



USING MHEALTH TO SELF-SCREEN AND PROMOTE TB AWARENESS IN TANZANIA

PROJECT CONTEXT

Tanzania is among the top 30 countries with a high tuberculosis (TB) burden, with an incidence of 154,000 TB cases, according to the World Health Organization's 2017 estimate. The TB treatment success rate is high at 90 percent, but one of the main challenges in controlling the epidemic is the high number of people with TB who are missing. Despite the high incidence, there is a lack of TB awareness among the general population that contributes to low case notification rates. In 2017, 69,818 cases were notified, equivalent to a 44 percent case detection rate.

The National Tuberculosis and Leprosy Control Programme's (NTLP) fifth strategic

plan lists among its primary objectives to increase case notification rates by 29 percent by 2020. In alignment with this priority, one of the main objectives of the USAID-funded Challenge TB project in Tanzania is to reach communities to increase awareness and demand for TB services. As most families in Tanzania have access to at least one mobile phone, mobile health (mHealth) technology is an opportunity to reach high numbers of people across the country in both urban and rural settings. Through Challenge TB, PATH partnered with the NTLP and Cardno Tanzania to develop a mobile application that allows people to self-screen for TB using a basic mobile phone to increase knowledge and awareness.



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CHALLENGE TB

STRATEGIC APPROACH

The government of Tanzania prioritizes the use of digital interventions in several complementary national strategies. The Ministry of Health, Community Development, Gender, Elderly and Children (MOHCDGEC) outlined its framework and strategic objectives for using digital technology to improve health services as stated in *National eHealth Strategy* (2013–2018) and the *Tanzania Digital Health Investment Road Map* (2017–2023), which was launched in 2016. The *National eHealth Strategy* lists under one of its strategic initiatives the promotion of mHealth services to provide accurate information to patients, especially for health high-priority areas such as TB. Both the eHealth strategy and the investment road map also underscore the importance of building on existing work and collaborating with various stakeholders in a coordinated manner to avoid duplication of efforts, which the NTLP's *National Tuberculosis and Leprosy eHealth Guide* (developed with support from Challenge TB) is aligned with. To ensure Challenge TB's application was responsive to the national strategic approach, the mHealth activities conducted were designed with the various national frameworks in mind and as such enlisted partners whose existing work was particularly well placed to adapt prior mHealth experience that could be leveraged for the TB context.

In support of the NTLP's objective to introduce digital health tools to improve TB services, PATH and Cardno Tanzania's mHealth Tanzania Public-Private Partnership program collaborated to develop two applications. The resulting innovation was the development of TAMBUA TB,¹ a mobile phone application that uses the MOHCDGEC's mHealth platform to send messages through basic mobile phones with information about TB and how to check for symptoms. The second application is for treatment adherence.

APPLICATION DEVELOPMENT PROCESS

STAKEHOLDER ENGAGEMENT

The TAMBUA TB application development process was a rigorous and iterative collaborative effort. Challenge TB convened key stakeholders through a series of workshops that included various staff from different departments from within MOHCDGEC, including NTLP, and information and communications technology (ICT) and health promotion staff from both. Other important participants included TB and HIV program implementing partners, District TB and Leprosy Coordinators, and health facility staff, among others, to gather inputs from experts with vast experience in TB programing, mHealth solutions, and national clinical guidelines. The workshops took place over more than a year throughout various phases of the application design, launch, and modification process post-launch. Discussions during the workshops included brainstorming and developing the content for the messages, ensuring information is in compliance with national clinical guidelines, pretesting messages, troubleshooting, and determining the implementation approach for the application's launch and rollout.

1. TAMBUA TB is also the name for the second application for treatment adherence.

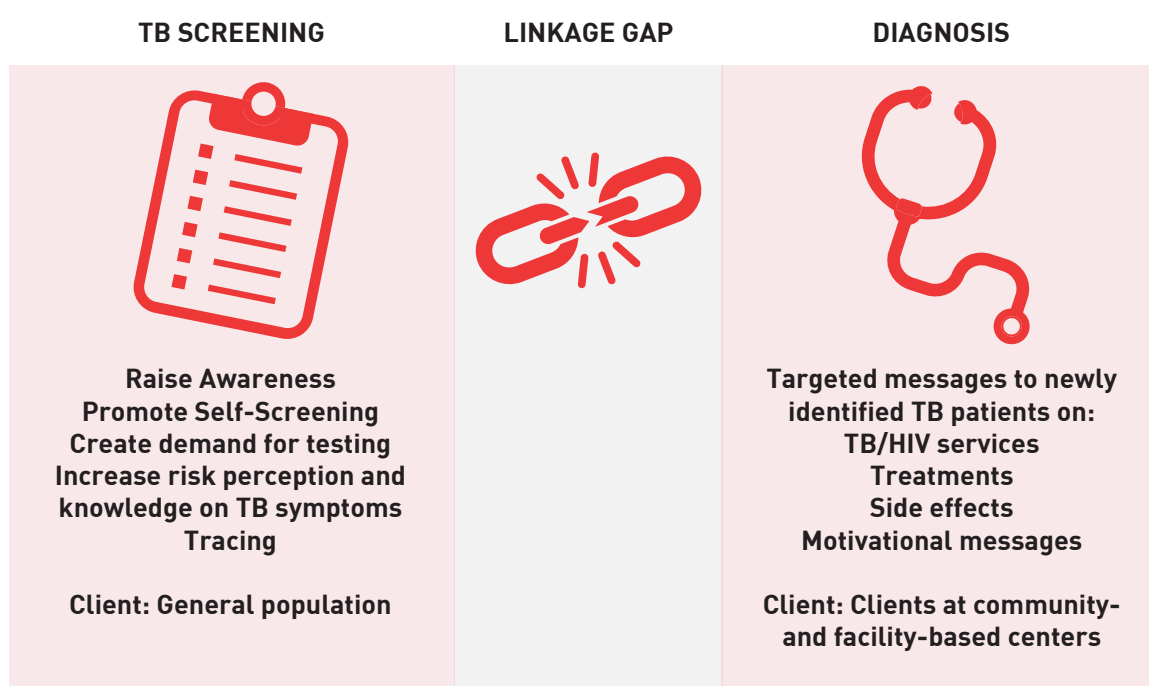
KEY ACTIVITIES DURING THE DEVELOPMENT PROCESS:

- Collaboration between NTLP, PATH, and Cardno Tanzania to develop an mHealth concept note and work plan.
- Multiple workshops, including convening key stakeholders to develop content for TB information and self-screening messages.
- Gathering technical requirements for the applications in consultation with information and communications technology experts.
- Costing the messages and determining implications for Challenge TB and the government.
- Pretesting messages with intended beneficiaries.

APPLICATION DESIGN

The design for the TB self-screening application was adapted from Cardno Tanzania's maternal health mobile application, "Wazazi Nipendeni," which links pregnant women to prenatal, antenatal, postnatal, and early childhood development services. Applying lessons learned from the maternal health example and aligning with the various national eHealth strategies to build on existing technology and avoid duplication, the approach for the TB application followed a similar pattern in which the TB cascade was outlined, focusing on bridging the gap between screening and diagnosis.

A mobile application using Unstructured Supplementary Service Data (USSD) technology was designed on the MOHCDGEC's mHealth platform and eGov home page. The self-screening application design included the development of several content "tracks"—one set of three tracks includes messages that provide general TB information for individuals who are non-presumptive, and another set of three tracks are for individuals who are assumed to be TB presumptive based on answers to self-screening questions. A total of 56 messages were developed for these tracks, with information according to the age of the person for which the questions were answered. For example, parents can answer screening questions for their children aged 0 to 4 or 5 to 14. Messages were also designed for those aged over 15.



IMPLEMENTATION

LAUNCH AND ROLLOUT

The NTLP officially launched the TAMBUA TB application in September 2018. Since Challenge TB works in six regions, other TB implementing partners in Tanzania committed to supporting a national rollout in regions where there was

no Challenge TB coverage to leverage the presence of other programs and maximize dissemination efforts. To further increase awareness to the general public about the application, Challenge TB promoted it through television, radio, and social media advertisements. Printed informational materials, such as posters and palm cards for self-screening that describe the step-by-step instructions on how to use the self-screening application, were also distributed. Community-based organizations supported by Challenge TB that work with cadres of member volunteers across the various regions to increase TB awareness were

actively engaged in distributing information about the mHealth application within their communities.

SELF-SCREENING QUESTIONS

“Do you regularly get a fever for two weeks or more?”

“Are you sweating more than usual at night?”

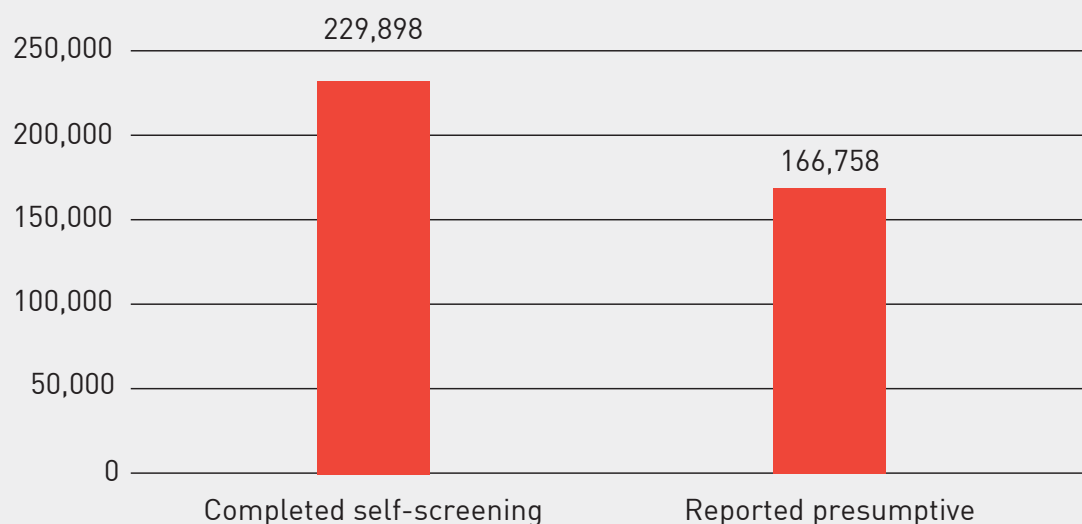
GENERAL TB INFORMATION

“Cover the mouth and nose with a cloth, light paper or hand to cough or sneeze.”

RESULTS

From September 2018 to April 2019, a total of 229,898 individuals have self-screened using the application, and 166,758 were self-reported as presumptive, according to their answers to the screening questions. However, not all who are categorized by the application as presumptive are necessarily presumptive. Usage monitoring revealed that some may use the application to test its functionality and messaging, whether due to mere curiosity or as part of efforts to share information with others, which can lead to inflated numbers that have almost certainly contributed to the total number of self-screenings to date.

Figure 1. Number of people using self-screening application—September 2018 to April 2019.

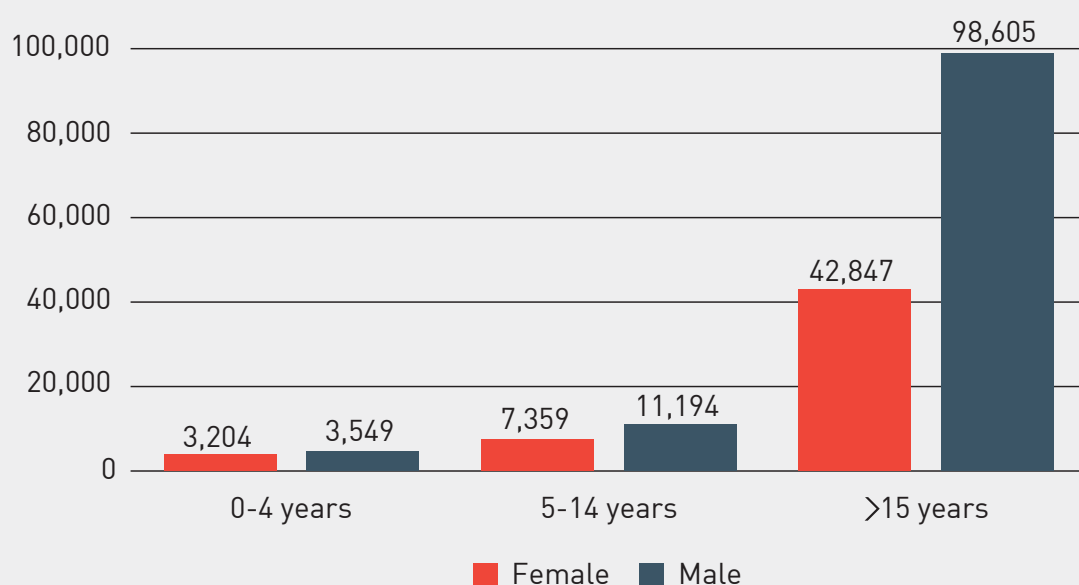


FEEDBACK AND REVISIONS

As part of the iterative and ongoing process to improve the application, Challenge TB continues to work with NTLP and the mHealth Tanzania Public-Private Partnership program to add a component that will facilitate follow-up with those who are presumptive. The update of the application will include contact tracing and referral features, which will help users link to a health facility and ultimately provide a more accurate representation of the actual number of presumptive individuals using the application.

To further strengthen follow-up and linkage efforts, a tailored reporting dashboard was developed for Regional and District TB and Leprosy Coordinators. These dashboards were designed to increase data accessibility to key TB stakeholders, which allows Regional and District TB and Leprosy Coordinators to view the data for potentially presumptive individuals in their respective districts and generate reports that can further support follow-up to bridge the gap from screening to diagnosis.

Figure 2. Sex and age of presumptive individuals according to TAMBUA TB—September 2018 to April 2019.



LESSONS LEARNED

- It is not feasible to expect to follow up with all, or even most, presumptive individuals who use the application, but there should be a strategy to determine what is possible and prioritize given limited available resources. Health care workers already have heavy workloads, and the implications for them should be part of the planning process.
- While the application provides some insights into who may need to be reached to find missing people with TB, the follow-up required to do so is complex, and engaging multiple stakeholders to address this is key. Appropriate resources, both human and financial, need to be considered beyond the intervention launch as technology improvement is an ongoing process.

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BEST PRACTICES

- The development of mHealth and other technologies must include carefully coordinated partnerships with the relevant government stakeholders and other implementing partners to ensure technology-based interventions build off past and current efforts—this is a requirement for sustainability and efficiency.
 - The early successes of the TAMBUA TB self-screening application can be partly attributed to applying the prior experiences and lessons learned of other implementing partners. As part of a mapping exercise to understand mHealth in Tanzania, Challenge TB engaged Pathfinder International and the Elizabeth Glaser Pediatric AIDS Foundation for insights on challenges and key takeaways that informed Challenge TB's approach.
 - The expressed interest of other implementing partners to use the TB self-screening application in other TB programs indicates there is a significant higher likelihood of the application's sustainability beyond Challenge TB.
 - The application was designed on the government's platform, which is an integral component for the sustainability of any application developed in response to government's strategic health priorities.
- Resource planning should include a thorough analysis of the local landscape to determine who might be well placed to contribute support beyond the program initiating the innovation, whether technical, financial, or other. The national eHealth strategy documents emphasize the need to engage local personnel as a core tenet. In alignment with this, the self-screening application was developed in close coordination with the ICT departments from MOHCDGEC and NTLP, as well as other local ICT professionals.
- Government leadership and commitment is essential. NTLP as a key and leading stakeholder in the application development and post-launch of the application was instrumental to facilitating the engagement of the various participants throughout the process; this has contributed to the successful improvements to TAMBUA TB that is expeditiously continuing under the guidance of NTLP and MOHCDGEC.
- The design of any mHealth application should consider existing government systems and the potential for integration. Integration efforts, including across a wide range of health areas, are more likely to be successful when this is part of the early stages of the application design process.