Low Engagement in HIV Services and Progress through the Treatment Cascade among Key Populations Living with HIV in Mozambique: Alarming Gaps in Knowledge of Status

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Research article

Keywords: Female sex workers, key populations, HIV treatment cascade, men who have sex with men, Mozambique, people who inject drugs

Posted Date: May 19th, 2020

DOI: https://doi.org/10.21203/rs.3.rs-28468/v1

Version of Record: A version of this preprint was published on January 15th, 2021. See the published version at https://doi.org/10.1186/s12889-020-10039-2.

Abstract

Background.

Mozambique has a generalized HIV epidemic of 13.5% among the general population. Early modeling exercises estimate that key populations (KPs) and their partners account for about one third of all new infections due to their sexual and drug use behaviors. The Fast Track Targets monitor key indicators along the treatment cascade.

Methods.

We conducted a secondary data analysis of HIV-positive participants in the first Bio-behavioral Surveillance (BBS) surveys in Mozambique in order to assess HIV service uptake and progress though the HIV treatment cascade among men who have sex with men (MSM), female sex workers (FSW) and people who inject drugs (PWID). Unweighted pooled estimates were calculated for each key population group.

Results.

Among HIV-positive MSM, 63.2% of participants had ever received an HIV test, 8.8% were aware of their status, 6.1% reported having been linked to care, while 3.5% initiated ART and were currently on treatment. Of the HIV-infected FSW participants, 76.5% reported a previous HIV test and 22.4% were previously aware of their status. Linkage to care was reported by 20.1%, while 12.7% reported having initiated ART and 11.8% reported being on treatment at the time of the survey. Among HIV-infected PWID participants, 79.9% had previously received an HIV test, 63.2% were aware of their HIV status, and 49.0% reported being linked to care for their HIV infection. ART initiation was reported by 42.7% of participants, while 29.4% were on ART at the time of the survey. All key population groups fell below the global targets of the HIV treatment cascade.

Conclusion.

Among the three high risk populations in Mozambique, losses occurred throughout critical areas of service uptake with the most alarming breakpoint occurring at knowledge of HIV status. Special attention should be given to increasing HIV testing and linkage to ART treatment. Future surveys will provide the opportunity to monitor improvements across the cascade and should include viral load testing to guarantee a more complete picture of the treatment cascade.

Background

Mozambique has a generalized HIV epidemic, with a prevalence in the general population of 13.5% (1). However sub-sections of the population, defined as key populations (KP), have a high burden of disease disproportionate to their size due to their high-risk sexual and drug use behaviors while early modeling exercises have estimated that KPs and their partners account for about one third of all new infections in Mozambique (2).

The HIV National Strategic Plans (2010–2014, 2015–2019) called for special surveys to be conducted among men who have sex with men (MSM), female sex workers (FSW), and people who inject drugs (PWID) to estimate HIV prevalence, assess risk factors for HIV infection and estimate population size of these key populations. The first round of bio-behavioral surveillance surveys (BBS) were conducted between 2011–2014 in three urban areas in Mozambique.

The UNAIDS launched the 2020 Fast Track Targets by which to monitor the response to and progression of the HIV epidemic. The “90-90-90 targets” advocate for tracking key indicators along the treatment cascade with the goal of ending the AIDS epidemic by 2030 (3). These ambitious targets aim to ensure that by 2020, 90% of people living with HIV (PLHIV) are aware of their status, of which 90% are on treatment (81% of the total), and finally 90% of them are virally suppressed (73% of the total).

In 2015, the National AIDS Indicator Survey (AIS) was conducted in Mozambique and provided the first nationally representative data about the engagement of the general population across the HIV treatment cascade. It is estimated that 40% of PLHIV are aware of their status, 35% are on treatment and 23% are virally suppressed; disaggregations of this cascade by sex highlight that men are less engaged than women at every step. These numbers among the general population are well below global targets and therefore imply a worse situation for KPs given the evidence that social, legal and structural barriers to prevention, care and treatment services severely limit the progress of KPs through the cascade when compared to the general population (4).

In this context, the purpose of this secondary analysis is to examine available survey data to (a) describe engagement of MSM, FSW, and PWID living with HIV in HIV testing, care and treatment services and (b) assess the HIV treatment cascade and progress toward the Fast Track Targets in order to bring attention to the critical points along the cascade requiring targeted interventions in order to inform the implementation of the next generation of targets.

Methods

Survey Design

From 2011–2014, the first round of BBS surveys among KPs in Mozambique were conducted in three urban centers – Maputo (MSM, FSW, PWID), Beira (MSM, FSW), Nampula (MSM, FSW) and Nampula/Nacala (PWID) – using respondent-driven sampling (RDS).(5, 6) RDS is a probability-based peer-to-peer sampling strategy used among hard-to-reach populations. Based on social network size,

weights can be computed to produce adjusted estimates representative of the target population in the geographical location where the survey is conducted.

Study population

Participants in the MSM survey were eligible for the survey if they were biologically male, were at least 18 years of age, and had engaged in oral or anal sex with another male in the 12 months preceding the survey. Being biologically female, at least 15 years of age (FSW), and having received money in exchange for sex from someone other than a steady partner in the 6 months preceding the survey were required of FSW participants. Finally eligibly criteria for PWID was not restricted by sex, but required an individual to be at least 18 years of age. All individuals who participated in the PWID survey prior to December 2013 must have injected drugs without a prescription in the 12 months preceding the survey, however, due to slow recruitment patterns, this criterion was later modified to include any person who had ever injected drugs without a prescription.

All eligible participants in the three surveys needed to have lived, worked or socialized in one of the recruitment areas in the 6 months preceding the survey, received a valid referral coupon from a peer, and had not previously participated in the study. Participants provided separate written informed consent for both the behavioral questionnaire and biological testing; however, only consent to the behavioral questionnaire was necessary in order to be enrolled in the study. For the purpose of analysis, individuals who did not respond to at least 90% of the behavioral questionnaire and/or did not consent to have an HIV test result were excluded (n = 53 MSM, n = 6 FSW, n = 47 PWID).

Recruitment lasted from July to November 2011 (MSM), September 2011 to March 2012 (FSW) and October 2013 to March 2014 (PWID).

Study Measures

The number of PLHIV was computed based on confirmatory central-level ELISA test results (MSM, FSW) or by combining rapid test results for new-positives with self-report of known-positives (PWID). HIV testing uptake was assessed based on the question, “Have you been tested for HIV?” Knowledge of seropositive status was determined based on responses to the question “What do you think is your HIV status today?”. Linkage to care was assessed based on responses to the question, “Have you seen a nurse, doctor or other health care provider for a medical evaluation or care related to your HIV infection?” (MSM) or “Have you sought a doctor, nurse, or other health care professional for medical examinations or treatment for your HIV infection?” (FSW, PWID). ART initiation and current on treatment were assessed by the question, “Have you ever taken or are you currently taking ARTs? (Antiretrovirals are medicines that slow the growth of the virus in HIV-infected people and enable people with AIDS to live for a much longer time).”

Statistical Analysis

Unweighted pooled estimates were calculated for each area of service uptake due to the low sample size of key populations in each survey city. There are various approaches to constructing an HIV cascade

depending on the desired outcome of interest when assessing progress toward the Fast Track targets (4, 7, 8). For the purpose of this analysis, the total number of PLHIV was the denominator of each step along the HIV treatment cascade; viral load suppression was not assessed. This approach provides insight into infection and potential HIV transmission. Data analysis was conducted using SAS version 9.4 (SAS Institute, Cary, NC, USA).

Results

Recruitment

Figure 1 outlines the recruitment and analysis flow of the surveys where 1,379 MSM (447 Maputo, 581 Beira, 351 Nampula), 1,234 FSW (397 Maputo, 409 Beira, 428 Nampula), and 445 PWID (319 Maputo, 126 Nampula/Nacala) had an HIV test result. Among those, 8.3% of MSM (n = 114), 27.5% of FSW (n = 339) and 45.8% of PWID (n = 204) were positive for HIV and were included in the final analysis.

Engagement in care

Table 1 outlines the engagement of HIV-positive MSM, FSW and PWID participants in testing, care and treatment services. Of the 114 MSM who tested positive for HIV (n = 50 Maputo, n = 53 Beira, n = 11 Nampula), 63.2% (n = 72) reported ever receiving an HIV test, 8.8% (n = 10) were aware of their status, 6.1% (n = 7) reported having been linked care, while 3.5% (n = 4) initiated ARTs and were currently on treatment; thus 42.9% were not retained in treatment.

Table 1
Engagement in HIV Services among MSM, FSW and PWID in Mozambique, 2011–2014

	MSM (N = 114)		**FSW (N = 339)**		**PWID (N = 204)**	
Services	n	%	n	%	n	%
Previous HIV Test	72	63.2%	261	77.0%	163	79.9%
Knowledge of HIV status	10	8.8%	76	22.4%	129	63.2%
Linkage to HIV services	7	6.1%	70	20.6%	100	49.0%
Initiated ART Treatment	4	3.5%	43	12.7%	87	42.6%
Currently on ART Treatment	4	3.5%	40	11.8%	60	29.4%

Of the HIV-infected FSW participants (n = 339), 76.5% (n = 261) reported a previous HIV test and 22.4% (n = 76) were aware of their status at the time of the survey. Linkage to care was reported by 20.1% (n = 68), while 12.7% (n = 43) reported having initiated ART and 11.8% (n = 40) reported being on treatment at the

time of the survey; thus 93.0% of FSW who initiated treatment were retained in care at the time of the survey.

Among HIV-infected PWID participants (n = 204), 79.9% (n = 163) had previously be tested for HIV, 63.2% (n = 129) were aware of their HIV status and 49.0% (n = 100) reported being linked to care for their HIV infection. ART initiation was reported by 42.7% of participants (n = 87), while 29.4% (n = 60) were on ART at the time of the survey; thus there was 69.0% treatment retention among PWID participants.

Progress through the HIV Treatment Cascade

Figure 2 displays the unadjusted pooled estimates for the number of participants within each key population group as they advance through the HIV treatment cascade. Participants in all three groups fell well below global Fast Track Targets for knowledge of HIV status (MSM: 8.8%, FSW: 22.4% PWID: 63.2%) and currently on treatment (MSM: 3.5%, FSW: 11.8% PWID: 29.4%); viral load data was not available.

Discussion

Gaps were identified throughout the HIV treatment cascade for the three populations, with the largest breakpoint occurring at knowledge of HIV status; all key populations fell below the 90% target for every indicator although this was most stark among MSM where only 8.8% had knowledge of their HIV status prior to the survey. Furthermore, results show that of the MSM, FSW and PWID participants who were aware of their status, only 40.0%, 52.6%, and 47.2%, respectively reported being on treatment at the time of the survey. This translates to two in five HIV-positive MSM participants, and one in two for both HIV-infected FSW and PWID participants. However, once initiated on ART, both MSM and FSW were retained above the 90% target, while a laudable achievement this only represents a small fraction of the HIV-positive population. In general terms, use of services appears higher among PWID, when compared to the other KP groups; however, PWID are still well below global targets.

When compared to other KP groups in the region, HIV testing uptake among survey participants was consistent with previous studies (9, 10). However, MSM and FSW surveys in Mozambique reported lower awareness of their HIV status compared to those same groups in other Sub-Saharan African countries, although PWID participants reported higher awareness than other PWID in the region (11–15). ART engagement was also lower across all populations groups (11, 15–17). In the few studies with results of viral load suppression in Sub-Saharan Africa, there was a range of 11%-42 among MSM, 11.0%-49.5% among FSW and less than 5% in among PWID in Kenya. (12–15, 18). The differences in results may be attributed to different survey measures, recruitment methodology, policies and interventions. However, accurate and quality data examining the cascade in Sub-Saharan Africa across the three population groups is still scarce (15). Nevertheless, to our knowledge, no countries in Sub-Saharan Africa have been able to meet ambitious 90-90-90 Fast Track Targets for key populations.

Comparing engagement in HIV services of MSM, FSW and PWID survey participants to the general population from the most recent AIS in Mozambique, shows that HIV testing among all three key population groups was consistent with people living with HIV (PLHIV) in the general population 71.3% (76.9% females vs 59.4% males) (1). Although linkage to care was not assessed in the AIS, KPs are much less aware of their status than PLHIV in the general population: 40% (46% females vs 28% males), leading to major programmatic challenges to link these vulnerable populations to care and treatment services. All three KPs also report lower levels of current treatment than the general population: 35% (40% females vs 23% males) further highlighting the potential for these population groups to transmit HIV. Our results do not include viral load, however given that viral suppression among PLHIV in the general population was low at 23% (28% females vs 13% males), we can assume that the outcomes among KPs are considerably lower given their lower engagement in services compared to the general population as well as the evidence of social, legal and structural barriers to access health care services (4). The low evidence of engagement in health services among MSM is consistent with low health service access among men in the general population in Mozambique (1). However, the majority of PWID participants were male and reported higher engagement along the cascade than the other KP groups, which may be due to greater use of health services as a result of co-morbidities, such as viral hepatitis, which would have required accessing health care services.

This is the first analysis of engagement in HIV services and progress through the HIV treatment cascade among key populations in Mozambique. Although this analysis offers important insights into the use of HIV treatment services among key populations in Mozambique, it is important to acknowledge this analysis' limitations.

While RDS is a robust methodology for sampling among hidden populations, there are some inherent limitations such as selection bias in chain referral sampling methods, recall bias and social desirability bias for self-reported risk behaviors; non-response bias also applies to individuals who did not consent to an HIV test – and were subsequently removed from the analysis –however the proportion was relatively low (3.70% MSM, 0.24% FSW, and 9.55% PWID). Additionally, some respondents may have been previously aware of their HIV positive status but refused to disclose due to stigma or social desirability given the common knowledge that HIV-positive individuals should be engaged in care and treatment. This potential selective underreporting of HIV status has been observed in previous studies, and can underestimate prevalence results and subsequent cascade assessments (12, 13). In the most recent AIS conducted in Mozambique, only 26% of PLHIV self-reported current ART use however, when biomarker testing was used, the number of current on ART increased to 35% indicating that individuals did not self-disclose their status (1).

Next, the computation of unweighted pooled estimates among survey participants means that results are not generalizable to the KPs in the geographic locations where the surveys were conducted nor to other cities in Mozambique, but instead only represents survey participants. Due to the low sample size, it was not possible to conduct meaningful weighted estimates of the cascade for the KPs in each survey city. However, the results provide the best available proxy indication of engagement in services and progress

through the HIV treatment cascade and highlight the need for enhanced efforts targeted to these groups in each survey location.

Finally, the results must be understood within the context of the care and treatment landscape when the surveys were implemented. Mozambique's National Acceleration Plan was introduced in 2013, which changed treatment guidelines and vastly scaled up the availability of ART in the country. The roll-out of increased ART provisions occurred after the BBS was implemented among MSM & FSW. This change in the landscape may explain why PWID reported greater engagement in the care compared to the other KP groups. Despite this policy change however, there is still evidence in the most recent AIDS Indicator Survey of low engagement of the general population in the HIV treatment cascade, where men are less engaged than women, and thus it can be posited that even with greater access to ART services, social and structural barriers continue to impact KPs engagement in health services.

Conclusions

The results of this analysis highlight the necessity for interventions that increase uptake of HIV testing and ART treatment among all KPs, but particularly among MSM and FSW who reported less engagement than PWID. Since the implementation of the first round of BBS surveys among KPs in Mozambique, National Guidelines were adopted outlining a standard package of 10 services for KPs such as HIV counseling and testing; STI screening; and provision of condoms and lubricants (19). Additionally, in 2017, Mozambique began the roll-out of the test and start strategy with specific emphasis on individuals belonging to key population groups.

Follow-up BBS surveys will provide important data points to assess trends and monitor improvements in KP engagement in the health system as a result of these policies. In addition, the inclusion of viral load testing in future surveys will guarantee a more complete picture of the HIV testing and treatment cascade among populations most vulnerable to HIV transmission. In the meantime, the results from this analysis can be applied to size estimation exercises to support target setting and resource allocation. Modeling exercises can also use these and programmatic data to assess the burden of the HIV epidemic attributable to key populations in Mozambique. Finally, improved health information systems at the community and facility level for KPs can also provide more up to date information on their progression through the cascade.

Abbreviations

AIS
AIDS Indicator Survey
ART
Antiretroviral
BBS
Biological and behavioral Survey

KP
Key populations
FSW
Female sex workers
HIV
Human immunodeficiency virus
MSM
Men who have sex with men
PLHIV
People living with HIV
PWID
People who inject drugs
RDS
Respondent-driven sampling
STI
Sexually transmitted Infection
WHO
World Health Organization

Declarations

Ethics approval and consent to participate

All study protocols were approved by the Mozambican National Bioethics Committee for Health, by the Committee on Human Research at the University of California at San Francisco, and by the Division of Global HIV/AIDS of the U.S. Centers for Disease Control and Prevention, Atlanta. For all participants, written informed consent was obtained.

Consent for Publication

Not Applicable

Availability of data and materials

The dataset analysed for the current study are fully available from the Data Management Unit of the Mozambique National Institute of Health (INS) data repository for researchers who meet the criteria for access to confidential data following the submission of a concept note. For information, please visit: www.ins.gov.mz or contact: secretaria@ins.gov.mz.

Competing Interests

The authors declare that they have not competing interests.

Funding

“This research has been supported by the President’s Emergency Plan for AIDS Relief (PEPFAR) through the Centers for Disease Control and Prevention (CDC) under the terms of the Cooperative Agreement #U2GPS001468. The findings and conclusions in this report are those of the author(s) and do not necessarily represent the official position of the CDC.”

Author’s contributions

All authors reviewed and provided edits and comments on manuscript drafts. In addition, authors had the following responsibilities: Makini Boothe had full access to the data, conducted data analysis, drafted and revised the manuscript, and takes responsibility for the integrity of the data, accuracy of the data analysis and contents of this article; Isabel Sathane was involved in BBS survey recruitment, data management and data analysis; Cynthia Semá Baltazar was Principle Investigator for the PWID survey, was involved in BBS recruitment and implementation activities for all surveys and provided scientific oversight; Noela Chicuecue were involved in survey design and provided overall scientific oversight of the study; Roberta Horth was responsible for overall study design and for overseeing data analysis; Erika Fazito provided critical revision and final approval of the manuscript; Henry F. Raymond designed the study, was the BBS co- investigator, and was involved in recruitment, scientific oversight and data analysis.

Acknowledgements

The authors are grateful for the support received from Peter Young, Beverley Cummings and Jennifer Peregoy. We would also like to thank Stanley Luchters for his critical review of the manuscript. Finally, the study team acknowledges the immense contributions of the Mozambican BBS Technical Working Group, and all who have contributed to the successful implementation of the MSM, FSW and PWID surveys in Mozambique.

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Figures

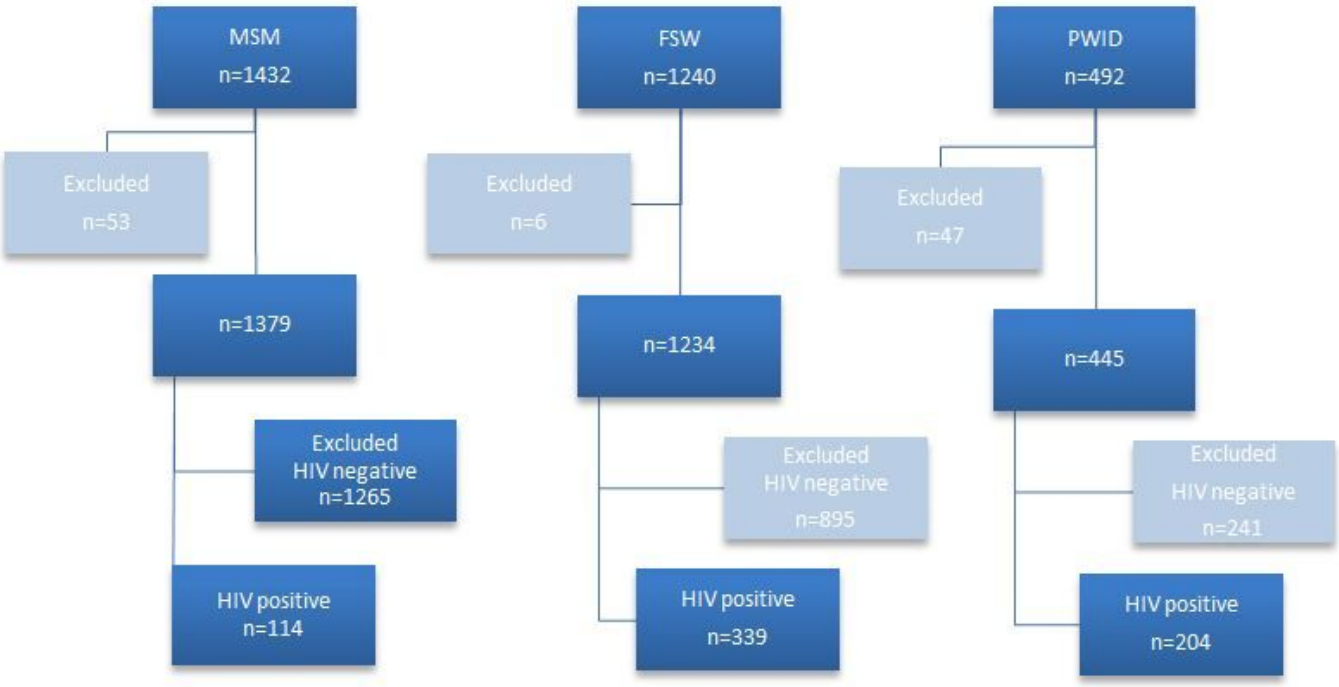
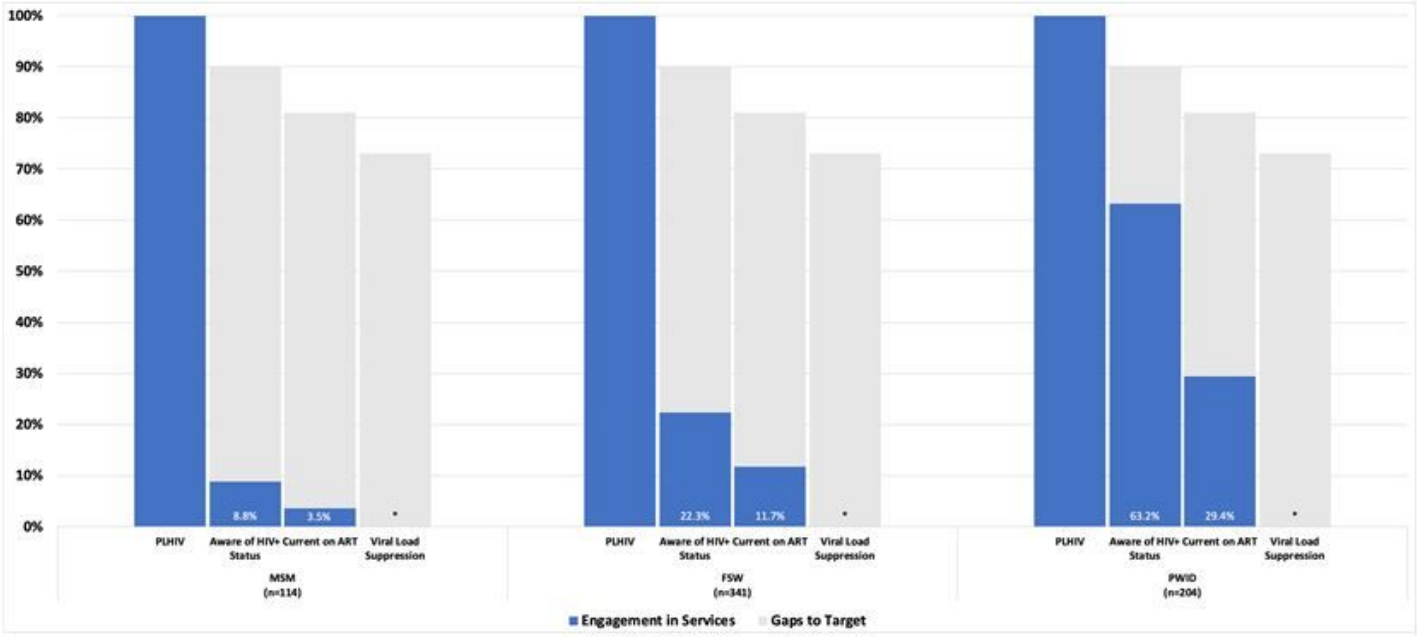


Figure 1

BBS Recruitment and Analysis Flow, Mozambique 2011-2014



PLHIV: People Living with HIV
Gaps in Target: The shortfall between service engagement and the 90-81-73 achievement of the Fast Track Targets
* Viral load suppression data not available

Figure 2

HIV Treatment Cascade among MSM, FSW and PWID in Mozambique, 2011-2014