



# HHS Public Access

Author manuscript

*AIDS Care*. Author manuscript; available in PMC 2024 April 03.

Published in final edited form as:

*AIDS Care*. 2021 October ; 33(10): 1308–1311. doi:10.1080/09540121.2021.1874266.

## Improving the benefits of HIV testing and referrals in large household surveys through active linkages to care: lessons and recommendations from the Namibia population-based HIV impact assessment (NAMPHIA), 2017

Michael A. Grasso<sup>a</sup>, Ndapewa Hamunime<sup>b</sup>, Andrew D. Maher<sup>a</sup>, David Cockburn<sup>c</sup>, Dan B. Williams<sup>d</sup>, Negussie Taffa<sup>b</sup>, Steven Y. Hong<sup>d</sup>, Keisha Jackson<sup>d</sup>, Adam Wolkon<sup>d</sup>, Andrea Low<sup>e</sup>, Sally C. Stephens<sup>a</sup>

<sup>a</sup>Institute for Global Health Sciences, University of California San Francisco, San Francisco, CA, USA

<sup>b</sup>Namibia Ministry of Health and Social Services, Directorate for Special Programs, Windhoek, Namibia

<sup>c</sup>Development Aid from People to People (DAPP), Windhoek, Namibia

<sup>d</sup>U.S. Centers for Disease Control and Prevention, Division of Global HIV and TB, Atlanta, GA, USA

<sup>e</sup>ICAP at Columbia University, New York, NY, USA

### Abstract

In household-based surveys that include rapid HIV testing services (HTS), passive referral systems that give HIV-positive participants information about how and where to access ART but minimal follow-up support from survey staff may result in suboptimal linkage. In the 2017 Namibia Population-based HIV Impact Assessment (NAMPHIA), we piloted a system of active linkage to care and ART (ALCART) that utilized the infrastructure of existing community-based partner organizations (CBPOs). All HIV-positive participants age 15–64 years not on ART were given standard passive referrals to ART plus the option to participate in ALCART. Cases were assigned to CBPOs in participants' localities. Healthcare workers from the CBPO's contacted cases and facilitated their linkage to facility-based ART. A total of 510 participants were eligible and consented to ALCART. The majority were new diagnoses (80.8%), while the remainder were previously diagnosed but not on ART (19.2%). Of the 510, 473 (92.7%) were successfully linked into care. Of these, all but one initiated ART. Our ALCART system used existing CBPOs and contributed to >90% linkage-to-care and >99% ART-initiation among linked participants in a large, nationally-representative survey. This approach can be used to improve the potential benefits of HTS in other large population-based surveys.

---

**CONTACT** Michael A. Grasso, mikegrassosf@gmail.com, Institute for Global Health Sciences, University of California San Francisco, 550 16th Street, San Francisco, CA 94158, USA.

Disclosure statement

No potential conflict of interest was reported by the author(s).

## Keywords

HIV; home-based HIV testing; linkage to care; treatment; cascade of care; sub-Saharan Africa

---

## Introduction

Population-based surveys that include HIV-related biomarkers are used to monitor trends in HIV epidemics in many high-prevalence settings (UNAIDS & World Health Organization (WHO), 2015). Until recently, such surveys had not returned HIV results to participants (UNAIDS & World Health Organization (WHO), 2015). Although not their primary goal, these surveys present an opportunity for many individual persons to learn their HIV serostatus and, if infected, be referred to antiretroviral-therapy (ART). However, many population-based surveys may lack the capacity to provide supportive referrals to and follow-up on all HIV-positive participants.

An efficient approach to maximizing the benefits of testing and referrals in household-based surveys could be to work with existing Community-based Partner Organizations (CBPOs) that have capacity to perform this work. Rather than attempt to build and fund infrastructure for supportive participant referrals from scratch, potentially duplicating the efforts of other programs, population-based surveys could utilize these existing organizations and leverage resources, infrastructure and expertise of existing CBPOs.

We describe a novel system of active linkages to care and antiretroviral therapy (ALCART) used among some HIV-infected individuals who participated in a large, nationally-representative population-based survey in Namibia in 2017. We also report on the proportion of HIV-infected participants who were linked to care and initiated ART through ALCART.

## Methods

The Namibia population-based HIV impact assessment (NAMPHIA) was a cross-sectional, nationally representative, household-based survey implemented between June and December 2017 (Ministry of Health and Social Services, 2019). A full description of the study design, sampling, eligibility and testing procedures, and findings is available (Ministry of Health and Social Services, 2019). Briefly, residents in randomly selected households were invited to participate then received rapid HIV testing with immediate disclosure of results and post-test counseling (Ministry of Health and Social Services, 2017). A total of 16,934 women and men aged 15–64 were tested as part of NAMPHIA with an estimated HIV prevalence of 12.6% [95% CI: 11.7–13.5] (Ministry of Health and Social Services, 2019).

Those testing HIV-positive were counseled about ART and given referral forms to seek services. According to Namibia's national ART guidelines at the time, all persons living with HIV were eligible to receive ART.

## ALCART

Prior to the survey implementation, CBPOs funded by the Namibian government or the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) to provide community-

based linkages and HIV treatment adherence support were identified. Eight CBPO's and government health clinics agreed to provide ALCART to HIV-positive participants of NAMPHIA. The Ministry of Health and Social Services' (MoHSS) Health Extension Workers/Community Health Workers (HEW/CHW) were used where CBPOs were unavailable. A coordinator was hired by NAMPHIA to oversee ALCART activities.

After the completion of the survey and household-based HIV testing services (HTS), all eligible HIV-positive NAMPHIA participants were offered an optional linkage to HIV treatment (ALCART) and associated consent. Consent to ALCART permitted the voluntary sharing of client contact information for a trained CBPO/HEW (herein referred to as a CBPO) to potentially make a follow-up contact to facilitate linkage to HIV treatment. Eligibility parameters were: Newly HIV diagnosed during NAMPHIA or previously diagnosed but self-reported as not currently on ART (Figure 1). Reasons for non-consent were not collected.

Survey staff uploaded electronic data collected in the field and each week data of ALCART-eligible participants were made available to ALCART staff. Participants were considered priority if they were currently pregnant, under 18 months of age, or had a CD4 count < 200 cells/ $\mu$ L (i.e., evidence of late stage HIV disease). Identification of priority cases helped determine workflow and assignment of cases with an objective of narrowing the time between diagnosis and initial CPBO contact.

## Measures

**Assignment:** NAMPHIA orientation and ALCART trainings were held with each CBPO, including training on the ALCART linkage system and reporting requirements. The ALCART coordinator reviewed and assigned each case to one of eight participating CBPOs based on their geographical coverage area (Table 1).

**Linkage:** The CBPO reached out to the participants for the purpose of linking them to treatment. CBPOs were requested to make up to three attempts within four weeks of receiving information. Documented evidence of failure to contact the participant or refusal by the participant was an indication of no linkage to HIV treatment.

**Initiation of ART:** Assigned cases and linkages had two possible outcomes: Initiated ART (including reinitiation for treatment defaulters) or did not initiate ART. Initiation of ART was verified through verbal confirmation. By design, NAMPHIA did not follow-up on those initiating ART to ensure adherence.

## Ethical clearance

Ethical clearance for NAMPHIA including ALCART was obtained through four ethical reviews boards: Namibia Ministry of Health and Social Services; United States Centers for Disease Control and Prevention; University of California, San Francisco; and Columbia University.

## Results

A total of 2,573 participants tested positive during household-based testing. Of these, 599 (23.3%) were potentially eligible to participate in ALCART and 510 (19.8%) consented and were assigned (Table 2). Among the 510 participants, 412 (80.8%) were new diagnoses and 98 (19.2%) were participants who self-reported previously testing HIV-positive and not on ART. Of the eligible participants, 77 were flagged as priority cases. Approximately 60% of eligible and consenting participants were female (n = 304); the majority (79%) were over the age of 24 years (n = 401), approximately 17% were older adolescents/young adults (15–24 years; n = 85) and less than 5% were aged 14 years and younger (n = 24).

All 510 (100%) were assigned to CBPO's. Four hundred seventy-three (92.7%) participants were linked to care and all but one of the linked participants (n = 472; 99.8%) were reported by the CBPO to have started ART. Among 77 priority cases, 75 (97.4%) were linked to care compared to 398 of 433 non-priority cases (91.9%). All 75 priority cases that were linked to care were reported by the CBPO to have initiated ART.

Ninety-four percent of men (n = 194) and 91.8% of women (n = 279) were linked to care. Among adults aged 25–64 years, 93.8% (n = 376) of participants were linked, 88.2% (n = 75) of participants aged 15–24 years were linked, and 91.7% (n = 22) of participants under the age of 15 years were linked.

Previously diagnosed HIV cases were more likely to be linked (re-engaged) to care compared to new diagnoses. Ninety-five out of 98 known HIV cases (96.9%) were linked to care by CBPOs. Among new diagnoses, 378 out of 412 (91.8%) were linked. All newly diagnosed participants were reported to have initiated ART.

## Discussion

Piloting ALCART in Namibia's nationwide household survey with HIV testing resulted in a high rate of linkage and ART initiation. All eligible and consenting participants were successfully assigned to a CBPO, more than 90% linked into care, and nearly all of those who linked (99.8%) were reported to have initiated ART. These are encouraging findings in support and reflective of Namibia's progress and success toward UNAIDS 90–90–90 targets (Joint United Nations Programme on HIV/AIDS (UNAIDS), 2014). Our findings compare similarly with Namibia's ART program data showing a 90% cumulative linkage rate within 4 weeks of HIV diagnosis (Directorate of Special Programs – Ministry of Health and Social Services, 2017b), suggesting ALCART integrated well into the existing health service system.

## Lessons learned

There were challenges to implementing and interpreting results from ALCART. Some CBPOs expressed initial hesitation to participation citing concerns about additional staff work without added remuneration. These concerns were overcome by: (a) Providing approximate date ranges and volumes of expected referrals; and (b) Highlighting that referred cases may count toward their program targets and caseload. With this information

CBPOs had the opportunity to prepare and staff accordingly. Future surveys should dedicate sufficient efforts to pilot standard operating procedures and logistics.

By design active referrals operated in parallel with the passive referrals. However, neither method independently tracked successful referrals. Therefore, high linkages reported by CBPOs may represent the amalgamation of NAMPHIA participants linked through passive and active referrals. Future research may wish to qualitatively interpret how these methods and other factors influenced high initiation rates.

Although the outcome of interest was linkage and ART initiation, no measurement of time between diagnosis to (re)initiation was systematically tracked. We acknowledge this may appear to have influenced the high rate of linkages reported here. Despite the high linkages, there is opportunity for improvement, particularly as HIV testing programs move toward same day initiation.

The incorporation of ALCART into a large household survey provided additional opportunities to link newly diagnosed and out-of-care participants into care and treatment with minimal resources. The success of ALCART was in large part attributable to the strong collaborative work between CBPOs and health facilities throughout the country. At the backbone of the collaboration is the MoHSS' national Test and Start guidelines implemented from 2016, declaring ART be available immediately and indefinitely to persons testing HIV-positive (Directorate of Special Programs – Ministry of Health and Social Services, 2017a).

It is possible that ALCART under a different name but with similar processes may already be underway in some areas of sub-Saharan Africa. To our knowledge, however, this paper is the first to document these procedures. Although we acknowledge the limitations of our findings, we believe integration of ALCART in other surveys presents an opportunity to improve linkages to care and progress toward ultimately ending new HIV infections.

## Acknowledgements

A special thank you to all of the CBPOs and individuals who participated in ALCART. We also wish to acknowledge Hilma Shipo-Kodi and Lydia Nisbet for their contributions implementing ALCART in Namibia, and Karen Banda and Terthu Shuumbwa for their leadership and supporting role integrating ALCART into the NAMPHIA survey. MG, AM, SS developed the first draft of the paper and provided substantial edits to subsequent versions. NH, TB, DC, DW, NT, SH, KJ, AW, AL reviewed and provided feedback on all versions.

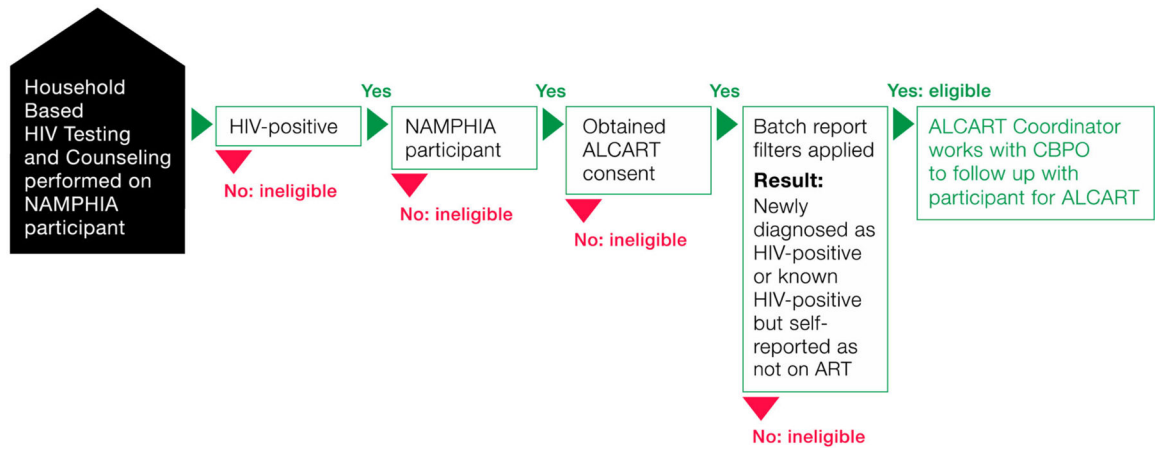
## Funding

This project was supported by the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) through CDC under the terms of cooperative agreement #U2GGH001226. Center for Global Health.

## References

- Directorate of Special Programs – Ministry of Health and Social Services. (2017a). National strategic framework for HIV and AIDS response in Namibia 2017/18 to 2021/22
- Directorate of Special Programs – Ministry of Health and Social Services. (2017b). Quarterly report (unpublished)

- Joint United Nations Programme on HIV/AIDS (UNAIDS). (2014). 90–90–90 An ambitious treatment target to help end the AIDS epidemic [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)
- Ministry of Health and Social Services. (2017). Draft national guidelines on HIV testing services Windhoek.
- Ministry of Health and Social Services. (2019). Namibia population-based HIV Impact assessment (NAMPHIA) 2017: Final report Windhoek.
- UNAIDS, & World Health Organization (WHO). (2015). Monitoring HIV impact using population-based surveys



**Figure 1.**  
Steps to confirm ALCART eligibility and assignment to CBPO.

**Table 1.**

Community-based partner organizations providing ALCART linkage in the Namibia population-based HIV Impact assessment (NAMPHIA).

<b>CBPO name</b>	<b>Regions</b>	<b>Number of persons assigned</b>
Catholic AIDS Action	Omaheke, Karas	60
CHW/MoHSS	Kunene, Hardap, Otjozondjupa	79
Karibib Clinic	Erongo	5
Okahandja CBC	Otjozondjupa	11
Project Hope	Oshikoto, Oshana, Omusati, Kavango West, Kavango East, Zambezi, Khomas	234
Rehoboth HC	Hardap	6
Total Control of the Epidemic	Khomas, Omusati	47
Walvis Bay Corridor Group	Erongo, Ohangwena	68
Total		510



**Table 2.**

Namibia population-based HIV Impact Assessment (NAMPHIA) participants assigned, linked and initiated care through active linkage to care and ART (ALCART).

HIV+ awareness	Total household-based positive	Potentially eligible (% of total)	Consented (% of eligible)	Assigned (% of consented)	Linked (% of assigned)	Initiated ART (% of linked)
Total	2573	599 (23.3%)	510 (85.1%)	510	473 (92.7%)	472 (99.8%)
Diagnosis status						
Newly diagnosed	580 (22.3%)	486 (83.8%)	412 (84.8%)	412 (100%)	378 (91.7%)	378 (100%)
Previously diagnosed <sup>1</sup>	1993 (77.4%)	113 (5.7%)	98 (86.7%)	98 (100%)	95 (96.9%)	94 (98.9%)
Priority status						
Yes	318	96 (30.2%)	77 (80.2%)	77	75 (97.4%)	75 (100%)
No	2255	503 (22.3%)	433 (86.1%)	433	398 (91.9%)	397 (99.7%)
Gender						
Female	1757	353 (20.1%)	304 (86.1%)	304	279 (91.8%)	278 (99.6%)
Male	816	246 (30.1%)	206 (83.7%)	206	194 (94.2%)	194 (100%)
Age category						
0–14 years	134	33 (24.6%)	24 (72.7%)	24	22 (91.7%)	22 (100%)
15–24 years	241	106 (44.0%)	85 (80.2%)	85	75 (88.2%)	75 (100%)
25–44 years	1377	317 (23.0%)	278 (87.7%)	278	262 (94.2%)	262 (100%)
45–64 years	821	143 (17.4%)	123 (86.0%)	123	114 (92.7%)	113 (99.1%)
Locality						
Urban	916	258 (28.2%)	205 (79.5%)	205	196 (95.6%)	196 (100%)
Rural	1657	341 (20.6%)	305 (89.4%)	305	277 (90.8%)	276 (99.6%)

<sup>1</sup> Previously diagnosed = self-reported having tested HIV positive prior to NAMPHIA.