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CHALLENGE TB

TECHNICAL BRIEF

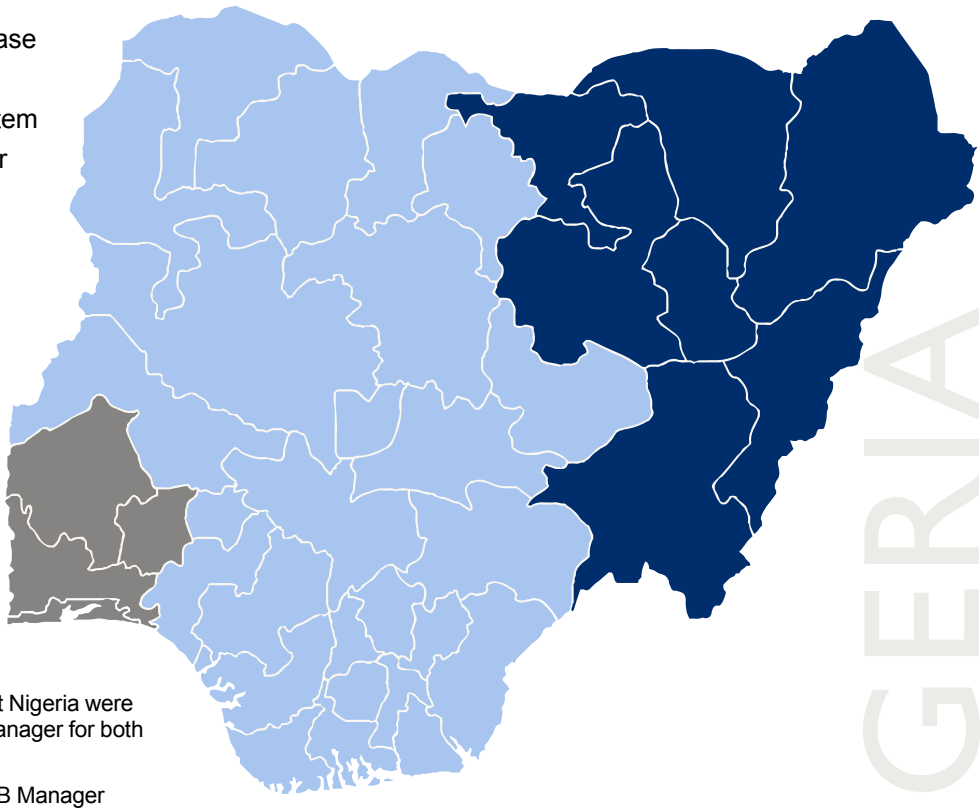
Overcoming the Challenges of Rolling Out e-TB Manager in Nigeria

Training on e-TB Manager for tuberculosis supervisors in Kano, North West, Nigeria

PROJECT CONTEXT

In 2011, an electronic tuberculosis (TB) management system, e-TB Manager, was introduced in Nigeria for drug-resistant TB case management. The e-TB Manager is a web-based, case-by-case real time reporting system for TB patient data. It was initially adopted for recording and reporting drug-resistant TB (DR-TB) data but was harmonized in 2015 to support both drug-resistant and drug-susceptible tuberculosis (DS-TB).[2,3]
The system is accessible to users through a password-protected website. Currently, e-TB Manager cuts across more than 300 high-burden TB DOTS facilities, 16 DR-TB treatment centers, two national and six zonal reference laboratories, and 37 state TB program offices.

FIGURE 1. Implementation of harmonized e-TB manager version in Nigeria



- (4 states- Lagos, Oyo, Ondo & Ogun-, South West Nigeria were pilot states for the harmonized version for e-TB Manager for both DS & DR-TB.
- (26 states- scale-up states) as of today on the e-TB Manager
- (7 states) are the pending states, where we have not rolled out the e-TB manager

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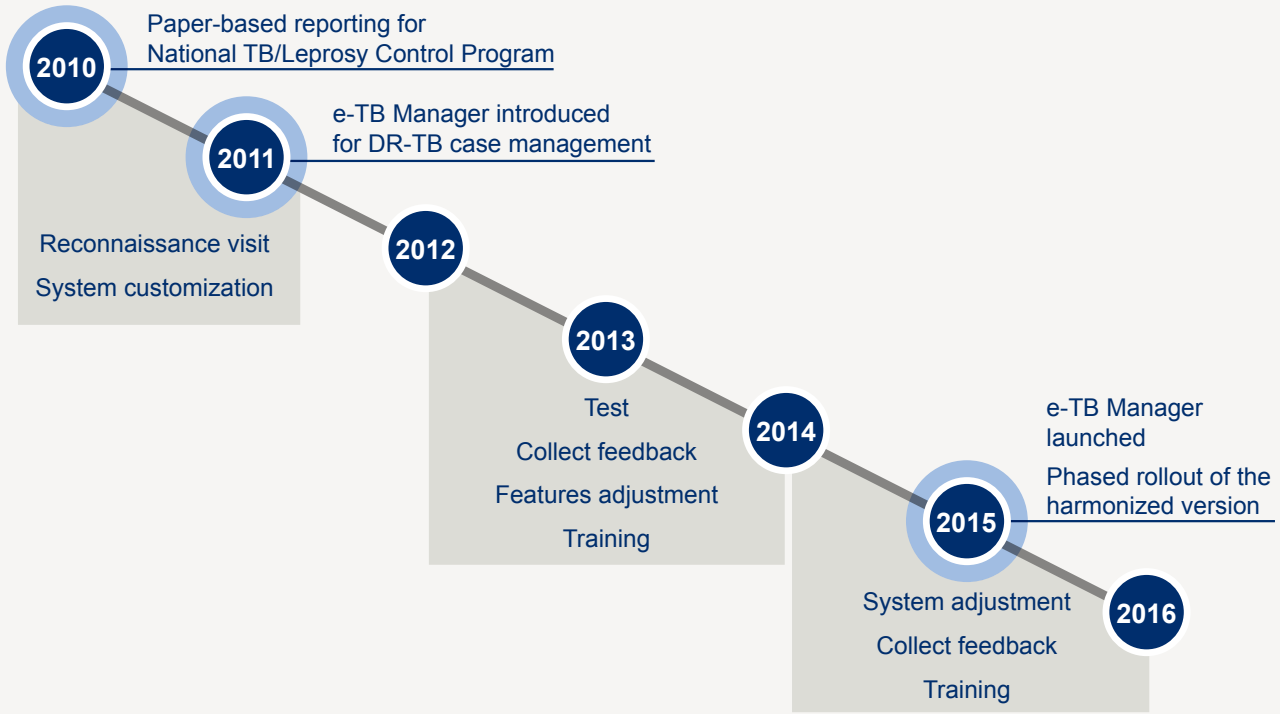
Initially, e-TB Manager was used only for DR-TB patients at one treatment center at the University of Ibadan Teaching Hospital in South West Nigeria, but it has gradually been expanded to other treatment centers as they have opened. By 2016, e-TB Manager was in use in all 16 treatment centers where DR-TB patients are managed. Encouraged by the successful implementation for DR-TB, the process to harmonize and implement the system for both DS-TB and DR-TB patients was launched in 2015 by the Federal Government of Nigeria.[2,4]

FIGURE 2. History of e-TB Manager development in Nigeria



STRATEGIC RESPONSE

In 2011, the Nigerian National TB Control Program (NTP) sought to migrate from paper-based to electronic reporting. Prior to 2011, e-TB Manager was at various stages of implementation in Ukraine and the Philippines, and evidence suggested the significant impact the tool could have when fully operational. This body of evidence and the push by the World Health Organization for countries to start exploring the potential of information and communication technologies necessitated an in-country drive for an electronic tool that could be adapted for digital reporting for TB care and control.[1,4] TBCARE 1 leveraged MSH's capability in software development to offer e-TB Manager, a customized, comprehensive, web-based electronic platform for TB.

e-TB Manager includes five operating units called modules that support the notification of DS-TB and DR-TB presumptive clients and cases; provides first- and second-line TB medicine management; and has a new laboratory module designed to help reference laboratory staff reported completed tests for TB patients across the country promptly.[2]

PROJECT IMPLEMENTATION

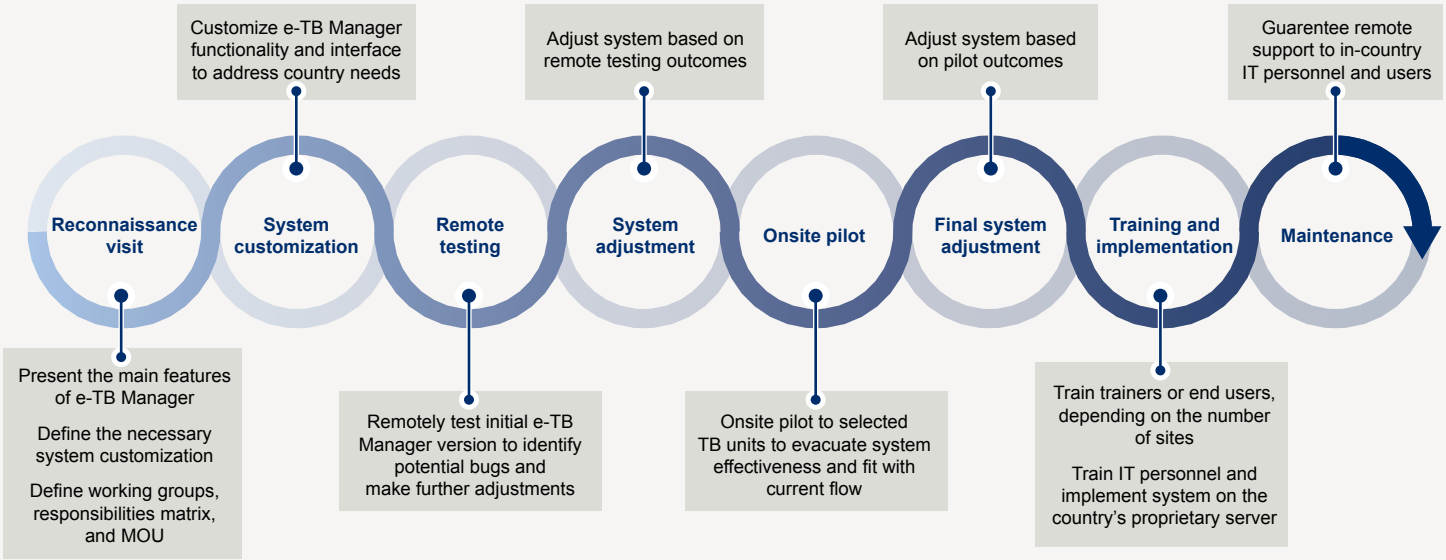
e-TB Manager now has eight implementation models that have been adopted by in-country stakeholders. It is important to note that a key component of a successful implementation is to involve the country team at each step of the process to guarantee country buy-in and ownership. Although challenges were encountered at each stage of the implementation, the MSH team ensured that these challenges were addressed before proceeding to the next step. The following were necessary steps in the implementation of the electronic platform (Figure 3).

Reconnaissance visit: This visit was conducted by MSH's e-TB Manager experts to study the country health system and the operational standards for its TB and DR-TB structure, define working groups, create a responsibility matrix, and sign a memorandum of understanding with the overall aim of adapting the generic version of e-TB Manager to country-specific needs.

The HMH, Dr. Khaliru Al-Hassan, launched e-TB Manager in March 2015.

A major challenge was getting the country to agree on the initial level of customization, what approach should be used in the rollout process, and whether the adoption should be for both DS-TB and DR-TB. MSH supported the country to methodically work through each of these challenges. It was agreed that the initial adoption of the electronic tool should support DR-TB case management only, with a plan to expand the system if the DR-TB implementation was successful.

FIGURE 3. The e-TB Manager Implementation Model



System customization: The generic e-TB Manager was customized to address in-country paper-based reporting needs. In-country stakeholders had multiple requests for customization and refined old requests, which necessitated discussion and delayed the release of the prototypes for the final versions. To address this challenge, a deadline was set after which no new customization or refining of requests would be accepted.

Remote testing: After the deadline for request submissions had passed, e-TB Manager was remotely tested to identify bugs and make any necessary adjustments. Remote testing was initially conducted outside of Nigeria, and as a result, necessary feedback was not provided by target users of the platform and prototype versions did not meet the specifications. The project engaged the services of an in-country TB advisor who worked directly with the e-TB Manager developer to ensure that the agreed-upon specifications were achieved internally before presentation to outside stakeholders.

System adjustment: Skype meetings were regularly organized by the in-country e-TB Manager system implementation team, which comprised MSH-TBCARE and MSH Challenge TB project staff, a TB advisor and trainer, an IT expert, and the e-TB Manager developer, and communicated country-level feedback during testing and proposed adjustments that would help improve the final version.

Dr. Opeyemi facilitating one of the e-TB Manager training sessions.

Onsite pilots: A prototype, country-specific version of e-TB Manager was then deployed to be piloted at one DR-TB treatment center during DR-TB implementation and in four states during the pilot of the harmonized version for DS-TB and DR-TB before scaling-up across the country. Experiences from field testing by in-country end users of the system were gathered during the pilot and helped to inform further customization to improve the system. The aim of the pilot test was to evaluate system effectiveness and fitness within the current workflow of the NTP and to show whether the electronic tool would be acceptable to end users.

Final system adjustment: The system was adjusted based on pilot outcomes and configured to enable future remodeling to improve outcomes and integration into Nigeria's flow of TB data recording and reporting.

Implementation and training: National-level officers of the NTP and other supporting TB implementing partners, including DOTS providers, medical officers, pharmacists, laboratory officers, and program staff, were trained as master trainers on the different operating units of the system. They would then be responsible for conducting country-level training, supportive supervision, and on-the-job mentoring for users of the five operating modules of the system.

Maintenance: During the initial implementation process, the servers were hosted in the MSH Arlington Office and were later move to the cloud, but in-country stakeholders felt that country-level information should be housed within Nigeria. Consequently, during the implementation of the harmonized version, the e-TB Manager server was moved in country. Continued regular support is being provided to in-country IT personnel and the system in general.

RESULTS AND ACHIEVEMENTS

The e-TB Manager was used for DR-TB case management from 2010. The number of active DR-TB cases being managed in the system increased from 23 in 2010[i] to 1,037 in 2016.

Following the launch of the harmonized version of the e-TB Manager in December 2015 by the Federal Government of Nigeria and the subsequent phased roll-out of the platform across the 37 states in Nigeria, the number of presumptives TB patients entered into the e-TB Manager platform increased from 21,104 in 2016 to 123,137 in July,2017; the number of TB and DR-TB cases notified increased from 7,671 to 31,638 and 1,084 to 1017 from 2016 to July 2017 respectively. See figures 4-6.

Other achievements:

- Training of and provision of tablets and desktops for 784 health care workers across 30 states in Nigeria
- Creation of a virtual dashboard that showcases NTBLCP's TB reportable indicators
- Integration of the dashboard to the NTBLCP's website to help increase visibility of tracked national level indicators
- Source of data for WHO annual DR-TB indicators for Nigeria
- Local hosting of e-TB Manager server in-country for country ownership and sustainability
- Adoption of the e-TB Manager as the sole electronic reporting tool for patients-level TB management by the NTP in Nigeria

FIGURE 4. Progress with patients-level electronic reporting in Nigeria

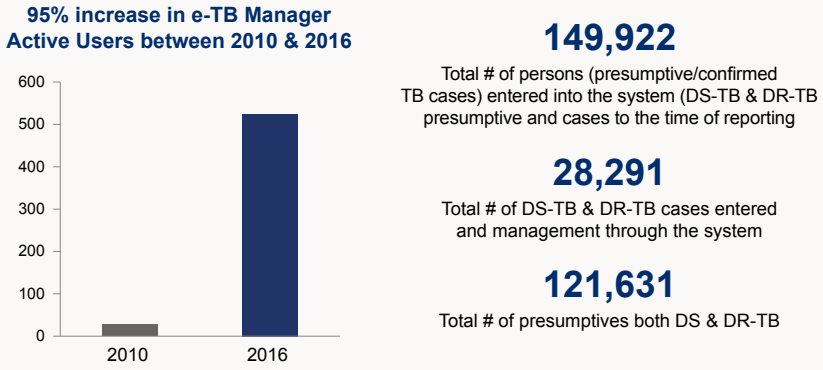


FIGURE 5. DR-TB Patients managed on the e-TB Manager Platform (2010–2016)

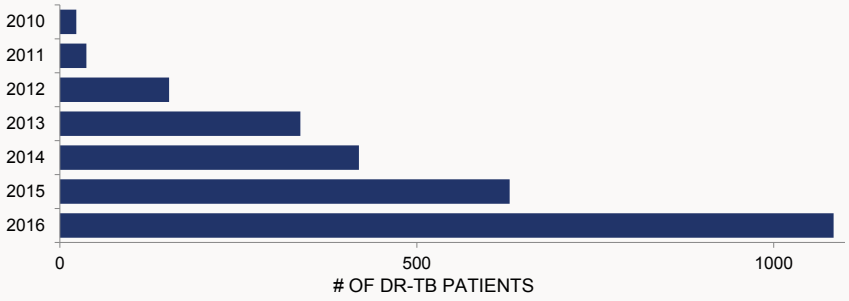
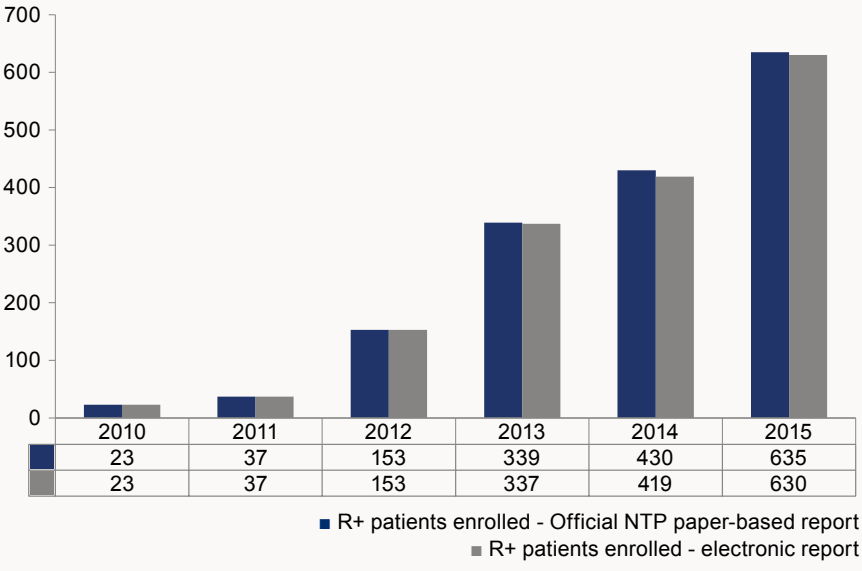


FIGURE 6. Comparison between NTP official DR-TB report Versus Report on the e-TB Manager[ii]



[i] e-TB Manager pilot for DR-TB started in the same facility where programmatic management for DR-TB started in the country in 2010. Users entered retrospective patient data for patients in 2010.

[ii] Before electronic reporting can replace the paper-based reporting system it must be shown that paper-based and electronic reporting are comparable over multiple reporting periods. R+ refers to Rifampicin resistant TB.

CHALLENGES

The challenges encountered during the process of digitalizing TB reporting can be broadly categorized into operational and infrastructural challenges.

OPERATIONAL CHALLENGES

Human resource: The need for change, the methodology of communicating that need, and the reluctance of users to adapt to the new technology slowed the process. This was further complicated by low computer literacy among TB program users. Users often had to multitask because they were required to attend to both TB needs and the needs of other health programs, such as HIV, malaria, and immunizations.

Program: e-TB Manager had to be adapted to reflect the NTP's frequently changing paper-based recording and reporting system, which made it difficult for users to become familiar with the tool.

INFRASTRUCTURAL CHALLENGES

Internet service: The access and availability of internet service in Nigeria is limited. Urban areas have service providers, but rural settings often have limited or no access to the internet, making it difficult to upload data into e-TB Manager.

Computers: Most of the supported facilities do not have computers. With support from implementing partners in the TB control program in Nigeria, some facilities were provided with tablets.

LESSONS LEARNED

The e-TB Manager implementation began in 2011 with one DR-TB facility at the University of Ibadan Teaching Hospital and fewer than 30 users across the service providing areas. Since then, the tool has received wide recognition and gained acceptance across various level of TB service provision. Critical factors that have aided the growing buy-in by stakeholders include:

- ***A commitment by stakeholders to understanding system requirements:*** TBCARE 1 and now Challenge TB made a concerted effort to adjust the e-TB Manager implementation model based on participants' feedback, the NTP's needs, and the implementation experience. The project solicited user feedback on the data that should be collected; changes in paper-based reporting; expected outputs; and clear definitions of users' roles and responsibilities, which were used to determine access rights.
- ***Critical and ongoing customization:*** MSH's generic version of e-TB Manager was used, but the system underwent critical and ongoing customization to reflect Nigeria's paper-based reporting system, address gaps reported during pilots, and meet the needs of the NTP and end users. In addition to the basic features of e-TB Manager for DS-TB and DR-TB presumptive clients and case, the tool was remodeled to reflect the NTP's paper-based quarterly reporting templates to simplify report generation by primary users.
- ***Flexible implementation approach:*** e-TB Manager and the approach to implementation have remained flexible by responding to the needs of participants at the various trainings and their informal evaluations of each new e-TB Manager module that has been introduced.
- ***System pilot for each version of e-TB Manager:*** Following the acceptance of a newly introduced and upgraded version of the electronic tool, capacity building of target users in the country was done in a phased manner to allow for skilled and experienced facilitators to deliver the trainings. When capacity was an issue, a group of master trainers was trained to help deliver the same quality of training. Such pilots also allowed for bugs to be reported and fixed.

Acknowledgements

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WAY FORWARD

e-TB Manager is a well-structured TB surveillance tool that has served the NTP well. Its implementation has benefitted the TB program by improving access to useful information. It is receiving recognition and is accepted by health care workers, particularly TB supervisors at the subnational level and TB program managers at the national level. The platform is currently undergoing a revision to allow for an offline version that will ensure continuous data entry without internet connectivity, thereby allowing health units to notify and follow-up with presumptive clients and cases even when internet connectivity is lacking. This offline mode is being developed for Android mobile devices and tablets. The system uses an open source solution to allow for ease of adaptation and integration with other platforms.

According to the World Health Organization, the potential of information and communication technologies for TB control is largely untapped. The potential of e-TB Manager has not been fully maximized in-country because of the challenges mentioned above, but efforts are under way to ensure that the system is institutionalized and that infrastructural challenges, such as limited internet connectivity, are addressed through the development and deployment of the offline version.

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