

## Supporting information

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Table 1. Cluster-level fidelity to HIV self-testing intervention

	Population N	CBDAs N	HIVST kits distributed N	N	Endline survey		
					Heard of self- testing n (%)	Ever self-tested n (%)	Self-tested in the last 12 months n (%)
<b>HIVST</b>							
Chifunga	3933	9	7357	251	233 (92.8%)	87 (34.7%)	76 (30.3%)
Chikowa	6918	24	22697	251	224 (89.2%)	70 (27.9%)	64 (25.5%)
Chikweo	6471	51	90582	265	239 (90.2%)	115 (43.4%)	106 (40.0%)
Kunenekude	2947	15	14145	254	223 (87.8%)	92 (36.2%)	82 (32.3%)
Luwani	2638	8	5769	188	147 (78.2%)	71 (37.8%)	54 (28.7%)
Madziabango	2434	13	10579	228	211 (92.5%)	105 (46.1%)	100 (43.9%)
Magareta	3544	9	11864	233	218 (93.6%)	131 (56.2%)	114 (48.9%)
Mangamba	3752	21	20159	290	236 (81.4%)	75 (25.9%)	69 (23.8%)
Mpemba	5801	18	19994	229	192 (83.8%)	104 (45.4%)	96 (41.9%)
Namanja	2122	22	53402	272	258 (94.9%)	185 (68.0%)	160 (58.8%)
Soche Maternity	3830	13	17181	121	113 (93.4%)	62 (51.2%)	53 (43.8%)
Total	44390	203	273729	2582	2294 (88.8%)	1097 (42.5%)	974 (37.7%)
<b>SOC</b>							
Dziwe	6244			232	60 (25.9%)	3 (1.3%)	2 (0.9%)
Ligowe	6649			300	60 (20.0%)	2 (0.7%)	2 (0.7%)
Lirangwe	7972			252	29 (11.5%)	3 (1.2%)	1 (0.4%)
Makata	3283			267	38 (14.2%)	2 (0.7%)	1 (0.4%)
Mbonechera	3526			181	40 (22.1%)	1 (0.6%)	1 (0.6%)
Mkwepere	3021			243	186 (76.5%)	112 (46.1%)	105 (43.2%)
Nayuchi	3298			332	255 (76.8%)	69 (20.8%)	63 (19.0%)
Ngokwe	4914			256	146 (57.0%)	43 (16.8%)	33 (12.9%)
Pensulo	5532			250	46 (18.4%)	4 (1.6%)	3 (1.2%)
Thambani	3915			288	24 (8.3%)	1 (0.3%)	0 (0.0%)
Tulonghondo	3134			307	33 (10.7%)	0 (0.0%)	0 (0.0%)
Total	51488			2908	917 (31.5%)	240 (8.3%)	211 (7.3%)

CBDAs, community-based distribution agents; HIVST, HIV self-testing; SOC, standard of care.

**Table 2. Household and individual response rates at baseline and endline**

	Households enumerated N	Households sampled n/N (%)	Individuals in sampled households N	Individuals ≥ 18 years surveyed and included in primary analysis		
				Overall n/N (%)	Males n/N (%)	Females n/N (%)
<b>Baseline</b>						
HIVST	2286	1633/2286 (71.4%)	3577	2809/3577 (78.5%)	1170/1676 (69.8%)	1639/1901 (86.2%)
SOC	2349	1643/2349 (69.9%)	3567	2664/3567 (74.7%)	1085/1617 (67.1%)	1579/1950 (81.0%)
<b>Endline</b>						
HIVST	1951	1525/1951 (78.2%)	3355	2582/3355 (77%)	1075/1546 (69.5%)	1507/1809 (83.3%)
SOC	1782	1489/1782 (83.6%)	3699	2908/3699 (78.6%)	1264/1746 (72.4%)	1644/1953 (84.2%)

HIVST, HIV self-testing; SOC, standard of care.

**Table 3. Comparison of baseline population characteristics by study arm**

	HIVST n (%)	SOC n (%)
<b>Household characteristics</b>	(N=1467)	(N=1426)
Adults (median/range) *	2 (1-8)	2 (1-7)
Children (median/range) *	2 (0-8)	2 (0-10)
Household wealth index †		
Lowest	590 (40.4%)	717 (50.3%)
Middle	382 (26.1%)	332 (23.3%)
Highest	489 (33.5%)	376 (26.4%)
<b>Individual characteristics</b>	(N=2809)	(N=2664)
Age (median/range)	31 (16-96)	31 (16-96)
Male	1170 (41.7%)	1085 (40.7%)
Age group		
16-19 years	445 (15.8%)	407 (15.3%)
20-24 years	507 (18.0%)	476 (17.9%)
25-39 years	971 (34.6%)	934 (35.1%)
≥ 40 years	886 (31.5%)	847 (31.8%)
Marital status ‡		
Married or living together	1938 (69.0%)	1744 (65.5%)
Separated, divorced or widowed	382 (13.6%)	461 (17.3%)
Never married	488 (17.4%)	458 (17.2%)
Educational attainment §		
None	602 (21.4%)	665 (25.0%)
Primary	1740 (62.0%)	1661 (62.4%)
Secondary or higher	465 (16.6%)	337 (12.7%)
Literate	1864 (66.4%)	1660 (62.3%)
Resident in last 12 months	2736 (97.4%)	2612 (98.0%)
Self-rated health status		
Very good	814 (29.0%)	699 (26.2%)
Good	1163 (41.4%)	1191 (44.7%)
Fair	627 (22.3%)	617 (23.2%)
Poor	204 (7.3%)	157 (5.9%)

HIVST, HIV self-testing; SOC, standard of care.

\* 3 missing values in the HIVST arm and 1 missing value in the SOC arm.

† 6 missing values in the HIVST arm and 1 missing value in the SOC arm.

‡ 1 missing values in the HIVST arm and 1 missing value in the SOC arm.

§ 2 missing values in the HIVST arm and 1 missing value in the SOC arm.

|| 1 missing value in the HIVST arm and 1 missing value in the SOC arm.

¶ 1 missing value in the HIVST arm.

Table 4. Post-hoc outcomes by study arm

	HIVST		SOC		Risk difference (95% CI)	Adjusted risk difference (95% CI)	Risk ratio (95% CI)	Adjusted risk ratio (95% CI)
	n/N (%)	GM	n/N (%)	GM	GM	p-value	p-value	p-value
<b>HIV testing in the last 12 months</b>								
Stratified by age group *								
16-19 years	252/366 (68.9%)	69.5%	185/439 (42.1%)	39.2%	27.5% (13.4-41.5%) <0.001	26.1% (12.9-39.2%) <0.001	1.77 (1.31-2.41) <0.001	1.78 (1.33-2.38) <0.001
20-39 years	1062/1400 (75.9%)	75.8%	897/1556 (57.6%)	56.3%	18.6% (8.7-28.6%) <0.001	15.0% (4.7-25.3%) 0.007	1.35 (1.14-1.59) 0.001	1.27 (1.06-1.51) 0.01
≥ 40 years	454/816 (55.6%)	54.0%	340/913 (37.2%)	37.4%	15.2% (4.5-25.9%) 0.008	13.9% (2.0-25.7%) 0.03	1.44 (1.14-1.83) 0.005	1.38 (1.06-1.8) 0.02
<b>Lifetime HIV testing</b>								
Stratified by age group †								
16-19 years	280/366 (76.5%)	77.0%	239/439 (54.4%)	53.5%	21.7% (9.5-33.8%) 0.001	18.6% (7.3-29.9%) 0.003	1.44 (1.16-1.78) 0.002	1.38 (1.13-1.7) 0.004
≥ 20 years	1963/2216 (88.6%)	88.9%	2044/2469 (82.8%)	82.8%	6.1% (2.5-9.7%) 0.002	4.4% (0.5-8.2%) 0.03	1.07 (1.03-1.12) 0.002	1.05 (1.01-1.1) 0.03
Stratified by sex ‡								
Male	898/1075 (83.5%)	83.7%	908/1264 (71.8%)	72.2%	11.6% (5.3-18.0%) 0.001	10.2% (3.1-17.2%) 0.007	1.16 (1.07-1.26) 0.001	1.14 (1.04-1.25) 0.007
Female	1345/1507 (89.3%)	89.8%	1375/1644 (83.6%)	83.5%	6.4% (2.4-10.4%) 0.004	3.4% (-0.9-7.7%) 0.12	1.08 (1.03-1.13) 0.004	1.04 (0.99-1.09) 0.13
Stratified by household wealth index								
Lowest	612/723 (84.6%)	84.5%	669/902 (74.2%)	73.8%	10.8% (4.5-17.1%) 0.002	9.2% (3.0-15.4%) 0.006	1.15 (1.06-1.24) 0.002	1.12 (1.04-1.21) 0.005
Middle	721/829 (87.0%)	87.2%	717/868 (82.6%)	82.60%	4.7% (0.6-8.9%) 0.03	1.6% (-3.2-6.3%) 0.49	1.06 (1.01-1.11) 0.03	1.02 (0.96-1.08) 0.53
Highest	846/961 (88.0%)	89.2%	801/1013 (79.1%)	79.5%	9.5% (3.7-15.3%) 0.003	7.9% (3.2-12.5%) 0.002	1.12 (1.05-1.2) 0.003	1.1 (1.04-1.17) 0.002
ART initiation per 100,000 population across intervention period								

Stratified by period ¶									
0-5 months	214/44390 (482.1)	439.2	185/51488 (359.3)	282.1	173.8 (-77.6-425.2) 0.17	142.6 (-81.5-366.7) 0.20	1.56 (0.79-3.05) 0.19	1.42 (0.8-2.52) 0.22	
6-11 months	198/44390 (446.0)	448.1	147/51488 (285.5)	241.9	211.0 (39.8-382.2) 0.02	194.8 (31.4-358.1) 0.02	1.85 (1.1-3.13) 0.02	1.75 (1.08-2.82) 0.03	
12-16 months	115/44390 (259.1)	221.4	136/51488 (264.1)	199.6	-17.9 (-176.4-140.6) 0.82	-28.3 (-186.5-129.9) 0.72	1.11 (0.59-2.09) 0.74	1.07 (0.57-2.01) 0.84	

ART, antiretroviral therapy; GM, geometric mean (of cluster-level proportions); HIVST, HIV self-testing; k, coefficient of variation in health facility-defined clusters; SOC, standard of care.

HIV testing outcomes adjusted for cluster-level baseline outcomes (testing in the last 12 months) and individual-level covariates (age, sex, marital status). Sub-group analysis by age group adjusts for the same covariates except for age group. Sub-group analysis by sex adjusts for the same covariates except for sex. ART initiation outcome adjusted for cumulative incidence of ART initiations in 12-month pre-intervention period.

\* P-value for interaction (20-39 years versus 16-19 years), p=0.13. P-value for interaction ( $\geq 40$  years versus 16-19 years), p=0.40.

† P-value for interaction, p=0.02.

‡ P-value for interaction, p=0.07.

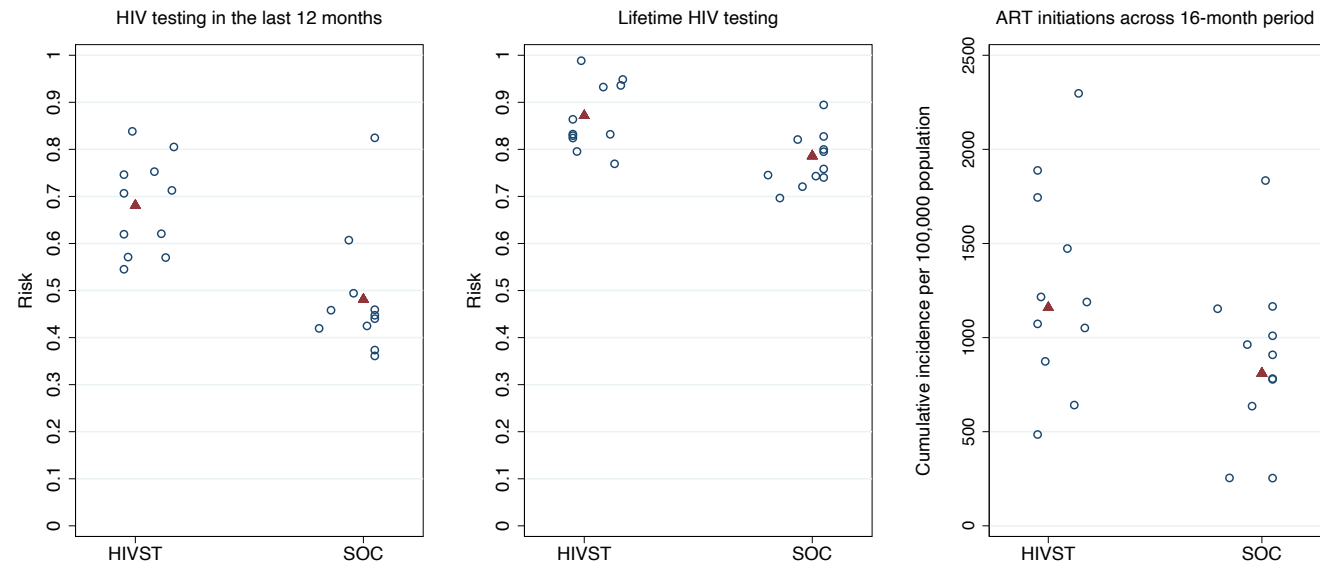
§ P-value for interaction (middle versus lowest), p=0.005. P-value for interaction (highest versus lowest), p=0.51.

|| Denominator for ART initiations is the estimated cluster population of adults  $\geq 16$  years, which was estimated using village and health facility registers.

¶ P-value for interaction (6-11 months versus 0-5 months), p=0.38. P-value for interaction (12-16 months versus 0-5 months), p=0.42.

**Figure 1. Cluster risks for primary and secondary HIV testing outcomes**

ART, antiretroviral therapy; HIVST, HIV self-testing; SOC, standard of care. Comparison of cluster risks for primary and secondary outcomes by study arm, with blue circles indicating cluster risks and red triangles indicating geometric means of cluster risks.



**Figure 2. Fidelity to HIV self-testing intervention by sex and age group**

HIVST, HIV self-testing; SOC, standard of care. The proportion ever self-testing and 95% CI adjusted for clustering following the HIVST intervention. Data are stratified by study arm, sex and age group.

