Engage4Health

Testing a Multi-Component Intervention to Increase Linkage to and Retention in HIV Care Following Diagnosis in Mozambique

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CCS Centro de Colaboração em Saúde

Background and Rationale

Over the last decade, HIV testing, care, and treatment services have been rapidly scaled up across sub-Saharan Africa. Currently, an estimated 25.5 million people are living with HIV in the region, including 12 million who are accessing antiretroviral therapy (ART).[1] To optimize the health outcomes of people living with HIV, it is critical that prompt linkage to care occur following diagnosis, and that patients are subsequently retained in lifelong care. In most countries, HIV testing is offered in diverse settings—from voluntary testing sites to inpatient and outpatient clinics where health workers initiate HIV testing as part of routine medical care—and those newly diagnosed face numerous challenges accepting their status, enrolling in HIV care, and staying engaged in care for life. Finding innovative ways to address these challenges will be essential to achieving UNAIDS' ambitious 90-90-90 targets.[2]

Challenges related to patient linkage and retention have been particularly acute in Mozambique, where approximately 11 percent of the population (1.5 million people) is living with HIV.[3] One study estimated that, among people who initiated ART in Mozambique in 2012, 31 percent were lost to follow-up within 12 months.[4] Barriers hindering patient engagement in ongoing care include multiple clinic visits, long wait times, long distances to the health facility, transportation costs, and work and child care-related constraints. While a number of studies have evaluated specific interventions targeting a single barrier to linkage and retention, few studies have rigorously assessed the impact of a multi-component intervention package composed of pragmatic, evidence-based interventions that simultaneously target known barriers across the HIV care continuum.

Study Overview

From April 2013 to June 2016, ICAP collaborated with Mozambique's Ministry of Health and the Center for Collaboration in Health (CCS) to conduct the Engage4Health study. Supported by the United States (U.S.) President's Emergency Plan for AIDS Relief and U.S. Agency for International Development (USAID), the study aimed to evaluate the effectiveness, acceptability, and cost-effectiveness of a package of scalable, evidence-based interventions targeting multiple barriers to linkage to and retention in HIV care among adults newly diagnosed with HIV in Mozambique.

Patients wait to be seen outside of a health facility in Mozambique's Inhambane Province.

[1] UNAIDS. Global AIDS Update 2016.
[2] Targets are that 90% of all people living with HIV know their HIV status; 90% of all people with diagnosed HIV infection receive sustained ART; and 90% of all people receiving ART have viral suppression.
[3] Mozambique National Council to Combat AIDS. Global AIDS Response Progress Report. 2016.
[4] Auld AF, Shiraishi RW, Couto A, et al. A decade of antiretroviral therapy scale-up in Mozambique: Evaluation of outcome trends and new models of service delivery among more than 30,000 patients enrolled during 2004-2013. J Acquir Immune Defic Syndr. 2016;73(2).

The Intervention Package

The intervention package was designed to be carried out at the health facility level and focused on streamlining service delivery to increase **patient linkage** from HIV testing to enrollment in HIV care and **retention in care**:

- HIV testing and counseling clinics were equipped with Pima™ Analyzers that enabled HIV test counselors to conduct **on-the-spot CD4 count testing** immediately following HIV diagnosis. This aimed to minimize the amount of time clients have to wait between receiving a positive HIV test result and learning their CD4 count. Existing facility-based HIV test counselors were trained to conduct the CD4 count test and interpret results according to Mozambique's national treatment guidelines.
- Patients eligible for ART underwent **accelerated ART initiation.**[5] Existing HIV test counselors were trained to provide ART preparatory counseling to eligible ART patients immediately following CD4 count testing in the HIV testing and counseling clinic and instructed clients to enroll in HIV care as soon as possible. Where available, peer workers escorted patients to the reception to enroll in HIV care. In addition, the study team worked with health facility receptionists so that when ART-eligible clients presented for HIV care, scheduling of their first clinical consultation was prioritized. Once enrolled, patients were eligible for immediate ART initiation without having to wait for any additional laboratory results.

Table 1: Summary of SMS Message Content, Frequency, and Duration

Message Type	Message Content	Frequency and Duration
Health Messages	Hi. Your health is the most important thing. Please remember to come to the health center for health services.	Weekly for one month following diagnosis
	Hi. Continue coming to the health center to take care of your and your family's health.	Monthly for 11 months beginning one month after diagnosis
Appointment Reminders	Hi. Your health is the most important thing. We expect to see you at your upcoming appointment scheduled for the day ___.	3-7 days before each scheduled clinic visit once enrolled in HIV care

A Pima™ Analyzer used to provide on-the-spot CD4 testing.

- Study participants—whether ART eligible or not—who had access to a personal or friend's mobile phone received one-way **health messages via SMS message** that encouraged them to consider their health needs. Participants who successfully linked to HIV care also received **appointment reminders** specifying the date of their next appointment. SMS messages (see Table 1) did not reveal any personal information, included no references to HIV, and did not require participants to reply.
- A subset of study participants was provided with a **non-cash financial incentive** consisting of mobile phone airtime vouchers worth approximately $5 upon achieving each of the following linkage and retention milestones: (1) after enrolling in HIV care within one month of HIV diagnosis; (2) after being retained in HIV care for six months after diagnosis; and (3) after being retained in HIV care for 12 months after diagnosis. Participants who did not own a mobile phone could still receive the vouchers and choose to sell them for cash or trade them for other goods.[6]

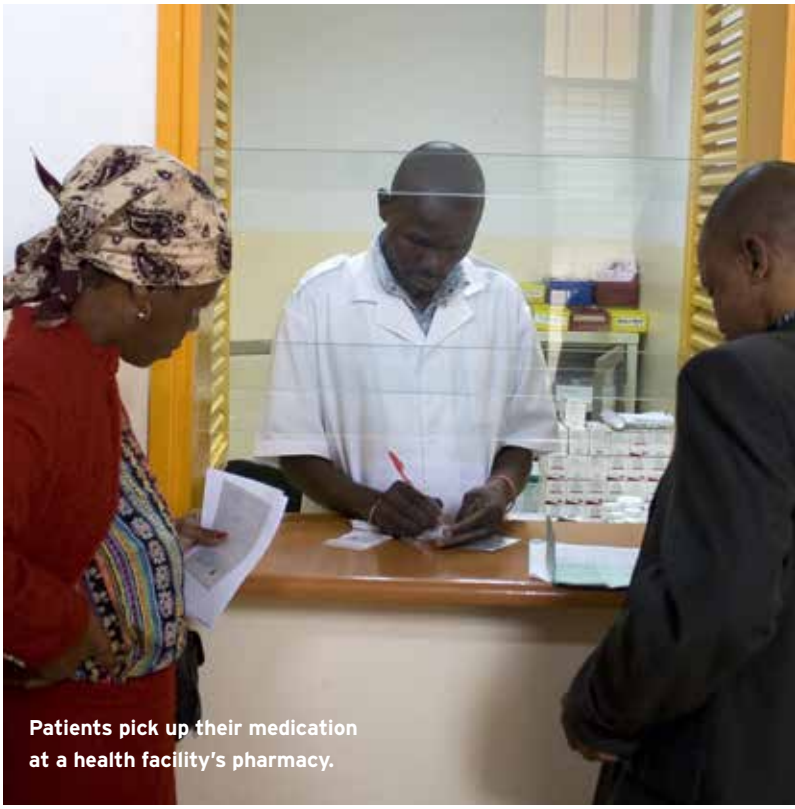
[5] According to Mozambique's national guidelines at the time the study was implemented, patients were eligible for ART if their CD4 count was 350 cells/, and at least one preparatory counseling session was required before ART initiation.
[6] All costs expressed in U.S. dollars.

Study Design

To evaluate the multi-component intervention, 10 public health facilities in Mozambique's City of Maputo and Inhambane Province (see Figure 1) were randomly assigned to provide either the standard of care (i.e., to follow usual procedures, as dictated by national guidelines) or to deliver the Engage4Health multi-component intervention package (see Table 2). The intervention sites enrolled two sequential groups of patients, the first of which received on-the-spot CD4 count testing, accelerated ART initiation, and SMS messages; and the second of which received the same package plus financial incentives.

At health facilities assigned to implement the Engage4Health package, relevant health providers were trained to implement **on-the-spot CD4 count testing** in the HIV testing and counseling clinic and **accelerated ART initiation** as part of routine care for all clients 15 years and older who tested positive for HIV.

The study team was responsible for sending the **SMS health messages** and reminders and providing **financial incentives** to all eligible study participants.

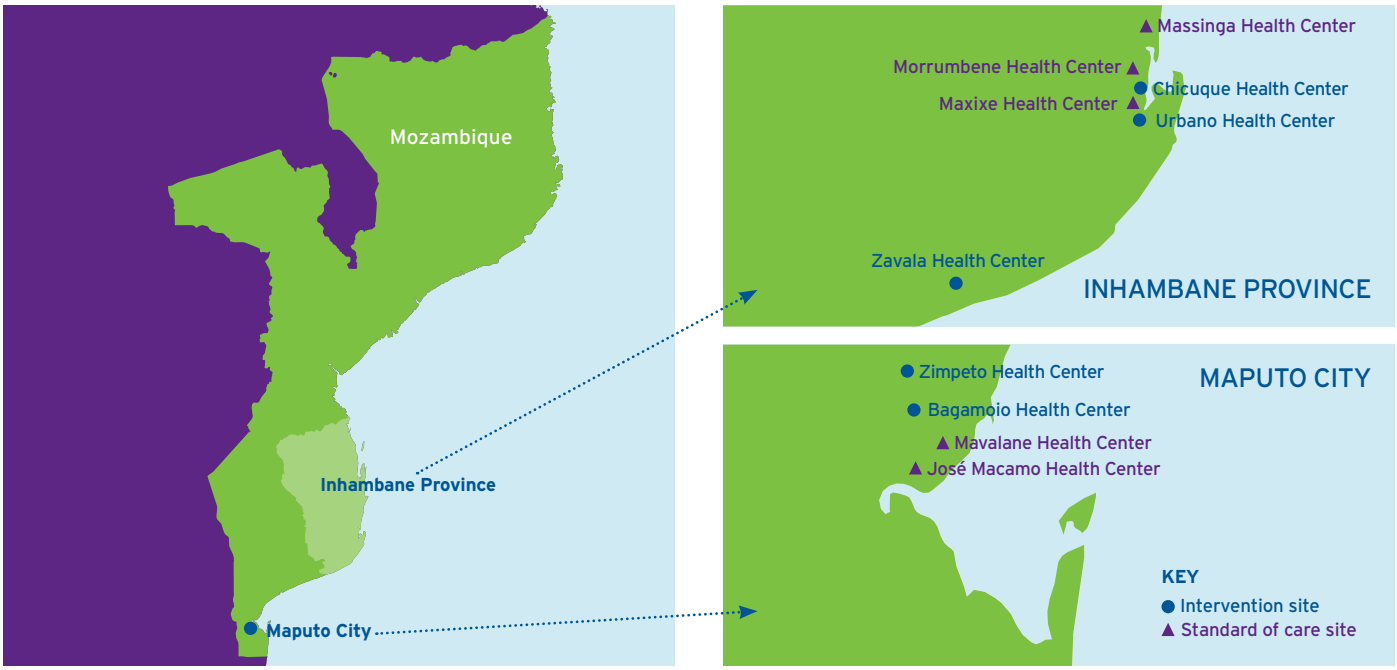


Patients pick up their medication at a health facility's pharmacy.

Table 2: Comparison of the Standard of Care and Engage4Health Intervention Package

	Standard of Care	Engage4Health Intervention (without Financial Incentive)	Enhanced Engage4Health Intervention (with Financial Incentive)
CD4 Count Testing	Once the client enrolled in HIV care, s/he was directed to the clinic laboratory for CD4 count testing and typically returned 2-4 weeks later to receive results	Client was provided with CD4 count testing in the HIV testing and counseling clinic on the same day as diagnosis, with immediate turn-around time	
ART Initiation	ART-eligible clients were initiated on ART after baseline laboratory tests were received and they completed at least one ART preparatory counseling session in the HIV clinic (usually 1-2 months after enrollment in HIV care)	ART-eligible clients received one ART preparatory counseling session in the HIV testing and counseling clinic and were initiated on treatment within one week of receiving their HIV diagnosis	
SMS Reminders	None	Clients received SMS health messages and appointment reminders (see Table 1)	
Financial Incentives	None	None	Clients received pre-paid mobile phone airtime vouchers when linking to care within one month of diagnosis and if retained in care six and 12 months after diagnosis

Figure 1: Map of Engage4Health Study Facilities



Study Methods

Data were collected using the following methods to compare the proportion of patients achieving the combined outcome of linkage to care within one month of HIV diagnosis and retention in care 12 months after diagnosis across the study's two arms (see Box 1), and to assess the intervention's cost-effectiveness and acceptability.

- Closed-ended interviews with all eligible and consenting patients after HIV-positive diagnosis, and at one and 12 months following enrollment. Follow-up interviews were conducted by phone or at participants' homes
- Abstraction of routinely collected clinical and immunological data for each study participant from the health facilities' existing electronic patient tracking system (EPTS)
- Standardized site assessments documenting the configuration of HIV services at the 10 study sites at the beginning and end of the study
- Aggregation of program, medical, and patient cost data from health facility records and participant questionnaires

Ensuring Local Ownership and Fostering Collaboration

ICAP sought to maximize local ownership of the Engage4Health study by collaborating with the Ministry of Health to conceptualize the study's design and interventions. In addition, the Director General of Mozambique's National Institute of Health served as a study co-investigator, guiding the study's development and ongoing implementation. ICAP also collaborated with CCS, a Mozambican non-governmental organization, to coordinate the day-to-day implementation of the study and build their capacity to conduct research. To ensure ongoing stakeholder input, a Study Advisory Group that included representatives from the Ministry of Health, ICAP, CCS, and USAID met annually to review the study's progress and discuss implementation challenges.

BOX 1: Operationalizing the Study Outcome

The combined study outcome of linkage to care within one month of HIV diagnosis and retention in care 12 months after diagnosis was operationalized using data from the EPTS at each of the participating health facilities. Linkage to care was defined as having a clinical consultation in the HIV care and treatment clinic at the same health facility where the participant was diagnosed. Retention was defined as accessing any HIV care service (i.e., clinical consultation, pharmacy pick-up, laboratory testing) at the same facility.

Additional analyses (not reported in this brief) will examine linkage and retention at any health facility, based on data collected during patient interviews.

Key Findings

Key characteristics of the 2,004 adults enrolled in the study at the 10 participating health facilities are summarized in Box 2.

Effectiveness of the Engage4Health Intervention

- The combined outcome of linkage to and retention in HIV care at the diagnosing facility was higher among patients in the intervention arm compared to those in the standard of care arm, as were linkage to care within one month of diagnosis (regardless of retention) and retention in care 12 months after diagnosis (regardless of the timing of linkage) (see Figure 2).
- The addition of a financial incentive provided to patients in the intervention arm did not have an impact on the proportion of patients who were linked to and retained in HIV care.

Acceptability of the Engage4Health Intervention

The majority of study participants found the Engage4Health intervention package—both with and without the financial incentive—helpful for supporting linkage to and retention in HIV care. Participants found on-the-spot CD4 count testing to be the package's most useful component supporting linkage to care (over 40%), followed by same-day ART preparatory counseling (over 30%), SMS reminders (over 10%), and the financial incentive (3%).

Cost-Effectiveness of the Engage4Health Intervention

- The cost of providing the standard of care to 1,000 patients was approximately **$269,780**, while the cost of providing the Engage4Health intervention package to 1,000 patients was approximately **$307,465** and the cost of providing the enhanced intervention package to 1,000 patients was **$315,305**.[7]
- Facilities implementing the Engage4Health intervention package can expect to spend approximately **$122** for every additional patient successfully linked to HIV care within one month of diagnosis and retained 12 months after diagnosis.[8]

BOX 2: Summary of Patient Characteristics

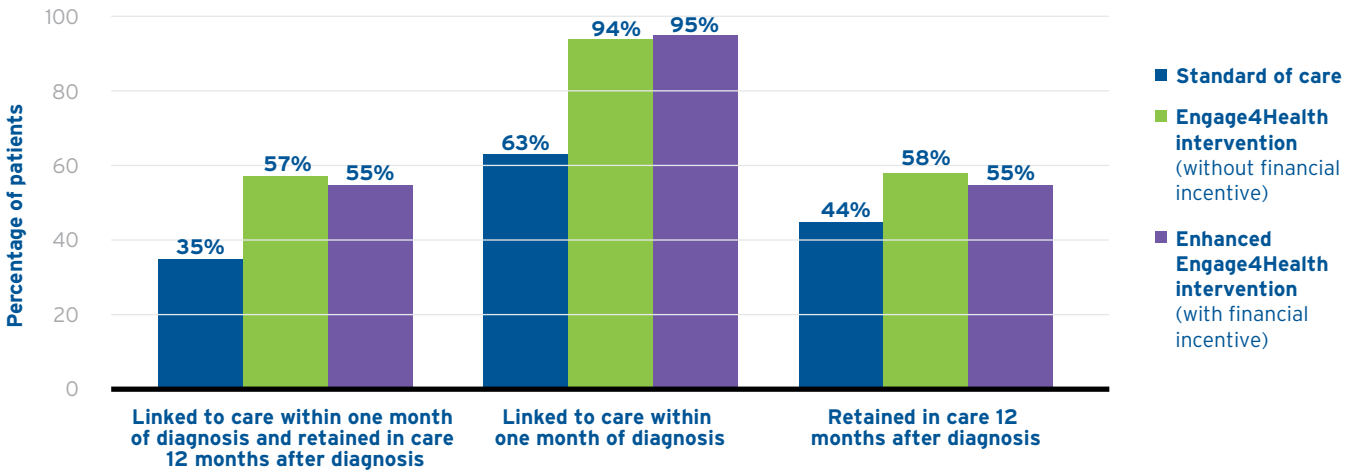
- Mean age at enrollment was 32 years
- 64% were female
- 56% were living with a partner
- One-third had at least a secondary education
- 74% were employed
- 54% reported that another household member was living with HIV

BOX 3: Assessing Levels and Predictors of Late HIV Diagnosis

As a secondary analysis, ICAP used data from participants who received on-the-spot CD4 count testing to assess the magnitude and predictors of advanced disease at diagnosis. Among the 1,235 patients enrolled at the intervention sites:

- Median CD4 count at diagnosis was 318 cells/L (340 cells/L among women and 266 cells/L among men).
- At diagnosis, over half (55%) had a CD4 count 350cells/L and 13 percent had a CD4 count 100 cells/L.
- Male participants and those who were not married or living with a partner were more likely to have advanced disease at diagnosis, while younger participants (aged 18-24) were less likely to have advanced disease at diagnosis.

Figure 2: Linkage and Retention Outcomes by Study Group



[7] Costs include discounted fixed costs, such as those associated with training and intervention compliance, as well as per patient costs, such as test cartridges, air time, and staff time.
[8] As no additional benefit of adding financial incentives to the multi-component intervention was found, the cost for a successful outcome under the enhanced intervention was not estimated.

Implications

In this implementation science study, we found that a multi-component intervention that addresses known barriers across the HIV care continuum was feasible to implement at public sector health facilities in Mozambique, and resulted in a greater percentage of patients being both linked to care within one month of diagnosis and retained in care 12 months later, with particularly impressive increases observed in timely linkage to care. **Specific recommendations** include:

- Making **on-the-spot CD4 count testing** available to patients directly in the HIV testing and counseling clinic helped health workers prioritize the sickest patients at diagnosis and reduced the time between HIV diagnosis and ART initiation. This approach also allowed patients to receive additional information about their health immediately following diagnosis, which may have motivated them to link to care quickly. Mozambique has already implemented on-the-spot CD4 count testing at some health facilities throughout the country, but this testing usually takes place in the laboratory setting rather than in the HIV testing and counseling clinic. The study findings suggest that offering on-the-spot CD4 count testing directly in the HIV testing and counseling clinic may be a more optimal approach, as many patients are being lost following HIV diagnosis.
- Providing **accelerated ART initiation** through reduced ART preparatory counseling sessions and improved patient flow further streamlined the care provided to patients, and helped minimize unnecessary delays. Engaging peer workers to escort patients eligible for ART to the facility reception and training receptionists to prioritize scheduling of appointments for ART-eligible patients proved particularly useful. Lessons learned regarding how to optimally structure patient flow to ensure accelerated ART initiation are particularly relevant as Mozambique recently increased the CD4 count threshold for ART eligibility from 350 to 500 cells/μL and may move toward implementing the "test and start approach," whereby every person living with HIV is eligible to begin ART irrespective of CD4 count.
- Sending **health messages and appointment reminders via SMS** may have contributed to the increased linkage to and retention in HIV care after diagnosis. If this intervention is scaled up in Mozambique, it is recommended that the SMS system be linked to the EPTS so that all patients with scheduled appointments automatically receive SMS reminders. Alternative approaches will need to be explored to automate delivery of health messages before patients link to care.

"It was very important to introduce PIMA [CD4] testing in the HIV testing and counseling clinic because it substantially decreased the wait time [for patients to learn their eligibility for ART]."

Dr. Sara Carlos Machava
Director of the Zimpeto Health Clinic

- Surprisingly, the **financial incentives** provided to study participants did not have an impact on outcomes across the HIV care continuum. This may have been a result of the incentive type and value (mobile phone airtime vouchers worth approximately $5 at three points in time), the logistics associated with receiving the incentive, or insufficient patient understanding about how the incentive worked. Indeed, financial incentives have been shown to increase uptake of HIV testing in sub-Saharan Africa;[9, 10] however, the few studies that have evaluated the effect of financial incentives on linkage to care failed to show any benefit.[11] Similarly, data on the effectiveness of incentives for improving retention to care is limited, with a study from rural Uganda that provided $2.50-$7.00 to ART participants for transportation costs finding only a modest increase in 12-month retention (from 87 percent to 92 percent).[12] Further research is merited to gain insights into which incentive types and delivery methods might be more effective in changing behaviors among people newly diagnosed with HIV, including conditional versus unconditional incentives and cash versus vouchers.
- Important lessons were learned regarding how to manage **implementation challenges** associated with this multi-component intervention. Given the high turnover of health facility staff, the study team organized refresher trainings and one-on-one mentorship of new staff to ensure compliance with study interventions. Also, monitoring tools were developed to assess the quality of implementation of each intervention component and guide targeted supportive supervision to enhance implementation. As new strategies are adopted (e.g., the test and start approach), it will be important that monitoring tools are developed that enable the tracking of critical service elements and the identification of emerging needs.

Overall, in both the intervention and standard of care arms of the study, retention in HIV care fell far short of what will be needed to end the HIV epidemic in Mozambique. As countries begin to adopt the test and start approach, it will become even more critical to identify innovative strategies to increase successful patient engagement in long-term care.

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[10] Nglazi MD, van Schaik N, Kranzer K, et al. An incentivized HIV counseling and testing program targeting hard-to-reach unemployed men in Cape Town, South Africa. J Acquir Immune Defic Syndr. 2012;59:e28–34
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ABOUT ICAP

ICAP was founded in 2003 at Columbia University's Mailman School of Public Health. Now a global leader in HIV and health systems strengthening, ICAP provides technical assistance and implementation support to governments and non-governmental organizations in more than 21 countries. ICAP has supported work at more than 5,200 health facilities around the world. More than 2.2 million people have received HIV care through ICAP-supported programs and over 1.3 million have begun antiretroviral therapy.

Online at icap.columbia.edu

ABOUT CCS

The Center for Collaboration in Health (CCS) is a non-governmental, non-profit organization that was established in 2010 as a local partner of Mozambique's Ministry of Health, with support from ICAP and the U.S. Government. In 2011, CCS began its activities as a clinical partner implementing HIV-related activities in 23 health facilities in Maputo City. CCS has since expanded its work to Inhambane Province, with direct funding from CDC, where it now works in 14 districts.

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