



**THE START STUDY**  
BRIDGING THE KNOW-DO GAP  
TO ENSURE TIMELY AND EFFECTIVE  
ANTIRETROVIRAL TREATMENT  
OF TB/HIV CO-INFECTED PATIENTS  
IN LESOTHO



## BACKGROUND AND RATIONALE

The TB and HIV epidemics are closely linked in Africa: approximately 32 percent of people with TB in the African region are also living with HIV (a proportion that exceeds 50 percent in parts of Southern Africa). It is estimated that TB is responsible for one in three HIV deaths.<sup>1</sup> After three clinical trials demonstrated that initiating antiretroviral therapy (ART) early during TB treatment is safe and greatly increases survival among TB/HIV patients, the World Health Organization (WHO) revised its guidelines in 2010 to recommend that co-infected patients start ART as soon as possible after beginning TB treatment.

Despite the compelling scientific evidence and WHO endorsement, on-the-ground implementation of these guidelines has been slow to take root, resulting in delayed ART initiation among many co-infected patients. Barriers preventing timely ART initiation include health workers with inadequate TB/HIV management knowledge, experience, and confidence (e.g., insufficient awareness of the importance of early ART initiation and/or a lack of confidence managing complications); patient beliefs about TB/HIV co-treatment, such as fear of side effects; patients lacking resources to cover the cost of transportation to monthly clinic visits; and patients with insufficient social support (often as a result of HIV-related stigma).

While a number of studies have described specific interventions to address this “know-do” gap, few have rigorously assessed a combination approach that comprises programmatic, structural, and psychosocial interventions seeking to address these diverse, multi-level barriers.

## STUDY OVERVIEW

In 2012, ICAP collaborated with its long-standing partner in Lesotho, the Ministry of Health, to design a multi-component intervention package that includes practical, feasible, scalable interventions targeting multiple known barriers to timely ART initiation and retention among TB/HIV patients. Further, to evaluate the intervention's effectiveness, cost-effectiveness, and acceptability, ICAP and the Ministry of Health designed The **Start TB Patients on ART and Retain on Treatment (START)** Study, a rigorous implementation science study that was carried out in Lesotho's Berea District. The project has responded to a key Ministry of Health priority: Lesotho has one of the world's most severe epidemics of HIV and TB, an estimated 72 percent of TB patients are co-infected with HIV,<sup>2</sup> and, at the initiation of the START study in 2012, only 53 percent of TB/HIV patients in Lesotho had initiated ART.<sup>3</sup>



In Lesotho, people must often travel long distances through mountainous terrain—by foot, truck, or horseback—to reach health facilities.

## The Intervention Package

The intervention was designed to be carried out at the health facility and community level, and focused on providing training, mentorship, and tools to support existing nurses and village health workers (VHWs) to provide more effective care to TB/HIV co-infected patients. A targeted intervention was also included in the package to increase the ability of patients to access TB/HIV services. Specifically:

- To address **programmatic barriers**, ICAP provided nurses with a two-day training focused on reviewing Lesotho's TB/HIV co-infection treatment guidelines, discussing the importance of—and scientific evidence for—early ART initiation during TB treatment, and introducing a clinical algorithm to help nurses better manage TB/HIV patients. Following the training, job aids summarizing the algorithm were provided for each of the health facility's consultation rooms and a nurse mentor visited regularly to provide ongoing mentorship to nurses.
- To address **structural barriers** and encourage TB/HIV patients to bring their treatment supporters to clinic visits each month, ICAP reimbursed patients and their treatment supporters for transportation costs at the end of each clinic visit.
- **Psychosocial barriers** were addressed using a multi-pronged approach:
  - ICAP provided a four-day training to community-based VHWs affiliated with the health facility. The training focused on how to support TB/HIV co-infected patients in the community through: patient education, encouraging ART initiation, providing adherence and psychosocial support between clinic visits, and advocating for patients. Following the training, VHWs provided ongoing support to TB/HIV patients through home visits, weekly phone calls, and follow-up with patients who had missed a clinic appointment.
  - To increase coordination and oversight among VHWs, a system was implemented whereby VHWs designated 1-2 “lead VHWs” to be based full-time at the health facility and carry out critical functions. These included using a TB/HIV treatment literacy flipchart that ICAP developed to provide facility-based individual and group health education sessions to TB/HIV patients and their treatment supporters, managing the clinic appointment system, providing escort services, assigning each new TB/HIV patient initiating ART to a community-based VHW, holding monthly meetings with VHWs and clinic nurses to discuss patient challenges, and supervising VHWs in the community.
  - TB/HIV patients initiating ART and their treatment supporters were enrolled in an automated text messaging system that sent them regular medication adherence messages and appointment reminders, using strategies to maintain patient confidentiality. Patients also received airtime vouchers so they would not hesitate to call the nurse or VHW if experiencing difficulties adhering to their treatment plan.
  - After initiating the study, lead VHWs reported that many patients were struggling with the process of disclosing their status to others and that they themselves were struggling with providing patients with adequate disclosure-related support. In response, ICAP developed a flipchart specifically designed to help VHWs structure the way they approach supporting patients throughout the disclosure process.



**Top:** A lead village health worker uses the TB/HIV treatment literacy flipchart to provide health education to patients in a health clinic's waiting area.

**Bottom:** A village health worker provides support to a patient during a home visit.

<sup>1</sup> WHO. Global Tuberculosis Report. 2015.

<sup>2</sup> Ibid.

<sup>3</sup> WHO. Global Tuberculosis Report. 2013.

## Study Design

To evaluate the multi-component intervention, 12 public health facilities in Lesotho's Berea District were randomly assigned to provide either the standard of care (i.e., to follow usual procedures for managing TB/HIV patients) or to deliver the standard of care plus the newly designed START intervention (see Table 1 and Figure 1). At health facilities assigned to implement the combination intervention package, all nurses and VHWs affiliated with the TB/HIV clinic were trained to implement the interventions as part of the routine care they provide to all TB/HIV patients.

## Study Methods

Data were collected for the START Study between April 2013 and December 2015, using the following methods to compare rates of ART initiation, retention on ART, and TB treatment success among TB/HIV patients across the study's two arms, and to assess the intervention's acceptability among patients and providers:

- Abstraction of information from clinic records and registers
- Baseline, monthly follow-up, and end-of-treatment interviewer-administered questionnaires conducted with a sample of TB/HIV patients who initiated ART
- Unannounced pill count calls to participants on ART between their monthly visits (asking them to count the number of pills they have remaining)
- In-depth, key informant interviews with nurses, VHWs, and TB/HIV patients (including those who initiated ART on time and those who initiated ART late or not at all) at intervention health facilities
- Monthly cost surveys conducted with nurses and VHWs to capture program costs associated with implementation of the START intervention

## Building Local Research Capacity

A key component of the START Study was to enhance local research capacity in Lesotho. At the study's outset, a survey was administered to relevant staff at the Ministry of Health and the National University of Lesotho to assess research capacity gaps and needs. The results were used to plan tailored capacity building activities, which included a range of Lesotho-based training activities (see Box 1). In addition, the Ministry of Health's National TB Program Manager and the National STI/HIV/AIDS Program Manager were sponsored to attend one-week courses at the Epidemiology and Population Health Summer Institute at Columbia University (EPIC).

## Ensuring Local Ownership

ICAP sought to maximize local ownership of the START Study to ensure the intervention's and study's relevance to the local context, and to ensure swift integration of study findings in local policy and programmatic contexts. As described above, ICAP worked closely with the Ministry of Health's National TB Program to design both the START Study and the multi-component intervention it evaluated. In addition, the Ministry of Health's National TB Program Manager participated as a START study co-investigator and was closely involved in guiding each step of the study's implementation. A Stakeholder Advisory Group was also formed at the study's outset that included representatives of Lesotho's local public, private, and non-profit sectors (the Ministry of Health, the Christian Health Association of Lesotho, Lesotho Red Cross, the National University of Lesotho, the Berea District Health Management Team, local VHWs, and patient representatives). The Stakeholder Advisory Group was engaged regularly throughout the START Study's implementation, holding focused discussions on the study's progress and providing feedback to guide next steps.

### BOX 1: START Activities to Build Local Research Capacity

- Two ICAP-led symposia on implementation research conducted for Ministry of Health and National University of Lesotho staff and students
- Training in qualitative research methods provided to Ministry of Health staff, faculty of six Lesotho nursing training institutions, and National University of Lesotho students
- Several research capacity building workshops provided to Ministry of Health staff and faculty of Lesotho nursing training institutions on developing a research question, writing a literature review, epidemiological research methods, how to visualize and present data, and writing a scientific manuscript



A START research assistant travels between study sites to collect data.

Table 1: START Intervention and Standard of Care Comparison

	STANDARD OF CARE	START INTERVENTION
Nurses trained on <b>national TB guidelines</b> <sup>4</sup>	✓	✓
All TB patients offered <b>HIV testing</b> by lay counselors	✓	✓
<b>ART</b> available to TB/HIV patients in integrated clinics	✓	✓
TB patients identify <b>treatment supporter</b> for TB treatment	✓	✓
Nurses provided with training and mentorship in TB/HIV co-treatment using a <b>clinical algorithm</b>		✓
Patients and treatment supporters provided with reimbursement for <b>transportation costs</b> associated with monthly clinic visits		✓
Patients and treatment supporters provided with health education by VHWs using <b>TB/HIV treatment literacy and disclosure flipcharts</b>		✓
Patients provided with real-time <b>adherence support</b> by trained VHWs and through automated SMS text messaging system		✓
Patients provided with <b>cellphone airtime vouchers</b>		✓

<sup>4</sup> Per Lesotho's national guidelines, all TB/HIV patients are to be started on ART 2-4 weeks after initiating TB treatment.

Figure 1: Map of START Study Sites in Lesotho's Berea District



## KEY FINDINGS

Key characteristics of the 1,233 TB/HIV patients newly registered at the 12 health facilities across both arms of the study are summarized in Box 2. Key findings of the START study are summarized below.

### Effectiveness of the START Intervention Package

- ART initiation was higher among patients in the START intervention arm compared to those in the standard of care arm.
- Time to ART initiation was shorter among patients in the START intervention arm compared to those in the standard of care arm.
- TB treatment success was more common among patients in the START intervention arm than in the standard of care arm.
- Among a sample of 371 TB/HIV patients who initiated ART, there was no difference in ART retention at 6 months by study arm.

### Cost-Effectiveness of the START Intervention Package

- Preliminary analyses suggest that the intervention was cost-effective. (Costs of the intervention included, but were not limited to, training sessions for nurses and VHWs, SMS and air-time costs, transport reimbursements, and the nurse mentor's salary.)

### Acceptability of the START Intervention Package among Nurses and VHWs

The START intervention package was well-received and deemed useful by both nurses and VHWs. They felt it facilitated quicker access to medical care among TB/HIV patients and allowed for greater coordination of TB and HIV services. Further, they reported that patients accessed services more enthusiastically after the START intervention began, and felt that patient adherence and retention had improved. Specific themes that emerged from the key informant interviews conducted with nurses and VHWs include:

- Nurses appreciated the synthesis of detailed materials into short training sessions. They felt the training and mentorship helped remind them to adhere to national TB/HIV guidelines, helped them deliver higher quality clinical care with increased independence, and enhanced their ability to provide sensitive care to patients.
- Nurses and VHWs found the job aids to be very useful: nurses found the laminated clinical algorithm to be clear and concise, triggering them to promptly initiate TB/HIV patients on ART and guiding them on how to manage drug interactions and emerging medical complications effectively and efficiently; and VHWs appreciated how the TB/HIV treatment literacy flipcharts simplified complex medical information and used culturally meaningful images that patients could relate to.
- Health workers unanimously expressed support for the mobile technology component of the START study. Both nurses and VHWs felt that patient and provider access to cell phones enhanced communication with patients and treatment supporters, and between nurses and VHWs. Mobile technology helped providers communicate regularly with patients, including those living in very remote locations, enabling them to resolve potential reasons a patient may miss an appointment, triage emerging medical complications, and support patients through difficult periods in their treatment. Health workers stated that

### BOX 2: TB/HIV Patient Characteristics

- Mean age at enrollment was **38.6 years**
- **43 percent** were female and **57 percent** were male
- **86 percent** were diagnosed with pulmonary TB and **14 percent** were diagnosed with extra-pulmonary TB
- **84 percent** represented new TB cases and **16 percent** represented cases being retreated
- **29 percent** were already on ART when they started TB treatment

patients felt more cared for when followed up routinely, and that being able to make phone calls and send SMS text messages strengthened the patient-provider bond.

- Health workers felt that the START intervention had improved the division of labor between nurses and VHWs. They stated that the assignment of lead VHWs allowed for enhanced supervision of community-based VHWs, improved lines of communication between the health facility and VHWs, and helped alleviate nurses' patient education responsibilities. Nurses expressed appreciation of VHWs, whom they saw as in tune with patients' multiple needs and complex social circumstances—and whom they felt served as a critical entry point to medical care. Further, VHWs felt their role as providers had been bolstered, they felt more knowledgeable and confident providing services to patients, and they expressed pride in their capacity to bond with patients, monitor their treatment, and help them come to terms with the various challenges of their illness.

*"At times, there is a lot of work and these books, you don't have time to sit down and read and learn what is emerging, what has changed. But when we keep on getting the training and people keep coming, say maybe for thirty minutes, we sit down and remind ourselves...it helps us a lot."*

Nurse at a health facility implementing the START intervention

*"The use of SMS is very important...suppose it rains heavily and I am unable to visit the patient. I text him and say, 'It is your time now, have you remembered your food?' He already knows, I will have taught him that when I say that I mean it's time to take his pills. So it is very helpful, this SMS thing, it helps us communicate with our patients."*

VHW associated with a health facility implementing the START intervention

Notable challenges experienced by health workers and suggestions made to improve the START intervention package include:

- Both nurses and community-based VHWs had difficulties keeping up with the growing number of patients and felt that high patient volume made it difficult to meet their patients' complex needs in a comprehensive way.
- Some nurses requested more frequent refresher training sessions that considered facility-specific needs, resources, and patient schedules. They also asked that junior/less experienced providers be included in the trainings and suggested including a practical training component where they could shadow an experienced colleague or participate in field visits to learn in a more hands-on, interactive way.
- Some nurses requested an algorithm specifically focused on adherence and strategies to mitigate patients' challenges adhering to their treatment plans.

### Acceptability of the START Intervention Package among TB/HIV Patients

TB/HIV patients found the START intervention package to be highly acceptable. In particular, patients appreciated the:

- Access to coordinated and concurrent TB/HIV treatment
- Treatment literacy sessions and frequent counselling
- Positive interactions with clinic nurses, during which their concerns about treatment initiation were addressed
- Consistent, personalized support from VHWs throughout the course of TB treatment and systematic engagement of their treatment supporters
- Access to transport reimbursements, which alleviated some of their financial hardships
- Reminder SMS messages and cellphone airtime vouchers, which facilitated communication with health workers

Based on participant feedback, potential ways to improve the intervention package include:

- Focusing VHW support on patients who lack stable social support networks (some patients didn't feel they needed VHW support as they had reliable treatment supporters)
- Ensuring that patients receive refresher treatment literacy education (some patients reported feeling too unwell at the point of treatment initiation to effectively absorb the information health workers were trying to communicate with them)
- Tailoring reminder SMS messages to the specific needs and preferences of patients

*"I was in the dark and thought something different about the medications, that they might have side effects...the [counseling] session helped me to accept the treatment and that there was a chance to live."*

Patient at a health facility implementing the START intervention

## IMPLICATIONS

In this large, cluster-randomized implementation science trial, we found that a multi-component intervention that addresses the different types of barriers inhibiting TB/HIV patients' access to quality care resulted in higher rates of ART initiation and TB treatment success, and a shorter time to ART initiation. Further, the intervention was found to be acceptable to both patients and health providers. The study's findings highlight that:

- Key programmatic barriers can be addressed by providing nurses with focused training on TB/HIV patient management and regular mentorship, and introducing user-friendly job aids that serve as a regular reminder to nurses of key TB/HIV clinical algorithms.
- Key structural barriers can be decreased by reimbursing TB/HIV patients and their treatment supporters for the cost of transportation to the clinic, and providing patients with cellphone airtime vouchers to cover the cost of mobile communication with health workers.
- Key psychosocial barriers can be addressed by capacitating facility- and community-based lay health workers to provide ongoing psychosocial, disclosure, and adherence support to TB/HIV patients; providing these health workers with job aids that are easily understood and incorporate culturally relevant graphics; taking specific measures to ensure effective linkages and communication between facility- and community-based providers; and utilizing mobile technology to enhance patient adherence.



A lead village health worker uses her cell phone to contact a TB/HIV patient to find out why he missed his most recent clinic appointment.

## 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 4,980 health facilities around the world. More than 2.3 million people have received HIV care through ICAP-supported programs and over 1.4 million have begun antiretroviral therapy.

Online at [icap.columbia.edu](http://icap.columbia.edu)

Photography by Jake Price

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