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High Acceptability and Increased HIV Testing Frequency Following Introduction of HIV Self-Testing and Network Distribution among South African MSM

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Abstract

Background—South African men-who-have-sex-with-men (MSM) have a high burden of undiagnosed HIV infection and HIV-testing rates incommensurate with their risk. HIV self-testing (HIVST) may increase testing uptake, frequency, and earlier HIV detection and treatment.

Setting—Gert Sibande and Ehlanzeni districts, Mpumalanga Province, South Africa.

Methods—We conducted a longitudinal HIVST study among MSM between June 2015 – May 2017. Overall 127 HIV-negative MSM were provided with up to nine test kits of their choice - oral fluid or blood fingerstick – to use themselves and distribute to their networks. Surveys conducted three and six months post-enrollment elicited information on HIVST experiences, preferences, acceptability, utilization and distribution. We used generalized estimating equations to assess changes in testing frequency.

Results—Ninety-one percent of participants self-tested. All participants who self-tested reported being likely to self-test again, with over 80% preferring HIVST to clinic-based testing. Fingerstick was preferred to oral fluid tests by approximately two to one. Returning participants distributed 728 tests to sexual partners (18.5% of kits), friends (51.6%), and family (29.8%). Six participants

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Authors' contributions

SL, TL, JM, and OR designed the research. HG and SL created questionnaires and data collection forms; HG, KM, and NM supervised implementation and data collection. HG reviewed and cleaned all data; AM assisted with parent study data, sampling, and advised on data analysis; YC conducted primary analysis. SL and TL led manuscript development with content support from JM, HG, YC, AM, OR, KM, and NM. All authors have read and approved the final manuscript.

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Conflicts of interest

The authors declare no conflicts of interest.

seroconverted during the study and 40 new diagnoses were reported among test-recipients. Frequent (semi-annual) testing increased from 37.8% prior to the study to 84.5% at follow-up ($p<0.001$), and participants reported anticipated frequent testing of 100% if HIVST were available compared to 84% if only clinic-testing available in the coming year ($p<.01$).

Conclusion—HIVST use and network-distribution is acceptable and feasible for MSM in South Africa, and can increase testing uptake and frequency, potentially improving early detection among MSM and their networks.

Keywords

HIV Self-testing; Home HIV testing; MSM; South Africa

Introduction

In South Africa, which has the most persons living with HIV globally,¹ testing still falls far below the levels necessary to impact the epidemic, particularly among men, who test half as frequently as women.² Data from the most recent Demographic and Health Survey indicate that close to one-third of men ages 15–49 had never tested for HIV, with only 45% reporting testing in the last year.³ The 2012 National Household Survey noted that only 37.8% of men who were HIV-positive were aware of their status.⁴ Furthermore, as in most high HIV burden countries of Sub-Saharan Africa, stigma and discrimination against sexual minorities have hindered implementation and scale-up of effective HIV testing, prevention, and treatment programming for men who have sex with men (MSM)⁵ — even despite South Africa having decriminalized homosexual behavior more than two decades ago. With few targeted testing and treatment programs aimed at engaging MSM, the epidemic among MSM has continued to expand in South Africa, with high prevalence, incidence, and rates of HIV-testing that are not commensurate with the risk of infection.^{6–10} In fact, in two peri-urban districts of Mpumalanga data indicate that over two-thirds of HIV-positive MSM were unaware of their status in 2012–2013.⁷

Ethnographic studies across South Africa have documented how fear of stigmatization in public health care settings serves as a barrier to testing for MSM, and how actual experiences of stigmatizing attitudes and behaviors by health care workers (HCW) are a barrier to receiving effective risk-reduction counseling among those MSM who do access HIV testing at public clinics.^{11–13} In such high-burden and high-stigma environments, identifying strategies to expand HIV testing options for MSM is critical. HIV self-testing (HIVST) offers an alternative to clinic-based testing, with potential to increase testing uptake and frequency, thus facilitating early HIV detection and treatment, adoption of safer sexual behavior, and prevention of new infections.^{14–17} Studies conducted among MSM outside of the African context have demonstrated that HIVST is a means of reaching high-risk MSM, that MSM will use HIVST both alone and in partnerships, and that introduction of HIVST has not resulted in increased risk behaviors or increases in sexually transmitted infections.^{18–24} Furthermore, a recent randomized trial in Australia demonstrated that MSM who were offered HIVST tested at twice the rate of MSM offered clinic-based testing only.

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South Africa recently made strides towards making HIVST available: The South African National Strategic Plan for HIV, STIs and TB 2017 – 2022 (NSP)²⁶ includes guidance on HIVST, expanded in the National HIV Testing Services Policy for South Africa in 2016²⁷ and a policy and guideline supplement issued in 2017.²⁸ Policy restrictions are being lifted making it likely that self-tests could increasingly expand testing for MSM who may feel uncomfortable accessing clinic services. However, it is currently unknown whether MSM in Sub-Saharan Africa will utilize HIVST, how these tests might be shared and distributed among MSM, and whether introduction of HIVST would increase testing uptake and frequency to ultimately improve early detection and treatment. To address this gap, we implemented an HIVST study among South African MSM in two districts of Mpumalanga Province, in order to explore acceptability, feasibility, utilization and distribution patterns, and to better understand how HIV self-testing might expand testing options and frequency in this high prevalence area.

Methods

Sites

We conducted this research in two district municipalities in Mpumalanga province, Gert Sibande and Ehlanzeni, where our team had previously observed high HIV prevalence and incidence in the MSM population through the 2012-2015 Mpumalanga Men's Study (MpMS) and where our team had ongoing prevention activities and a community presence established.^{6,7} Briefly, the MpMS employed respondent driven sampling (RDS)²⁹ to recruit independent samples of MSM in Gert Sibande (307) and Ehlanzeni (298) in 2012-13. In Gert Sibande, two successive waves of mixed RDS recruitment and targeted recruitment of prior wave participants produced samples of 326 in 2014 and 311 in 2015. The Gert Sibande site was centered in Ermelo, the administrative center of the municipality. Despite its distance from urban centers, Gert Sibande's local municipalities of Msukaligwa (Ermelo), Mkhondo (Piet Retief), Goven Mbeki (Secunda), Lekwa (Standerton), and Dr. Pixie Ka Seme (Volksrust) have a visible and thriving gay community. The Ehlanzeni site office was located in Mbombela (Nelspruit), the Mpumalanga provincial capital and a hub for tourists visiting Kruger National Park. Recruitment included the Mbombela central business district (CBD) and surrounding peri-urban areas.

Materials

Two self-testing kits were utilized for this study. The OraQuick HIV 1/2 Rapid Antibody Test (OraSure Technologies, Bethlehem, Pennsylvania) uses oral fluid, collected using a swab which is inserted into a tube of reagent for processing, to detect HIV antibodies and was approved by the FDA for clinical use in 2004 and for over-the-counter sales in 2012. The test has 99.3% sensitivity and 99.80% specificity in a laboratory setting, and 93.0% sensitivity and 99.98% specificity in self-testing studies.³⁰⁻³² The AtomoRapid HIV 1/2 Antibody Test (Atomo Diagnostics, Sydney, Australia) uses whole blood and has a built-in lancet device which the user pricks him/herself with, then delivers the drawn blood into a specimen collection window via an onboard collection tube; the test processes with the addition of 2 drops of reagent, also provided in the test package. Sensitivity and specificity of the AtomoRapid with professional use are 100.0% and 99.6%, respectively.³³ The

AtomoRadpid utilizes a WHO pre-qualified test strip, the OraQuick self-test is fully pre-qualified, and both are being packaged for sales in sub-Saharan Africa.

Procedures

Participants in Gert Sibande were selected randomly from among the MpMS participants who had tested HIV-negative during the final RDS survey conducted in 2015. Participants in Ehlanzeni were recruited from among all HIV-negative MpMS participants who had participated in 2013 who were still reachable/in the area (n=14), and from a new RDS recruitment designed to mimic MpMS recruitment, which occurred in September and October 2016 (n=58). The new RDS was instituted as the majority of the MpMS participants in Ehlanzeni were no longer reachable. Participants recruited from MpMS in both sites were contacted by study staff to assess interest in the study, review eligibility criteria, and to gauge willingness to take an HIV test at the study office to confirm eligibility. Participants recruited through the new RDS in Ehlanzeni presented at the study office with a coupon and were screened for eligibility on site. Eligibility criteria included being at least 18 years of age or over, being sexually active with another man in the six months prior to recruitment, willing to undergo HIV testing to confirm negative HIV-status, and able to provide consent.

Recruitment for the HIVST study in Gert Sibande occurred between May and June 2015, with 55 MSM enrolled into the study. Recruitment in Ehlanzeni occurred between August and October 2016, with 72 MSM enrolled. Written informed consent was obtained from all participants, and all participants underwent HIV rapid test with the counselor to confirm HIV negative status at enrollment. Participants were then administered a brief behavioral questionnaire, shown a demonstration on how to use both the oral fluid and fingerstick HIV self-tests, and asked to choose the type of test they would like to take home. Each participant received 5 tests (either oral fluid or blood). Participants were encouraged to use at least one test kit themselves and to test and share the kits with sexual partners and others with whom they felt safe distributing kits and discussing HIV. Participants were provided with logs to document the use of the tests, a list of local psycho-social and medical resources and referrals should the participant test HIV-positive – including a 24-hour study phone number – and safer sex supplies (i.e. condoms and lubricant). All test kits included instructions for use, the study contact number, and referral numbers; all test instructions and study resources had been pilot tested for clarity and updated during a formative phase in both sites in early 2015.

Return visits were conducted at three and six-months following enrollment. The three month visit included an acceptability survey, delivery of used test logs, and receipt of additional tests (up to four of either type) if requested. Six month visits included a behavioral and acceptability survey, delivery of used test logs, and an observed HIVST experience with the test kit of the participant's choice (blood or oral). The staff called each participant six weeks following the enrollment and three month visits (mid-way between visits) in order to monitor for adverse events, such as emotional distress or partner violence, answer any questions about the test kits, and make referrals if needed. Study retention efforts included visiting the more distant rural areas to conduct follow-up visits for those who were unable to present at the study office. Participants were provided a reimbursement of R100 (~USD\$8)

for their time at each visit plus up to R50 (~USD\$4) additional transport reimbursement if traveling from a rural township. The protocol was approved by the UCSF Committee on Human Research, the University of the Witwatersrand's Human Research Ethics Committee, and the Mpumalanga Department of Health and Social Development Research Committee.

Analysis

Survey data were captured in QDS™ (Questionnaire Development System) and exported to STATA (Stata Statistical Software: Release 14. College Station, TX: StataCorp LP) and R (R Foundation for Statistical Computing, Vienna, Austria) for analysis. All measures are based on self-report during surveys and the received HIVST logs. Acceptability indicators include HIVST test utilization, preference, and intention to use HIVST in the future. We asked each participant to report on whom tests were shared with and the frequency of partner testing. In order to assess changes in HIV testing behaviors, we compare reported HIV testing at endline to reported HIV testing behaviors prior to participation in our research initiatives, including MpMS. As a result we use MpMS survey data for those recruited from MpMS and baseline HIVST survey data for those recruited in the new RDS. This choice reflects testing behaviors prior to study initiatives that included HIV testing and thus would bias reporting. We also recorded HIV testing during the study and reported anticipated future testing to assess change in frequency of testing.

Frequency tables were generated to describe the population demographics, reported testing preferences, history of testing and anticipated testing in the future. We compared frequencies of these variables across site, using Fisher's exact tests. Additionally, we summarized frequencies of characteristics of all distributed kits, including the relationship of the receiver to the study participant and the test result. Here, we compared dyad-level frequencies across site using Wald-based tests of generalized estimating equations with binomial distributions, log links, and exchangeable working correlation structures. Finally, we compared reported HIV testing frequencies before and after study initiation using a Wald-based test of generalized estimating equations.

Results

Among those contacted for participation in the pilot study in Gert Sibande, where men were recruited solely from the consecutive MPMS samples, sixty-four were reached by telephone. Six were ineligible due to relocation out of the area, and three declined to participate, resulting in a participation rate of 95% (55/58). In Ehlanzeni, where men were recruited either from the original MpMS sample or by the new respondent-driven sampling scheme, a total of one hundred and seven were approached about participation in the study. Twenty seven were ineligible for a variety of reasons, including relocation out of the area (8), unwilling to have an HIV test (2), not MSM (3), under the age of 18 (2), and HIV-positive either by rapid test during screening (11) or by self-report (1). A further eight refused participation, resulting in a participation rate of 90% (72/80) among those eligible. There were no differences in age, education, employment, or HIVST testing history between the participants recruited from MPMS and the original MPMS cohorts. Between the two sites, 127 MSM were enrolled, of whom 98 participants returned for the 3-month visit and 110

returned at 6 months, including 18 who did not return at 3-months, resulting in 82% retention at the end of the study and 116 (91.3%) who returned at least one time to report on HIVST use and experiences.

The majority of participants were young, with 65% of the participants ages 18-24, only 10% reporting studies beyond high school to date, and only 30% reporting paid work in the last six months (Table 1). While having regular male partners was consistently reported by over 80% of men in both sites and the majority of the men in the study identified as bisexual, reported sexual identity and regular female sexual partners was different between sites, such that in Gert Sibande more men identified as bisexual and likewise reported more female partners. In Gert Sibande, all participants had tested recently during their participation in MpMS. HIV testing history prior to the MpMS/HIVST research collaboration noted that 18.2% of participants in Gert Sibande and 12.5% of participants in Ehlanzeni had never tested, and 10.9% and 25.0% had not tested in the last year in the two locations, respectively.

Among all 127 participants, test use was reported among 116 (91.3%). Three participants were never reached to confirm use of HIVST and are assumed to be non-users. Self-testing was preferred over clinic-based testing: over 80% of participants with a return visit who had used both clinic and self-testing stated that for their next HIV test, they would prefer HIVST to clinic-based testing. (Table 2) Reasons for self-testing preference centered on benefits of privacy, convenience, and empowerment. Those who preferred clinic-based testing stated a desire for counselling or support. Test choice favored fingerstick tests over oral fluid, with 57 (44.9%) ever choosing to take oral fluid tests home and 102 (80.3%) ever choosing blood. Test preferences were consistent over time, with 65% of those who stated a preference for HIVST at the final visit stating they would select a fingerstick test, the main reason being trust in the blood test as compared to oral fluid. Additionally, 97% of participants who returned said they were very likely to use HIVST if available in the future. (Table 2)

Participants returning for at least one follow-up visit reported on test distribution and testing conditions, that is, with whom they shared tests kits, whether they themselves tested with someone else present and whether someone else tested in their presence. Overall 66% reported distributing tests to their sexual partners, 97% reported distributing tests to friends, and 84% reported distribution to family members. Overall, 32% of the cohort reported testing with someone else present and 24% reported concurrent testing (testing at the same time as another).

Returning participants reported distributing a total of 728 tests in the community, with 18.5% of kits going to sexual partners, 51.6% going to friends, and 29.8% going to family members. Participants reported on the results of distributed test kits, providing information regarding results for over 80% of tests distributed; reported results included 71.7% reported as negative results, 5.5% (40 results) reported as positive, and 3.7% (27 results) reported as invalid tests. Finally, six participants, 5% of those returning for follow-up, had documented sero-conversion over the course of the six month study.

We assessed HIV testing uptake over time as well as anticipated HIV testing with and without HIVST availability. We found that less than 40% of the cohort tested frequently

(every six months or less) prior to joining the MpMS or HIVST research cohort, and that over 84% reported recent testing following six months in the HIVST study (at the end of the follow-up period), seeing a doubling in recent test uptake facilitated by the distribution of HIV test kits. (Table 3) The increase in 6-month testing over the study period was statistically significant in Gert Sibande (difference = 62.6, $p < 0.01$) as well as in Ehlanzeni (difference = 34.5, $p < 0.01$). Furthermore when asked about anticipated frequency of testing in the coming year, while 86% noted they would test every six months or more frequently under the current scenario (of clinic-based testing), 100% said they would test every six months or more frequently if HIVST were also available. (See Table 3; Figure 2). The difference in anticipated testing under the scenario of HIVST availability was statistically significant in Gert Sibande (difference = 11.1, $p = 0.02$) as well as in Ehlanzeni (difference = 15.6, $p = < 0.01$).

Linkage to care was recorded for those who tested HIV-positive. Of the six participants who were known to have seroconverted, four reported having linked to care and starting treatment. One in Gert Sibande refused care referral, despite multiple attempts at follow-up by study staff; one in Ehlanzeni accepted the care referral and stated an intention to go to care, but had not done so by the end of study follow-up.

Discussion

We documented extremely high uptake and acceptability of HIVST following distribution of HIV self-testing kits to MSM in two high prevalence districts of Mpumalanga, South Africa. Uptake was over 90% and preference for HIVST over clinic-based testing was over 80%, a finding either commensurate or higher than other studies with MSM in resource poor settings when MSM had the opportunity to use HIVST.^{24,34} We also found a significant preference for fingerstick tests over oral fluid tests among the participants. Very few studies have provided both oral fluid and fingerstick testing opportunities to date; our findings differ substantively from one study conducted in a U.S. emergency department where oral fluid testing was greatly preferred.³⁵ Based on survey responses during follow-up as well as reports from the study interviewers, this preference likely reflects both comfort with blood-based testing, which is the standard test utilized by public clinics, and some confusion about the difference between virus and antibody detection, as a number of MSM asked counselors how HIV would be detected in saliva if the virus cannot be transmitted through kissing. Nonetheless, given the diversity of preferences and the overwhelming support for HIVST, we recommend availability and distribution of both products (fingerstick and oral fluid) for MSM in South Africa.

We found that distribution of kits was extensive through the MSM network, with approximately 65% of MSM reporting providing a test to a sexual partner, over half of whom stated they were present during their partner's test. Given low likelihood of uptake of partner testing for MSM in South African clinics, HIVST signals a new opportunity to both promote MSM partner testing and encourage discussions around serostatus.^{19,21,36} Furthermore, in addition to providing kits to partners, almost all MSM who returned for follow-up distributed test kits to both friends and family. While distribution to friends was expected, the fact that 83% of MSM shared a test kit with a family member was

unanticipated. While the nature of the family member relationship was not asked (e.g. it could have been a parent, grandparent, sibling, or cousin, etc), the potential for supportive HIV testing in families is enormous in an environment where HIV is ubiquitous and treatment adherence may be improved when family is aware and supportive of ones' infection.^{37,38} Furthermore, it should be noted that 40 (5.5%) of the distributed tests were reported as positive, which is a huge gain in new diagnosis. However, this may be an underestimate of new diagnoses, as the majority of distributed tests were conducted without the index participant present and therefore could have been misreported.

We found that frequency of testing increased over the duration of the study, with a doubling of those who reported frequent testing facilitated by the distribution of HIV test kits. A handful of other studies have documented a similar increase in testing frequency when MSM were provided with HIVST. In a recent randomized trial in Australia, Jamil et al.²⁵ demonstrated that MSM who were offered HIVST tested at twice the rate of MSM offered clinic-based testing only. Similarly, Katz et al.²² noted that among MSM randomized to HIVST access vs. standard clinic-based testing in Seattle, the mean number of HIV tests and quarterly testing increased significantly among those in the HIVST arm, with no increases in risk behaviors. Furthermore, we noted that when asked about anticipated testing in the coming year, MSM anticipated more frequent testing with both clinic-based and HIVST available as compared to the current, clinic-based only scenario, providing some additional evidence that adding HIVST to the testing options could improve testing uptake and frequency. Although this study did not aim and was not powered to document incidence, our observation of 6 seroconversions in a short time span (amounting to six new infections in 55 person years of observation) is consistent with previous estimates by Lane et al.⁶ and Kamali et al.³⁹ These facts and observations taken together confirm the urgent need to increase testing uptake in what is very likely a community experiencing peak incidence.

This study has some limitations. Though recruited through methods designed to generate a representative sample, and though participants reflect the original MPMS (RDS) cohort, the sample is unlikely representative of all MSM in the area. The sample was largely young, indicating that older MSM networks were not represented. While our data add to a growing evidence base that HIVST would in fact increase testing, data is still sparse regarding whether HIVST would effectively decrease time to HIV diagnosis, reaching MSM who would not otherwise test and increasing frequency among high HIV risk non- or infrequent-testers, as opposed to becoming a substitute or replacement for clinic-based testing for those who would have tested regardless of the testing mechanism. This was a limitation of our study as well, and we recommend additional implementation science research to understand HIVST's impact on early diagnosis and thus early entry into care and reduced incident infections, which is the key to further promotion of this potentially impactful tool in the HIV epidemic.

Conclusion

In the absence of targeted HIV prevention and treatment programming for MSM, extensive sexual transmission has resulted in a concentrated MSM HIV epidemic within South Africa's generalized epidemic,⁴⁰ with testing rates that are not commensurate with risk

among the MSM community. HIVST is acceptable and feasible, can be disseminated through high-risk peer networks, and increases testing frequency and partner testing, potentially improving early detection and facilitating treatment. Both national stakeholders and international institutions are increasingly embracing HIVST; however, targeted distribution channels and accessible pricing are urgently needed to ensure MSM have access to this promising tool. At present in South Africa, over the counter sales of HIVST by pharmacists are no longer restricted; however, the cost (approximately 6-12 US dollars) limits access by low-income South Africans, including MSM. We strongly recommend the immediate implementation and scaling of HIVST as a programmatic innovation that can conceivably reduce time to diagnosis and subsequent treatment uptake in such rapid-transmission settings.

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Figure 1.
Recruitment and enrollment in HIV self-testing among South African MSM

Every six month or more frequent HIV Testing over time

Figure 2.
Change in frequent HIV testing over time

Table 1

Characteristics of study HIVST participants by recruitment area

Respondent characteristics	Overall (n=127)		Gert Sibande (n=55)		Ehlanzeni (n=72)	
	n	%	n	%	n	%
Age						
18–24	83	65.4	35	63.6	48	66.7
25–39	44	34.6	20	36.4	24	33.3
Highest level of education						
Primary or secondary	65	51.2	20	36.4	45	62.5
Matric (graduated high school)	49	38.6	28	50.9	21	29.2
Some college or technical school	13	10.2	7	12.7	6	8.3
Paid work in the past 6 months?						
Yes	40	31.5	16	29.1	24	33.3
No	87	68.5	39	70.9	48	66.7
Sexual identity*						
Gay/Homosexual	37	29.1	8	14.5	29	40.3
Straight	3	2.4	3	5.5	0	0.0
Transgender	1	0.8	1	1.8	0	0.0
Bisexual	86	67.7	43	78.2	43	59.7
HIV Testing History at HIVST baseline*§						
Never tested	5	3.9	0	0.0	5	6.9
Tested in past 6 months	93	73.2	54	98.2	39	54.2
Tested 6–12 months ago	10	7.9	1	1.8	9	12.5
Tested >12 months ago	19	15.0	0	0.0	19	26.4
HIV Testing History prior to MPMS/HIVST studies*						
Never tested	19	15.0	10	18.2	9	12.5
Tested in past 6 months	48	37.8	11	20.0	37	51.4
Tested 6–12 months ago	36	28.3	28	50.9	8	11.1
Tested >12 months ago	24	18.9	6	10.9	18	25.0

Respondent characteristics	Overall (n=127)		Gert Sibande (n=55)		Ehlanzeni (n=72)	
	n	%	n	%	n	%
Regular Male Sexual Partner						
Yes	106	83.5	44	80.0	62	86.1
No	21	16.5	11	20.0	10	13.9
Regular Female Sexual Partner*						
Yes	65	51.2	38	69.1	27	37.5
No	62	48.8	17	30.9	45	62.5
Number of sexual partners in the last 6 months						
0	3	2.4	2	3.6	1	1.4
1	79	62.2	36	65.5	43	59.7
2	45	35.4	17	30.9	28	38.9

* differences in site characteristics (p .05)

§ All participants in Ermelo had recently tested in the MpMS study.

Uptake of HIVST among full cohort and utilization and distribution of HIVST among MSM participants returning for follow-up, by recruitment site in Mpumalanga, South Africa.

Table 2

Participant Utilization α	Overall (n=127)		Gert Sibande (n=55)		Ehlanzeni (n=72)	
Number of reported HIVST used by participant *						
None reported (including LTF)	11	8.7	2	3.6	9	12.5
1 test	43	33.9	19	34.5	24	33.3
2 tests	59	46.4	32	58.2	27	37.5
3+ tests	14	11.0	2	3.6	12	16.7
Test(s) selected						
Blood	70	55.1	30	54.5	40	55.6
Oral fluid	25	19.7	9	16.4	16	22.2
Selected both (selected other test at 3 month follow-up visit)	32	25.2	16	29.1	16	22.2
Testing Conditions β	N=116	%	N=51	%	N=65	%
Distributed at least 1 test to: δ						
Sexual Partners	76	65.5	34	66.7	42	64.6
Friends	112	96.6	49	96.1	63	96.9
Family members	97	83.6	45	88.2	52	80.0
Tested with someone present						
Ever tested with others	37	31.9	14	27.5	23	35.4
Always tested alone	79	68.1	37	72.5	42	64.6
Tested concurrently (tested together at the same time)						
Yes	28	24.1	12	23.5	16	24.6
No	88	75.9	39	76.5	49	75.4
Present while test receiver conducted test δ						
Yes – partner	46	39.7	21	41.2	25	38.5
Yes – friend	48	41.4	25	49.0	23	35.4

	Overall (n=127)	Gert Sibande (n=55)	Ehlanzeni (n=72)
Participant Utilization α			
Yes – family	38	20	18
	32.8	39.2	27.7
Participant seroconversions during study	6	2	4
	4.7	3.6	5.6
Testing Preferences δ	N=112	N=51	N=61
	%	%	%
Testing Preference (among those who utilized HIVST)			
Prefer HIV self-test	93	43	50
	83.0	84.3	82.0
Prefer to test with a health professional	12	7	5
	10.7	13.7	8.2
No preference	7	1	6
	6.2	2.0	9.8
Likelihood of using self-test if available?			
Very likely	109	48	61
	97.3	94.1	100.0
Somewhat likely	3	3	0
	2.7	5.9	0.0
Unlikely	0	0	0
	0.0	0.0	0.0
HIVST kit preference (at 6 month survey) Ω			
Blood	51	23	28
	64.6	63.9	65.1
Oral fluid	27	13	14
	34.2	36.1	32.6
No preference	1	0	1
	1.3	0.0	2.3
Total tests distributed by all participants β	N=728	N=332	N=396
	%	%	%
Distributed tests provided to: δ			
Sexual Partners	135	57	78
	18.5	17.2	19.7
Friends	376	167	209
	51.6	50.3	52.8
Family members	217	108	109
	29.8	32.5	27.5
Distributed test results *			
Negative	522	233	289
	71.7	70.2	73.0
Positive	40	10	30
	5.5	3.0	7.6
Invalid	27	8	19
	3.7	2.4	4.8
Don't know	139	81	58
	19.1	24.4	14.6

* denotes differences in site utilization, preference, or distribution (p .05);

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Reported for all enrolled participants, including those who did not confirm use or who did not return to provide follow-up data;
Includes participants returning to at least one follow-up visit;
Numbers reflect those who returned to a follow-up visit and reported use (e.g. non-use and LTFU excluded);
Percentages for individual boxes, not referent to column or row;
Preference question only asked of those reporting HIVST preference at six month survey.

Table 3

Reported HIV testing frequency over time by site in Mpumalanga, South Africa.

Reported Testing Frequency	Overall N=127		p-value		Gert Sibande N=55		p-value		Ehlanzeni N=72		p-value	
	n	%			n	%			n	%		
Prior to study participation (HIVST or MPMS)^a												
< 6 months	48	37.8			11	20.0			37	51.4		
6–12 months	36	28.3			28	50.9			8	11.1		
> 12 months	43	33.9			16	29.1			27	37.5		
			<0.01 [*]								<0.01 [*]	
Following HIVST participation												
	N=116	%			N=51	%			N=65	%		
< 6 months	98	84.5			42	82.4			56	86.2		
6–12 months	15	12.9			9	17.6			6	9.2		
> 12 months	3	2.6			0	0			3	4.6		
Anticipated in following year – clinic based testing only^Q												
	N=109	%			N=45	%			N=64	%		
< 6 months	94	86.2			40	88.9			54	84.4		
6–12 months	14	12.8			5	11.1			9	14.1		
> 12 months	1	0.9			0	0.0			1	1.6		
			<0.01 ^{**}								0.02 ^{**}	<0.01 ^{**}
Anticipated in following year – clinic-based and HIVST testing available^Q												
< 6 months	109	100			45	100			64	100		
6–12 months	0	0			0	0			0	0		
> 12 months	0	0			0	0			0	0		

^a Includes data from 2015 for MPMS recruited participants and 2016 for non-MPMS recruited participants;^Q anticipated testing question only asked at six month survey; one participant in Ehlanzeni was inadvertently not asked questions about anticipated testing.^{*} difference between testing frequency at end of follow-up compared to prior testing frequency (overall; Gert Sibande; Ehlanzeni);^{**} difference between anticipated testing with clinic-based testing available compared to with HIVST and clinic-based testing available.