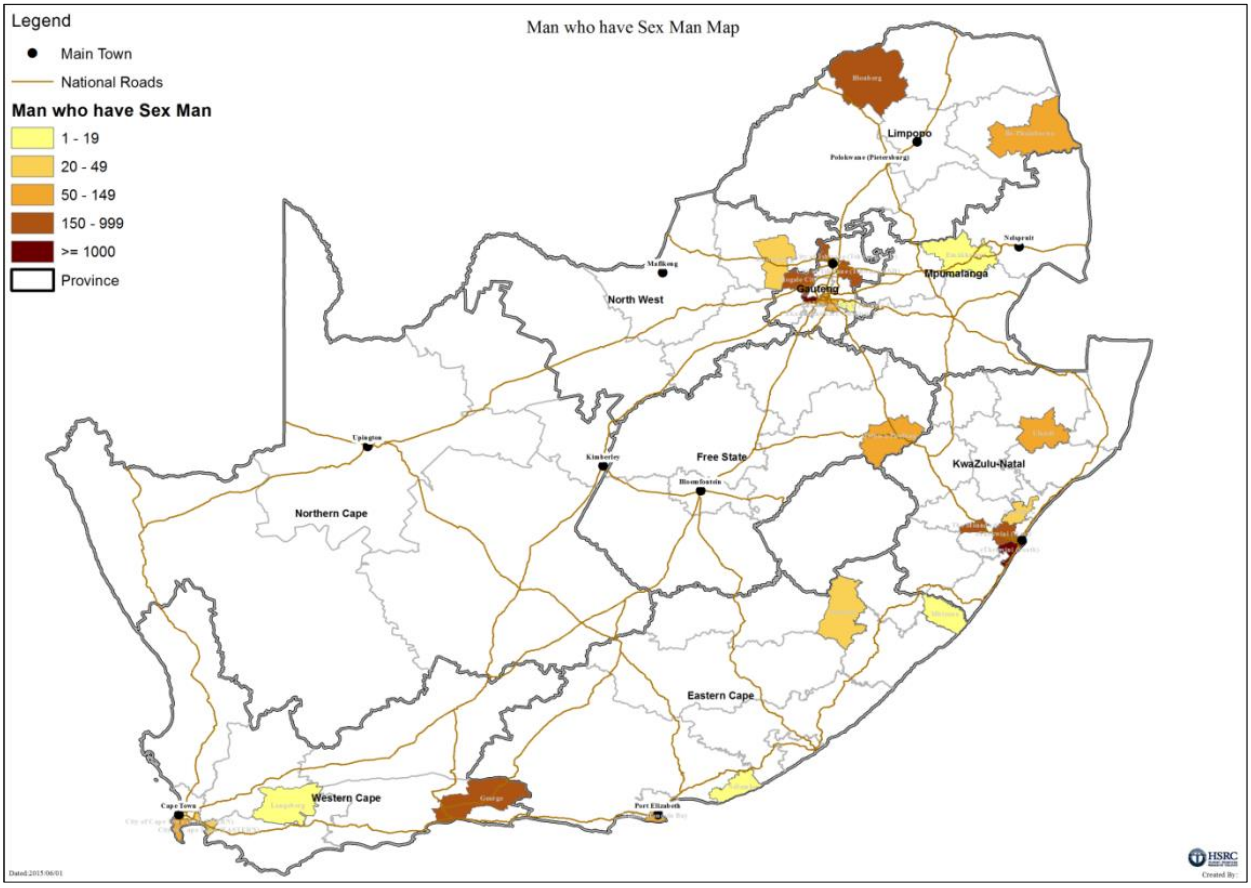

Figure 17. Concentration of sites with MSM in selected sub-districts

Following site verification, the data showed that the type of sites frequented by MSM ranged from venues (Bar/nightclub/casino/ tavern) approximately (71%, Figure 18) much higher the other key populations. MSM rarely frequents the streets (7%). Other sites include Fast food/ restaurant, Braaivleis place, Brothel, Shopping centre/mall/ Market, Hostel, under bridges/open spaces, and events. Based on fact that most of the sites verified for MSM were venue based, and based on literature on MSM being a "hard-to-reach"

population, derived estimates are adjusted to correct for this under estimation, and should be interpreted with caution.

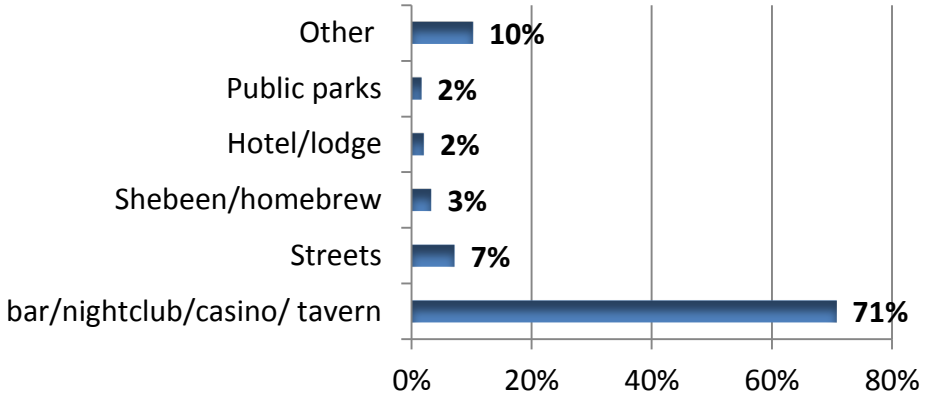

Figure 18. Types of sites frequented by MSM in South Africa

4.1.4.2 Size estimates for MSM in South Africa Size

The size estimates for MSM are between 1 01millioni and 1.17million, respectively representing 5.81% and 6.67% of the adult male population 15 years and older (Census 2011).

4.1.5 Persons who inject drugs size estimates

Figure 19 shows the distribution of PWID sites in the mapped sub-districts. Respectively, most PWIDs sites were in EThekwini South, EThekwini West, Johannesburg D, and Tshwane 6. These are mostly the metro sub-districts.

4.1.5.1 Distribution and type of sites for persons who inject drugs in South Africa

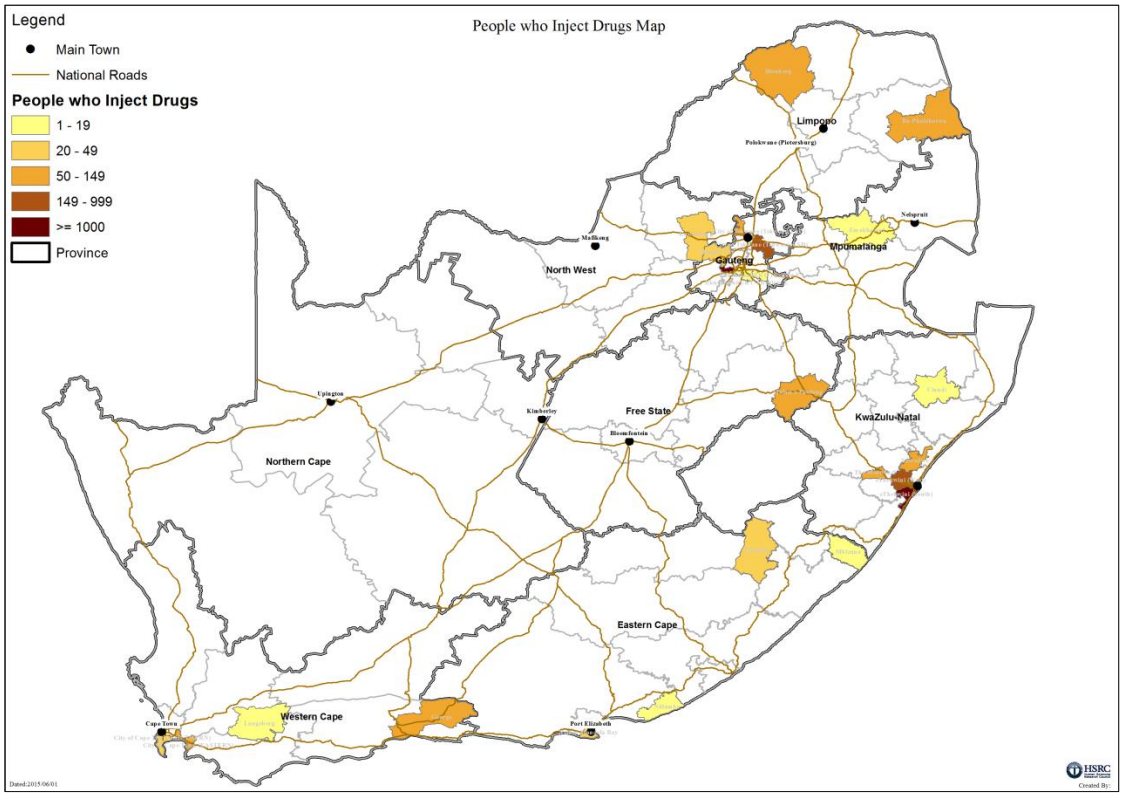

Figure 19. Concentration of sites with PWIDs in selected sub-districts

The type of sites that PWIDs mostly frequent include venues (Bar/nightclub/casino/ tavern) (44%, Figure 20), and streets (20%) followed by public parks 7%, and 4% Hotel/lodge, these percentages are much lower compared with other key populations.

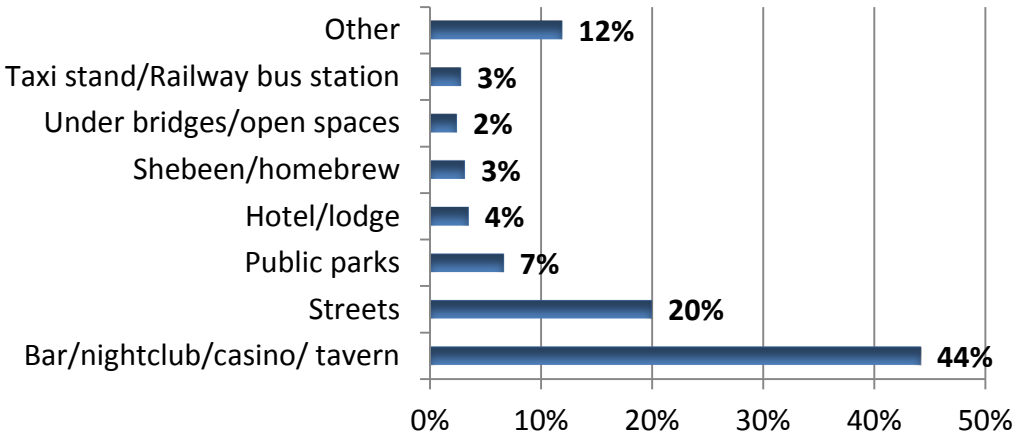

Figure 20. Types of Sites frequented by PWIDs in South Africa

4.1.5.2 Size estimates for both men and women who inject drugs in South Africa

The size estimate was disaggregated by gender for PWIDs. For men size estimates were found is between 41 374 and 44135, respectively representing 0.24% and 0.25 of the adult male population 15 years and older based on census 2011, while for women, size estimates

were found between 31 489 and 34 402 respectively representing 0.16% and 0.18% of adult female population 15 years and older. Overall, the size estimate is slightly higher than the current national estimate of 67 000 (Petersen et al. 2013).

4.1.6 Transgender people size estimates

4.1.6.1 Distribution and type of sites for transwomen in South Africa

Figure 21 shows the distribution of transwomen sites in the mapped sub-districts. Respectively, most transwomen sites were in EThekwini, Johannesburg D, George and Tshwane 6. These are mostly the metro sub-districts.

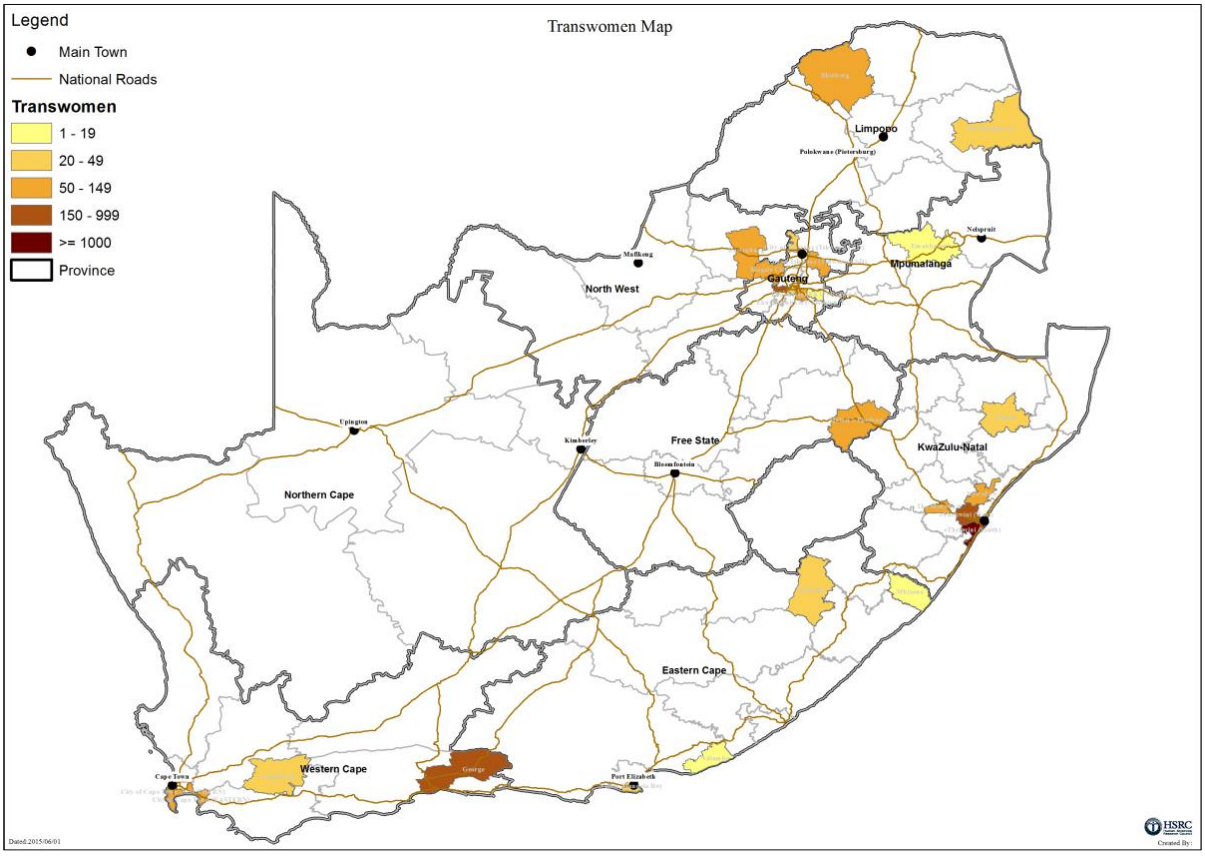

Figure 21. Concentration of sites with transwomen in selected sub-districts

Transwomen frequent sites includes venues (Bar/nightclub/casino/ tavern) (65%, Figure 22), and streets (7%) lower compared with other key populations.

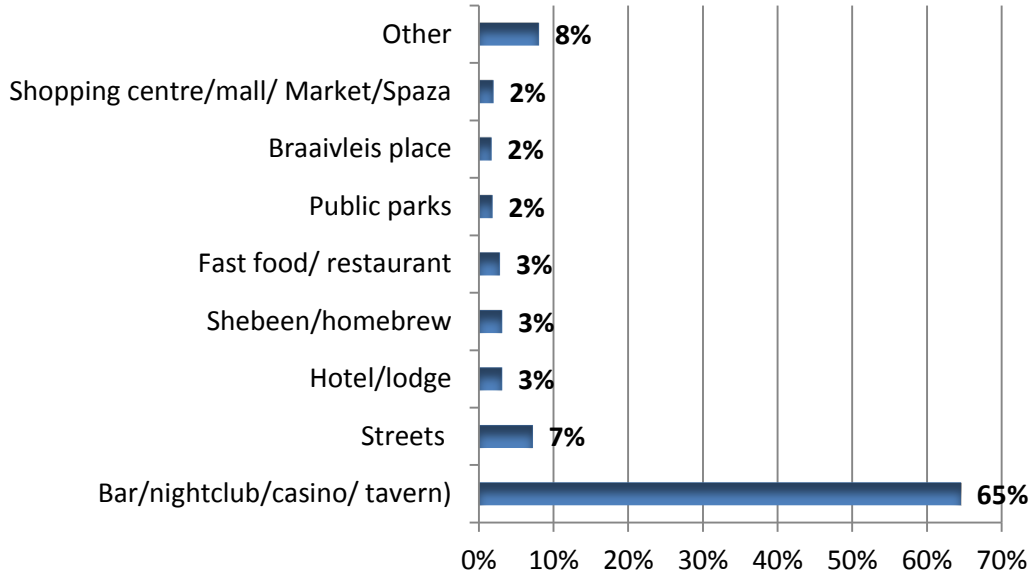

Figure 22. Types of Sites frequented by transwomen in South Africa

4.1.6.2 Size estimates of transwomen in South Africa

The study estimated the size of transwomen between is 72 156 with minimum of 67757 and maximum of 76 554. Because of the lack of data on TG people, inflation factors were not applied. The highest numbers is in the Johannesburg D, Cape Town southern sub-district (2642), George (1400), Cape Town eastern sub-district (1216), and Tshwane 6 (1010).

4.1.6.3 Distribution and type of sites for transmen South Africa

Figure 23 shows the distribution of transmen sites in the mapped sub-districts. The transmen sites are slightly more than transwomen sites in the EThekwini sub-districts and Johannesburg but slightly less for George and Tshwane 6. These are mostly the metro sub-districts.

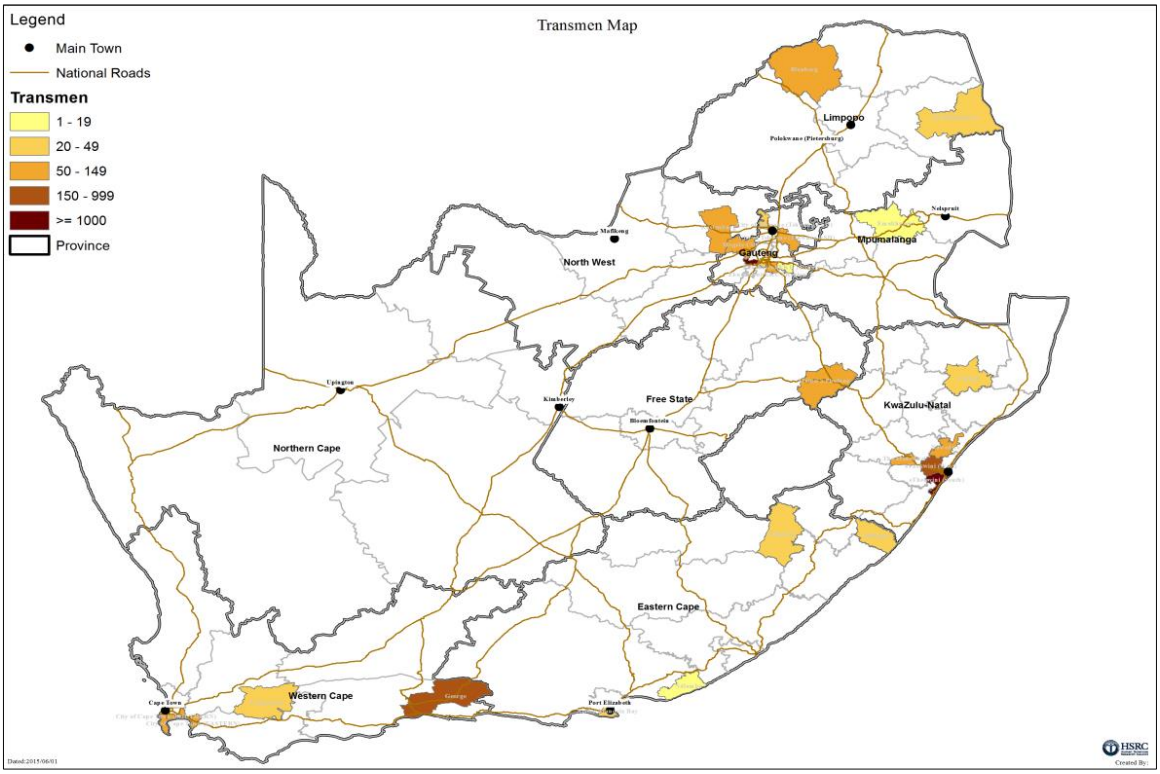

Figure 23. Concentration of sites with transmen in selected sub-districts

Transmen frequent sites includes venues (Bar/nightclub/casino/ tavern) (67%, Figure 24) more than the transwomen sites.

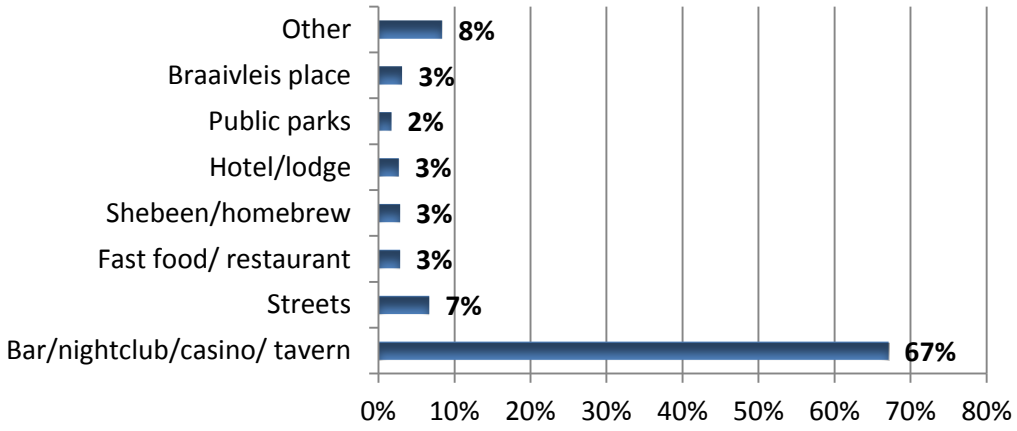

Figure 24. Types of sites frequented by transmen in South Africa

4.1.6.4 Size estimates of transmen in South Africa

The study estimated the size of transmen between is 67 510 with minimum of 60 129 and maximum of 67 510, representing 0.3% and 0.4 % of adult male population 15 years and older, (Census 2011) respectively. The highest numbers is in the EThekwini south (2863) followed by Southern sub-district of Cape Town (2309), Johannesburg D (2143) George (1400), Cape Town eastern (1251, and George (1012). A similar study of Transgender in US found that 0.2-0.3% of adult population is being transgender.

4.2 Programmatic activities

4.2.1 HIV prevention activities at the venue including condom distribution

Using the site verification form (see appendix FORM 2A Site verification), we asked site informants if any HIV prevention activities are made available to patrons including key population visiting the site in the last 12 months. In particular we focused on the availability of condoms onsite, and if condoms are for sale at the site.

Figure 25 shows the distribution of condoms at sites within the mapped districts. According to sub-district data, condoms are freely distributed monthly in the following sub-districts: Ekurhuleni South (53.6%); Ndlambe (47.1%) located in the Eastern Cape province, Elundini (45.7%), and Ulundi (47.7%) sub-districts, both located in the province of KwaZulu-Natal and Eastern sub-district of Cape Town (40%). In some sites in Gauteng districts respondents indicated complete lack of condoms, and if distributed its only monthly.

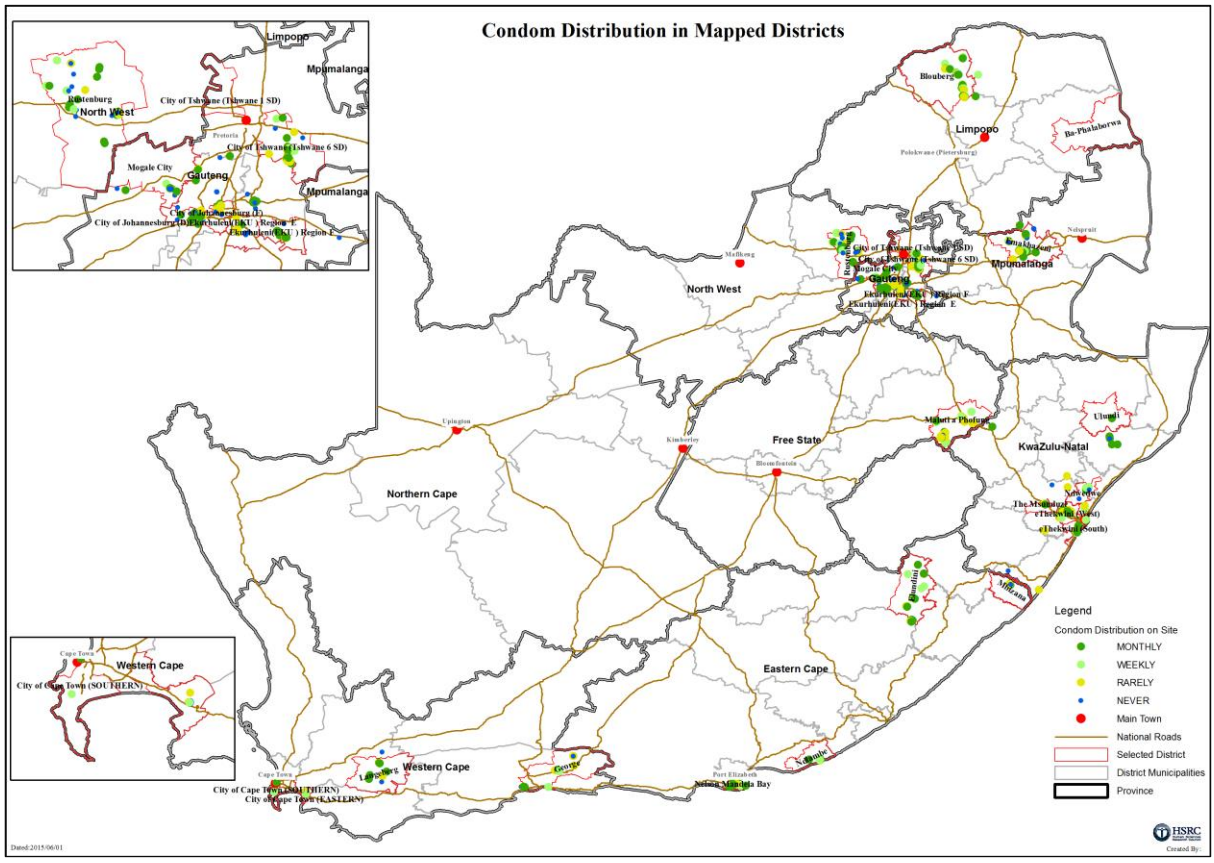

Figure 25. Condom distribution onsite in mapped sub-districts

Over one-third (31.6% Table 9) of site informants reported "never" to freely distributed condoms in the last 12 months, while 24.1% reported to free condom distribution "monthly". With regards to the distribution of lube, 76.1% of site informants reported there has "never" been freely distributed lube in the last 12 months. With smaller proportions

reporting that “rarely” (6.2%); “monthly” (3.7%) and “weekly” (2%) free distribution of lube. Almost 70% of site informants reported that condoms have not been sold onsite in the last 12 months (see Table 9).

Table 9. Availability of condoms and lube onsite in the last 12 months

Free distribution of condoms		
	N	%
Never	450	31.6
Rarely	270	18.9
Monthly	343	24.1
Weekly	200	14
Missing	162	11.4
Total	1425	100

Free distribution of lube		
	N	%
Never	1085	76.1
Rarely	89	6.2
Monthly	53	3.7
Weekly	28	2
Missing	170	11.9
Total	1425	100

Condoms for sale at the site		
	N	%
Never	978	68.6
Rarely	102	7.2
Monthly	54	3.8
Weekly	121	8.5
Missing	170	11.9
Total	1425	100

Table 10 shows information on the visibility of male and female condoms onsite. We asked site informants to show the interviewers if there are any male and female condoms onsite. Almost 40% of site informants were able to show the interviewer male condoms onsite, with one third (31%) reporting that there are no male condoms onsite. Smaller proportions of site informants interviewed reported the visibility of female condoms onsite and only 10% reported were able to show the interviewer a female condom.

Table 10. Visibility of male and female condoms onsite

Visibility of male condoms		
	N	%
Yes, male condoms here but you can't see one	242	17
Yes, male condoms here and a condom was seen	565	39.6
No, male condoms here now	442	31
Missing	176	12.4
Total	1425	100

Visibility of female condoms		
	N	%
Yes, female condoms here but you can't see one	130	9.1
Yes, female condoms here and a condom was seen	144	10.1
No, female condoms here now	962	67.5
Missing	189	13.3
Total	1425	100

Table 11 shows information regarding the availability of HIV testing, safer sex education by peer educators; visits by peer outreach workers and visits by a mobile clinic at sites that were verified. With regards to persons tested onsite for HIV, the overwhelming majority of site informants who took part in the study reported to have "never" implemented HIV testing onsite (81.5%); most reported that peer educators have "never" provided safer sex education onsite. In addition, 73.2% reported to have "never" been visited by peer outreach workers or visits by a mobile clinic (77.3%).

Table 11. Any other HIV prevention activities reported by site informants in the last 12 months

Persons tested onsite for HIV		
	N	%
Never	1161	81.5
Rarely	64	4.5
Monthly	27	1.9
Weekly	11	0.8
Missing	162	11.4
Total	1425	100

Safer sex education by peer educators		
	N	%
Never	1062	74.5
Rarely	129	9.1
Monthly	46	3.2
Weekly	28	2
Missing	160	11.2

Total	1425	100

Visits by peer outreach workers

	N	%
Never	1043	73.2
Rarely	146	10.2
Monthly	45	3.2
Weekly	26	1.8
Missing	165	11.6
Total	1425	100

Visits by a mobile clinic

	N	%
Never	1102	77.3
Rarely	103	7.2
Monthly	47	3.3
Weekly	11	0.8
Missing	162	11.4
Total	1425	100

4.2.2 Behavioural characteristics of key populations

During the final phase of the study, the validation, 1302 patron found at the sites were interviewed. Of these 679 were members of key populations and completed a questionnaire to assess HIV risk taking and protective behaviours, in particular, focusing on condom use and HIV testing practices in the last 6 or 12 months. The 525 patrons who were not members of key population gave information on site characteristics, while the rest refused to self-disclose. Table 12 provides information on members of key populations own description of condom use in the last 6 months, and whether or not they were in possession of a condom during the interview and condom use during last heterosexual sex act. Over one - third (35.2% Table 12) of respondents reported to have used condoms every time they had sex in the last 6 months and 27.1%, Table 12 reporting to have used condoms occasionally. For detailed analysis of behavioural characteristics by each key population (see Appendix Table 19a, b)

Table 12.HIV protective behaviours among members of key populations

Description of condom use in the last 6 months

	N	%
I did not use condoms at all	18	2.7
I used condoms occasionally	184	27.1
I used condoms every time I had sex	238	35.1
Missing	239	35.2
Total	679	100

Able to show condom if they have it

	N	%
Yes, but you cannot see it	71	0.46
Yes, condom seen	202	29.75
No, no condom with me	265	39.03
Missing	141	20.77
Total	679	100

Condom use during last heterosexual sex act

	N	%
Yes	302	44.5
No	55	8.1
Never had Vaginal sex	76	11.2
Missing	246	36.2
Total	679	100

Table 13 provides information about whether or not respondents received condoms from an outreach worker in the last 12 months. Over 40% of respondents reported to not been given condoms by an outreach worker in the last 12 months

Table 13. Condoms given in the last 12 months by outreach worker

	N	%
Yes	231	34.0
No	272	40.1
Missing	176	25.9
Total	679	100

We also asked key populations of their perception of chances of getting infected with HIV. Almost 26% reported that their chances of getting infected with HIV is low, whilst, similar proportions respectively reported a moderate (17.4%) and a high (15.6%) chance of getting infected with HIV (See Table 14).

Table 14. Perception of chances of getting infected with HIV

	N	%
No chance	73	10.8
Low	174	25.6
Moderate	118	17.4
High	106	15.6
Not Applicable, already positive	74	10.9
Missing	134	19.7
Total	679	100

Table 15 provides information on HIV testing practices among members of key populations in the last 12 months. Almost half of the study sample, reported to have tested for HIV in the last 12 months, with one third (31.9%) reported not to have tested for HIV in the last 12 months.

Table 15. Testing for HIV in last 12 months

	N	%
Yes, in past 12 months	326	48.0
No, not in past 12 months	213	31.4
Missing	140	20.6
Total	679	100

In addition to the availability and accessibility to HIV prevention services for members of key populations we also collected information regarding experiences with structures that are

supposed to provide protection to what are often still vulnerable and marginalized groups. Table 16 provides information on experiences with police services and perceptions of overall law enforcement in the area where respondent live. The majority of those interviewed reported to not have experienced policy brutality. However there is still a concern that 17.5% reported to have experienced police brutality (Table 16). With regards to law enforcement in the area, 21% reported that the law enforcement in the area where they live is abusive, with 38.3% reporting that law enforcement is fair. With regards to experiences of police harassment, 19.2% reported that they experience police harassment once a month, with one-tenth reporting that they experience police harassment more than once a week, and 3.5% reporting everyday police harassment.

Table 16. Experiences with police and law enforcement

Self-reported experiences of police brutality

	N	%
Yes	119	17.5
No	419	61.7
Missing	141	20.8
Total	679	100

Perception of law enforcement in area

	N	%
Good	89	13.1
Fair	260	38.3
Abusive	144	21.2
Police do not come here	52	7.7
Missing	134	19.7
Total	679	100

Experiences of police harassment

	N	%
Once a month	130	19.2
Once a week	53	7.8
More than once a week	68	10.0
Everyday	24	3.5
Never	272	40.1
Missing	132	19.4
Total	679	100

5. DISCUSSION

5.1 Size estimation and programmatic mapping

Data for FSWs are more widely available (Shinde and colleagues (2009) compared to other key populations, and this population is, generally, also better represented in national targets (Grosso et al. 2015). Data on MSM are less common, as were targets specifically pertaining to them. With a few notable exceptions, data on PWIDs remain largely unavailable, and this population is not widely included in national targets. Overall, more data is available for HIV prevalence than key population size estimates. With the exception of Ghana and Nigeria, which also have low HIV prevalence in the general population, have the most complete set of data for all populations (Grosso et al. 2015).

Table 17 provides a summary of the size estimates for all key populations in South Africa, in comparison with findings from previous studies. We estimated the FSWs population in South Africa to represent 0.97% and 1.07% of the adult female population 15 years old and above (Census 2011). This estimate is adjusted for 5% excluded from previous estimates that were assumed not to visit public venues but only visit private venues. The estimate improves on the previous estimate based on the National Sex Worker Study commissioned by SANAC and implemented by SWEAT (SWEAT/Impact Consulting, 2013) that found FSWs to represent between 0.76 and 1 % of adult female population. Our estimates also fall within the range of other estimates from Africa (0.1%- 12.0%) of adult women (Vandepitte, Lyerla, and Dallabetta 2006), and in the case of Mauritius (0.17% of adult female population 15-49 years old). However the estimate is much less in the case of Port Moresby (4.77% of adult female population 15-49 years old).

The National Sex Worker Study used the following definition for sex work: “The regular professional exchange of sex for cash, defining their target group as SWs who identify themselves as such. This includes self-identified SWs who are under the age of 18” (Konstant, Rangasami, Stacey, Stewart, & Nogoduka, 2015; SWEAT/Impact Consulting, 2013). This study also included a size estimate of those SWs who also identify as TG. In our study, only male and female SWs were included in our size estimate. Hence we are unable to provide a size estimate of the SWs who also identify as TG. This is an important subcategory of SW, since the dynamics of HIV transmission among TG SW (as well as MSWs) could be further complicated by the heightened biological risks of anal intercourse, high prevalence of HIV in some subgroups of MSM, and the large proportion of male and TG SWs who report bisexual practices (Baral et al., 2012). Additionally, a growing portion of sex work is arranged through the internet (Baral et al., 2012). This size estimate study was also unable to provide estimates on how many SWs meet clients through the internet. In addition, SWs under the age of 18 were also excluded in our study. Hence those SWs who identify as transgender and those who are under 18 years of age are not included in our size estimates. Operational definitions for SWs in our study, incorporated counting those who engage in

sex work for cash and sex work for goods and favours, separately (please see Appendix 9.3). Hence we are able to provide size estimates for those SWs who exchange sex for cash and for those SWs who exchange sex for goods and favours. However we are not able to provide a total estimate for SWs.

The size estimate for MSM in this study is slightly lower than the finding from (J. McIntyre, Jobson, Struthers, De Swardt, & Rebe, 2013). We estimated the MSM population in South Africa at 1.17 million, representing 5.78% and 6.71 % of the adult male population 15 years older and above. According to the WHO report in 2010, the MSM proportion in the male population was 3%–12% in East Asia and Southeast Asia, which was similar to our results. (Marcus et al. 2013) study on MSM in 38 countries in Europe reported that relative MSM population sizes were between 0.03% and 5.6% of the adult male population aged 15–64. Data from the British National Survey of Sexual Attitudes and Lifestyles found that the proportion of MSM in the 16 to 44-year-old males was 5.5% (4.2%- 7.1%) in London, and reached 8.27% (6.36%, 0.69%) in inner London. A study in Toronto showed that the proportion of MSM in males over 15-years-old was 3.86%.(Archibald, Jayaraman, and Major 2001). In China, the proportion of MSM in the adult male population has been reported between 4%-7% (Ning, Pan, and Zheng 2007). The world literature cites the proportion of adult men who practice male-to-male sex as 2% to 5% (Caceres, Konda, and Segura 2008) and is consistent with our estimate for MSM. But compared to African countries, with an estimated proportion of MSM in Ghana of 0.48% of the adult male population (Ghana AIDS Commission 2012) (Grosso et al. 2015), and in Kenya with an proportion of MSM in about 1.2% of the adult male population (Okal et al. 2013), whereas the size estimates in South Africa were found to be much higher.

We propose that our current estimate while slightly lower than previous estimate can form a starting point upon which additional, more rigorous data can be added and to which other population size estimation methods can be compared.

The size estimate for PWID is slightly higher than in a previous study. As for TG people, there are no previous estimates and the estimates provided by this study are the first in this country.

Table 17. Size estimates for key populations in South Africa with comparison of findings from previous studies

	Estimates	Percentage of adult Female or Male population	
Sex workers	**237 717**		
Female sex workers (FSWs)	185 357- 205 240 **195 299**	0.97% and 1.07% of adult female population	131 000 -182 000
Male sex workers(MSWs)	39 064- 45 772 **42 418**	0.22% and 0.26% of adult male population	No previous studies
Men who have sex with men (MSM)	1 019 582- 1 171 472 **1 095 527**	5.81% and 6.67% of adult male population	1.2 million
Persons who inject drugs (PWIDs)	75 701		67 000
Men	41 374 - 44 135 **42 755**	0.24% and 0.25% of adult male population	
Women	31 489- 34 402 **32 946**	0.16% and 0.18% of adult female population	
Transgender People (TG)*	139 666		No previous studies
Transwomen	67 757 -76554 **72 156**	0.35% and 0.40% of adult female population	
Transmen	60 129- 74 891 **67 510**	0.34% and 0.43% of adult male population	

**No adjustment for hidden population for transgender*

5.1.1 Female sex workers

In Baral and colleagues (2012) systematic review and meta-analysis of the burden of HIV among FSWs in low and middle income countries, the author stresses that three decades into the HIV pandemic, understanding the burden of HIV among FSWs remains limited. The burden of HIV among FSWs varies by geographical epidemic typology, structure of sex work, and overlapping nature of HIV-risk behaviours such as IDU (Baral et al., 2012). More recently, the role that structural determinants have in mitigating HIV epidemics and access to care for FSWs has been illuminated by Shannon et al (2014). In addition, Shannon and colleagues (2014) stressed that multipronged structural and community-led interventions are crucial to increase access to prevention and treatment and to promote human rights for FSWs worldwide. In most settings however, in particular where sex work is criminalized, size estimates which are crucial for directing HIV prevention resources and funding for FSWs remains undocumented.

In Southern African countries, including South Africa, sex for goods and favours (i.e. transactional sex) have been shown to be a common practice where prevalence rates were reported between 5% and 80% (Béné & Merten, 2008; Chatterji, Murray, London, & Anglewicz, 2005; Dunkle et al., 2004; Dunkle et al., 2007; Jewkes, Dunkle, Nduna, & Shai, 2010; R. Jewkes, Morrell, Sikweyiya, Dunkle, & Penn-Kekana, 2012; Stephenson, Winter, & Elfstrom, 2013).

In South Africa, SANAC commissioned SWEAT to conduct a rapid assessment of the SW population size in South Africa in 2012. The study published recently by Konstant and colleagues (2015) used principles of participatory mapping and “Wisdom of the Crowds” in twelve locations across South Africa. At each site, SW focus groups mapped local hotspots. Interviews with SWs at identified hotspots were used to estimate the numbers and gender identifications of SWs working in each hotspot. Estimates provided in the literature were combined with enumeration exercise results to define assumptions that could be applied to a national extrapolation (Konstant et al., 2015). A working estimate was reached of between 131 000 and 182 000 SWs in South Africa, or between 0.76 and 1% of the adult female population (Konstant et al., 2015). This study used the following definition for sex work: “The regular professional exchange of sex for cash, defining their target group as sex workers who identify themselves as such. This includes self-identified SWs who are under the age of 18” (SWEAT/Impact Consulting, 2013).

According to Vandepitte and colleagues (2006) most studies use mapping and census of FSWs to estimate the number of FSW. Mapping and census of FSWs, even though it is an elaborate method is also a straightforward one. For example, in Nepal, The mapping and size estimation of key populations included establishment-based FSWs, street-based FSWs and home-based FSWs and was conducted across 39 select districts in the six epidemic

regions of Nepal, India (HIV/AIDS and STI Control Board (HSCB), 2011). Similarly, Abdul-Qadar, Baughman and Hladik (2014) identified two broad categories of methods used to estimate the size of key populations. Methods under category one (census and enumeration, multiplier, and capture - recapture) were used to collect data directly from the key populations, including existing data from related institutions. Methods under category two (population survey, network scale-up) were used to collect data from the general population.

In Kenya, Nairobi three population size estimate methods were integrated into a Behavioural surveillance survey among FSWs during 2010-2011 to estimate the size of those at risk for HIV infection (Okal et al., 2013). These methods included the multiplier method, "Wisdom of the Crowds" and an approach that drew on published literature (Okal et al., 2013). They estimated that there were approximately 29 494 FSWs with a plausible range of 10 000-54 467 FSWs (Okal et al., 2013).

In a study conducted by Paz-Bailey and colleagues (2011) using a capture - recapture exercise to estimate the number FSWs in San Salvador, El Salvador the researchers found that the first capture was done by distributing key chains to FSW populations through local NGOs that work with these groups. The second capture was done during the course of an integrated Behavioural and biological surveillance surveys using RDS. The proportion receiving a key chain estimated from the IBBSS study was adjusted by RDS-derived weights. The first capture included 400 FSWs. Of the 663 FSWs interviewed in the IBBSS, 39 (5.9% crude; 6.9% adjusted RDS) had received the key chain. The estimated number of FSWs was 5765 (95% CI 4253 to 7277) (Paz-Bailey et al., 2011).

5.1.2 Male sex workers

According to Shinde and colleagues (2009) while research on FSWs is extensive, comparatively less information exists on male sex work. Where the male sex work industry is concerned, the social marginalization of groups such as MSWs which include MSM make prevention efforts with these vulnerable groups challenging (Mahalingam P, Watts R, Monica J, Sundari E, Balasubramaniam S, Chakrapani V., 2004). MSWs that sell or exchange sex for cash or goods encompass a very diverse population across and within countries worldwide (S. D. Baral et al., 2015). Information characterizing their practices, contexts where they live, and their needs is limited, because these individuals are generally included as a subset of larger studies focused on gay men and other MSM or even FSWs (Baral et al., 2015). MSWs, irrespective of their sexual orientation, mostly offer sex to men and rarely identify as SWs, using local or international terms instead (Baral et al., 2015). This makes reaching MSWs challenging for HIV prevention efforts.

In addition, according to Jewkes et al, (2012) the notion of 'transactional sex' developed through research with women does not translate easily to men. Men perceive expectations

that they fulfil a provider role, with quid pro quo entitlement to sex (R. Jewkes et al., 2012). This might also complicate efforts to estimate the size of this population.

In a study conducted among MSWs in Mombasa, Kenya with the aim of identifying social and Behavioural characteristics associated with sexual risk behaviours among MSWs who sell sex to other men, the study found one third of respondents did not know HIV can be transmitted via anal sex, which was a significant predictor of unprotected anal sex (Geibel et al., 2008). A capture-recapture enumeration estimated that 739 MSWs who sell sex to men were active in Mombasa District, Kenya (Geibel et al., 2007) confirming the existence of a highly vulnerable population insufficiently addressed in national and local HIV programming (also see Kibicho, 2003). In Nepal, a mapping and size estimate study was conducted among MSWs (HIV/AIDS & STI Control Board, 2011). The study found a size estimate of MSWs, to be in the following range: 46,102 and 56,466 (HIV/AIDS & STI Control Board, 2011).

5.1.3 MSM

Before the onset of a heterosexual HIV epidemic, HIV infection in South Africa was characterized by male homosexual transmission (cited in Burrell, Mark, Grant, Wood, & Bekker, 2010; Ras, Simson, Anderson, Prozesky, & Hamersma, 1983; Van Harmelen et al., 1997) specifically affecting mainly the white male homosexual population (Van Harmelen et al., 1997). By the mid-1980s, a parallel epidemic emerged among heterosexuals in the general population (Maartens, Wood, O'Keefe, & Byrne, 1997). In fact; the heterosexual epidemic has completely eclipsed HIV MSM in South Africa (McIntyre, 2010). This resulted in a shift in the focus of HIV surveillance and intervention programs towards heterosexual transmission and prevention of mother-to-child transmission (PMTCT) (Department of Health, 2007).

In addition to the shift in focus towards heterosexual transmission, the lack of information on HIV risk among MSM in South Africa, and in the rest of Africa stems from the perception that MSM behaviours are not that prevalent. Despite the evidence that same sex relations are not only indigenous but also widespread in African contexts, it is still widely perceived as 'unAfrican' and considered a European perversion (Constantine-Simms, 2000; Epprecht, 1998; Epprecht, 2006; Graziano, 2004a; Graziano, 2004b; Grundlingh, 1999; Isaacs & Miller, 1985; Johnson, 2001; Lillah-Chiki, 1999; Stein, 2001). In contradiction to other parts of the world, African same sex patterns are not only widespread but they are also diverse (Murray & Roscoe, 1998). However, in many African contexts, men tend to engage in clandestine same sex relationships whilst still fulfilling their expected gender roles and responsibilities (Cloete, Rispel, Metcalf, & Reddy, 2010).

In this context, MSM constitutes a "hard-to-reach" population and are consequently thought of as epidemiologically invisible (McKenna, 1996). In South Africa, the 2008 South African national household HIV sero-prevalence and Behavioural survey (unpublished) revealed that a very small proportion of the population reported same sex behaviour. Hence the national survey data on HIV prevalence and behaviour is of limited use. This also impact

on the validity of the size estimates based on extrapolated data from such population-based surveys.

Although the poor response rates among MSM in national surveys are most likely the result of persistent stigmatization of same sex sexual interactions in South African communities, in the national sero-prevalence study, the unit of sampling in this study (i.e. household) and the sampling method used makes obtaining a representative sample of MSM difficult. This, together with poor response rates drives the misconception that same sex sexual intercourse is not that prevalent between men. Due to these factors, HIV prevention, treatment and counselling services are more geared towards the heterosexual population and this informs and directs the national prevention, treatment and research agenda. It is therefore imperative to conduct HIV surveillance that will document HIV prevalence among MSM and its social and Behavioural drivers. Consequently, such information will be used to advocate for HIV prevention programs to be specifically tailored to the needs of MSM.

Although there is currently no routine surveillance system to measure HIV prevalence and incidence among MSM in South Africa, recently there has been an upsurge in HIV biological and Behavioural surveys among MSM (Baral et al., 2011; Burrell et al., 2010; Cloete et al., 2014; Lane et al., 2011; Lane et al., 2014; Rispel, Metcalf, Cloete, Reddy, & Lombard, 2011).

As a consequence to the upsurge of HIV bio-Behavioural data and an increase in services available that are tailored to the needs of MSM in South Africa, The University of California, San Francisco (UCSF) has recently published a report that triangulates data from different sources and explores the extent to which research is being conducted in terms of the prevalence and incidence of MSM with HIV in South Africa (University of California, San Francisco, 2015).

5.1.4 Persons who inject drugs

Data for the prevalence of PWIDs is often unavailable for countries located in Africa. In most countries worldwide, PWIDs has been shown to be an increasingly important cause of HIV transmission (Mathers et al., 2008). Only two countries (Ghana and Nigeria) had both key population size estimates and HIV prevalence data for PWIDs (Grosso et al. 2015). Studies on PWID in East Africa document that PWIDs (specifically heroin injectors) are now common in most large towns in Kenya and Tanzania, both countries where HIV rates are high (Beckerleg, Telfer, & Hundt, 2005; Tun et al., 2015). In Mauritius, a programmatic mapping study to estimate the size of the PWID population as well as HIV prevalence among this group (National AIDS Secretariat, 2014) found that PWIDs is the largest key population in Mauritius estimated at a size of 5046 (range: 4 139 to 5 952) and the number increased to 7,598 (range: 6 463 to 8 732) on peak days (National AIDS Secretariat, 2014; Tun et al., 2015).

In Kenya, the PWID population is small, but the HIV prevalence (18.7%) in this population group compared to people in the general population is high (Tun et al., 2015).

In South Africa there has been little information about the extent of PWIDs. A recent rapid assessment of HIV prevalence and HIV-related risks among PWIDs across five cities in South Africa recruited, in total 450 PWIDs and estimated a 14% HIV prevalence (Scheibe, Brown, & dos Santos, 2015).

5.1.5 Transgender people

There is no data for transgender persons in sub-Saharan countries (Grosso et al. 2015). The degree to which HIV prevention service targets are adopted is highly variable across the selected countries, and the collection of relevant HIV prevention service coverage data for those targets that were identified was inconsistent. Population-specific minimum packages of services were identified in three countries (Cote d'Ivoire, Ghana, and Nigeria), although only Ghana and Nigeria included services for PWIDs (Grosso et al. 2015).

Policy formulation and health care programming are considered to be the main reasons for developing reliable estimates of the size of the populations that we consider to be at high risk for HIV (Pisani, Weir, & Zaba, 2003). The availability of relevant policies enables governments and civil society organizations to advocate and lobby for resource allocation. However, with some key populations and in particular with regards to TG people, the first and most difficult issue is in defining the population. It might be possible that not all members of the group are at risk, and only certain sub-populations need different public health strategies for making health care accessible to them. The lack of consensus in a definition for TG people contributes to the challenges of identifying and calculating the size estimate for this key population. There are varying gender presentations and social categories for TG people and different terms are used to describe individuals who live between or outside a male-female binary (Baral & Poteat, Strömdahl, Wirtz, A.L., Guadamuz, Beyrer, 2013).

Transwomen, have long been known to be at high risk for HIV infection and transmission. In a systematic review and meta-analysis conducted by Baral and colleagues (2013): “Data were only available for countries with male-predominant HIV epidemics, which included the USA, six Asia-Pacific countries, five in Latin America, and three in Europe. The pooled HIV prevalence was 19.1% in 11 066 transwomen worldwide. In 7197 transwomen sampled in ten low-income and middle-income countries, HIV prevalence was 17.7%. In 3869 transwomen sampled in five high-income countries, HIV prevalence was 21.6%. The odds ratio for being infected with HIV in transwomen compared with all adults of reproductive age across the 15 countries was 48.8% and did not differ for those in low-income and middle-income countries compared with those in high-income countries” (p.214).

Given, the high HIV prevalence rates among transwomen, it becomes especially important to estimate the size of this population in any given country, in order to provide adequate HIV prevention resources. Yet, because of the challenging in defining the population and the

persistent stigmatization that TG people experience globally, size estimates of this population remains undocumented in many countries. Where data is available this is often not informed by straightforward methods. In a study conducted by Gates (2011) to estimate the number of TG people in the US, estimates that about 0.3% of the adult population in the US identify as transgendered.

5.2 Service coverage

Coceka (2013) identified combination HIV prevention interventions for key populations that are similar to those identified in this study. She identified biomedical, socio-Behavioural and structural HIV prevention interventions.

Biomedical interventions include HIV Counselling and Testing (HCT), diagnosis and treatment of sexually transmitted infections (STIs), voluntary medical male circumcision (VMMC), PMTCT, post-exposure prophylaxis (PEP) and condoms. Socio-Behavioural interventions include promoting consistent and correct use of condoms, changing patterns of sexual behaviour (e.g. delaying sexual debut, reducing number of sexual partners) and undertaking communication for social and behaviour change. Structural interventions include appropriate national policy and legislation, advocacy at all levels decision-making, positive leadership, appropriate budgeting and resource management, addressing gender inequity and gender-based violence and reducing stigma at facility and community level.

6. STUDY LIMITATIONS

In this study, we used programmatic mapping (i.e. the PLACE method). There are several strengths to using the PLACE method. Firstly, size estimates based on information from specific locations can be readily translated into outreach targets by local service delivery providers because the providers have been a part of the mapping in collaboration with and led by members of key populations. Secondly, site-based estimates can empower key populations as they are at the center of the process. Finally, often people who go to sites are among the most vulnerable and at risk of HIV infection because the sites are places where people go to meet new sexual partners or socialize.

To the extent possible, the methodology was comprehensively and uniformly applied across the 25 sub-districts; however, certain limitations, which are typical of a study of this scale, in attempting to estimate hidden population groups such as PWIDs, MSM, TG people and SWs are summarized as follows:

Firstly, a central assumption of the mapping and size estimates of key populations at the sites was the definition of a typical day when it is likely to get the members of key populations at the sites. This is particularly important for SWs and PWIDs where there are likely to be fluctuations due to seasonal variations or changes in law and order situations at the sites.

The mobility of key populations is another factor from site to site or even sub-districts. These weaknesses were overcome through the application of adjustments at different levels to adjust the estimates. The multipliers/inflation factors were developed to adjust the data from venue-based methods to include hidden populations (Yu et al. 2014, HIV/AIDS and STI Control Board (HSCB) 2011). As acknowledged by Yu and colleagues (2014) a broader survey should have been conducted of the proportion of members of key populations who prefer to meet new sex partners in private or public venues, since this would have been a more effective indicator of their preferred meeting areas.

The application of the PPS approach to sampling the 25 sub-districts, irrespective of whether these are known "key population sub-districts" means that the information will be useful for targeting because one will be able to answer the question about whether there are key populations in all types of areas. Additional work to extrapolate the findings from the areas in the study to non-study areas will be necessary.

With regards to fieldwork implementation, interviewers reported that during site verification that they felt at times that owners and managers of establishments were often not honest in terms of key populations that might be found at the specific site. They might have feared that having been associated with "sex work" or "injecting drug users" that they would get into trouble with the authorities. In South Africa, sex work and drug use are criminalized activities, and the experiences reported on by the interviewers might have reflected this.

The main limitation of the study is that there was inadequate time to implement a full pilot and consequently that data quality may be variable across study zones or across types of sites. During a pilot, many implementation issues arise and can be resolved, including whether the study is too ambitious for the budget, what points to focus on during the interviewer training, how to assess street sites, and how to manage the forms and data entry.

Despite the above limitations, efforts have been made to ensure the data was captured and corrected, necessary adjustment factors applied to arrive at final estimates, both at mapped sites and in the wider population by applying the sampling weights.

7. CONCLUSIONS AND RECOMMENDATIONS

Understanding geographic variation in the numbers of key populations is critical to targeting and scaling up HIV prevention programs. This study adapted the PLACE – a recognized operational research methodology to identify sites where key populations meet new partners, complemented by a complex multiplier methods to adjust estimates for male sex workers, MSM and PWID, it has achieved its aim of providing a national size estimate for key populations including SWs, MSM, PWIDs and TG people in South Africa.

Overall, the size estimate for FSWs in this study was higher than that of a previous study (205 240 vs. 182 000) conducted in South Africa in the past three years. As there was no previous study estimating the size of MSWs in South Africa, this study provided baseline estimates (45 772 and 55 868) for MSWs in exchange for cash and in exchange for goods and favours respectively.

The upper range of the size estimate for MSM in this study was slightly lower than that of a previous study (1.17 million vs. 1.2 million) conducted in this population in South Africa. The size estimate for PWIDs was derived by gender with women PWIDs estimates of 31 489-34 402 and men PWIDs estimate of 41 374 - 44 135. Overall these estimates are higher than that found in a previous size estimate of 67 000. As there was no previous study estimating the size of transgender people in South Africa, this study provided baseline estimates (76 554 and 74 891 for transwomen and transmen respectively. This equates to 0.4% of adult female and male population 15 years and older.

This study serves as an important tool to develop programmes that address the needs of key populations as part of the national HIV response in South Africa.

Following our results and consequent study limitations we are making the following recommendations for future size estimate studies:

1. Future size estimate studies examine the intersecting categories, for example sex worker and/or transgender identifications; MSM and male sex worker etc. In the present study, the complexities inherent with such intersections (overlapping identifications) were not investigated.
2. Future size estimates for TG people might benefit from a separate study, exclusively focusing on this target population.
3. Further in-depth studies should be considered in this area surrounding social media mapping and Key populations in south Africa
4. Further a study that utilizes all the different methods of size estimation will help to improve on the estimates.

8. REFERENCES

Abdul-Quader, A.S., Baughman, A.L. & Hladik, W. 2014, "Estimating the size of key populations: current status and future possibilities", *Current opinion in HIV and AIDS,* vol. 9, no. 2, pp. 107-114.

Baral, S.D. & Poteat, T., Strömdahl, S. ,Wirtz, A.L., Guadamuz, T.E., Beyrer, C. 2013, "Worldwide burden of HIV in transgender women: A systematic review and meta-analysis", *Lancet Infectious Diseases.,* vol. 13, pp. 214-222.

Baral, S., Beyrer, C., Muessig, K., Poteat, T., Wirtz, A.L., Decker, M.R., Sherman, S.G. & Kerrigan, D. 2012, "Burden of HIV among female sex workers in low-income and middle-income countries: a systematic review and meta-analysis", *The Lancet infectious diseases,* vol. 12, no. 7, pp. 538-549.

Baral, S., Burrell, E., Scheibe, A., Brown, B., Beyrer, C. & Bekker, L.G. 2011, "HIV risk and associations of HIV infection among men who have sex with men in peri-urban Cape Town, South Africa", *BMC public health,* vol. 11, pp. 766-2458-11-766.

Batist, E., Brown, B., Scheibe, A., Baral, S.D. & Bekker, L. 2013, "Outcomes of a community-based HIV-prevention pilot programme for township men who have sex with men in Cape Town, South Africa", *Journal of the International AIDS Society,* vol. 16, no. 4Suppl 3.

Beckerleg, S., Telfer, M. & Hundt, G.L. 2005, "The rise of injecting drug use in East Africa: a case study from Kenya", *Harm reduction journal,* vol. 2, pp. 12.

Bolding, G., Davis, M., Hart, G., Sherr, L. & Elford, J. 2007, "Where young MSM meet their first sexual partner: the role of the Internet", *AIDS and Behavior,* vol. 11, no. 4, pp. 522-526.

Burrell, E., Mark, D., Grant, R., Wood, R. & Bekker, L.G. 2010, "Sexual risk behaviours and HIV-1 prevalence among urban men who have sex with men in Cape Town, South Africa", *Sexual health,* vol. 7, no. 2, pp. 149-153.

Centre for Global Public Health 2012, *
A Field Manual: Geographical Mapping Approach – Mapping Key Populations at a higher risk of HIV. CGPH,* , University of Manitoba.

Cloete, A., Simbayi, L.C., Rehle, T., Jooste, S., Mabaso, M., Townsend, L., Ntsepe, Y., Louw, J., Naidoo, D., Duda, T. & Naidoo, P. 2014, *The South African Marang Men's Project: HIV bio-Behavioural surveys using respondent-driven sampling conducted among men who have sex with men in Cape Town, Durban and Johannesburg*, HSRC Press, Cape Town.

Cloete, A., Rispel, L., Metcalf, C. & Reddy, V. 2010, "Being straight and being gay:Identity or Multiple Desire: The Case of South Africa.", *Sexuality in Africa Magazine & Monographs,* vol. 6, no. 1, pp. 9-10.

Constantine-Simms, D. 2000, *The greatest taboo: Homosexuality in black communities.* Alyson Books., Los Angeles, New York:.

Csete, J. & Cohen, J. 2010, "Health benefits of legal services for criminalized populations: the case of people who use drugs, sex workers and sexual and gender minorities", *The Journal of Law, Medicine & Ethics,* vol. 38, no. 4, pp. 816-831.

Department of Health 2007, ***HIV and AIDS and STI National Strategic Plan for South Africa 2007 2011. Pretoria: Department of Health.***.

Desmond Tutu HIV Foundation 2011, *The Policy Brief. Key Populations. Key Solutions. A Gap Analysis and Recommendations for Key Populations and HIV in South Africa.
.
* , Unpublished.

Dunkle, K.L., Jewkes, R.K., Murdock, D.W., Sikweyiya, Y. & Morrell, R. 2013, "Prevalence of consensual male-male sex and sexual violence, and associations with HIV in South Africa: a population-based cross-sectional study", *PLoS medicine,* vol. 10, no. 6, pp. e1001472.

Epprecht, M. 2006, *"Bisexuality" and the politics of normal in African ethnography.*

Epprecht, M. 1998, "The "unsaying" of indigenous homosexualities in Zimbabwe: Mapping a blindspot in an African masculinity", *Journal of Southern African Studies,* , pp. 1-20.

Ferreira, L.O.C., De Oliveira, E.S., Raymond, H.F., Chen, S.Y. & McFarland, W. 2008, "Use of time-location sampling for systematic Behavioural surveillance of truck drivers in Brazil", *AIDS and Behavior,* vol. 12, no. 1, pp. 32-38.

Global Fund 2010, *Using Programmatic Mapping to Improve Program Access and Coverage for Key Populations Guidelines for Countries.*

Global Fund/PEPFAR 2015, *Using Programmatic Mapping to Improve Program Access and Coverage for Key Populations. Guidelines for Countries.* .

Gouws, E. & Cuchi, P. 2012, "Focusing the HIV response through estimating the major modes of HIV transmission: a multi-country analysis", *Sexually transmitted infections,* vol. 88, no. Suppl 2, pp. i76-i85.

Graziano, K.J. 2004a, "Oppression and resiliency in a post-apartheid South Africa: Unheard voices of black gay men and lesbians. Cultural diversity and ethnic minority", *Psychology,* vol. 10, pp. 302-316.

Graziano, K.J. 2004b, "'Coming out on a South African university campus: Adaptations of gay men and lesbians", *Society in Transition,* vol. 35, no. 2, pp. 237-287.

Grundlingh, L. 1999, "HIV/AIDS in South Africa: A case of failed responses because of stigmatization, discrimination and morality, 1983 – 1994", *New Contree,* vol. 46, pp. 55-81.

Heckathorn, D.D. 1997, "Respondent-Driven Sampling: A new approach to the study of hidden populations
 ", *Social Problems,* vol. 44, no. 2, pp. 174-199.

HIV/AIDS and STI Control Board (HSCB) 2011, *Mapping and size estimation of most at risk population in Nepal. Vol.3. Female Sex Workers*, Nielsen/UNAIDS/World Bank.

Isaacs, G. & Miller, D. 1985, "AIDS - Its implications for South African homosexuals and the mediating role of the medical practitioner", *South African Medical Journal = Suid-Afrikaanse Tydskrif vir Geneeskunde,* vol. 68, no. 5, pp. 327-330.

Johnson, C.A. 2001, "Hearing voices: Unearthing evidence of homosexuality in precolonial Africa", *The greatest taboo: Homosexuality in Black communities,* , pp. 132-148.

Joint United Nations Programme on HIV/AIDS 2012, *Global report: UNAIDS report on the global AIDS epidemic: 2012,* UNAIDS.

Joint United Nations Programme on HIV/AIDS 2011, "UNAIDS terminology guidelines", *Geneva: Joint United Nations Programme on HIV/AIDS,* .

Jonas, A. & Patel, S. *
Formative Assessment to Inform an Integrated Biological and Behavioural Surveillance Survey (IBBSS) with size estimation among Female Sex Workers and Men who have Sex with Men in Namibia. MOHSS and* , CDC-Namibia on behalf of the Namibia IBBSS Task Force.

Karon, J.M. & Wejnert, C. 2012, "Statistical methods for the analysis of time–location sampling data", *Journal of Urban Health,* vol. 89, no. 3, pp. 565-586.

Konstant, T.L., Rangasami, J., Stacey, M.J., Stewart, M.L. & Nogoduka, C. 2015, "Estimating the Number of Sex Workers in South Africa: Rapid Population Size Estimation", *AIDS and Behavior,* vol. 19, no. 1, pp. 3-15.

Lane, T., Osmand, T., Marr, A., Shade, S.B., Dunkle, K., Sandfort, T., Struthers, H., Kegeles, S. & McIntyre, J.A. 2014, "The Mpumalanga Men's Study (MPMS): Results of a Baseline Biological and Behavioural HIV Surveillance Survey in Two MSM Communities in South Africa", *PloS one,* vol. 9, no. 11, pp. e111063.

Lane, T., Raymond, H.F., Dladla, S., Rasethe, J., Struthers, H., McFarland, W. & McIntyre, J. 2011, "High HIV prevalence among men who have sex with men in Soweto, South Africa: results from the Soweto Men's Study", *AIDS and Behavior,* vol. 15, no. 3, pp. 626-634.

Lillah-Chiki, R. 1999, *Gay Town, South Africa: the township where homosexuals can relax in SA's first 'gay-friendly shebeen'
* .

Maartens, G., Wood, R., O'Keefe, E. & Byrne, C. 1997, "Independent epidemics of heterosexual and homosexual HIV infection in South Africa--survival differences", *QJM : monthly journal of the Association of Physicians,* vol. 90, no. 7, pp. 449-454.

Mathers, B.M., Degenhardt, L., Phillips, B., Wiessing, L., Hickman, M., Strathdee, S.A., Wodak, A., Panda, S., Tyndall, M. & Toufik, A. 2008, "Global epidemiology of injecting drug use and HIV among people who inject drugs: a systematic review", *The Lancet,* vol. 372, no. 9651, pp. 1733-1745.

McIntyre, J., Jobson, G., Struthers, H., De Swardt, G. & Rebe, K. 2013, *Rapid Assessment of HIV Prevention, Care and Treatment Programming for MSM in South Africa. Assessment Report.* , Johannesburg.

McIntyre, J.A. 2010, "The need for HIV prevention interventions for men who have sex with men in Africa", *Sexually transmitted infections,* vol. 86, no. 2, pp. 82-83.

McKenna, N. 1996, "On the margins: men who have sex with men and HIV in the developing world.", .

Murray, S.O. & Roscoe, W. 1998, "Boy-wives and female-husbands: Studies in African homosexualities", .

National AIDS Secretariat 2014, *Programmatic Mapping and Sixe Estimation of Key Populations in Mauritius*, Office of the Prime Minister, Mauritius.

Okal, J., Geibel, S., Muraguri, N., Musyoki, H., Tun, W., Broz, D., Kuria, D., Kim, A., Oluoch, T. & Raymond, H.F. 2013, "Estimates of the size of key populations at risk for HIV infection: men who have sex with men, female sex workers and injecting drug users in Nairobi, Kenya", *Sexually transmitted infections,* vol. 89, no. 5, pp. 366-371.

Parry, C., Petersen, P., Carney, T., Dewing, S. & Needle, R. 2008, "Rapid assessment of drug use and sexual HIV risk patterns among vulnerable drugusing populations in Cape Town, Durban and Pretoria, South Africa", *SAHARA-J: Journal of Social Aspects of HIV/AIDS,* vol. 5, no. 3, pp. 113-119.

Paz-Bailey, G., Jacobson, J.O., Guardado, M.E., Hernandez, F.M., Nieto, A.I., Estrada, M. & Creswell, J. 2011, "How many men who have sex with men and female sex workers live in El Salvador? Using respondent-driven sampling and capture-recapture to estimate population sizes", *Sexually transmitted infections,* vol. 87, no. 4, pp. 279-282.

Petersen, Z., Myers, B., Van Hout, M., Plüddemann, A. & Parry, C. 2013, "Availability of HIV prevention and treatment services for people who inject drugs: findings from 21 countries", *Harm Reduct J,* vol. 10, no. 13.

Pisani, E., Weir, S. & Zaba, B. 2003, *Estimating the Size of Populations at Risk for HIV: Issues and Methods: Updated July 2003,* Family Health International.

Ras, G., Simson, I., Anderson, R., Prozesky, O. & Hamersma, T. 1983, "Acquired immunodeficiency syndrome", *S Afr Med J,* vol. 64, pp. 140-142.

Rees, H., Beksinska, M.E., Dickson-Tetteh, K., Ballard, R. & Htun, Y. 2000, "Commercial sex workers in Johannesburg: risk behaviour and HIV status.", *South African Journal of Science,* vol. 96, no. 6, pp. 283-284.

Rispel, L.C., Metcalf, C.A., Cloete, A., Reddy, V. & Lombard, C. 2011, "HIV prevalence and risk practices among men who have sex with men in two South African cities", *Journal of Acquired Immune Deficiency Syndrome,* vol. 57, no. 1, pp. 69-76.

Sabin, K.M. & Johnston, L.G. 2014, "Epidemiological challenges to the assessment of HIV burdens among key populations: respondent-driven sampling, time-location sampling and demographic and health surveys", *Current opinion in HIV and AIDS,* vol. 9, no. 2, pp. 101-106.

Saidel, T., Loo, V., Salyuk, T., Emmanuel, F., Morineau, G. & Lyerla, R. 2010, "Applying current methods in size estimation for high risk groups in the context of concentrated epidemics: lessons learned", *jHASE-Journal of HIV/AIDS Surveillance & Epidemiology,* vol. 2, no. 1.

SANAC 2011, *National strategic plan on HIV, STIs and TB 2012–2016*, SANAC, Pretoria.

Scheibe, A., Brown, B. & dos Santos, M. 2015, *Rapid assessment of HIV prevalence and HIV-related risks among people who inject drugs
in five South African cities*.

Shisana, O., Rehle, T., Simbayi, L.C., Zuma, K. & Jooste, S. 2014, *South African national HIV prevalence, incidence and behavioural survey,2012*, HSRC Press, Cape Town.

Stein, J. 2001, "'The gay community – a hidden HIV/AIDS epidemic?'", *AIDS Bulletin,* vol. 10, no. 1, pp. 17-18.

SWEAT/Impact Consulting 2013, *Estimating the size of the sex worker population in South Africa*.

Tun, W., Sheehy, M., Broz, D., Okal, J., Muraguri, N., Raymond, H.F., Musyoki, H., Kim, A.A., Muthui, M. & Geibel, S. 2015, "HIV and STI prevalence and injection behaviours among people who inject drugs in Nairobi: Results from a 2011 bio-Behavioural study using respondent-driven sampling", *AIDS and Behavior,* vol. 19, no. 1, pp. 24-35.

UCSF, CDC, UCT & ANOVA 2013, *
Protocol Jan. 15, 2013 - Integrated Biological and Behavioural Surveillance Surveys with Population Size Estimation among Female Sex Workers and Long Distance Truck Drivers in KwaZulu Natal, South Africa.
* , University of California San Francisco, Center for Disease Control, University of Cape Town and ANOVA.

University of California, San Francisco 2015, *Report of the South Africa men-who-have-sex-with men. Data Triangulation Project.* , San Francisco: UCSF. Global Health Sciences.

Van Harmelen, J., Wood, R., Lambrick, M., Rybicki, E.P., Williamson, A. & Williamson, C. 1997, "An association between HIV-1 subtypes and mode of transmission in Cape Town, South Africa", *Aids,* vol. 11, no. 1, pp. 81-87.

Weir, S.S., Pailman, C., Mahlalela, X., Coetzee, N., Meidany, F. & Boerma, J.T. 2003, "From people to places: focusing AIDS prevention efforts where it matters most", *Aids,* vol. 17, no. 6, pp. 895-903.

Weir, S.S., Tate, J.E., Zhusupov, B. & Boerma, J.T. 2004, "Where the action is: monitoring local trends in sexual behaviour", *Sexually transmitted infections,* vol. 80 Suppl 2, pp. ii63-8.

Yu, D., Calleja, J.M.G., Zhao, J., Reddy, A. & Seguy, N. 2014, "Estimating the size of key populations at higher risk of HIV infection: a summary of experiences and lessons presented during a technical meeting on size estimation among key populations in Asian countries", *Western Pacific surveillance and response journal: WPSAR,* vol. 5, no. 3, pp. 43.

9. APPENDICES

Appendix 9.1: Additional Tables for Site characteristics and behavioural characteristics of the key populations

Table 18: Busiest time at the sites

Busiest day of the week at the site	N=1425	%
Monday	10	0.7
Tuesday	2	0.1
Wednesday	13	0.9
Thursday	17	1.2
Friday	389	27.3
Saturday	647	45.4
Sunday	39	2.7
Missing	308	21.6
Busiest hours on day		
Early morning	21	1.5
Late morning/lunch time	71	5
Afternoon	231	16.2
Evening/night	730	51.2
Whole day/24 hours	162	11.4
Day time work hours	32	2.2
Missing	178	12.5

Table 19a: Behaviour characteristics for FSWs, MSWs, MSM, PWIDs, and TG populations

	FSWs		MSWs		Trans man		Trans woman		MSMs		PWID		Total	
	N=338	%	N=109	%	N=115	%	N=154	%	N=234	%	N=118	%	N=679	%
Condom use in the past 6 months														
I did not use condoms at all	9	2.7	1	0.9	1	0.9	5	3.3	7	3.0	2	1.7	18	2.7
I used condoms occasionally	118	34.9	33	30.3	16	13.9	40	26.0	71	30.3	31	26.3	184	27.1
I used condoms every time I had sex	145	42.9	38	34.9	37	32.2	57	37.0	88	37.6	33	28.0	238	35.1
Missing	66	19.5	37	33.9	61	53.0	52	33.8	68	29.1	52	44.1	239	35.2
Able to show condom if they have it														
	49	14.5	11	10.09	5	4.35	4	2.6	18	7.69	7	5.93	71	10.46
	124	36.69	29	26.61	29	25.22	51	33.12	78	33.33	34	28.81	202	29.75
	125	36.98	47	43.12	53	46.09	75	48.7	105	44.87	39	33.05	265	39.03
	40	11.83	22	20.18	28	24.35	24	15.58	33	14.1	38	32.2	141	20.77
How easy or difficult is it for you to get a condom when you want one?														
Very easy	129	38.2	35	32.1	35	30.4	64	41.6	96	41.0	41	34.8	230	33.9
Easy	130	38.5	34	31.2	16	13.9	31	20.1	61	26.1	23	19.5	185	27.3
Difficult	13	3.9	4	3.7	3	2.6	7	4.6	9	3.9	1	0.9	25	3.7
Very difficult	3	0.9	0	0.0	0	0.0	0	0.0	1	0.4	1	0.9	4	0.6
Missing	63	18.6	36	33.0	61	53.0	52	33.8	67	28.6	52	44.1	235	34.6
Used condom the last time had penis to vagina sex														
Yes	206	61.0	35	32.1	33	28.7	39	25.3	68	29.1	48	40.7	302	44.5
No	37	11.0	13	11.9	7	6.1	12	7.8	23	9.8	8	6.8	55	8.1
Never had Vaginal sex	27	8.0	23	21.1	13	11.3	49	31.8	70	29.9	9	7.6	76	11.2
Missing	68	20.1	38	34.9	62	53.9	54	35.1	73	31.2	53	44.9	246	36.2

Given condom by an outreach worker such as a peer educator in the past 12 months														
Yes	153	45.3	27	24.8	40	34.8	57	37.0	77	32.9	28	23.7	231	34.0
No	140	41.4	57	52.3	39	33.9	68	44.2	113	48.3	39	33.1	272	40.1
Missing	45	13.3	25	22.9	36	31.3	29	18.8	44	18.8	51	43.2	176	25.9
Given a lube by an outreach worker in the past 12 months														
Yes	100	29.6	19	17.4	22	19.1	41	26.6	64	27.4	21	17.8	153	22.5
No	152	45.0	46	42.2	41	35.7	59	38.3	96	41.0	38	32.2	272	40.1
I don't know what lube is	36	10.7	14	12.8	14	12.2	21	13.6	27	11.5	4	3.4	64	9.4
Missing	50	14.8	30	27.5	38	33.0	33	21.4	47	20.1	55	46.6	190	28.0
Perceptions of getting infected with HIV														
No chance	22	6.5	9	8.3	22	19.1	15	9.7	36	15.4	9	7.6	73	10.8
Low	78	23.1	23	21.1	29	25.2	48	31.2	69	29.5	31	26.3	174	25.6
Moderate	78	23.1	18	16.5	14	12.2	27	17.5	37	15.8	24	20.3	118	17.4
High	62	18.3	27	24.8	16	13.9	20	13.0	39	16.7	12	10.2	106	15.6
Not Applicable, already positive	58	17.2	9	8.3	9	7.8	18	11.7	21	9.0	10	8.5	74	10.9
Missing	40	11.8	23	21.1	25	21.7	26	16.9	32	13.7	32	27.1	134	19.7
Had HIV test anywhere in the past 12 months														
Yes, in past 12 months	182	53.8	53	48.6	52	45.2	74	48.1	126	53.9	47	39.8	326	48.0
No, not in past 12 months	109	32.2	35	32.1	36	31.3	55	35.7	77	32.9	38	32.2	213	31.4
Missing	47	13.9	21	19.3	27	23.5	25	16.2	31	13.3	33	28.0	140	20.6
Been hurt physically by the police														
Yes	62	18.3	21	19.3	11	9.6	23	14.9	42	18.0	27	22.9	119	17.5
No	230	68.1	64	58.7	79	68.7	104	67.5	161	68.8	61	51.7	419	61.7
Missing	46	13.6	24	22.0	25	21.7	27	17.5	31	13.3	30	25.4	141	20.8
Perception of law enforcement is in this location														

Good	46	13.6	22	20.2	13	11.3	17	11.0	33	14.1	14	11.9	89	13.1
fair	152	45.0	33	30.3	44	38.3	70	45.5	87	37.2	46	39.0	260	38.3
Abusive	75	22.2	21	19.3	16	13.9	28	18.2	59	25.2	21	17.8	144	21.2
Police do not come here	25	7.4	9	8.3	15	13.0	11	7.1	22	9.4	5	4.2	52	7.7
Missing	40	11.8	24	22.0	27	23.5	28	18.2	33	14.1	32	27.1	134	19.7
Frequency of police harassment at the site														
Once a month	69	20.4	13	11.9	22	19.1	22	14.3	36	15.4	29	24.6	130	19.2
Once a week	29	8.6	13	11.9	4	3.5	12	7.8	18	7.7	14	11.9	53	7.8
More than once a week	43	12.7	6	5.5	7	6.1	20	13.0	24	10.3	17	14.4	68	10.0
Everyday	8	2.4	10	9.2	2	1.7	4	2.6	9	3.9	6	5.1	24	3.5
Never	150	44.4	43	39.5	55	47.8	69	44.8	115	49.2	21	17.8	272	40.1
Missing	39	11.5	24	22.0	25	21.7	27	17.5	32	13.7	31	26.3	132	19.4

Table 19b: Behaviour characteristics for FSWs, MSWs, MSM, PWIDs, and TG populations

	FSWs		**MSWs**		**Trans man**		**Trans woman**		**MSM**		**PWID**		**Total**	
	338	**%**	**n=109**	**%**	**n=115**	**%**	**n=154**	**%**	**n=234**	**%**	**n=118**	**%**	**n=679**	**%**
Frequency of site visits														
Everyday	108	32.0	9	8.3	15	13.0	20	13.0	30	12.8	35	29.7	149	21.9
4 to 6 times per week	86	25.4	16	14.7	16	13.9	31	20.1	40	17.1	26	22.0	132	19.4
2 to 3 times per week	86	25.4	35	32.1	29	25.2	36	23.4	65	27.8	25	21.2	175	25.8
One time per week	22	6.5	26	23.9	20	17.4	29	18.8	52	22.2	9	7.6	88	13.0
2 to 3 times per month	15	4.4	13	11.9	9	7.8	18	11.7	26	11.1	6	5.1	52	7.7
One time per month	6	1.8	2	1.8	6	5.2	7	4.6	9	3.9	4	3.4	21	3.1
This is my first visit	2	0.6	2	1.8	3	2.6	4	2.6	6	2.6	0	0.0	7	1.0
Missing	13	3.8	6	5.5	17	14.8	9	5.8	6	2.6	13	11.0	55	8.1
Number of sites visited in the day														
1	119	35.2	28	25.7	43	37.4	45	29.2	62	26.5	47	39.8	237	34.9

2	50	14.8	20	18.3	27	23.5	42	27.3	55	23.5	26	22.0	112	16.5
3+	157	46.4	59	54.1	41	35.7	63	40.9	110	47.0	44	37.3	295	43.4
Missing	12	3.6	2	1.8	4	3.5	4	2.6	7	3.0	1	0.9	35	5.2
Injected any non-prescription drug in the past 12 months														
Yes past 12 months	25	7.4	11	10.1	6	5.2	16	10.4	21	9.0	59	50.0	69	10.2
Not in past 12 months	7	2.1	4	3.7	1	0.9	4	2.6	6	2.6	7	5.9	17	2.5
Missing	306	90.5	94	86.2	108	93.9	134	87.0	207	88.5	52	44.1	593	87.3
Received money in exchange for sex in the last 12 months														
Yes	249	73.7	51	46.8	24	20.9	54	35.1	83	35.5	37	31.4	307	45.2
No	44	13.0	32	29.4	53	46.1	72	46.8	109	46.6	27	22.9	194	28.6
Missing	45	13.3	26	23.9	38	33.0	28	18.2	42	18.0	54	45.8	178	26.2
Ever used a condom														
Yes	275	81.4	72	66.1	54	47.0	101	65.6	166	70.9	66	55.9	443	65.2
No	21	6.2	11	10.1	26	22.6	26	16.9	26	11.1	2	1.7	64	9.4
Missing	42	12.4	26	23.9	35	30.4	27	17.5	42	18.0	50	42.4	172	25.3
Used condom during last time had anal sex														
Yes	120	35.5	48	44.0	32	27.8	73	47.4	127	54.3	35	29.7	223	32.8
No	38	11.2	12	11.0	7	6.1	12	7.8	21	9.0	3	2.5	57	8.4
Never had anal sex	114	33.7	9	8.3	15	13.0	15	9.7	17	7.3	27	22.9	156	23.0
Missing	66	19.5	40	36.7	61	53.0	54	35.1	69	29.5	53	44.9	243	35.8
Had any burning when you pee, or discharge feeling in the last 12 months														
Yes	88	26.0	23	21.1	15	13.0	25	16.2	41	17.5	11	9.3	132	19.4
No	201	59.5	59	54.1	68	59.1	99	64.3	153	65.4	66	55.9	389	57.3
Missing	49	14.5	27	24.8	32	27.8	30	19.5	40	17.1	41	34.8	158	23.3
Spent a night in jail or prison														
Yes	99	29.3	33	30.3	15	13.0	38	24.7	67	28.6	49	41.5	180	26.5

No	200	59.2	53	48.6	75	65.2	89	57.8	135	57.7	38	32.2	366	53.9
Missing	39	11.5	23	21.1	25	21.7	27	17.5	32	13.7	31	26.3	133	19.6

Appendix 9.2 Selected sub-districts

	CAT	SUB-DISTRICT	PROVINCE	SUBLOCATCODE	District Name	Seat	Population
1	Local Municipality	Ba-Phalaborwa	LIM	LIM333	Mopani	Tzaneen	390095
2	Local Municipality	Blouberg	LIM	LIM344	Vhembe	Louis Trichardt	516031
3	Metropolitan Municipality	CT Eastern SD	WC	CPT	CPT	Cape Town	423986
4	Metropolitan Municipality	CT Southern SD	WC	CPT	CPT	Cape Town	544341
5	Metropolitan Municipality	Ekurhuleni E1 SD	GT	EKU	EKU	Germiston	508082
6	Metropolitan Municipality	Ekurhuleni S1 SD	GT	EKU	EKU	Germiston	507707
7	Local Municipality	Elundini	EC	EC141	Joe Gqabi	Maclear	138141
8	Local Municipality	Emakhazeni	MP	MP313	Nkangala	Middelburg	229831
9	Metropolitan Municipality	EThekwini South SD	KZN	ETH	ETH	Durban	1537668
10	Metropolitan Municipality	EThekwini West SD	KZN	ETH	ETH	Durban	785304
11	Local Municipality	George	WC	WC044	Eden	George	193672
12	Metropolitan Municipality	Johannesburg D SD	GT	JHB	JHB	Johannesburg	1348147
13	Metropolitan Municipality	Johannesburg F SD	GT	JHB	JHB	Johannesburg	498341
14	Local Municipality	Langeberg	WC	WC026	Cape Winelands	Ashton	97724
15	Local Municipality	Maluti a Phofung	FS	FS194	Thabo Mofutsanyane	Phuthaditjhaba	335784
16	Local Municipality	Mbizana	EC	EC443	Alfred Nzo	Bizana	281905
17	Local Municipality	Mogale City	GT	GT481	West Rand	Krugersdorp	362422
18	Metropolitan Municipality	N Mandela B SD	EC	NMA	NMA	Port Elizabeth	265436
19	Local Municipality	Ndlambe	EC	EC105	Cacadu	Port Alfred	61176
20	Local Municipality	Ndwedwe	KZN	KZN292	iLembe	KwaDukuza	231187
21	Local Municipality	Rustenburg	NW	NW373	Bojanala Platinum	Rustenburg	549575
22	Local Municipality	The Msunduzi	KZN	KZN225	Ehlanzeni	Bushbuckridge	541248
23	Metropolitan Municipality	Tshwane 1 SD	GT	TSH	TSH	Pretoria	792230
24	Metropolitan Municipality	Tshwane 6 SD	GT	TSH	TSH	Pretoria	581367
25	Local Municipality	Ulundi	KZN	KZN265	Zululand	Nongoma	194908

Appendix 9.3 List of unique key population sites as reported by community informants

Sub-district Code	Sub-district Name	Female_Cash	Female_Goods & Favours	Men_Cash	Men_Goods & Favours	MSM	PWIDs	Transwomen	Transmen
LIM333	Ba-Phalaborwa	96	56	52	8	36	75	42	41
LIM344	Blouberg	85	97	36	37	75	76	97	97
CPT1	Cape Town Eastern	90	105	59	69	23	81	88	90
CPT2	Cape Town Southern	78	91	29	45	60	59	85	82
EKU E1	Ekurhuleni E1	77	88	35	58	42	34	103	100
EKU S1	Ekurhuleni S1	47	42	1	1	3	7	14	14
EC141	Elundini	76	100	27	33	19	53	67	66
MP313	Emakhazeni	39	50	3	2	3	19	0	0
ETHs	Ethekweni South	422	464	247	237	325	327	371	403
ETHw	Ethekweni West	135	183	38	45	105	156	184	185
WC044	George	164	146	98	78	106	91	168	160
JHBD	Johannesburg D	295	349	152	210	233	261	266	291
JHBF	Johannesburg F	65	55	5	16	39	19	37	36
WC026	Langeberg	23	33	13	17	12	25	31	32
FS194	Maluti a Phofong	76	108	33	70	36	68	89	97
EC443	Mbizana	14	26	3	4	2	24	17	29
GT481	Mogale city	108	64	11	10	120	46	124	128
NMA	N Mandela B SD	60	81	45	46	35	58	39	36
EC105	Ndlambe	14	14	5	4	6	22	0	0
KZN292	Ndwedwe	81	104	27	34	32	67	108	108
NW373	Rustenburg	14	78	60	19	29	62	84	87
KZN225	The Msunduzi	120	119	52	43	92	69	86	89
TSH1	Tshwane 1	101	145	44	62	90	81	68	62
TSH6	Tshwane 6	233	218	78	89	123	126	118	117
KZN265	Ulundi	69	59	12	14	35	26	39	39

Appendix 9.4 Data collection forms

FORM 1.A Community informant questionnaire/instructions

DO NOT RECORD ANY RESPONSES ON THIS FORM	
1.	**READ:** Hello. My name is **[Name of fieldworker]** and I am working with **[The Human Sciences Research Council and Name of partner organizations in Province]** on a study that will improve health programs in this area. I would like to ask you some questions about where programs are needed. This includes asking you about places around here where people meet new sex partners and places where people who inject drugs gather. People who have many sex partners or inject drugs are more at risk for some infections. I can offer you this information sheet that has more information about the study. This should take about 15 minutes.
2.	**Offer an Information sheet and answer questions.**
3.	**CONFIRM THAT RESPONDENT IS AGE 18 OR OLDER.** **IF YOUNGER THAN 18, STOP.**
4.	**ASK:** Are you willing to answer some questions? **IF RESPONDENT REFUSES, FIND ANOTHER RESPONDENT.**
5.	**FILL IN FORM 1.B FOR EACH COMMUNITY INFORMANT WHO CONSENTS.**

6.	**ASK:** We want to know about public places in this area that may benefit from visits from health workers.
	• Could you tell me about public places in this area where people go to meet new sex partners? We are interested in public sites, events and internet sites. We are not interested in private homes.
	  • Can you tell me about public sites, events and internet sites where people who inject drugs could be reached with a health program?
	  • Can you tell me about any other public sites, events and internet sites where transgender people gather?
	  • Can you tell me about any other public sites, events and internet sites where sex workers solicit clients? Or where people look for someone to pay for sex?
	  • Can you tell me about any other public sites, events and internet sites where gay or bisexual men or any other men who have sex with men gather?
	
	Instruction: Probe for sites where persons who inject drugs (PWIDs), transgender people and sex workers meet.

7.	**FOR EACH QUESTION ANSWERED AFFIRMATIVELY, COMPLETE ONE SITE AND EVENT REPORT (FORM 1.C) FOR EACH SITE OR EVENT NAMED.** **LIMIT THE PLACES TO SITES IN THE IMMEDIATE AREA [Name of sub-district] WHERE THE INTERVIEW IS BEING CONDUCTED.**
8.	**DON'T RECORD SITE, UNLESS IT IS ANSWERED AFFIRMATIVELY**
9.	**RECORD NUMBER OF SITES OR EVENTS NAMED ON FORM 1.B**

FORM 1.B Community Informant Characteristics Form

A.	**DATE**	__DD__/__MM__/__YY__
B.	**GEOGRAPHIC CODES FOR LOCATION OF INTERVIEW**	Province ☐☐☐ Sub-district ☐☐☐ Zone ☐☐ Ward ☐☐☐
C.	**INTERVIEWER NUMBER OR CODE**	/___/___/
D.	**COMMUNITY INFORMANT NUMBER**	/___/___/
E.	**AGE OF COMMUNITY INFORMANT IN YEARS**	
F.	**TYPE OF INFORMANT (CIRCLE 1 CODE)**	

	F1. If Key population:		
	Trans woman (Male to Female)..... 1	Person who injects drugs 3	Man who sells sex for money 5
	Trans man (Female to Male) 2	Man who has sex with men 4	Woman who sells sex for money..... 6
	F2. If not key population:	Nurse.....16	Mechanics, petrol attendants 27
	Taxi driver.....7	Peer educator.....17	Hairdresser.....28
	Truck driver.....8	Community health worker.....18	Community leader 29
	Shebeen owner 9	Youth in school.....19	Political leader.....30
	Bar or tavern owner 10	Youth out of school.....20	Traditional leader 31
	Barmaid, waiter, bar worker.....11	Teacher 21	Ward counsellor 32
	Individual socialising at sit 12	SAPS (police) 22	Car guard 33
	Bottle store/brewery drop off.....13	Security guard 23	Other man 34
	CBO/NGO staff.....14	Trader/business.....24	Other woman.....35
	SANDF 15	Hawker/ street vendor 25	Other 36
		Unemployed 26	

G.	NUMBER OF PHYSICAL SITES, WEBSITES AND EVENTS NAMED BY THIS INFORMANT	E. PHYSICAL SITES /___/___/ F. WEBSITES /___/___/ G. EVENTS /___/___/

LIST PLACES, WEBSITES AND EVENTS NAMED ON LINES BELOW FILL OUT A SITE REPORT FORM FOR EACH SITE OR EVENT OR WEBSITE NAMED.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

FORM 1.C Site and event form

(1 FORM PER SITE, EVENT & WEBSITE NAMED) _____/_____ /_____ Day Month Year					
	COMMUNITY INFORMANT ID NUMBER:				
	GEOGRAPHIC CODE OF CI INTERVIEW	Province ☐☐☐ Sub -district ☐☐☐ Zone ☐☐ Ward ☐☐☐			
1.	**SITE NAME:**				
2.	**2a.STREET ADDRESS:** 2b. Name of township/suburb:		2c. Landmark:		
3.	**HOW TO FIND THE PLACE:**				
4.	SITE TYPE: **CIRCLE 1 CODE** **Type of site**. CODES 1 - 31 ARE FOR TYPES OF VENUES. **IF IT IS AN EVENT,** CIRCLE 32-38 IF IT IS A WEBSITE, CIRCLE 39	Brothel.....1 Street sex work site .....2 Other street .....3 Venue (bar/nightclub/casino/ tavern) 4 Gay club.....5 Hotel/lodge .....6 Hostel..... 7 Massage parlour.....8 Fast food/ restaurant..... …9 Braaivleis place..... .....10 Shebeen/homebrew .....11 Spaza.....12 Porno/sex shop .....13 Shopping centre/mall/ Market.....14	Public parks.....15 Public toilet .....16 Under bridges/open spaces .....17 Construction site.....18 Port, harbour, ship……..19 Church/temple/mosque.....20 Grave yard..... .....21 In/near campus/school or school yard.....22 Railway or bus station..... ….23 Truck stop.....24 Busstop..... 25 Taxi stand..... .....26 Tourist attraction.....27 Beach/river..... ….28	Gym.....29 Public pool.....30 Other site .....31 ***Event*** Wedding, funeral.....32 Gay Pride.....33 Concert.....34 Sport event.....35 Gay party.....36 Other party.....37 Other event .....38 ***Virtual/Service*** Website.....39 Escort service 40

5.	Any of these populations at the site? **ANSWER YES, NO OR DONT KNOW FOR EACH.**		**YES**	**NO**	**DK**
		Women who sell sex for money.....	1	2	9
		Women who sell sex for goods and favours	1	2	9
		Men who sell sex for money.....	1	2	9
		Men who sell sex for goods and favours.....	1	2	9
		People who inject drugs	1	2	9
		Men who have sex with men	1	2	9
		Born male, but see themselves as a woman/girl and act as female, and dress in women's clothing (i.e. a dress)	1	2	9
		Born female, but see themselves as a man/boy and act as a man, and dress in male clothing (i.e. male cut pants, tie)	1	2	9

6.	a. Busiest time of operation **CIRCLE 1.**	A. Early morning B. Late morning/lunch time C. Afternoon	D. Evening/ night E. Whole Day/24 Hours F. Day Time Work Hours
7.	b. When are the operating hours of this site? **CIRCLE 1**	A. Early morning B. Late morning/lunchtime C. Afternoon	D. Evening / night E. Whole Day / 24 Hours F. Day Time Work Hours

8.	How many people are at the site at a busy time?	Less than 30 people ....1 30-99 people ....2 100 and more people ..3

FORM 2A Site verification

No.	Question [INSTRUCTION TO INTERVIEWER: Complete questions 1-11 before interview]	Response Categories
1	Date	**Day**___ **Month**____**Year**_____
2	Interviewer number or code	
3	Type of social mobilizer present?	No social mobilizer present during site visit.....0 Sex worker.....1 MSM.....2 Trans woman (Male to female).....3 Trans man: (Female to male)…… …..4 Person who injects drugs.....5
4	**GEOGRAPHIC CODE OF SITE:**	Province ☐☐☐ Sub-district ☐☐☐ Zone ☐☐ Ward ☐☐☐
5	Unique Site Number From Site List	Site number: _____
6	Site name (IF WEBSITE, INDICATE EXACT WEBSITE):	Site Name:_____
7	Site address given by community informant(s)_____ Township/Suburb name given by community informant(s):_____ Landmark given by community informant(s):_____	
8	Corrected Site address: _____ Corrected Township/Suburb name:_____ Corrected Landmark:_____	
9	GPS Coordinates **USE THE GPS UNIT. WRITE LATITUDE AND LONGITUDE HERE.**	Longitude: _____ Latitude: _____

10	Was the site found?	Location not found 0 Location found, interview conducted 1 Duplicate location 2 WRITE SITE # IF DUPLICATED: _____ Location closed 3 Location found, informant declined 4 Other (Write)_____5

11	SITE TYPE: CIRCLE 1 CODE Type of site. CODES 1 -31 ARE FOR TYPES OF VENUES. IF IT IS AN EVENT, CIRCLE 32-38 IF IT IS A WEBSITE, CIRCLE 39	Brothel .....1 Street sex work site .....2 Other street site .....3 Venue (bar/nightclub/casino/ tavern) .....4 Gay club..... .....5 Hotel/lodge .....6 Hostel..... 7 Massage parlour. ……8 Fast food/ restaurant .....9 Braaivleis place..... …….10 Shebeen/homebrew . ……11 Spaza .....12 Porno/sex shop.....……13 Shopping centre/mall/ Market.....14	Public parks ..... 15 Public toilet ..... 16 Under bridges/open spaces ...17 Construction site ..... 18 Port, harbour, ship ..... 19 Church/temple/mosque ..... 20 Grave yard ..... 21 In/near campus/school or school yard.....22 Railway or bus station..... 23 Truck stop ..... 24 Busstop ..... 25 Taxi stand..... .....26 Tourist attraction ..... 27 Beach/river 28	Gym .....29 Public pool..... .....30 Other site .....31 ***Event*** Wedding, funeral .....32 Gay Pride.....33 Concert. .....34 Sport event .....35 Gay party .....36 Other party .....37 Other event .....38 *Virtual/Service* **Website** .....39 Escort service 40

READ: Hello. My name is _____ and I am working with _____ on a study coordinated by The Human Sciences Research Council (HSRC) that will improve HIV prevention programs. I would like to ask you some questions about this site. I can offer you this information sheet that has more information about the study. This should take about 30-40 minutes.

INSTRUCTIONS TO THE INTERVIEWER (Do not read out):

1. Did you read the information sheet to the respondent? **Yes** 1 **No** 2
2. Did you read the consent form to respondent in language respondent understands? **Yes** 1 **No** 2
3. Have you asked the respondents if he/she has questions, and have you answered those questions? **Yes** 1 **No** 2

INTERVIEWER: **INDICATE ANY REFUSAL ON FORM 2 B**

12	**What is your age?** RESPONDENT MUST BE 18 OR OLDER. IF RESPONDENT IS younger than 18, STOP INTERVIEW AND FIND ANOTHER.	**AGE IN YEARS:** ☐☐

13	Site informant's gender **ASK IF UNCERTAIN.** **[HOW WOULD YOU LIKE ME TO REFER TO YOU, LOOKING AT THESE CATEGORIES?]**	Male: Born as male ..1 Female: Born as female ..2 Trans woman: (Male to female) ..3 Trans man: (Female to male) ..4
14	Site informant is a member of which key populations according to social mobilizer **OBTAIN THIS INFORMATION FROM THE SOCIAL MOBILIZER** **[IF NO SOCIAL MOBILIZER, ask respondent into which of the following categories he/she fits into?]**	**Y N** Sex Worker ..1..2 Person who Injects Drugs ..1..2 Man who have sex with Men ..1..2 Trans woman (Male to female) ..1..2 Trans man (Female to male) ..1..2 Heterosexual male ..1..2 Heterosexual female ..1..2 No Social Mobilizer ..99
15	A. During a typical week, what is the busiest day of the week here? **CIRCLE 1.** B. What are the busiest hours on that day?	**A. BUSIEST DAY:** Monday ..1 Tuesday ..2 Wednesday ..3 Thursday ..4 Friday ..5 Saturday ..6 Sunday ..7 B. **BUSY TIME:** Early morning ..1 Late morning/lunch time ..2 Afternoon ..3 Evening/night ..4 Whole day/24 hours ..5 Day time work hours ..6

16	On a busy day, how many women will be here over the course of the entire day and night? **READ OPTIONS** You have given me a range. Can you be more specific now and provide your best guess (estimate)?	A. 0 B. 1 - 14 C. 15-29 D. 30 - 49 E. 50 - 99 F. 100-149 G. 150 –199 H. 200-299 I. 300-399 J. 400-499 K. 500-999 L. 1000-1999 M. OVER 2000 **NUMBER: _____** **INSTRUCTION TO INTERVIEWER:** [IF the final number does not correspond with the range above – please probe for an accurate response]
17	Do women, aged 18 or older who sell sex for money come to this site?	Yes ..... .1 No ..... .2 **[IF NO: Skip to Q19]**
18	On a busy night, how many of these women will be here?	NUMBER: _____ **INSTRUCTION TO INTERVIEWER:** [IF this number does not correspond with the number mentioned in q16, please probe for an accurate response]
19	Some women sell sex for money, some women sell sex for goods and favours. Have you seen any of the women here sell sex for goods or favours? *By goods and favours we mean for example selling sex for airtime, a ride home, drinks, etc.*	Yes ..... .1 No ..... .2 **[IF NO: Skip to Q21]**
20	On a busy night, how many of these women will be here?	NUMBER: _____ **INSTRUCTION TO INTERVIEWER:** [IF this number does not correspond with the number mentioned in q16, please probe for an accurate response]

21	On a busy day, how many men will be here over the course of the entire day and night? **READ OPTIONS.** You have given me a range. Can you be more specific now and provide your best guess (estimate)?	A. 0 B. 1-14 C. 15-29 D. 30-49 E. 50-99 F. 100-149 G. 150 – 199 H. 200-299 I. 300-399 J. 400-499 K. 500-999 L. 1000-1999 M. OVER 2000 NUMBER: _____ **INSTRUCTION TO INTERVIEWER:** [IF the final number does not correspond with the range above – please probe for an accurate response]
22	Do men, aged 18 or older who sell sex for money come to this site?	Yes……1 No……..2 **[IF NO: Skip to Q24]**
23	On a busy night, how many of these men will be here?	NUMBER: _____ **INSTRUCTION TO INTERVIEWER:** [IF this number does not correspond with the number mentioned in q21, please probe for an accurate response]
24	Some men sell sex for money, some men sell sex for goods and favours, have you seen any of the men here sell sex for goods or favours?	Yes ..... .1 No ..... .2 **[IF NO: Skip to Q26]**
25	On a busy night, how many of these men will be here?	NUMBER: _____ **INSTRUCTION TO INTERVIEWER:** [IF this number does not correspond with the number mentioned in q21, please probe for an accurate response]
26	Do men aged 18 or older who have sex with other men come to this site? *By men who have sex with men, I mean men who have sex with other men, who are 18 years and older. These men can be either gay, bisexual or straight*	Yes ..... .1 No ..... .2 **[IF NO: Skip to Q28]**
27	On a busy night, how many men who have sex with men will be here?	NUMBER: _____

28	Some people are born male, but later on in their lives might not see themselves as a man and feel more comfortable acting as a woman, who for example might dress in women's clothing (i.e. a dress). Have you ever noticed anyone like this here? IF YES, how many have come in the last month? **INSTRUCTION TO INTERVIEWER:** Enter 'zero or '0' if no one of this description was seen at the site in the last month	A. Ever? Yes ..... .1 No, Never ..... .2 B. IF YES: NUMBER IN LAST MONTH:_____
29	Some people are born female, but later on in their lives might not see themselves as a woman and feel more comfortable acting as a man and would for example now dress in men's clothing (i.e. a tie and male cut pants). Have you ever noticed anyone like this here? IF YES, how many have come in the last month? **INSTRUCTION TO INTERVIEWER:** Enter 'zero or '0' if no one of this description was seen at the site in the last month	A. Ever? Yes ..... .1 No, Never ..... .2 B. IF YES: NUMBER IN LAST MONTH:_____
30	**INSTRUCTION TO INTERVIEWER:** Please remind the respondent that all information is treated as confidential, and the purpose of the study is to develop health programmes for key populations such as PWIDs. In your opinion how common is injecting drug use in this area? Would you say nobody injects drugs in this area, some people inject, or many people inject? *By people who inject drugs I mean a person who is 18 years and older (male/female) who has injected at least once in the last year*	Nobody……..1 Some .....2 Many.....3
31	Do you personally know anyone who has injected drugs in the last year?	Yes.....1 No.....2 **[IF NO: Skip to Q33]**
32	A. Of those who you personally know injected drugs in the last year, how many were female? B. Of those who you personally know injected drugs in the last year, how many were male?	A. NUMBER FEMALE: _____ B. NUMBER MALE: _____
33	Do you know whether persons who inject drugs hang out here?	Yes.....1 No.....2 **[IF NO: Skip to Q35]**

34 a-b	A. On a busy night how many MEN WHO INJECT DRUGS come here? B. On a busy night, how many WOMEN WHO INJECT DRUGS come here?	A. NUMBER: _____ B. NUMBER: _____
35 a-h	Physical characteristics of the site **(CIRCLE YES OR NO FOR EACH)**	**YES** **NO** A. Electricity available ... 1 2 B. Tap water available ... 1 2 C. Walls and ceiling ... 1 2 D. Inside toilet ... 1 2 E. Outside toilet (i.e. long drop) ... 1 2 F. Beds on site ... 1 2 G. Videos shown onsite ... 1 2 H. TV onsite ... 1 2
36 a-e	Which types of activities take place here at a busy time? **READ LIST.** **CIRCLE YES OR NO FOR EACH.**	**YES** **NO** A. Alcohol consumed ... 1 2 B. People buy food to eat ... 1 2 C. People socialize for 1 hour or more ... 1 2 D. People watch sports events ... 1 2 E. Other ... 1 2

37 a-j	I would like to talk to you about the characteristics of people who come to this place. In your opinion do……**READ LIST.**	**YES**	**NO**	**DK**
		A. People meet new sex partners here? ... 1	2	9
		B. Women who sell sex come here to find customers? ... 1	2	9
		C. Men who sell sex come here to find customers? ... 1	2	9
		D. Any male staff meet new sex partners here? ... 1	2	9
		E. Any female staff meet new sex partners here? ... 1	2	9
		F. People have sex on site? ... 1	2	9
		G. Men meet male sex partners here? ... 1	2	9
		H. Do young girls aged 15 – 17 come here? ... 1	2	9
		I. Do people who inject drugs come here? ... 1	2	9
		J. Is there someone onsite who helps people find new sex partners? ... 1	2	9

38a	What are other sites, where men who have sex with men, sex workers, people who inject drugs and men who were born male but act like a woman go to socialize, drink alcohol or look for a person to have sex? *(For each site indicate which key populations socialize there. You can choose more than one key population per site)*	Site Name	MSM	Sex Worker	PWID	Men who were born male but see themselves as a woman
39b		No additional sites mentioned…….999				

40 a-j	In the last 12 months how often have there been HIV prevention activities at this venue? Has there been any….. **ASK EACH.**	**NEVER**	**RARELY**	**MONTHLY**	**WEEKLY**
		A. HIV/AIDS prevention?.....1	2	3	4
		B. Free distribution of condoms? 1	2	3	4
		C. Free distribution of lube? 1	2	3	4
		D. Condoms for sale at venue?.....1	2	3	4
		E. Persons tested onsite for HIV? 1	2	3	4
		F. Safer sex education by peer workers? ...1	2	3	4
		G. Visits by peer outreach workers 1	2	3	4
		H. Visits by a mobile clinic?.....1	2	3	4
		I. Needle exchange programme?.....1	2	3	4
		J. Other.....1	2	3	4

41	In the last 12 months, how often have condoms been available here?	Always .....1 Sometimes .....2 Never .....3 Don't know.....9
42	Can I get a male condom here? If yes, can I see one?	Yes, male condoms here but you can't see one ..... 1 Yes, male condoms here and a condom was seen ....2 No, male condoms here now 3
43	Can I get a female condom here? If yes, can I see one?	Yes, female condoms here but you can't see one.....1 Yes, female condoms here and a condom was seen....2 No, female condoms here now.....3

44 a-e	**INTERVIEWER OBSERVATION:** **EVIDENCE OF HIV/AIDS PREVENTION ACTIVITIES SEEN BY INTERVIEWER AT THE VENUE**		**YES** **NO**
		A. HIV/AIDS POSTERS DISPLAYED? 1	2
		B. CONDOM PROMOTION POSTERS?.....1	2
		C. CONDOMS VISIBLE?.....1	2
		D. LUBE? 1	2
		E. STERILE NEEDLES/SYRINGES?.....1	2
45	We want to know if you personally are a member of a group that often needs additional health services. In the past 12 months have you…		**YES** **NO**
		A. Sold sex for money?.....1	2
		B. Sold sex for goods or favours? 1	2
		C. Injected drugs?.....1	2
		D. Were you born female and see yourself now as male? 1	2
		MEN ONLY:	
		E. Had sex with another man?.....1	2
		F. Were you born male and see yourself now as a woman?.....1	2

INSTRUCTION TO INTERVIEWER: IF SITE INFORMANT IS MEMBER OF A KEY POPULATION, PROCEED TO FORM 3.

THANK YOU FOR PARTICIPATING!

FORM 3. Behavioural questionnaire

1	INTERVIEW OCCURRING DURING SITE VISIT OR DURING SPECIAL SURVEY OF PATRONS AND WORKERS		DURING SITE VISIT WITH SITE INFORMANT 1 SPECIAL PATRON SURVEY 2
SECTION 1: SOCIO-DEMOGRAPHIC CHARACTERISTICS, EMPLOYMENT AND VENUE VISITING			
2	Date		DAY:_____ MONTH:_____ YEAR:_____
3	Interviewer number or code		
4	**GEOGRAPHIC CODES FOR LOCATION:**	Province/Sub-districtS ☐☐ ☐☐☐ ☐☐☐ ☐☐	
5	Unique site number from list		

6	TIME INTERVIEW BEGINS USE 24 HOUR TIME.hr min	A. START: ☐☐ ☐☐ B. END: ☐☐ ☐☐
7	LANGUAGE OF INTERVIEW	Afrikaans.....1 IsiXhosa .....4 English.....2 Setswana.....5 Isizulu .....3 Other (Specify) 6
8	How often do you come here? **CIRCLE ONE RESPONSE. PROBE FOR NUMBER OF TIMES.**	Everyday.....1 4 to 6 times per week .....2 2 to 3 times per week.....3 One time per week.....4 2 to 3 times per month .....5 One time per month .....6 This is my first visit.....7

9	When did you come here the first time?	This is my first visit .....1 Within past 4 weeks .....2 Within past 2 - 6 months 3	Within past 7 - 12 months .....4 Over a year ago .....5 Over 5 years ago 6

10	A. Excluding this place, how many other public places have you visited today to socialize, drink alcohol or look for a person to have sex with?	A. Number of places visited before this place_____
	B. How many <u>others</u> will you go to today or tonight?	B. Will go to:_____ other places
11	Have you ever met a new sexual partner here?	Yes ..1 No.....2
12	**IF YES, [MET A PARTNER HERE]:** How recently did you attract a new sexual partner at this site?	Within the past 7 days ..1 Within past 2 to 4 weeks ..2 Within past 2 to 6 months ..3 Within past 7 to 12 months ..4 Over a year ago ..5 Never met new partner here ..9

SECTION 2: SEXUAL PARTNERSHIPS AND CONDOM USE

13	Now I am going to ask you some questions about your sexual behaviour. If you have never had sex, tell me that you have never had sex. **IF NEVER HAD SEX, CIRCLE 99 AND SKIP TO Q31, IF RESPONDENT HAD REPORTED EVER HAVING SEX THEN CONTINUE TO Q14**	Never had sex 99

14	Now I would like to ask you about the number of men you had sex with in the last 4 weeks. Think of all the men you had sex with, since <INSERT DATE>, including men you had sex with once or twice and men you had sex with regularly. A. In total, how many men did you have sex with in the last 4 weeks? B. Of these men, how many had you never had sex with previously, that is you had sex with them for the first time in the past 4 weeks?	During Past 4 weeks: A. Number of Men: _____ B. Number New/ First Time:_____
15	Now I would like to ask you about the number of women you had sex with in the last 4 weeks. Think of all the women you had sex with, since <INSERT DATE>, including women you had sex with once or twice and women you had sex with regularly. A. In total, how many women did you have sex with in the last 4 weeks? B. Of these women, how many had you never had sex with previously, that is you had sex with them for the first time in the past 4 weeks?	During Past 4 weeks: A.Number of Women: _____ A. Number New/ First Time:_____
16	Now think of all the people you have had sex with in the last 12 months. A. In total, how many different men have you had sex with in the last 12 months? B. In total, how many different women have you had sex with in the last 12 months? *(All the people you had sex with include people you had sex with once or twice and people you had sex with regularly)*	Total 12 months: A. MEN:_____ B. WOMEN:_____ C. Total_____(COMPLETE BY INTERVIEWER)
17	You said you had sex with __ (NUMBER from q16) people. Of these, how many had you never had sex with previously? That is, people you had sex with have you have sex with for the first time during these last 12 months?	Number New:_____
18	Have you ever used a condom? **.....**	Yes.....1 No .....2 **[IF NO SKIP TO Q23]**
19	The last time you had penis to vagina sex, did you use a condom?	Yes.....1 No .....2 Never had vaginal sex.....9
20	The last time you had anal sex did you use a condom?	Yes.....1 No .....2 Never had anal sex.....9
21	Which best describes your condom use in the past 6 months? **READ OPTIONS AND CIRCLE 1 OPTION.**	I did not use condoms at all.....1 I used condoms occasionally .....2 I used condoms every time I had sex.....3 Not applicable: no sex in the past 6 months.....4
22	How easy or difficult is it for you to get a condom when you want one?	Very easy .....1 Easy.....2 Difficult .....3 Very difficult.....4

23	In the past 12 months, has an outreach worker such as a peer educator given you a condom?	Yes.....1 No 2
24	In the past 12 months, has an outreach worker given you lube?	Yes.....1 No .....2 I don't know what lube is……3
25	In the last 12 months, have you received money in exchange for sex?	Yes .....1 No.....2
26	The last time you received money for sex, did you use a condom?	Yes .....1 No.....2 Did not receive money 9
27	In the last 12 months, have you received goods or favours in exchange for sex?	Yes .....1 No.....2
28	The last time you received goods or favours for sex, did you use a condom?	Yes .....1 No.....2 Did not receive goods or favours.....9
29	In the last 12 months, have you given someone else money to have sex with you?	Yes .....1 No.....2 Did not give money for sex.....9
30	**ASK WOMEN ONLY:** Are you currently using a family planning method other than condoms such as oral contraception, IUD?	Yes.....1 No .....2 Respondent is biologically male.....5
SECTION 3. QUESTIONS FOR EVERYONE. SKIP TO HERE IF RESPONDENT HAS NEVER HAD SEX.		
31	Do you have a condom with you? **IF YES**: May I see it?	Yes, but you cannot see it .....1 Yes, condom seen .....2 No, no condom with me.....3
32	In the last 12 months, have you had any burning when you pee, or discharge from your penis or vagina or anus or sores on your genitals?	Yes .....1 No.....2 **[IF NO SKIP TO Q35]**
33	**IF YES FOR ANY SYMPTOM:** Where did you go the last time you had one of these symptoms? **PROBE FOR ONE BEST ANSWER.**	Private doctor.....1 Public clinic.....2 State hospital.....3 Gay friendly clinic.....4 Men's clinic.....5 Sex worker friendly site.....6 Other NGO .....7 Traditional healer.....8 Mobile clinic.....9 Other .....10 Did not go anywhere 11

34	How do you rate the service you received there? Was it poor, fair, good or excellent?	Poor.....1 Fair.2 Good.....3 Excellent.....4 Not applicable.....9
35	**MEN ONLY:** A. Are you circumcised or uncircumcised?	A. Circumcised.....1 Uncircumcised.....2
	B. IF UNCIRCUMCISED: What are the main reasons you are not circumcised? **PROBE AND CIRCLE ALL THAT APPLY.**	B. Not interested.....1 Do not know where to go.....2 Procedure is painful.....3 Takes too much time.....4 Worried about side effects.....5 Religious or spiritual reasons.....6 Partner objects.....7 No benefit for me.....8 Other: 9
36	Where can you get an HIV test in this area (sub-district)? **CIRCLE ALL THAT APPLY.**	Private doctor.....1 HIV testing center.....2 Workplace.....3 Public clinic.....4 State hospital.....5 Gay friendly clinic.....6 Men's clinic.....7 Sex worker friendly site.....8 Other NGO.....9 Traditional healer.....10 Other.....11 Mobile clinic.....12

37	A. Have you had an HIV test anywhere in the past 12 months? B. IF NO: Why haven't you had an HIV test in the past 12 months? (**CIRCLE UP TO 3 RESPONSES**) Instruction for interviewer: **PROBE CAREFULLY** C. **IF DID NOT HAVE AN HIV TEST IN THE PAST 12 MONTHS:** Have you ever had an HIV Test?	A. Yes, in past 12 months .....1 No, not in past 12 months .....2 B. I am already HIV positive .....1 I do not know where to get tested for HIV.....2 I do not think that I am at risk for HIV infection .....3 I trust my partner.....4 I was concerned about how the health care provider will treat me ...5 I am afraid of being stigmatized if I am found to be HIV positive.....6 I was concerned about losing my job .....7 **C.** Yes, ever.....1 No, never 2
38	Antiretroviral (ARV) drugs are medications for the treatment of infections that are primarily associated with HIV.	Do you … A. Think ARVs can be taken before unprotected sex to prevent getting infected with HIV ? **Yes**...1 **No**…2 B. Think ARVs can be taken after unprotected vaginal or anal sex to prevent getting infected with HIV ? **Yes...**1 **No**…2 C. Think the availability of ARVs makes it OK to be HIV positive ...**Yes**...1 **No**…2 D. Know where to get ARVs ...**Yes...**1 **No**…2 E.Have you ever taken ARVs? **Yes**….1 **No**….2
39	The last time you were tested: A. Did you get your result? B. Were you counseled when you got your result?	A. Yes..... .1 No..... .2 Never tested ..... .9**[SKIP TO Q41]** B. Yes..... .1 No..... .2 Never tested 9
40	How would you rate the testing service the last time you were tested: poor, fair, good or excellent?	Poor..... .1 Fair.2 Good..... .3 Excellent..... .4 Never tested 9

41	Where have you gotten information about HIV or AIDS in the past 12 months? **CIRCLE YES OR NO FOR EACH.**	Yes No A. Outreach worker here? .....1.....2 B. Bar or guest house? .....1.....2 C. School? .....1.....2 D. Television? .....1.....2 E. Radio? .....1.....2 F. Employer? .....1.....2 G. Any health worker? .....1.....2 H. NGO.....1.....2 I. Public clinic / hospital.....1.....2 J. Other (Specify) .....1.....2
42	How do you rate your chances of getting infected with HIV?	No chance .....1 Low.....2 Moderate .....3 High.....4 Not applicable: already HIV positive.....9
43	A. Some people have tried injecting drugs using a needle and syringe. Have you EVER injected any non-prescription drug such as *tik* (meth), nyope, wunga, and heroine? **IF NEVER, SKIP TO Q47** B. Have you injected any non-prescription drug in the past 12 months?	A. Yes.....1 Never .....2 B. Yes past 12 months.....3 Not in past 12 months 4
44	**IF EVER**: The last time you injected did you share a needle?	Yes, shared needle last time.....1 No, did not share needle last time.....2 Not applicable.....9
45	If you have EVER injected drugs. Do you currently get health or other services from programmes designed for people who inject drugs?	Yes .....1 No.....2
46	A. If you have ever injected drugs. Do you know of a place where you can get sterile needles/syringes? B. If you have ever injected drugs. Do you know of a place for drug overdose prevention and treatment? C. If you have ever injected drugs. Do you know of a drug dependency treatment centre?	A. Yes.....1 No .....2 B. Yes.....1 No .....2 C. Yes.....1 No 2
47	Have you ever spent a night in jail or prison?	Yes .....1 No.....2
48	Have you been hurt physically by the police?	Yes .....1 No.....2
49	I would like to know how law enforcement is in this location. Would you say it is good, fair, abusive or that the police do not come here?	Good.....1 Fair .....2 Abusive .....3 Police do not come here 4

50	Have you ever used legal services	Yes .....1 No.....2
51	Does police harassment occur here at this place and if so, how often?	Once a month .....1 Once a week.....2 More than once a week.....3 Everyday.....4 Never……5
52	How do you describe yourself? **CIRCLE BEST ANSWER.**	Heterosexual Male .....1 Heterosexual Female.....2 Gay Male .....3 Bisexual Male .....4 Lesbian .....5 Straight acting male, but have sex with other men .....6 Trans Woman (Male to Female).....7 Trans Male (Female to Male) 8
Checked by supervisor (signature)_____		Date: /