



Published in final edited form as:

*AIDS Behav.* 2021 May ; 25(5): 1518–1531. doi:10.1007/s10461-020-02991-2.

## Overcoming Barriers to HIV Care: Findings from a Peer-Delivered, Community-Based, Linkage Case Management Program (CommLink), Eswatini, 2015–2018

Duncan MacKellar<sup>1</sup>, Daniel Williams<sup>1</sup>, Makhosazana Dlamini<sup>2</sup>, Johnita Byrd<sup>3</sup>, Lenhle Dube<sup>4</sup>, Phumzile Mndzebele<sup>5</sup>, Sikhathele Mazibuko<sup>5</sup>, Ishani Pathmanathan<sup>1</sup>, Endale Tilahun<sup>2</sup>, Caroline Ryan<sup>5</sup>

<sup>1</sup>Division of Global HIV and TB, Center for Global Health, U.S. Centers for Disease Control and Prevention, 1600 Clifton Rd., Atlanta, GA 30329, USA

<sup>2</sup>Population Services International, Mbabane, Eswatini

<sup>3</sup>ICF Macro, Atlanta, GA, USA

<sup>4</sup>Eswatini National AIDS Programme, Eswatini Ministry of Health, Mbabane, Eswatini

<sup>5</sup>U.S. Centers for Disease Control and Prevention, Mbabane, Eswatini

### Abstract

To help persons living with HIV (PLHIV) in Eswatini initiate antiretroviral therapy (ART), the CommLink case-management program provided a comprehensive package of linkage services delivered by HIV-positive, peer counselors. Of 1250 PLHIV participants aged 15 years diagnosed in community settings, 75% reported one or more barriers to care (e.g., fearing stigmatization). Peer counselors helped resolve 1405 (65%) of 2166 identified barriers. During Test and Treat (October 2016–September 2018), the percentage of participants who initiated ART and returned for 1 antiretroviral refills was 92% overall (759/824); 99% (155/156) among participants without any identified barriers; 96% (544/564) among participants whose counselors helped resolve all or all but one barrier; and 58% (59/102) among participants who had 2 unresolved barriers to care. The success of CommLink is attributed, at least in part, to peer counselors who helped their clients avoid or at least temporarily resolve many well-known barriers to HIV care.

---

Duncan MacKellar, dym4@cdc.gov.

**Author Contributions** Conceptualization: DM. Formal analysis: DM, DW, JB. Funding acquisition: CR, MD, DM. Methodology: DM, DW, MD, LD. Project Administration: MD, DW, DM. Resources: MD, CR, DW, DM, LD. Supervision: MD, DW, DM. Validation: DW, DM, JB. Writing—original draft: DM. Writing—review and editing: DM, DW, MD, JB, LD, PM, SM, IP, ET, CR.

**Disclaimer** The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the funding agencies.

**Conflict of interest** The authors declare no conflicts of interest.

**Ethics Approval** CommLink was approved by the Eswatini Ministry of Health and anonymized program data were submitted to and analyzed at CDC under an approved non-research determination.

**Informed Consent** All adult clients and parents or legal guardians of children aged < 15 years who participated in CommLink provided oral informed consent to receive follow-up services in accordance with Eswatini national guidelines.

**Electronic supplementary material** The online version of this article (<https://doi.org/10.1007/s10461-020-02991-2>) contains supplementary material, which is available to authorized users.

## Resumen

Para ayudar a las personas que viven con el VIH (PVVIH) en Eswatini a iniciar la terapia antirretroviral (TARV), el programa de gestión de casos CommLink proporcionó un paquete integral de servicios de la vinculación prestados por consejeros pares VIH positivos. De los 1.250 participantes de las PVVIH de 15 años o más diagnosticados en entornos comunitarios, el 75% informó una o más barreras para la atención (por ejemplo, por temor a la estigmatización). Los consejeros pares ayudaron a resolver 1.405 (65%) de 2.166 barreras identificadas. Durante el período de prueba y tratamiento (octubre de 2016 - septiembre de 2018), el porcentaje de participantes que iniciaron TARV y recibieron 1 recargas antirretroviral fue del 92% en general (759/824); 99% (155/156) entre los participantes sin barreras identificadas; 96% (544/564) entre los participantes cuyos consejeros ayudaron a resolver todas o todas las barreras excepto una; y 58% (59/102) entre los participantes que tenían 2 barreras no resueltas para la atención. El éxito de CommLink se atribuye, al menos en parte, a los consejeros pares que ayudaron a sus clientes a evitar o al menos temporalmente resolver muchas barreras conocidas para la atención del VIH.

## Keywords

Linkage case management; Linkage to HIV care; Barriers to HIV care; Peer-delivered services

---

## Introduction

As part of the 95-95-95 initiative to control the HIV epidemic in sub-Saharan Africa, countries are aiming to diagnose, and initiate and retain on ART 90% of all PLHIV [1]. To help achieve this aim, the World Health Organization (WHO) recommends community-based HIV testing, including testing biologic children and sexual partners of all consenting PLHIV (index testing) [2]. To optimize prevention of HIV transmission and AIDS-related morbidity and mortality, WHO recommends that all PLHIV without contraindications initiate ART within 7 days of diagnosis [3].

Fifteen studies in sub-Saharan Africa, however, suggest that only 18–51% of PLHIV diagnosed in community settings enroll early in HIV care and initiate ART when referral is the only linkage service [4]. Two studies in Eswatini (formerly Swaziland), a country with an estimated HIV prevalence of 27.3% among adults aged 15–49 years, suggest that fewer than one-third of PLHIV diagnosed in community settings enroll in HIV care within 6 months of diagnosis in the absence of linkage services [5-7]. Even under Test and Treat policies in which all persons are eligible to receive ART, low (< 50%) community-to-facility ART initiation rates persist, and exceptionally few community-diagnosed clients initiate ART within 7 days of diagnosis when given only a referral [8-17]. These findings suggest that PLHIV diagnosed in community settings in sub-Saharan Africa are particularly vulnerable to the many barriers to HIV care that have been identified since ART became available [18-29].

To improve linkage to care among PLHIV diagnosed in community settings in Eswatini, we implemented a community-based HIV testing, mobile HIV care, and peer-delivered, linkage case management program (CommLink), based in part, on initial successful outcomes of a

similar program in Tanzania [30, 31]. Like the Tanzanian program, CommLink provided a comprehensive package of U.S. Centers for Disease Control and Prevention (CDC) and WHO recommended linkage services with the objective to enroll 90% of clients in facility-based HIV care within 3 months of diagnosis [30-33]. Although recommended by CDC in 2014 and WHO in 2016, evidence did not exist at the start of CommLink that a peer-delivered case management model providing a comprehensive package of linkage services could help nearly all clients diagnosed in community settings avoid or overcome the diversity of real and perceived barriers that prevent early ART initiation and retention [23, 31, 32].

This paper reports a process and outcome evaluation of CommLink. Processes evaluated include uptake of CDC and WHO recommended linkage services, and the types and frequencies of barriers that peer counselors identified. Outcomes evaluated include ART initiation and receipt of at least one antiretroviral refill at healthcare facilities, by client demographic characteristics, and number of resolved and unresolved barriers to care. Our findings may be important for programs and countries considering the scale up of CDC and WHO recommended linkage services and how these services might be improved to overcome barriers to achieve 90% early ART initiation and retention for PLHIV diagnosed in community settings.

## Methods

In close collaboration with the Eswatini Ministry of Health and CDC, CommLink was implemented by Population Services International (PSI) in the Hhohho, Manzini, and Lubombo regions of Eswatini in two phases of recruitment: Phase I, June 2015–March 2017, and Phase II, April 2017–March 2018. Case management was completed for the last Phase II client in September 2018.

### Phase I

Phase I methods of CommLink has been previously reported [31]. Briefly, CommLink was implemented by two outreach HIV testing teams, each operating with a modified van (mobile unit) in rural and urban catchment areas in the Hhohho and Manzini regions (Fig. 1). Teams included approximately three test counselors, three HIV-positive expert-client (peer) counselors, and a nurse. Peer counselors are an official cadre of the Eswatini Ministry of Health who are trained to provide ART-adherence counseling and supportive services in healthcare facilities [34]. Conducted in accordance with national guidelines, HIV testing was offered to persons encountered at homesteads, worksites, bars, and high-traffic urban locations [35]. Identified PLHIV were introduced to peer counselors for post-test counseling and screening for CommLink eligibility. Consenting PLHIV who had not received HIV care or ART in the prior 90 days were eligible for CommLink. PLHIV who requested referrals to facilities outside of regions where CommLink operated were ineligible to receive case management services but still received point-of-diagnosis medical services and referral (Fig. 1).

In accordance with CDC and WHO recommendations, the CommLink package of linkage services included point-of-diagnosis HIV medical services and peer-delivered counseling, at

least two additional (three total) face-to-face HIV counseling and psychosocial-support sessions, one-time free transportation to a healthcare facility (if requested), escort and treatment navigation services during at least the first healthcare visit, weekly telephone support and appointment reminder calls, and HIV testing of partners and family members [31-33].

Medical services were provided by nurses in mobile units parked at test locations. Services included physical assessment and WHO clinical staging, CD4 cell-count testing, syndromic treatment for sexually transmitted infections, and a 7-day course of cotrimoxazole. National treatment guidelines expanded ART eligibility twice during CommLink, resulting in the following ART-eligibility periods: (1) June 2015–November 2015 (CD4 count < 350/ $\mu$ L); (2) December 2015–September 2016 (CD4 count  $\geq$  500/ $\mu$ L); and (3) October 2016–September 2018 (any CD4 count, Test and Treat). During these periods, community-based ART was not authorized by the Eswatini Ministry of Health and ART was not provided by CommLink nurses.

During follow-up calls and face-to-face counseling sessions, peer counselors reminded clients about upcoming facility appointments; provided psychosocial support, and informational and motivational counseling on early enrollment in HIV care and ART adherence; encouraged and facilitated disclosure and index testing when appropriate and safe; and identified and helped resolve barriers to enrollment and retention in HIV care. Follow-up counseling sessions were provided at healthcare facilities, or at the client's home or other preferred location. For consenting clients, index testing and point-of-diagnosis medical services were offered to the main sexual partner and all family members at or near the client's home.

In Phase II, CommLink expanded to four mobile-clinic outreach teams and provided the same package of services in three of the four regions of Eswatini (Fig. 1). Peer counselors were retrained on the importance of helping clients disclose their HIV-status to partners and family members, and to help provide index testing when appropriate and safe. All Phase I and II clients were managed through enrollment in HIV care and at least the first antiretroviral refill if initiated on ART for up to 90 days. Case management sometimes exceeded 90 days to help ensure clients received refills or needed additional supportive services.

### **Process and Outcome Indicators**

Peer counselors recorded program processes and outcomes on CommLink case-management forms (Supplementary Files). Process indicators included eligibility screening and participation consent of eligible clients (Form 1a in Electronic Supplementary Material); weekly telephone contact calculated from completed telephone logs (Form 1b in Electronic Supplementary Material); receipt of point-of-diagnosis medical services (Form 1c in Electronic Supplementary Material); receipt of HIV-care transportation services, and number of clinic visits during which escort and treatment navigation services were provided (Form 1d in Electronic Supplementary Material); receipt of at least three face-to-face counseling sessions (Form 1d in Electronic Supplementary Material), and counseling on the importance of disclosure and partner and family member testing (Forms 1d and 2 in Electronic

Supplementary Material), and assessment of barriers to enrollment and retention in HIV care (Forms 1d and 3 in Electronic Supplementary Material).

Outcome indicators included disclosure to at least one partner or family member, and index-testing outcomes including participation in CommLink of HIV-positive partners, family members, or associates (e.g., friend) (Form 2 in Electronic Supplementary Material); resolution of identified barriers to enrollment or retention in HIV care (Form 3 in Electronic Supplementary Material); and enrollment in HIV care, ART initiation, and receipt of at least one antiretroviral refill (Form 4 in Electronic Supplementary Material) (Supplementary Files). Barriers to care were considered resolved when peer counselors believed that they no longer interfered with or prevented early enrollment or retention in HIV care. Enrollment in HIV care was defined as having received HIV medical services at least once at a healthcare facility. Enrollment in HIV care, ART initiation, and receipt of antiretroviral refills were abstracted from patient healthcare cards or facility medical records.

### Data Management and Analyses

All data were double-entered into CPro v5.0, routinely evaluated for completeness and logic consistency, and cleaned and validated using program forms or clinic records. Process and outcome indicators are reported as percentages for nominal and ordinal variables, and as medians and interquartile ranges (IQR) for ratio-scaled variables. Prevalence estimates with 95% confidence intervals and statistical tests for group differences were not calculated because CommLink clients were not sampled from a defined population and represent the program population of interest. All data were analyzed using SAS 9.4 (SAS Institute Inc., Cary, NC, USA).

### Human Subjects

CommLink was approved by the Eswatini Ministry of Health and anonymized program data were submitted to and analyzed at CDC under an approved non-research determination. All adult clients and parents or legal guardians of children aged < 15 years who participated in CommLink provided oral informed consent to receive follow-up services in accordance with Eswatini national guidelines [35]. CommLink clients could opt out of specific services and could discontinue the program at any time. Family members and sexual partners of CommLink clients were offered testing only with the consent of CommLink clients.

## Results

### Process Indicators

From June 2015 through March 2018, 1686 PLHIV were identified during CommLink outreach events and index testing. Of these, 1655 (98%) were screened for CommLink eligibility and 294 (18%) were ineligible. Most ineligible PLHIV were currently receiving HIV care (47%), were referred to a healthcare facility outside the operating area (15%), or resided in another country (10%). Of 1361 eligible clients, 1278 (94%) consented to participate. Of consenting clients, 28 (2%) were < 15 years of age and were excluded from analyses. Of clients aged ≥ 15 years, consent rates were similar by sex (men, 95%; women, 93%), age group in years (15–24, 94%; 25–34, 93%; ≥ 35, 95%), and program phase (Phase

I, 92%; Phase II, 96%). Most clients were men, 34 years of age, newly HIV diagnosed, and from rural areas (Table 1).

The 1250 clients aged 15 years received services for a median of 59 days (IQR, 43–79). During this period, nearly all clients received recommended linkage services including point-of-diagnosis HIV care (98%); treatment navigation at healthcare facilities (95%); weekly support calls and appointment reminders (89%); at least three face-to-face counseling sessions (94%); counseling on the importance of disclosure of HIV-status and HIV testing of partners and family members, if needed (99%); and assessment and counseling on real and perceived barriers to HIV care and ART (99%).

Excluding weekly calls, > 90% of clients in all demographic and counselor-client groups received recommended services (Table 1). Although proportionally fewer male (84%) than female counselors (93–94%) either made or documented weekly calls, male counselors contacted 96% of their 545 clients by phone at least five times.

Peer counselors met their clients at 83 different healthcare facilities a median of 2 (IQR, 1–2) times to provide treatment navigation services; 290 (23%) clients were met at facilities 3–5 times. Clients were typically met at healthcare facilities by appointment; 10% requested and were provided transportation to facilities by car one time (Table 1).

Peer counselors identified 2166 enrollment or retention barriers (median, 1; IQR, 1–3) of 1234 clients who received at least one session on barriers to care. The most frequent identified barriers involved being too busy (33%), stigmatization (19%), alcohol use (16%), non-disclosure of HIV status (15%), perceived wellness (14%), partner response (13%), and ART side effects (11%) (Table 2). Although similar proportions of women (26%) and men (25%) had 3 barriers, proportionally more men than women had barriers that involved being too busy, non-disclosure, and alcohol use (Table 2). Proportionally more clients aged 15–24 years (30%) than clients aged 35 years (21%) had 3 barriers, and proportionally more had barriers that involved stigmatization, partner response, perceived wellness, costs, and denial. Proportionally more rural (30%) than urban (16%) clients had 3 barriers, and excluding non-disclosure, proportionally more had most other types of barriers (Table 2).

## Outcome Indicators

**Disclosure and Index Testing**—Of the 1250 clients, 1048 (84%) reported disclosing their HIV status to at least one sexual partner or family member. Proportionally more clients in Phase II than Phase I reported disclosing their HIV-status to a partner or family member [94% (562/598) vs. 75% (486/652)], and had 1 partners, family members, or associates HIV tested through CommLink [41% (245/598) vs. 18% (117/652)]. Of 537 persons tested, 253 (47%) were HIV positive and had not received HIV care in the prior 90 days, 214 of whom were aged 15 years and eligible for CommLink, and 210 (98%) consented to participate.

**Resolving Barriers to HIV Care**—During case management, peer counselors helped resolve 1405 (65%) behaviors overall, and > 60% of barriers across demographic groups except urban clients (50%) (Table 2). Although differences exist across demographic groups,



peer counselors helped resolve proportionally more barriers that involved disrespectful providers, poor medical care, ART side effects, being too busy, and denial, than barriers that involved costs, partner response, prayer, and alcohol use (Table 3).

By the end of case management, peer counselors helped resolve 100% (994/994) of identified barriers of 482 (39%) clients (range of identified barriers per client: 1–10), and 54% (326/605) of identified barriers of 279 clients who had one remaining unresolved barrier (range of identified barriers per client: 1–8). Of the 165 clients who had 2 remaining unresolved barriers, peer counselors helped resolve 15% (85/567) of identified barriers (range of identified barriers per client: 1–11). At the end of case management, 761 identified barriers remained unresolved (median unresolved barriers 0, IQR 0–1), and 279 (23%), 91 (7%), and 74 (6%) clients had 1, 2, 3 unresolved barriers, respectively (Table 2).

**HIV-Care Outcomes**—In all ART-eligibility periods combined, 1215 (97%) clients enrolled in facility-based HIV care a median of 3 days (IQR, 1–7) from HIV diagnosis. Across demographic, diagnostic, and counselor-client groups, nearly all clients enrolled in HIV care, and most initiated ART and received at least one antiretroviral refill during case management (Table 4). The percentage of all clients initiated on ART increased from 66% (90/137) during the CD4 < 350/μL ART-eligibility period, to 81% (235/289) during the CD4 500/μL period and 96% (795/824) during Test and Treat. Of 632 newly diagnosed clients, the median CD4 count at ART initiation increased from 306 (IQR, 203–422) during the CD4 < 350/μL ART-eligibility period to 416 (IQR, 256–628) during Test and Treat.

During Test and Treat, 795 clients initiated ART at a healthcare facility a median of 4 days (IQR: 1–8) after diagnosis [570 (72%) 7 days of diagnosis], and 701 (88%) received ART on the same day as their first facility visit. Of all clients, 90% initiated ART and received at least one antiretroviral refill overall, and across demographic, diagnostic, and counselor-client groups (Table 4). The 759 clients who received an antiretroviral refill returned to a facility a median of 14 days (IQR, 14–16) after ART initiation.

Nearly all clients enrolled in HIV care and received at least one antiretroviral refill, if ART initiated, among those who did not report any barriers, or whose peer counselors helped resolve all or all but one barrier (Table 4). The proportion of clients who initiated ART and received at least one antiretroviral refill decreased with the number of unresolved barriers to care, falling well below 90% for clients with 2 unresolved barriers to care (Table 4).

Of the 1234 clients on whom barriers to care were assessed, 1141 (92%) enrolled in care and received an antiretroviral refill if ART initiated (linked), and 93 (8%) did not enroll in HIV care (n = 28) or did not receive at least one antiretroviral refill, if ART initiated (n = 65) (not linked). Clients who were not linked had proportionally more total identified and unresolved barriers of nearly all types than those who were linked (Table 5). Although peer counselors helped resolve at least some of all types of barriers for clients who were not linked, they resolved proportionally more barriers of each type among those who linked to care (Table 5).

## Discussion

Of 1250 adult PLHIV diagnosed in community settings in Eswatini who participated in CommLink, a peer-delivered, community-based program that provided a comprehensive package of CDC and WHO recommended linkage services, nearly all clients received recommended services and enrolled in HIV care within a few days of participation in the program. During Test and Treat (when all persons are eligible for ART regardless of CD4 count), 90% initiated ART and returned for at least one antiretroviral refill among all demographic groups including men, young adults, clients diagnosed in urban and rural areas, and those who had a counselor of a different gender. Of those initiated on ART, 88% were initiated at their first clinic visit enabling 72% to receive rapid ART (7 days of diagnosis) in accordance with WHO recommendations.

CommLink findings are consistent with those from a similar program in Tanzania that enrolled in HIV care 93% of 4206 clients within three months of diagnosis [30]. Outcomes from these two peer-delivered, linkage case management programs stand in contrast to studies in sub-Saharan Africa including two from Eswatini suggesting that in the absence of linkage services, only a minority of persons diagnosed in community settings enroll early in HIV care, exceptionally few receive ART within 7 days of diagnosis, and that many delay their enrollment in care for years [4-17]. Notably, in one study conducted in Lesotho, after consenting participants were initiated and provided a 30-day supply of ART in their homes, but no other linkage service except counseling and referral, only 69% obtained an antiretroviral refill at a healthcare facility within three months of initiation [13]. The importance of helping newly diagnosed PLHIV avoid or resolve barriers to care as soon as possible is underscored by the findings in one report that mortality one year after HIV diagnosis increases with the number of barriers to care identified at diagnosis [29].

Three-quarters of CommLink clients disclosed a variety of well-known real and perceived barriers to HIV care [18-29]. Having too many responsibilities at work or to care for family members, concerns about loss of confidentiality and stigmatization, excessive alcohol use, fear of partner response or loss, and perceived wellness and low perceived need for immediate care were the most frequently reported barriers. Proportionally more young adults and those from rural areas had 3 barriers to care, and the frequency of several types of barriers varied by age group, sex, and urban/rural residence. As reported elsewhere, these variations in barriers to care underscore the need for client-centered counseling and differentiated services to meet diverse individual needs and circumstances [2, 3, 18-29, 33].

Over an average 2-month case-management period, CommLink peer counselors helped resolve 65% of over 2000 identified barriers, and the 61% of clients whom they helped resolve all or all but one barrier were nearly equally as likely to initiate ART and return for an antiretroviral refill (94–97%) during Test and Treat, as those who had no identified barriers to care (99%). Excluding alcohol use, CommLink peer counselors helped resolve more than 60% of all types of identified barriers, and at least half of identified barriers across demographic groups.



As a client-centered program based on strong client-counselor relationships, CommLink peer counselors focused on understanding their client's circumstances, and used their personal experiences living with HIV to help clients cope with their diagnosis, plan when and how to tell sex partners and family members when appropriate and safe, and enroll in and navigate HIV care and adhere to ART [2, 32, 33]. Encouragingly, gender differences between peer counselors and clients did not affect uptake of services and enrollment in HIV care. Most peer counselors had extensive experience working as ART-adherence counselors in healthcare facilities and were keenly motivated to help their clients. During their initial session, peer counselors routinely disclosed their HIV status to clients and showed their own treatment cards emphasizing that living successfully with HIV is not only possible but normal. They re-assured clients that they had someone to call upon whenever they needed help as they cope with the considerable individual, social, and medical implications of HIV diagnosis.

Although CommLink findings are encouraging, in the absence of a contemporary control group, resolution of identified barriers to care and near universal ART initiation and return for antiretroviral refill cannot be directly attributed to CommLink services, including peer-delivered, linkage case management. Given the consistent low uptake of HIV care among community-diagnosed clients and well-known diversity of barriers to care, however, it is likely that the package of recommended services helped many clients avoid or resolve barriers, and enroll in and return for HIV care [4-29].

In addition to peer counselors, CommLink clients received psychosocial and informational support from HIV test counselors and nurses who delivered consistent messages about the importance of early enrollment in care and ART initiation, and guidance on which facilities might be best for their circumstances. Receiving point-of-diagnosis medical services in the community reinforced messages on the importance of immediate care and likely helped motivate some clients to enroll early in facility-based care. Regular telephone follow-up was fundamental for building strong client-counselor relationships, and enabled peer counselors to coordinate treatment navigation at facilities, help manage treatment side effects, and assess disclosure and index-testing plans. Regular calls, often initiated by clients, helped provide real-time support when questions, adverse experiences, and fears emerged.

To ensure all clients were knowledgeable and reasonably comfortable in receiving care and ART, peer counselors stayed with their client for the duration of at least their first facility visit and most met their clients at subsequent visits. As part of treatment navigation, they introduced clients to facility-based ART adherence counselors and healthcare staff, and ensured they understood the stations and sequence of care, and when and how best to access care at specific facilities. Peer counselors also provided adherence counseling for cotrimoxazole and ART, and helped to affect transfers to other facilities when needed. The presence of peer counselors not only helped avoid or mitigate adverse experiences, but improved ART access as some providers had more confidence in prescribing ART on the first clinic visit because they knew patients had a dedicated case manager who provided adherence support for up to 90 days. The support from the Eswatini Ministry of Health was fundamental to the success of the program by requesting all healthcare staff support new treatment-navigation services provided by community peer counselors.

Finally, peer counselors played an important role in helping clients disclose their HIV status, and test over 500 partners, family members, and associates. Non-disclosure of HIV status is a particularly important barrier to enrollment and retention in HIV care, and testing partners and family members is essential for enabling effective treatment support for all PLHIV family members [2, 19-28, 33]. Encouragingly, reported disclosure to partners or family members increased from Phase I (75%) to Phase II (94%), suggesting that our focus on resolving this specific barrier may have been effective.

Nonetheless, many CommLink clients (16%) had not disclosed their HIV status to any partners or family members, and by the end of case management, nondisclosure and concerns about partner response or loss were among the most frequent unresolved barriers of those not linked to care. Not surprisingly, peer counselors were not able to help resolve all barriers for all clients, and they resolved few barriers (27%) among the 93 clients who were not linked to HIV care, suggesting that an important minority of clients (8%) were not helped by the comprehensive package of services. Our findings that clients not linked to care had more total and unresolved barriers to care of each type compared with those who linked affirms one report that it is the number of barriers, rather than barriers of a specific type, that is most predictive of not enrolling or remaining in HIV care [29].

Further research is needed to assess how services might be improved to meet the linkage needs of all clients. Barriers that peer counselors were less successful in helping resolve involved alcohol use, strong religious beliefs, partner response or loss, and costs associated with transportation or lost work. These findings suggest that peer counselors may need to provide or coordinate additional services from available substance-use, social-support, church, or other programs to address these specific client needs.

Findings from CommLink are subject to at least five limitations not already described. First, although counselors used a standard instrument to measure 12 different barriers to care, the total and median number of identified barriers is likely an underestimate because the number of *avoided* barriers cannot be estimated in the absence of a control group. Clients are likely to report more barriers that would otherwise have been avoided if they were provided a comprehensive average 2-month package of linkage services from the point of diagnosis. Second, peer counselors exercised their own judgement in determining when identified barriers were resolved and the validity of their judgement for each individual barrier is unknown. Importantly, resolved barriers in this report are restricted to the case management period only and are *not* assumed to be extinguished. Barriers to HIV care likely emerge, intensify, resolve, and can re-emerge over time as individual circumstances change [18-29]. Third, although the peer-delivered, linkage case management program in Tanzania achieved similar results as CommLink, the generalizability of our findings to other populations is unclear [30]. A comprehensive package of peer-delivered linkage services may be less effective when important structural, policy, or societal barriers exist. In Eswatini, decentralized HIV care was available throughout rural and urban areas during CommLink, and the Ministry of Health recommended ART initiation at the first clinic visit in 2015, 2 years before WHO [3, 35].

Finally, while it is reassuring that nearly all CommLink clients received at least one antiretroviral refill if initiated on ART, longer-term retention on ART is unknown. Although avoiding or resolving barriers to care soon after diagnosis may promote retention on ART, one-third of CommLink clients who linked to care had one or more unresolved barriers and may thus be at higher risk from defaulting from ART. Findings from a study on the cost-effectiveness of CommLink compared with standard linkage services on ART initiation and retention at 12 months and longer, including risk of defaulting from care among CommLink clients with unresolved barriers, will be reported in 2021.

## Conclusions

Providing a comprehensive package of CDC and WHO recommended services, built on a peer-delivered, linkage case management model, helped > 90% of adult clients diagnosed in community settings in Eswatini initiate ART at a healthcare facility and return for at least one antiretroviral refill. The success of the program is attributed, at least in part, to HIV-positive peer counselors who helped their clients avoid or overcome many well-known barriers to care. To strengthen client-centered services and improve early ART initiation and retention, HIV prevention and treatment programs should consider routinely monitoring and evaluating resolved and unresolved barriers to HIV care as part of standard counseling and psychosocial-support services. In 2019, the Eswatini Ministry of Health adopted linkage case management as standard of care for clients diagnosed in both facility and community settings, and PSI with the support of CDC expanded CommLink services to all four regions in Eswatini [36]. The U.S. President's Emergency Plan for AIDS Relief recommends peer-delivered linkage case management, including routine assessment and resolution of barriers to HIV care, as a potential solution that countries should consider as part of differentiated care models to help achieve 95-95-95 [37].

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

## Acknowledgements

The authors extend their deepest gratitude to the Eswatini National AIDS Programme and Regional Health Management Teams for their support of CommLink, as well as the excellent access and collaborative spirit of medical staff at government healthcare facilities. The authors recognize and profoundly appreciate the critical contributions of PSI CommLink peer counselors, linkage coordinators, and PSI Eswatini staff whose commitment and dedication to client services are responsible for the superb achievements of the program.

**Funding** This research was supported by the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) through the U.S. Centers for Disease Control and Prevention under the terms of cooperative agreement NU2GGH001935-01.

## References

1. Joint United Nations Programme on HIV/AIDS. Fast-track: ending the AIDS epidemic by 2030. Geneva: Joint United Nations Programme on HIV/AIDS; 2014.
2. World Health Organization. Consolidated guidelines on HIV testing services for a changing epidemic. Geneva: World Health Organization; 2016.

3. World Health Organization. Guidelines for managing advanced HIV disease and rapid initiation of antiretroviral therapy, July 2017. Geneva: World Health Organization; 2017.
4. Sharma M, Ying R, Tarr G, Barnabas R. Systematic review and meta-analysis of community and facility-based HIV testing to address linkage to care gaps in sub-Saharan Africa. *Nature*. 2015;528:S77–S85. [PubMed: 26633769]
5. Joint United Nations Programme on HIV/AIDS. Eswatini country overview. Geneva: Joint United Nations Programme on HIV/AIDS; 2018.
6. Parker LA, Jobanputra K, Rusike L, Mazibuko S, Okello V, Kerschberger B, et al. Feasibility and effectiveness of two community-based HIV testing models in rural Swaziland. *Trop Med Int Health*. 2015. 10.1111/tmi.12501.
7. MacKellar DA, Williams D, Storer N, Okello V, Azih C, Drummond J, et al. Enrollment in HIV care two years after HIV diagnosis in the Kingdom of Swaziland: an evaluation of a national program of new linkage procedures. *PLoS ONE*. 2016. 10.1371/journal.pone.0150086.
8. Iwuji CC, Orne-Gliemann J, Larmarange J, Okesola N, Tanser F, Thiebaut R, et al. Uptake of home-based HIV testing, linkage to care, and community attitudes about ART in rural KwaZulu-Natal, South Africa: descriptive results from the first phase of the ANRS 12249 TasP cluster-randomised trial. *PLoS Med*. 2016;13:e1002107. [PubMed: 27504637]
9. Maheu-Giroux M, Tanser F, Boilye MC, Pillay D, Joseph SA, Barnighausen T. Determinants of time from HIV infection to linkage-to-care in rural KwaZulu-Natal, South Africa. *AIDS*. 2017;31:1017–24. [PubMed: 28252526]
10. Hayes R, Floyd S, Schaap A, Shanaube K, Bock P, Sabapathy K, et al. A universal testing and treatment intervention to improve HIV control: one-year results from intervention communities in Zambia in the HPTN 071 (PopART) cluster-randomised trial. *PLoS Med*. 2017;14:e1002292. 10.1371/journal.pmed.1002292. [PubMed: 28464041]
11. Haber N, Tanser F, Bor J, Naidu K, Mutevedzi T, Herbst K, et al. From HIV infection to therapeutic response: a population-based longitudinal HIV cascade-of-care study in KwaZulu-Natal, South Africa. *Lancet HIV*. 2017;4:e223–e230. [PubMed: 28153470]
12. Ruzagira E, Baisley K, Kamali A, Biraro S, Grosskurth H. Linkage to HIV care after home-based HIV counseling and testing in sub-Saharan Africa: a systematic review. *Trop Med Int Health*. 2017;22:807–21. [PubMed: 28449385]
13. Labhardt ND, Ringera I, Lejone TI, Klimkait T, Muhairwe J, Amstutz A, et al. Effect of offering same-day ART vs usual health facility referral during home-based HIV testing on linkage to care and viral suppression among adults with HIV in Lesotho. The CASCADE randomized clinical trial. *JAMA*. 2018;319:1103–12. [PubMed: 29509839]
14. Rentsch CT, Wringe A, Machecha R, Michael D, Urassa M, Todd J, et al. Linkage to care and antiretroviral therapy initiation by testing modality among individuals newly diagnosed with HIV in Tanzania, 2014–2017. *Trop Med Int Health*. 2018. 10.1111/tmi.13153.
15. Sabapathy K, Hensen B, Varsaneux O, Floyd S, Fidler S, Hayes R. The cascade of care following community-based detection of HIV in sub-Saharan Africa—a systematic review with 90-90-90 targets in sight. *PLoS ONE*. 2018;13:e0200737. [PubMed: 30052637]
16. Baisley KJ, Seeley J, Siedner MJ, Koole K, Matthews P, Tanser F, et al. Findings from home-based HIV testing and facilitated linkage after scale-up of test and treat in rural South Africa: young people still missing. *HIV Med*. 2019;20:704–8. [PubMed: 31454139]
17. Maughan-Brown B, Beckett S, Kharsany ABM, Cawood C, Khanyile D, Lewis L, et al. Poor rates of linkage to HIV care and uptake of treatment after home-based HIV testing among newly diagnosed 15–49 year-old men and women in a high HIV prevalence setting in South Africa. *AIDS Care*. 2020;9:1–10.
18. Fagan JL, Beer L, Garland P, Valverde E, Courogen M, Hillman D, et al. The influence of perceptions of HIV infection, care, and identity on care entry. *AIDS Care*. 2012;24:737–46. [PubMed: 22148942]
19. Govindasamy D, Ford N, Kranzer K. Risk factors, barriers and facilitators for linkage to antiretroviral therapy care: a systematic review. *AIDS*. 2012;26:2059–67. [PubMed: 22781227]

20. Hodgson I, Plummer ML, Konopka SN, Colvin CJ, Jonas E, Albertini J, et al. A systematic review of individual and contextual factors affecting art initiation, adherence, and retention for HIV-infected pregnant and postpartum women. *PLoS ONE*. 2014;9(11):e111421. [PubMed: 25372479]
21. Layer EH, Kennedy CE, Beckham SW, Mbwambo JK, Likindikoki S, Davis WW, et al. Multi-Level factors affecting entry into and engagement in the HIV continuum of care in Iringa, Tanzania. *PLoS ONE*. 2014;9:e104961. [PubMed: 25119665]
22. Ostermann J, Pence B, Whetten K, Yaob J, Itembag D, Maroh V, et al. HIV serostatus disclosure in the treatment cascade: evidence from northern Tanzania. *AIDS Care*. 2015;27:59–64.
23. Genberg BL, Shangani S, Sabatino K, Rachlis B, Wachira J, Braitstein P, et al. Improving engagement in the HIV care cascade: a systematic review of interventions involving people living with HIV/AIDS as peers. *AIDS Behav*. 2016. 10.1007/s10461-016-1307-z.
24. Ware NC, Wyatt MA, Asimwe S, Turyamureeba B, Tumwesigye E, van Rooyen H, et al. How home HIV testing and counselling with follow-up support achieves high testing coverage and linkage to treatment and prevention: a qualitative analysis from Uganda. *J Int AIDS Soc*. 2016;19:20929. [PubMed: 27357495]
25. Mavegam BO, Pharr JR, Cruz P, Ezeanolue EE. Effective interventions to improve young adults' linkage to HIV care in sub-Saharan Africa: a systematic review. *AIDS Care*. 2017;29:1198–204. 10.1080/09540121.2017.1306637. [PubMed: 28325077]
26. Tucker JD, Tso LS, Hall B, Ma Q, Beanland R, Best J, et al. Enhancing public health HIV interventions: a qualitative meta-synthesis and systematic review of studies to improve linkage to care, adherence, and retention. *EBioMedicine*. 2017;17:163–71. [PubMed: 28161401]
27. Naik R, Zembe W, Adigun F, Jackson E, Tabana H, Jackson D, et al. What influences linkage to care after home-based HIV counseling and testing? *AIDS Behav*. 2018;22:722–32. [PubMed: 28643242]
28. Maughan-Brown B, Harrison A, Galárraga O, Kuo C, Smith P, Bekker LG, et al. Factors affecting linkage to HIV care and ART initiation following referral for ART by a mobile health clinic in South Africa: evidence from a multimethod study. *J Behav Med*. 2019;42:883–97. [PubMed: 30635862]
29. Bassett IV, Coleman SM, Giddy J, Bogart LM, Chaisson CE, Ross D, et al. Barriers to care and 1-year mortality among newly diagnosed HIV-Infected people in Durban, South Africa. *J Acquir Immune Defic Syndr*. 2017;74:432–8. [PubMed: 28060226]
30. MacKellar D, Maruyama H, Rwabiyago OE, Steiner C, Cham H, Msumi O, et al. Implementing the package of CDC and World Health Organization recommended linkage services: methods, outcomes, and costs of the Bukoba Tanzania Combination Prevention Evaluation peer-delivered, linkage case management program, 2014–2017. *PLoS ONE*. 2018;13:e0208919. [PubMed: 30543693]
31. MacKellar D, Williams D, Bhembe B, Dlamini M, Byrd J, Dube L, et al. Peer-delivered linkage case management and same-day ART initiation for men and young persons with HIV infection—Eswatini, 2015–2017. *MMWR Morb Mortal Wkly Rep*. 2018;67:663–7. [PubMed: 29902168]
32. Centers for Disease Control and Prevention, Health Resources and Services Administration, National Institutes of Health, American Academy of HIV Medicine, Association of Nurses in AIDS Care, International Association of Providers of AIDS Care, National Minority AIDS Council, and Urban Coalition for HIV/AIDS Prevention Services. Recommendations for HIV prevention with adults and adolescents with HIV in the United States, 2014: Summary for Clinical Providers, 2014.
33. World Health Organization. Consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection Recommendations for a public health approach. Geneva: World Health Organization; 2016.
34. Swaziland Ministry of Health. Kingdom of Swaziland national expert client program participant's training manual. Mbabane: Eswatini Ministry of Health; 2012.
35. Kingdom of Swaziland Ministry of Health. Swaziland integrated HIV management guidelines. Mbabane: Swaziland Ministry of Health; 2015.
36. Eswatini Ministry of Health National AIDS Program. HIV linkage case management standard operating procedures. Mbabane: Eswatini Ministry of Health National AIDS Program; 2018.

37. United States President's Emergency Plan for AIDS Relief. PEPFAR solutions platform. Washington, DC: United States President's Emergency Plan for AIDS Relief; 2018.

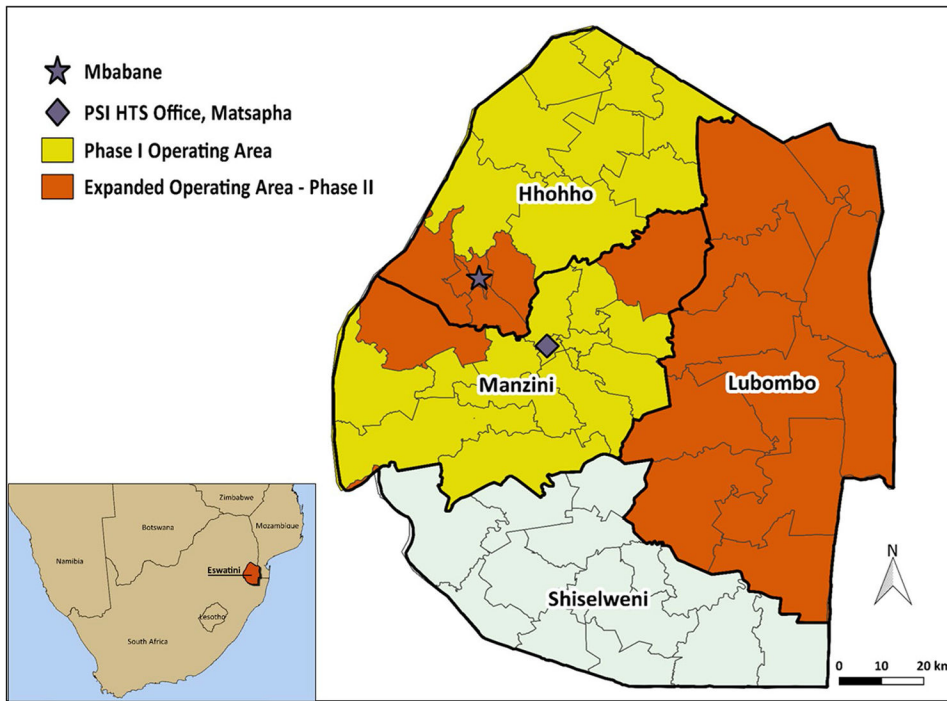
Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript





**Fig. 1.** Eswatini CommLink Operating Areas. Phase I, June 2015–March 2017, and Phase II, April 2017–September 2018

**Table 1**  
Uptake of CommLink services, by client characteristics, Eswatini, June 2015–September 2018

| Characteristics                     | CommLink clients n | HIV care services <sup>a</sup> n (%) | Transport services <sup>b</sup> n (%) | Treatment navigation <sup>c</sup> n (%) | Weekly tele contact <sup>d</sup> n (%) | Counseling sessions <sup>e</sup> n (%) | Disclosure/ICT counseling <sup>f</sup> n (%) | Barriers counseling <sup>g</sup> n (%) |
|-------------------------------------|--------------------|--------------------------------------|---------------------------------------|---|--|--|--|--|
| Total                               | 1250               | 1222 (98)                            | 124 (10)                              | 1188 (95)                               | 1108 (89)                              | 1172 (94)                              | 1234 (99)                                    | 1234 (99)                              |
| ART-eligibility period <sup>h</sup> |                    |                                      |                                       |   |  |  |  |  |
| Jun 2015–Nov 2015 (CD4 < 350/μL)    | 137                | 123 (90)                             | 10 (7)                                | 117 (85)                                | 102 (74)                               | 115 (84)                               | 131 (96)                                     | 132 (96)                               |
| Dec 2015–Sep 2016 (CD4 500/μL)      | 289                | 285 (99)                             | 20 (7)                                | 284 (98)                                | 248 (86)                               | 273 (94)                               | 281 (97)                                     | 280 (97)                               |
| Oct 2016–Sep 2018 (Test and Treat)  | 824                | 814 (99)                             | 94 (11)                               | 787 (96)                                | 758 (92)                               | 784 (95)                               | 822 (100)                                    | 822 (100)                              |
| Sex                                 |                    |                                      |                                       |   |  |  |  |  |
| Men                                 | 699                | 682 (98)                             | 66 (9)                                | 665 (95)                                | 617 (88)                               | 651 (93)                               | 687 (98)                                     | 688 (98)                               |
| Women                               | 551                | 540 (98)                             | 58 (11)                               | 523 (95)                                | 491 (89)                               | 521 (95)                               | 547 (99)                                     | 546 (99)                               |
| Age group (years)                   |                    |                                      |                                       |   |  |  |  |  |
| 15–24                               | 207                | 202 (98)                             | 23 (11)                               | 195 (94)                                | 184 (89)                               | 193 (93)                               | 204 (99)                                     | 204 (99)                               |
| 25–34                               | 541                | 526 (97)                             | 52 (10)                               | 513 (95)                                | 478 (88)                               | 505 (93)                               | 534 (99)                                     | 535 (99)                               |
| 35                                  | 502                | 494 (98)                             | 49 (10)                               | 480 (96)                                | 446 (89)                               | 474 (94)                               | 496 (99)                                     | 495 (99)                               |
| Diagnostic status                   |                    |                                      |                                       |   |  |  |  |  |
| New <sup>i</sup>                    | 727                | 704 (97)                             | 74 (10)                               | 681 (94)                                | 625 (86)                               | 676 (93)                               | 713 (98)                                     | 714 (98)                               |
| Prior, out-of-care <sup>j</sup>     | 523                | 518 (99)                             | 50 (10)                               | 507 (97)                                | 483 (92)                               | 496 (95)                               | 521 (100)                                    | 520 (99)                               |
| Outreach setting <sup>k</sup>       |                    |                                      |                                       |   |  |  |  |  |
| Urban                               | 420                | 413 (98)                             | 38 (9)                                | 404 (96)                                | 354 (84)                               | 389 (93)                               | 409 (97)                                     | 409 (97)                               |
| Rural                               | 830                | 809 (97)                             | 86 (10)                               | 784 (94)                                | 754 (91)                               | 783 (94)                               | 825 (99)                                     | 825 (99)                               |
| Counselor-client dyad               |                    |                                      |                                       |   |  |  |  |  |
| Female–male                         | 404                | 392 (97)                             | 34 (8)                                | 390 (97)                                | 370 (92)                               | 376 (93)                               | 398 (99)                                     | 397 (98)                               |
| Female–female                       | 301                | 292 (97)                             | 24 (8)                                | 284 (94)                                | 281 (93)                               | 285 (95)                               | 300 (100)                                    | 298 (99)                               |
| Male–female                         | 250                | 248 (99)                             | 34 (14)                               | 239 (96)                                | 210 (84)                               | 236 (94)                               | 247 (99)                                     | 248 (99)                               |
| Male–male                           | 295                | 290 (98)                             | 32 (11)                               | 275 (93)                                | 247 (84)                               | 275 (93)                               | 289 (98)                                     | 291 (99)                               |

Tele telephone, HIV human immunodeficiency virus, ART antiretroviral therapy, ICT (index testing) HIV testing of sexual partners and family members of CommLink clients

<sup>a</sup>Point-of-diagnosis clinical assessment, CD4 + T-cell count testing, screening and treatment for sexually transmitted infections, and 7-day supply of cotrimoxazole preventive therapy

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

- b* By project vehicle from the client’s home, testing outreach point, or other community location to a healthcare facility one time at no cost to the client
- c* Accompanied by CommLink peer counselor for the duration of at least one HIV-care facility visit. Peer counselors provided psychosocial support and counseling on the location and content of HIV-care services
- d* Spoke with peer counselor, on average, once per week by phone during case management [median (interquartile range) interval in days: 59 (43–79)]
- e* Received at least three face-to-face counseling sessions including at the point of diagnosis and at two subsequent times during case management. Follow-up sessions could occur at healthcare facilities, homes, or other community locations
- f* At least one session dedicated to counseling on the importance of HIV-status disclosure to and HIV testing of sexual partners and family members when appropriate and safe; offered CommLink index testing services, and if accepted, helped clients plan how partners and family members would be notified and offered HIV testing
- g* At least one session dedicated to assessment and mitigation of real and perceived barriers to HIV care. Counselors used a standard instrument to identify barriers to enrollment and retention in HIV care
- h* Changes in national ART polices based on CD4 count; Test and Treat = ART for all HIV-positive persons regardless of CD4 count
- i* Diagnosed with HIV infection for the first time based on the Eswatini national rapid HIV testing algorithm
- j* Prior, out-of-care = received a prior HIV diagnosis and either never enrolled in HIV care or had not received HIV care, including ART, in the prior 90 days
- k* Settings where CommLink testing services were offered included homesteads, worksites, bars, and high-traffic locations such as near markets and bus stops

**Table 2**  
Total identified, resolved, and unresolved barriers to enrollment and retention in HIV care, by CommLink client characteristics, Eswatini, June 2015–September 2018

| Enrollment and retention barriers                   | Clients <sup>a</sup><br>(n = 1234) | Sex              |                    | Age group years    |                    |                 | Location           |                    |
|---|------------------------------------|------------------|--------------------|--------------------|--------------------|-----------------|--------------------|--------------------|
|   |                                    | Men<br>(n = 688) | Women<br>(n = 546) | 15–24<br>(n = 204) | 25–34<br>(n = 535) | 35<br>(n = 495) | Urban<br>(n = 409) | Rural<br>(n = 825) |
| Total   | 2166                               | 1186             | 980                | 399                | 961                | 806             | 551                | 1615               |
| Median (IQR)  | 1 (1–3)                            | 1 (1–2.5)        | 1 (0–3)            | 1 (1–3)            | 1 (1–3)            | 1 (0–2)         | 1 (0–2)            | 2 (1–3)            |
| Identified barriers [no. (%) of clients]            |                                    |                  |                    |                    |                    |                 |                    |                    |
| 0   | 308 (25)                           | 160 (23)         | 148 (27)           | 50 (25)            | 125 (23)           | 133 (27)        | 137 (33)           | 171 (21)           |
| 1–2   | 614 (50)                           | 356 (52)         | 258 (47)           | 93 (46)            | 264 (49)           | 257 (52)        | 208 (51)           | 406 (49)           |
| 3   | 312 (25)                           | 172 (25)         | 140 (26)           | 61 (30)            | 146 (27)           | 105 (21)        | 64 (16)            | 248 (30)           |
| Type [no. (%) of clients]                           |                                    |                  |                    |                    |                    |                 |                    |                    |
| Too busy <sup>b</sup>                               | 407 (33)                           | 263 (38)         | 144 (26)           | 55 (27)            | 189 (35)           | 163 (33)        | 107 (26)           | 300 (36)           |
| Concerned about stigma <sup>c</sup>                 | 229 (19)                           | 115 (17)         | 114 (21)           | 54 (26)            | 104 (19)           | 71 (14)         | 47 (11)            | 182 (22)           |
| Excessive alcohol use                               | 193 (16)                           | 133 (19)         | 60 (11)            | 14 (7)             | 84 (16)            | 95 (19)         | 28 (7)             | 165 (20)           |
| Non-disclosure <sup>d</sup>                         | 189 (15)                           | 123 (18)         | 66 (12)            | 26 (13)            | 95 (18)            | 68 (14)         | 109 (27)           | 80 (10)            |
| Perceived wellness <sup>e</sup>                     | 170 (14)                           | 86 (13)          | 84 (15)            | 39 (19)            | 81 (15)            | 50 (10)         | 43 (11)            | 127 (15)           |
| Fears response from or loss of partner <sup>f</sup> | 156 (13)                           | 69 (10)          | 87 (16)            | 37 (18)            | 79 (15)            | 40 (8)          | 24 (6)             | 132 (16)           |
| ART has side effects or is ineffective <sup>g</sup> | 137 (11)                           | 64 (9)           | 73 (13)            | 24 (12)            | 64 (12)            | 49 (10)         | 25 (6)             | 112 (14)           |
| Costs are too high <sup>h</sup>                     | 117 (9)                            | 48 (7)           | 69 (13)            | 33 (16)            | 40 (7)             | 44 (9)          | 22 (5)             | 95 (12)            |
| Denies having HIV <sup>i</sup>                      | 97 (8)                             | 45 (7)           | 52 (10)            | 28 (14)            | 39 (7)             | 30 (6)          | 11 (3)             | 86 (10)            |
| HIV-care providers are disrespectful                | 81 (7)                             | 32 (5)           | 49 (9)             | 18 (9)             | 26 (5)             | 37 (7)          | 12 (3)             | 69 (8)             |
| Quality of HIV care is Poor <sup>j</sup>            | 69 (6)                             | 37 (5)           | 32 (6)             | 12 (6)             | 31 (6)             | 26 (5)          | 11 (3)             | 58 (7)             |
| Believes in traditional medicine                    | 32 (3)                             | 22 (3)           | 10 (2)             | 0                  | 18 (3)             | 14 (3)          | 8 (2)              | 24 (3)             |
| Believes prayer can prevent or cure AIDS            | 22 (2)                             | 11 (2)           | 11 (2)             | 2 (1)              | 8 (1)              | 12 (2)          | 7 (2)              | 15 (2)             |
| Other   | 267 (22)                           | 138 (20)         | 129 (24)           | 57 (28)            | 103 (19)           | 107 (22)        | 97 (24)            | 170 (21)           |
| Resolved and unresolved barriers                    |                                    |                  |                    |                    |                    |                 |                    |                    |

| Enrollment and retention barriers                            | Clients <sup>a</sup><br>(n = 1234) | Sex              |                    | Age group, years   |                    |                 | Location           |                    |
|--|------------------------------------|------------------|--------------------|--------------------|--------------------|-----------------|--------------------|--------------------|
|  |                                    | Men<br>(n = 688) | Women<br>(n = 546) | 15–24<br>(n = 204) | 25–34<br>(n = 535) | 35<br>(n = 495) | Urban<br>(n = 409) | Rural<br>(n = 825) |
| Resolved barriers <sup>k</sup> [no. (%) of total barriers]   | 1405 (65)                          | 730 (62)         | 675 (69)           | 276 (69)           | 586 (61)           | 543 (67)        | 274 (50)           | 1131 (70)          |
| Unresolved barriers <sup>l</sup> [no. (%) of total barriers] | 761 (35)                           | 456 (38)         | 305 (31)           | 123 (31)           | 375 (39)           | 263 (33)        | 277 (50)           | 484 (30)           |
| Unresolved barriers [median (IQR)]                           | 0 (0–1)                            | 0 (0–1)          | 0 (0–1)            | 0 (0–1)            | 0 (0–1)            | 0 (0–1)         | 0 (0–1)            | 0 (0–1)            |
| Barriers [no. (%) of clients] <sup>m</sup>                   |                                    |                  |                    |                    |                    |                 |                    |                    |
| No barriers identified                                       | 308 (25)                           | 160 (23)         | 148 (27)           | 50 (25)            | 125 (23)           | 133 (27)        | 137 (33)           | 171 (21)           |
| All identified barriers resolved                             | 482 (39)                           | 262 (38)         | 220 (40)           | 82 (40)            | 199 (37)           | 201 (41)        | 111 (27)           | 371 (45)           |
| 1 unresolved barrier   | 279 (23)                           | 172 (25)         | 107 (20)           | 48 (24)            | 125 (23)           | 106 (21)        | 101 (25)           | 178 (22)           |
| 2 unresolved barriers  | 91 (7)                             | 51 (7)           | 40 (7)             | 15 (7)             | 44 (8)             | 32 (6)          | 35 (9)             | 56 (7)             |
| 3 unresolved barriers  | 74 (6)                             | 43 (6)           | 31 (6)             | 9 (4)              | 42 (8)             | 23 (5)          | 25 (6)             | 49 (6)             |

HIV/human immunodeficiency virus, IQR interquartile range, ART antiretroviral therapy, AIDS acquired immunodeficiency syndrome

<sup>a</sup>Barriers to care were assessed on 1234 (99%) of 1250 participants

<sup>b</sup>Too busy with work, family, or other responsibilities to enroll or remain in HIV care

<sup>c</sup>Fears loss of confidentiality and stigma when visiting healthcare facilities

<sup>d</sup>Did not disclose HIV status to any sexual partners or family members during case management

<sup>e</sup>Does not believe enrolling in HIV care and ART is needed because of perceived good health and wellbeing

<sup>f</sup>Fears lack of support, violence, or separation from spouse or sexual partner

<sup>g</sup>Believes ART has severe side effects or is ineffective

<sup>h</sup>Believes transportation costs or costs from loss of work will be too high

<sup>i</sup>Believes that the HIV test results were wrong and denies having HIV

<sup>j</sup>Believes that the quality of HIV care is poor and does not trust healthcare providers

<sup>k</sup>Judged by peer counselors at the end of case management to no longer interfere with or prevent early enrollment and retention in HIV care

<sup>l</sup>Judged by peer counselors at the end of case management to interfere with or prevent early enrollment or retention in HIV care

<sup>m</sup>At the end of case management [median (interquartile range) interval in days: 59 (43–79)]

**Table 3** Total identified and resolved barriers to enrollment and retention in HIV care, by CommLink client characteristics, Eswatini, June 2015–September 2018

| Enrollment and retention barriers                   | All clients (n = 1234) |                | Men (n = 688) |                | Women (n = 546) |                | Age 15–24 years (n = 204) |                | Age 25–34 years (n = 535) |                | Age 35 years (n = 495) |                | Urban (n = 409) |                | Rural (n = 825) |                |
|---|------------------------|----------------|---------------|----------------|-----------------|----------------|---------------------------|----------------|---------------------------|----------------|------------------------|----------------|-----------------|----------------|-----------------|----------------|
|   | Total n                | Resolved n (%) | Total n       | Resolved n (%) | Total n         | Resolved n (%) | Total n                   | Resolved n (%) | Total n                   | Resolved n (%) | Total n                | Resolved n (%) | Total n         | Resolved n (%) | Total n         | Resolved n (%) |
| HIV-care providers are disrespectful                | 81                     | 71 (88)        | 32            | 28 (88)        | 49              | 43 (88)        | 18                        | 14 (78)        | 26                        | 22 (85)        | 37                     | 35 (95)        | 12              | 8 (67)         | 69              | 63 (91)        |
| Quality of HIV care is poor <sup>a</sup>            | 69                     | 60 (87)        | 37            | 30 (81)        | 32              | 30 (94)        | 12                        | 11 (92)        | 31                        | 26 (84)        | 26                     | 23 (88)        | 11              | 6 (55)         | 58              | 54 (93)        |
| ART has side effects or is ineffective <sup>b</sup> | 137                    | 112 (82)       | 64            | 49 (77)        | 73              | 63 (86)        | 24                        | 20 (83)        | 64                        | 56 (88)        | 49                     | 36 (73)        | 25              | 17 (68)        | 112             | 95 (85)        |
| Too busy <sup>c</sup>                               | 407                    | 323 (79)       | 263           | 208 (79)       | 144             | 115 (80)       | 55                        | 45 (82)        | 189                       | 137 (72)       | 163                    | 141 (87)       | 107             | 79 (74)        | 300             | 244 (81)       |
| Denies having HIV <sup>d</sup>                      | 97                     | 77 (79)        | 45            | 32 (71)        | 52              | 45 (87)        | 28                        | 22 (79)        | 39                        | 29 (74)        | 30                     | 26 (87)        | 11              | 7 (64)         | 86              | 70 (81)        |
| Concerned about stigma <sup>e</sup>                 | 229                    | 169 (74)       | 115           | 85 (74)        | 114             | 84 (74)        | 54                        | 39 (72)        | 104                       | 72 (69)        | 71                     | 58 (82)        | 47              | 34 (72)        | 182             | 135 (74)       |
| Perceived wellness <sup>f</sup>                     | 170                    | 124 (73)       | 86            | 55 (64)        | 84              | 69 (82)        | 39                        | 32 (82)        | 81                        | 53 (65)        | 50                     | 39 (78)        | 43              | 22 (51)        | 127             | 102 (80)       |
| Believes in traditional medicine                    | 32                     | 23 (72)        | 22            | 16 (73)        | 10              | 7 (70)         | 0                         | 0              | 18                        | 13 (72)        | 14                     | 10 (71)        | 8               | 2 (25)         | 24              | 21 (88)        |
| Costs are too high <sup>g</sup>                     | 117                    | 79 (68)        | 48            | 34 (71)        | 69              | 45 (65)        | 33                        | 24 (73)        | 40                        | 25 (63)        | 44                     | 30 (68)        | 22              | 12 (55)        | 95              | 67 (71)        |
| Fears response from or loss of Partner <sup>h</sup> | 156                    | 102 (65)       | 69            | 42 (61)        | 87              | 60 (69)        | 37                        | 26 (70)        | 79                        | 48 (61)        | 40                     | 28 (70)        | 24              | 12 (50)        | 132             | 90 (68)        |
| Prayer can prevent or cure AIDS                     | 22                     | 14 (64)        | 11            | 5 (45)         | 11              | 9 (82)         | 2                         | 2 (100)        | 8                         | 4 (50)         | 12                     | 8 (67)         | 7               | 3 (43)         | 15              | 11 (73)        |
| Excessive alcohol use                               | 193                    | 79 (41)        | 133           | 58 (44)        | 60              | 21 (35)        | 14                        | 3 (21)         | 84                        | 33 (39)        | 95                     | 43 (45)        | 28              | 10 (36)        | 165             | 69 (42)        |
| Other   | 267                    | 172 (64)       | 138           | 88 (64)        | 129             | 84 (65)        | 57                        | 38 (67)        | 103                       | 68 (66)        | 107                    | 66 (62)        | 97              | 62 (64)        | 170             | 110 (65)       |

Barriers to care were assessed on 1234 (99%) of 1250 participants; resolved = judged by peer counselors at the end of case management to no longer interfere with or prevent early enrollment or retention in HIV care

HIV/human immunodeficiency virus, ART antiretroviral therapy, AIDS acquired immunodeficiency syndrome

<sup>a</sup>Believes that the quality of HIV care is poor and does not trust healthcare providers

<sup>b</sup>Believes ART has severe side effects or is ineffective

<sup>c</sup>Too busy with work, family, or other responsibilities to enroll or remain in HIV care

<sup>d</sup>Believes that the HIV test results were wrong and denies having HIV



Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

- $\epsilon$  Fears loss of confidentiality and stigma when visiting healthcare facilities
- $f$  Does not believe enrolling in HIV care and ART is needed because of perceived good health and wellbeing
- $g$  Believes transportation costs or costs from loss of work will be too high
- $h$  Fears lack of support, violence, or separation from spouse or sexual partner

Enrollment in facility-based HIV care, ART initiation, and antiretroviral refill outcomes among CommLink clients, by client characteristics, Eswatini, June 2015–September 2018

Table 4

| Characteristics                           | All ART eligibility periods <sup>a</sup> (Jun 2015–Sep 2018) |                                  |   | Test and treat (Oct 2016–Sep 2018) |                                  |   |
|---|--|----------------------------------|---|------------------------------------|----------------------------------|---|
|   | Enrolled in HIV care n (%) <sup>c</sup>                      | Initiated ART n (%) <sup>c</sup> | Received 1 ARV refills n (%) <sup>d</sup> | Clients n                          | Initiated ART n (%) <sup>c</sup> | Received 1 ARV refills n (%) <sup>d</sup> |
| Total                                     | 1250   | 1120 (90)                        | 1051 (94)                                 | 824                                | 795 (96)                         | 759 (95)                                  |
| Sex                                       |  |                                  |   |                                    |                                  |   |
| Men                                       | 699  | 623 (89)                         | 576 (92)                                  | 438                                | 420 (96)                         | 399 (95)                                  |
| Women                                     | 551  | 497 (90)                         | 475 (96)                                  | 386                                | 375 (97)                         | 360 (96)                                  |
| Age group (years)                         |  |                                  |   |                                    |                                  |   |
| 15–24                                     | 207  | 185 (89)                         | 170 (92)                                  | 140                                | 137 (98)                         | 128 (93)                                  |
| 25–34                                     | 541  | 474 (88)                         | 446 (94)                                  | 356                                | 339 (95)                         | 322 (95)                                  |
| 35  | 502  | 461 (92)                         | 435 (94)                                  | 328                                | 319 (97)                         | 309 (97)                                  |
| Diagnostic status                         |  |                                  |   |                                    |                                  |   |
| New <sup>e</sup>                          | 727  | 632 (87)                         | 588 (93)                                  | 414                                | 397 (96)                         | 378 (95)                                  |
| Prior, out-of-care > 90 days <sup>f</sup> | 523  | 488 (93)                         | 463 (95)                                  | 410                                | 398 (97)                         | 381 (96)                                  |
| Outreach setting <sup>g</sup>             |  |                                  |   |                                    |                                  |   |
| Urban                                     | 420  | 348 (83)                         | 316 (91)                                  | 81                                 | 79 (98)                          | 73 (92)                                   |
| Rural                                     | 830  | 772 (93)                         | 735 (95)                                  | 743                                | 716 (96)                         | 686 (96)                                  |
| Route of participation                    |  |                                  |   |                                    |                                  |   |
| Community outreach testing                | 1040   | 920 (88)                         | 855 (93)                                  | 631                                | 610 (97)                         | 578 (95)                                  |
| Index testing <sup>h</sup>                | 210  | 200 (95)                         | 196 (98)                                  | 193                                | 185 (96)                         | 181 (98)                                  |
| Counselor-client dyads                    |  |                                  |   |                                    |                                  |   |
| Female–male                               | 404  | 357 (88)                         | 329 (92)                                  | 226                                | 217 (96)                         | 206 (95)                                  |
| Female–female                             | 301  | 265 (88)                         | 253 (95)                                  | 191                                | 186 (97)                         | 177 (95)                                  |
| Male–female                               | 250  | 232 (93)                         | 222 (96)                                  | 195                                | 189 (97)                         | 183 (97)                                  |
| Male–male                                 | 295  | 266 (90)                         | 247 (93)                                  | 212                                | 203 (96)                         | 193 (95)                                  |
| Barriers to HIV care <sup>i</sup>         |  |                                  |   |                                    |                                  |   |

| Characteristics                               | All ART eligibility periods <sup>a</sup> (Jun 2015–Sep 2018) |                                     |  | Test and treat (Oct 2016–Sep 2018) |                                     |  |
|---|--|-------------------------------------|--|------------------------------------|-------------------------------------|--|
|   | Enrolled in HIV care<br>n (%) <sup>c</sup>                   | Initiated ART<br>n (%) <sup>c</sup> | Received 1 ARV refills<br>n (%) <sup>d</sup> | Clients<br>n                       | Initiated ART<br>n (%) <sup>c</sup> | Received 1 ARV refills<br>n (%) <sup>d</sup> |
| No barriers identified                        | 308 (100)  | 280 (91)                            | 273 (98)                                     | 156                                | 156 (100)                           | 155 (99) (99)                                |
| All identified barriers resolved <sup>j</sup> | 482  | 481 (100)                           | 455 (97)                                     | 395                                | 393 (99)                            | 385 (98) (97)                                |
| 1 unresolved barrier <sup>k</sup>             | 279  | 276 (99)                            | 252 (90)                                     | 169                                | 166 (98)                            | 159 (96) (94)                                |
| 2 unresolved barriers                         | 91   | 86 (95)                             | 81 (89)                                      | 58                                 | 53 (91)                             | 43 (81) (74)                                 |
| 3 unresolved barriers                         | 74   | 55 (74)                             | 34 (46)                                      | 44                                 | 26 (59)                             | 16 (62) (36)                                 |

Abstracted from client medical records only; enrollment = at least one documented visit at a healthcare facility to receive HIV medical care *ART* antiretroviral therapy, *ARV* antiretroviral medication, *Test and Treat* eligible for ART regardless of CD4 count

<sup>a</sup> ART-eligibility period (no. of participants): Jun 2015–Nov 2015, CD4 < 350/μL (n = 137); Dec 2015–Sep 2016, CD4 = 500/μL (n = 289), Oct 2016–Sept 2018, Test and Treat (n = 824)

<sup>b</sup> Includes eighteen clients who transferred care outside the CommLink catchment area (n = 9) or had died (n = 9) before ART initiation or first ARV refill

<sup>c</sup> % denominator = all clients

<sup>d</sup> % denominator = clients who initiated ART

<sup>e</sup> Diagnosed with HIV infection for the first time based on the Eswatini national rapid HIV testing algorithm

<sup>f</sup> Received a prior HIV diagnosis and either never enrolled in HIV care or had not received HIV care in the prior 90 days

<sup>g</sup> CommLink teams operated in northern and central urban areas during CD4 < 350/μL and CD4 = 500/μL ART eligibility periods, and in northern and western rural areas during CD4 < 350/μL and Test and Treat periods. During Test and Treat, teams operated primarily in the rural areas of Manzini and Lubombo regions of Eswatini

<sup>h</sup> HIV testing of sexual partners and family members of CommLink clients at home or other community settings by CommLink staff

<sup>i</sup> At the end of case management [median (interquartile range) interval in days: 59 (43–79)]

<sup>j</sup> Judged by peer counselors at the end of case management to no longer interfere with or prevent early enrollment or retention in HIV care

<sup>k</sup> Judged by peer counselors at the end of case management to interfere with or prevent early enrollment or retention in HIV care

Number and type of total identified and remaining unresolved barriers to enrollment and retention in HIV care among CommLink clients, by linkage-to-care status, Eswatini, June 2015–September 2018

Table 5

| Enrollment and retention barriers                   | Linked to HIV care <sup>a</sup> (n = 1141) |                                  | Not linked to HIV care <sup>a</sup> (n = 93) |                                  |
|---|--|----------------------------------|--|----------------------------------|
|   | Total barriers                             | Unresolved barriers <sup>b</sup> | Total barriers                               | Unresolved barriers <sup>b</sup> |
| Total   | 1888                                       | 558                              | 278  | 203                              |
| Median (IQR)  | 1 (0–2)                                    | 0 (0–1)                          | 3 (2–4)                                      | 2 (1–3)                          |
| Clients with 1 barrier (% of clients)               | 840 (74)                                   | 371 (33)                         | 86 (92)                                      | 73 (78)                          |
| Type (% of clients)                                 |  |                                  |  |                                  |
| Too busy <sup>c</sup>                               | 357 (31)                                   | 45 (4)                           | 50 (54)                                      | 39 (42)                          |
| Non-disclosure <sup>d</sup>                         | –  | 157 (14)                         | –  | 32 (34)                          |
| Perceived wellness <sup>e</sup>                     | 137 (12)                                   | 22 (2)                           | 33 (35)                                      | 24 (26)                          |
| Concerned about stigma <sup>f</sup>                 | 202 (18)                                   | 42 (4)                           | 27 (29)                                      | 18 (19)                          |
| Fears response from or loss of partner <sup>g</sup> | 136 (12)                                   | 40 (4)                           | 20 (22)                                      | 14 (15)                          |
| ART has side effects or is ineffective <sup>h</sup> | 113 (10)                                   | 11 (1)                           | 24 (26)                                      | 14 (15)                          |
| Excessive alcohol use                               | 180 (16)                                   | 102 (9)                          | 13 (14)                                      | 12 (13)                          |
| Denies having HIV <sup>i</sup>                      | 81 (7)                                     | 9 (1)                            | 16 (17)                                      | 11 (12)                          |
| Costs are too high <sup>j</sup>                     | 106 (9)                                    | 30 (3)                           | 11 (12)                                      | 8 (9)                            |
| HIV-care providers are disrespectful                | 69 (6)                                     | 5 (0)                            | 12 (13)                                      | 5 (5)                            |
| Quality of HIV care is poor <sup>k</sup>            | 57 (5)                                     | 4 (0)                            | 12 (13)                                      | 5 (5)                            |
| Believes in traditional medicine                    | 26 (2)                                     | 6 (1)                            | 6 (6)  | 3 (3)                            |
| Believes prayer can prevent or cure AIDS            | 18 (2)                                     | 5 (0)                            | 4 (4)  | 3 (3)                            |
| Other   | 249 (22)                                   | 80 (7)                           | 18 (19)                                      | 15 (16)                          |

HIV human immunodeficiency virus, IQR interquartile range, ART antiretroviral therapy, AIDS acquired immunodeficiency syndrome

<sup>a</sup>Barriers to care were assessed on 1234 (99%) of 1250 participants. Linked = enrolled in HIV care and received an antiretroviral refill, if ART initiated; not linked = did not enroll in HIV care or did not receive at least one antiretroviral refill if ART initiated

<sup>b</sup>Judged by peer counselors at the end of case management to interfere with or prevent early enrollment or retention in HIV care

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

- c* Too busy with work, family, or other responsibilities to enroll or remain in HIV care
- d* Did not disclose HIV status to any sexual partners or family members during case management
- e* Does not believe enrolling in HIV care and ART is needed because of perceived good health and wellbeing
- f* Fears loss of confidentiality and stigma when visiting healthcare facilities
- g* Fears lack of support, violence, or separation from spouse or sexual partner
- h* Believes ART has severe side effects or is ineffective
- i* Believes that the HIV test results were wrong and denies having HIV
- j* Believes transportation costs or costs from loss of work will be too high
- k* Believes that the quality of HIV care is poor and does not trust healthcare providers