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## NATIONAL HIV TESTING CAMPAIGNS TO SUPPORT UNAIDS 90-90-90 AGENDA: A LESSON FROM KENYA

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## NATIONAL HIV TESTING CAMPAIGNS TO SUPPORT UNAIDS 90-90-90 AGENDA: A LESSON FROM KENYA

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### ABSTRACT

**Background:** HIV diagnosis is the gateway to antiretroviral therapy. However, 20-50% of HIV-infected individuals are unaware of their HIV status, derailing epidemic control.

**Objective:** To increase awareness of HIV status and enrollment into HIV care & treatment (C&T) services through a national HIV testing services (HTS) rapid results initiative (RRI) campaign in Kenya.

**Design:** This cross-sectional analysis presents yield of undiagnosed people living with HIV (PLHIV) and their enrollment into HIV C&T resulting from HTS RRI implemented in July-August 2013 as an example of utilizing RRIs to catalyze achievement of UNAIDS targets.

**Results:** During the campaign 1,462,378 persons received HTS, of whom 220,902 (15%) were children (aged <15 years), 55,088 (7%) couples and 116,126 (8%) key populations. A total of 37,630 (2.6%) HIV+ individuals were identified. Among children who received HTS, 3,244 (1.5%) tested HIV positive, compared to 34,386 (2.8%) among adults. Of the eight regions in Kenya: Nyanza, Rift-valley and Nairobi contributed 73.3% of all HIV+ individuals identified. HTS at health facility settings yielded the highest proportion (69%) of HIV+ and key populations had the highest prevalence (4.8%). Of those infected, 29,851 (79.3%) were enrolled into HIV C&T. Sex, age and setting of HTS were significantly associated with enrollment into HIV C&T ( $p < 0.0001$ ).

**Conclusion:** National HTS campaigns have the potential of increasing knowledge of HIV status. Targeted provision of HTS at health facility settings, to key

**populations and high burden geographical regions would narrow the gap of undiagnosed PLHIV towards achieving UNIADS 90-90-90 targets for HIV epidemic control.**

## INTRODUCTION

In 2014, United Nations Programme on HIV/AIDS (UNAIDS) developed targets aimed at global HIV epidemic control: 90% of all people living with HIV (PLHIV) to know their status, 90% of diagnosed PLHIV to receive antiretroviral therapy (ART), and 90% of PLHIV on ART to achieve viral suppression by the year 2020 (UNAIDS, 2014a). According to UNAIDS 2014 Gap report, of the 35 million people estimated to be HIV infected by 2013 worldwide, 19 million (54.3%) were not aware of their HIV positive status (UNAIDS, 2014b), with a similar proportion (53.1%) documented in Kenya in 2012 (NASCO, 2014). The UNAIDS agenda was driven by an understanding that lack of awareness of HIV positive status was the single biggest barrier to ART programming (Cohen et al., 2011; NASCO, 2012; NASCO, 2014; UNAIDS, 2014b). In the recent national survey, Kenya posted an achievement of 80% in the 1<sup>st</sup> 90 of UNAIDS targets (NASCO KENPHIA 2018 Report, 2020).

At the time, a growing body of research had indicated sub-optimal linkage of HIV infected people to ART services (Fox & Rosen, 2010; Genberg et al., 2015; Gerdtz et al., 2014; Hatcher et al., 2012; Kranzer et al., 2010; Ng'ang'a et al., 2014; Rosen & Fox, 2011). In the intervening years, 'test and treat' has become an axiom for national HIV/AIDS programmes but it is worth remembering that concerted national testing campaigns are still a key foundation for the efficacy of those programmes. Kenya's national HIV testing

services (HTS) rapid results initiative (RRI) campaign in 2013 is a case in point, as we describe in this article which is based on a thorough analysis of the campaign data.

### *The RRI Campaign*

The RRI campaign was preceded by two months of planning on target setting, implementation strategies, coordination, commodity and logistics management, demand creation, stakeholder engagement, quality assurance, monitoring, and evaluation. Target setting was based on three factors: available funding resources, estimated regional HIV prevalence, HIV burden (estimated number of people living with HIV) and estimated HTS coverage. Provinces with estimated high HIV prevalence and high HIV burden were prioritized. These included Nyanza, Rift Valley and Nairobi provinces. Based on the above considerations, a target of 1,289,000 people was set for the campaign.

HTS was implemented as per MOH guidelines (NASCO, 2008). HTS procedure was enhanced with escort services to HIV C&T centers for individuals testing HIV positive during the campaign to facilitate enrolment into HIV C&T services. The HTS was based in two broad settings: Health facilities and Community settings. Those diagnosed with HIV were escorted or referred to HIV clinic of their choice. Monitoring and reporting was conducted using MOH reporting tools, and summarized data was submitted electronically to a central national database. Simple descriptive analysis was performed, proportions compared, and Chi square computed to explore associations

between different groups using SAS 9.3 (SAS Inc, 2012).

### Results

A total of 1,463,378 individuals received HTS during the national HTS campaign implemented from July to August 2013 (Table 1). This resulted to 114% achievement of the campaign HTS target for this HTS campaign as shown in Table 1. The geographical distribution of those tested was highest in Rift Valley (25.5%) and Nyanza (20.3%) regions,

while the lowest was recorded in Central (7.1%) and North Eastern (5.7%) regions (Table1). The majority of those who tested positive were from Nyanza (43.3%) and Rift Valley (18.5%). HIV prevalence was highest in Nyanza region at 5.6%, followed by Central region at 2.5% and Nairobi at 2.4%. The Western and North Eastern region had the lowest prevalence at 0.9% and 0.3% respectively.

**Table 1**

*Geographical distribution of individuals provided with HIV testing services during a national HTS campaign in Kenya: July – August 2013*

Province	Target	Total Number Tested	%Target Achieved	No. HIV Positive Identified	HIV Prevalence (%)	Prevalence 95% CI	% Yield of Total HIV Positive Identified
Nyanza	280,000	288,365	103.0	16,221	5.6	5.55 – 5.71	43.1
Rift valley	250,000	387,095	154.8	7,005	1.8	1.77 – 1.85	18.6
Nairobi	180,000	180,552	100.3	4,381	2.4	2.36 – 2.50	11.6
Western	150,000	155,158	103.4	1,448	0.9	0.88 – 0.98	3.8
Coast	140,000	139,660	99.8	2,856	2.0	1.97 – 2.12	7.6
Eastern	120,000	136,028	113.4	2,936	2.2	2.08 – 2.24	7.8
Central	95,000	100,503	105.8	2,497	2.5	2.39 – 2.58	6.6
North Eastern	74,000	75,017	101.4	286	0.4	0.34 – 0.46	0.7
<b>Total</b>	<b>1,289,000</b>	<b>1,462,378</b>	<b>113.5</b>	<b>37,630</b>	<b>2.6</b>	<b>2.54 – 2.60</b>	<b>100.0</b>

Of those tested, 220,902 (15.1%) were children aged less than 15 years and 55,088 (7.2%) were individuals tested together as couples. Eight percent of tested individuals (116,126) were classified as key populations according to Kenya MOH guidelines (i.e. particularly at higher risk of acquiring or transmitting HIV): sex workers, men who have sex with men, people who inject drugs, truckers, fisher folk and prisoners (Table 2).

This national HTS campaign identified 37,630 (2.6%) undiagnosed PLHIV and most of these individuals (25,994; 69%) were

diagnosed at health facility settings (Table 2). This proportion of PLHIV identified at health facility settings was significantly higher than 11,994 (31%) identified in the community-based settings ( $p < 0.0001$ ). Of the 853,922 persons tested at health facility settings, 25,994 (3.0%) were diagnosed with HIV, while 11,636 (1.9%) of 608,456 reached in community-based settings had HIV infection (Table 2). Therefore, those reached with HTS at health facility settings were more likely to test positive for HIV infection compared to those diagnosed in the community-based

settings; OR=1.6 (95% CI: 1.58-1.65),  $p<0.0001$ . Overall, women had a higher HIV prevalence of 2.9% compared to men whose HIV burden was estimated at 2.2%. Among children (<15 years of age) who received HTS, 3,244 (1.5%) tested HIV positive. Of all adults who tested as couples, 1,763 (3.2%) spouses were identified as being HIV sero-discordant and the highest proportion of HIV discordant couples was identified at health facility settings (4.7%) compared to 2.1% who were diagnosed at community-based settings (Table 2). Key populations had the highest HIV prevalence in both settings (4.8%).

Over the campaign period, 29,851 (79.3%) of individuals who tested positive for HIV were reported to have enrolled into HIV C&T

services (Table 2) within three months of HIV diagnosis. Of 11,636 PLHIV diagnosed at the community-based settings 9,908 (85%) were enrolled into HIV C&T services in this period compared to 19,943 (77%) of PLHIV that were identified at health facility settings. Therefore, PLHIV diagnosed at community-based settings had increased odds of enrolment into HIV C&T compared to those diagnosed at the health facility settings; OR=1.7 (95% CI: 1.64-1.84),  $p<0.0001$ . Women 19,314 (81%) were generally more likely to enroll into HIV C&T compared to men 10,537 (77%); OR=1.2 (95% CI: 1.18-1.31,  $p<0.0001$ ). Adults ( $\geq 15$  years old) were 2-fold as likely as children (<15 years old) to enroll into HIV C&T services; OR=1.9 (95% CI: 1.71-2.01),  $p<0.0001$ .

**Table 2***Characteristics of individuals provided with HIV testing services during a national HTS campaign in Kenya: July-August 2013*

Characteristic	Total		HTS in community settings		HTS in health facility settings		p-value
	n	%	n	%	n	%	
<b>Total tested</b>	1,462,378	100.0	608,456	41.6	853,922	58.4	
<b>HIV positives identified</b>	37,630	2.6	11,636	1.9	25,994	3.0	<0.001
<b>HIV positives enrolled into HIV C&amp;T</b>	29,851	79.3	9,908	85.2	19,943	76.7	<0.001
<b>Sex</b>							
<b>Male: Total tested</b>	633,459	43.3	285,809	47.0	347,650	40.7	
<b>HIV positives identified</b>	13,682	2.2	4,271	1.5	9,411	2.7	<0.001
<b>HIV positives enrolled into HIV C&amp;T</b>	10,537	77.0	3,604	84.4	6,933	73.7	<0.001
<b>Female: Total tested</b>	828,919	56.7	322,647	53.0	506,272	59.3	
<b>HIV positives identified</b>	23,948	2.9	7,365	2.3	16,583	3.3	<0.001
<b>HIV positives enrolled into HIV C&amp;T</b>	19,314	80.6	6,304	85.6	13,010	78.5	<0.001
<b>Age (years)</b>							
<b>&lt;15 Total tested</b>	220,902	15.1	72,165	11.9	148,737	17.4	
<b>HIV positives identified</b>	3,244	1.5	685	1.0	2,559	1.7	<0.001
<b>HIV positives enrolled into HIV C&amp;T</b>	2,230	68.7	623	91.0	1,607	62.8	<0.001
<b>≥15 Total tested</b>	1,241,476	84.9	536,291	88.1	705,185	82.6	
<b>HIV positives identified</b>	34,386	2.8	10,951	2.0	23,435	3.3	<0.001
<b>HIV positives enrolled into HIV C&amp;T</b>	27,621	80.3	9,285	84.8	18,336	78.2	<0.001
<b>Individuals tested as a couple</b>							
<b>Total tested</b>	55,088	3.8	32,133	5.3	22,955	2.7	
<b>Concordant HIV negative</b>	52,123	94.6	31,013	96.5	21,110	92.0	<0.001
<b>Concordant HIV positive</b>	1,202	2.2	442	1.4	760	3.3	<0.001
<b>HIV discordant</b>	1,763	3.2	678	2.1	1,085	4.7	<0.001
<b>Key populations</b>							
<b>Total tested</b>	116,126	7.9	64,585	10.6	51,541	6.0	
<b>HIV positives identified</b>	5,602	4.8	2,667	4.1	2,935	5.7	<0.001

A higher percentage of enrolment to HIV C&T was recorded among HIV positive adults (84.8%) and children (90.9%) identified in community-based settings compared to those diagnosed at health facility settings (78.2%) and (62.8%), respectively (Table 2). Similarly, higher proportions of enrolment to HIV C&T were observed among HIV positive men (84.4%) and women (85.6%) identified in community-based settings compared to those diagnosed at health facility settings (78.2%) and (62.8%), respectively. However, unlike among PLHIV diagnosed at community-based settings where female sex was not associated with enrolment to HIV C&T [OR=1.1 (95% CI: 0.99-1.22),  $p=0.077$ ], female PLHIV identified at health facility settings were more likely to enroll into HIV C&T services compared to their male counterparts; OR=1.3 (95% CI: 1.22-1.38),  $p<0.0001$ .

The campaign data revealed a differential association between age and the setting of diagnosis. Among PLHIV diagnosed at health facility settings, adults ( $\geq 15$  years old) had 2-fold increased odds of enrollment into HIV C&T compared to children ( $<15$  years old); OR=2.1 (95% CI: 1.95-2.32),  $p<0.0001$ . On the contrary, children ( $<15$  years old) were more likely to enroll into HIV C&T compared to adults ( $\geq 15$  years old) among PLHIV diagnosed at community-based settings; OR=1.8 (95% CI: 1.38-2.35),  $p<0.0001$ .

## DISCUSSION

This was a very successful campaign. All regional targets were achieved, with Rift Valley's target being significantly surpassed 154% ( $p<0.0002$ ). The number of previously undiagnosed PLHIV identified by this campaign was equivalent to 5.9% of the undiagnosed population as estimated by the 2012 population-based survey (NASCO

2014). The 3,750 previously undiagnosed HIV positive children under the age of 15 was equivalent to 8% of the total undiagnosed population of children in Kenya as estimated by the 2012 nation HIV survey (NASCO, 2014). For Kenya, this was particularly a major success because it was well known the ART programme had limited coverage of children (UNAIDS, 2014a, NASCO 2014).

There was a significant geographical variation both in HIV prevalence and yield of identified PLHIV. Three regions (Nyanza, Rift Valley and Nairobi) contributing approximately 75% of all PLHIV identified during the campaign. Nyanza region alone accounted for over 40% of all identified PLHIV. These findings were similar to those from the KAIS 2012 survey, which documented that the majority of undiagnosed PLHIV were in Nyanza province (35%), followed by Rift Valley (18%) and then Nairobi (11%) (NASCO, 2014). Furthermore, the gap in knowledge of status was reduced by a big range; notably, HIV prevalence especially those above the age of 15 was 2.8% which was half the national HIV prevalence estimate in 2012 (NASCO, 2014).

There could be many reasons why variations on yield and linkage were observed between the two HTS settings (Health facilities and Community settings) but these campaign results provided indicative scope for campaign planning, refining targets geographically and across different sub-populations in order to reach as many as undiagnosed individuals as possible, while providing useful information for refining estimates of HIV prevalence as sub-population level. It therefore seems that testing during campaigns should be much more targeted and further explorative analysis should be conducted specially to assess the yield in HIV positivity in different

testing sites, population subgroups and even within different departments of the health facilities. This will allow for better targeting in order to achieve a higher yield in identifying undiagnosed PLHIV. Likewise, the results regarding ART enrollment rates following HTS in different settings and amongst different sub-populations, provide information for refining concerted HTS campaigns. The campaign data showed that almost 80% of those who tested positive for HIV were subsequently enrolled in C&T services. However, individuals reached at community settings having better enrolment rates compared to those reached at health facility settings. Furthermore, the data showed that age and sex were patient-related factors significantly ( $p < 0.0001$ ) associated with enrollment for HIV treatment, suggesting that national RRIs provide a matrix for addressing age/sex-related unmet needs for HTS and enrolment for HIV C&T in HIV programming.

## CONCLUSION

Kenya's 2013 RRI campaign is an example of the utility of these interventions to boost the UNAIDS agenda:

- a) The RRI provided information in support of Kenya's commitment to achieving UNAIDS targets. Notably, increasing population-level knowledge of HIV status toward achieving the 1<sup>st</sup> 90 of the UNIAD targets and highlighting the need for optimizing enrollment of newly identified PLHIV into HIV C&T to facilitate achievement of the 2<sup>nd</sup> 90 in the UNAIDS target. These created a foundation for the test and treat policy that was implemented in Kenya in 2016. Indeed, the recent 2018 national

survey documented a marked reduction in proportion of PLHIV who did not know they were HIV infected from 53.1% in 2012 to 20.5% in 2018.

- b) As importantly, the RRI campaign provided a wide range of data for analysis such as we have presented, to enabled more informed planning of sub-programmes within Kenya's national HIV programme.
- c) The Kenyan government and PEPFAR-funded HIV program implementing partners followed through in last 2-4 years with expanding reach of HIV programmes, using lessons learned from 2013 RRI. More HTS RRIs as well as those for prevention of mother to child HIV transmission, voluntary medical male circumcision, viral load and TB preventative therapy (IPT) scale up have been conducted improving uptake of these HIV related services.

Therefore, HTS campaigns are still the core of any HIV programmes in Africa but, importantly, information derived from them should be used to support planning, focused on refining/elaboration of national HIV programming if the UNAIDS goals are really to be achieved.

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### REFERENCES

- Cohen, M. S., Chen, Y. Q., McCauley, M., Gamble, T., Hosseinipour, M. C., Kumarasamy, N., *et al.* (2011). Prevention of HIV-1 infection with early antiretroviral therapy. *The New England journal of medicine*, 365(6), 493–505.
- Fox, M. P., & Rosen, S. (2010). Patient retention in antiretroviral therapy programs up to three years on treatment in sub-Saharan Africa, 2007-2009: systematic review. *Tropical medicine & international health: TM & IH*, 15(Suppl 1), 1–15.
- Genberg, B. L., Naanyu, V., Wachira, J., Hogan, J. W., Sang, E., Nyambura, M., *et al.* (2015). Linkage to and engagement in HIV care & treatment in western Kenya: an observational study using population-based estimates from home-based counselling and testing. *The lancet. HIV*, 2(1), e20–e26.
- Hatcher, A. M., Turan, J. M., Leslie, H. H., Kanya, L. W., Kwena, Z., Johnson, M. O., *et al.* (2012). Predictors of linkage to care following community-based HIV counseling and testing in rural Kenya. *AIDS and behavior*, 16(5), 1295–1307.
- Kranzer, K., Zeinecker, J., Ginsberg, P., Orrell, C., Kalawe, N. N., Lawn, S. D., *et al.* (2010). Linkage to HIV care & treatment and antiretroviral therapy in Cape Town, South Africa. *PloS one*, 5(11), e13801.
- National AIDS and STI Control Program (NASCOP), Ministry of Public Health and Sanitation, Kenya. (2008). National HIV Testing and Counseling Guidelines. Nairobi, NASCOP. Retrieved from <https://www.nascop.or.ke/wp-content/uploads/2015/08/National-Guidelines-HIV-Testing-and-Counseling-Kenya-2008.pdf>
- National AIDS and STI Control Program (NASCOP), Ministry of Public Health and Sanitation, Kenya. (2012). Achieving Universal Access to knowledge of HIV status. The Kenya HTC report 2011. Nairobi, NASCOP. [http://guidelines.health.go.ke:8000/media/HTC\\_Report\\_2011.pdf](http://guidelines.health.go.ke:8000/media/HTC_Report_2011.pdf)
- National AIDS and STI Control Program – Kenya (NASCOP), Ministry of Public Health and Sanitation, Kenya. (2014). Kenya AIDS Indicator Survey 2012: Final Report. *J. Acquir. Immune Defic. Syndr.*, 66(Suppl 1), 1–530
- National AIDS and STI Control Programme (NASCOP) Kenya (2020). Preliminary KENPHIA 2018 Report. Nairobi: NASCOP; 2020. <https://www.health.go.ke/wp-content/uploads/2020/02/KENPHIA-2018-PREL-REP-2020-HR3-final.pdf>
- Ng'ang'a, A., Waruiru, W., Ngare, C., Ssempijja, V., Gachuki, T., Njoroge, I., *et al.* (2014). The status of HIV testing and counseling in Kenya: results from a nationally representative population-based survey. *Journal of acquired immune deficiency syndromes (1999)*, 66(Suppl 1), S27–S36.
- Rosen, S., & Fox, M. P. (2011). Retention in HIV care & treatment between testing and treatment in sub-Saharan Africa: a systematic review. *PLoS medicine*, 8(7), e1001056.
- UNAIDS. (2014a). An ambitious 90-90-90 treatment target to help end the AIDS epidemic," United Nations, 2014. Retrieved from [https://www.unaids.org/sites/default/files/media\\_asset/90-90-90\\_en.pdf](https://www.unaids.org/sites/default/files/media_asset/90-90-90_en.pdf)
- UNAIDS. (2014b). The Gap Report. Geneva, UNAIDS. Retrieved from [http://files.unaids.org/en/media/unaidspublication/2014/UNAIDS\\_Gap\\_report\\_en.pdf](http://files.unaids.org/en/media/unaidspublication/2014/UNAIDS_Gap_report_en.pdf)