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TB CARE I - Mozambique Final Report

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Cover photo: A group of community volunteers during a community outreach program – education sessions, Gondola district of Manica Province. (Photo: Algy Cassamo Abdula)

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List of Abbreviations

AFB	Acid-Fast Bacilli
ACSM	Advocacy, Communication and Social mobilization
APE	<i>Agente Polivalente Elementar</i> (Elementary Community Health Agent)
ARV	Anti-Retroviral therapy
CDR	Case Detection Rate
CB-DOTS	Community-Based Directly Observed Treatment—Short Course
CMAM	<i>Central de Medicamentos e Artigos Médicos</i> (Central Medical Stores)
CXR	Chest X-ray
DR-TB	Drug-Resistant Tuberculosis
EOA	External Quality Assurance
FHI 360	Family Health International
FAST	Finding cases Actively, Separating safely, and Treating effectively
GDF	Global Drug Facility
GF	Global Fund to Fight AIDS, Tuberculosis, and Malaria
HCW	Health care workers
HSS	Health System Strengthening
IA	Implementing Agency
IEC	Information, Education and Communication
IPT	Isoniazid preventive therapy
KNCV	KNCV Tuberculosis Foundation
MDR-TB	Multi-drug resistant TB
M&E	Monitoring and Evaluation
MOH	Ministry of Health
MSH	Management Sciences for Health
NMCP	National Malaria Control Program
NGO	Non-governmental organization
NRRL	Nampula Regional TB Reference Laboratory
NTP	National Tuberculosis Control Program
OR	Operations Research
PD	Pharmacy Department
PMI	President's Malaria Initiative
PPD	Purified Protein Derivative
SOP	Standard Operating Procedures
TA	Technical Assistance
TB	Tuberculosis
TB CAP	Tuberculosis Control Assistance Program
TSR	Treatment Success Rate
TST	Tuberculin Skin Test
USAID	United States Agency for International Development
USG	United States Government
WHO	World Health Organization
XDR-TB	Extreme Drug Resistant TB
ZN	Ziehl Neelsen
APA	Annual Plan of Action
CXR	Chest X-Ray
ERR	Electronic recording and reporting
CHW	Community health worker

DQA	Data quality assurance
DST	Drug Susceptibility Testing
DPS	<i>Director Provincial de Saude</i> (Provincial Health Directorate)
HF	Health facility
EP	Extra-pulmonary
ICF	Intensified case finding
IC	Infection control
MOU	Memorandum of Understanding
PMDT	Programmatic management of drug resistant TB
NPO	National Program Officer
PPM	Public-private mix
PCA	Patient Centered Approach
Xpert	GeneXpert MTB/RIF
WB	World Bank
LED	Light emission diode
TWG	Technical Working Group
SS+	Smear sputum positive
NRLT	National Reference Laboratory for Tuberculosis
TOT	Training of trainers
F&Q	Forecast and Quantification
MTB+	MDR-TB positive

Executive Summary

The TB CARE I project is a five-year United States Agency for International Development (USAID)-funded global project implemented by a coalition of partners led by KNCV Tuberculosis Foundation (KNCV), the prime recipient. The project builds and expands upon previous USAID-funded tuberculosis (TB) prevention and treatment efforts, particularly the Tuberculosis Control Assistance Program (TB CAP), which was implemented from 2006 to 2010 in many countries, including Mozambique.

Family Health International (FHI 360) was the lead partner for the TB CARE I project in Mozambique. Other coalition partners for TB CARE I-Mozambique project are KNCV, Management Sciences for Health (MSH) and the World Health Organization (WHO). FHI 360's main mandate under TB CARE I-Mozambique was to provide technical assistance to the National TB Program (NTP), focusing on the following technical areas: universal access with emphasis on Community Based Direct Observed Treatment Strategy (CB-DOTS), laboratories, TB/HIV, health system strengthening (HSS), monitoring and evaluation (M&E), surveillance and operational research (OR). MSH lead efforts to improve the laboratory network to increase its capacity to test more TB suspects and strengthen TB drug management. WHO provided technical assistance for HSS and KNCV provided technical support in programmatic management of drug resistant TB (PMDT) and advocacy, communication and social mobilization (ACSM). In addition to TB, the TB CARE I project in Mozambique provided national-level support to the National Malaria Control Program (NMCP) from 2010 to 2013, with some activities completed in 2014. Mozambique is the only TB CARE I country project that supported malaria interventions. The assistance provided to the NMCP was funded through the President's Malaria Initiative (PMI) of the US Government (USG).

The TB CARE I project used a combination of strategies which included building partnerships with other implementing organizations, and applying an integrated approach to address the challenges posed by TB and malaria. The TB component of the project was implemented in 7 out of 11 provinces while the malaria component was implemented throughout the country.

At the country level, the project was managed by a technical team based in Maputo, supported by three provincial technical officers based in Zambézia, Gaza and Nampula, where the project had a significant number of activities compared to other target provinces. These are the project priority provinces given the large population size which relates to higher numbers of expected TB cases, project coverage in terms of numbers of districts and limited access to health facilities for the population.

The total project buy in amount was \$20,925,696 of which about 40 percent was budgeted under universal access with most of the funds used to support the CB-DOTS program, and 20 percent was budgeted for the laboratory technical area, focusing on expansion of the country laboratory network with priority given to the rehabilitation and equipping of peripheral laboratories with new technologies for improving diagnosis.

As a response to the NTP strategic plan to expand CB-DOTS coverage, the project in partnership with local implementing agencies supported the consolidation and expansion of CB-DOTS implementation to 53 districts in 7 target provinces. Consolidation was done in the 25 districts covered through TB CAP with expansion to 28 new districts. In total, 52% of the national population was covered by CB-DOTS with support from TB CARE I.

Through collaboration with 9 local implementing agencies, a total of 4,532 Community based Health Workers (CHW) including community volunteers and traditional healers, 742 health technicians, 55 Elementary Community Health Agents (APE) and 85 Implementing agency (IA) field officers were trained in CB-DOTS, with a focus on improving case detection and achieving treatment success for patients supported by CB-DOTS. In addition, 130 nurses were trained on slide fixation as a short term strategy to expand access to the laboratory network in peripheral health facilities. To support CB-DOTS activity implementation at all levels, supportive supervision visits were carried out throughout the project period with on-the-job training and mentoring of CHWs and Health Care Workers (HCW). Moreover, Information, Education and Communication (IEC) materials were reproduced and distributed by trained CB-DOTS personnel (includes CHW and HCW) to increase awareness. The

project also procured motorbikes to support CB-DOTS activities at district and peripheral health facilities especially for supervision activities. These activities have contributed to increases in some of the NTP core indicators as outlined below:

- Nationally, the number of cases notified (all forms) increased from 47,452 cases in 2011 to 53,272 cases in 2013. The number of notified smear positive new TB cases increased from 19,537 to 23,115, the treatment success rate of confirmed TB cases from 85.2% to 87%, the number of multi-drug resistant TB (MDR-TB) cases diagnosed from 184 to 359 cases and those put on treatment from 146 to 313 cases. Over the life of project, TB CARE I contributed an average of 35% of all cases identified in target provinces. Remaining challenges include the need to increase the case detection rate (CDR) further to the national target of >70% in 2017 and to ensure that >45% of all MDR-TB cases diagnosed are initiated on treatment (NTP Strategic Plan 2014-2017 and NTP Annual Report 2013).
- The number of pediatric TB cases diagnosed increased from 2,822 in 2013 to 4,294 in 2014, a 52% increase. The proportion of cases that were pediatric cases also increased, from 5.8% to 10.7%. The resulted from Pediatric TB training conducted by NTP with support from TB CARE I. A total of 211 participants (89 female and 122 males) in 3 provinces were trained. Participants comprised district levels pediatric TB focal points, child and maternal health care nurses, nurses working in the children at high risk departments, nurses in pediatric wards (internal admissions) and nurses working in child health. The training aimed to address providers at all entry points in health facilities to increase suspect identification and screening of unsuspected TB cases among children, especially contacts of TB patients.

Other important achievements of the project include:

- Rehabilitation and equipping of the Nampula Regional TB Reference Laboratory (NRRL) for GeneXpert, culture and Drug Susceptibility Testing (DST) of first-line drugs in 2011. This will facilitate the decentralization of culture and DST to the Northern region of the country. With the full functioning of the NRL, the turnaround time for results of drug resistant TB (DR-TB) tests, time to initiation of treatment, and mortality among DR-TB patients between diagnosis time and starting treatment are expected to decrease. Between January and December 2013, 511 culture samples were processed, of which 150 were positive.
- The project also supported the introduction of new diagnostic technologies (3 GeneXpert MTB/RIF (Xpert) platforms and 60 LED microscopes). Distribution of the equipment was based on NTP priority ranking of sites and the three Xpert units were all installed in the project target areas. A total of 3,984 tests done between October 2012 and June 2014, with 865 being MDR-TB positive (MTB+), 191 of which were rifampicin resistant.
- The antimalarial Drug Efficacy Study was successfully accomplished during the project. A comparative analysis of malaria case management indicators shows that the percentage of severe malaria cases managed according to national guidelines increased for both arms. Treatment with Quinine increased from 60 to 90% and treatment with Artesunate increased from 20% to 65%. In addition to the Study, In addition to the Study, the malaria component of the TB CARE I Mozambique project strengthened malaria diagnosis and treatment through training 1,137 laboratory technicians (94.7% of all laboratory technicians nationally in 2011) in malaria laboratory diagnosis and laboratory management, including external quality assurance. Moreover, the project trained 1,250 clinicians in clinical diagnosis to ensure accurate malaria diagnosis at facility level. Supportive supervision visits were also conducted for both laboratory and clinical services in all provinces of the country.

Introduction

The TB CARE I project in Mozambique is implemented through an FHI 360 led coalition with KNCV, MSH and WHO. The project covered 53 districts in seven provinces of Mozambique, representing 68% of the population in the target provinces and 52% of the total population in the country.

The project activities planned under the eight TAs (universal access; laboratories; infection control; PMDT; TB/HIV; HSS; M&E, Surveillance and OR; and drug supply and management) were drawn from gaps identified by major TB control stakeholders in the country led by the NTP (coalition partners and other Ministry of Health (MoH) partners) based on a situational analysis and the NTP strategic plan (2008 – 2013). Main priority areas addressed were: (1) expansion of institutional and CB-DOTs, with the aim to increase TB case detection, patient follow up and Treatment Success Rate (TSR); (2) improvement in the implementation of TB/HIV collaborative activities, with emphasis on expanding access of Anti-Retroviral (ARV) drugs to all co-infected patients; (3) improvement of programmatic management and TSR of DR-TB, with emphasis on MDR-TB, Extensively Drug Resistant TB (XDR-TB) and activities to prevent development of DR-TB in sensitive TB patients; (4) improvement of diagnostic services at all levels; (5) strengthen the health system to offer quality TB service and universal access to a larger number of patients and (6) strengthen the NTP M&E system in order to improve data quality collection and recording of all program indicators and increase OR activities to guarantee that NPT decisions and strategies are developed by evidence based responses.

Technical assistance and support for the eight technical areas was divided among the coalition members as following: FHI 360 support across all eight areas, with the exception of drug management. The major effort was focused on universal access (CB-DOTS) and laboratory strengthening. MSH focused in three main areas: universal access, laboratories, and drugs supply and management. Under Universal Access, MSH implemented Standard Operating Procedures (SOPs) in 13 selected hospitals in Gaza and Nampula provinces with the objective of increasing the TB case detection rate. Under Laboratories, support was mostly on provision of technical assistance (TA) to the FHI 360 laboratory officer and provision of assistance to the NTP in policy development and training. KNCV provided TA for PMDT, Universal access (ACSM) and M&E. WHO was mostly oriented towards M&E with an in-country National Program Officer (NPO) contracted to support the NTP M&E department.

FHI 360 contracted three provincial officers to support the Provincial level NTP department. The provincial officers supported the Provincial Department of Health (DPS) activity planning process. TB CARE I also worked through IAs in communities to implement the CB-DOTs project. In provinces where the project had technical officers supporting directly activity implementation especially CB-DOTS, projects results attained were better compared to provinces where the project depended on support from other FHI 360 project staff cost shared to provide partial support to TB CARE I. A lesson learnt for future project design.

Mozambique is the only TB CARE I country program implementing both malaria and TB interventions. Though funded ended in year 3, activity implementation continued into year 4 as activity carryover was approved. The malaria activities were funded through the PMI and the project provides national-level assistance to the NMCP. The main three components to the malaria program included: TA to the NMCP with a focus on M&E, training of laboratory technicians in all the 11 provinces and implementation of an antimalarial Drug Efficacy Study.

Malaria support staff (contracted by FHI 360 to support the NMCP) was located at NMCP 4 days a week, with one day reserved for planning and reporting at the FHI 360 office. The WHO NPO and MSH Drug Management specialist for the NTP were located at the NTP. Co-locating with NTP and NMCP provided a mechanism for day-to-day support and assistance to the programs. Other project staff would normally support the NTP in technical working groups.

Core Indicators

TB CARE I has seven core indicators that the program is working to improve across all countries. Table 1 summarizes the core indicator results across the life of the project for TB CARE I-Mozambique, as well as the TB CAP, the precursor to TB CARE I, which our coalition also led.

Table 1: TB CARE I core indicator results for Mozambique – NTP Data

		C1. Number of cases notified (all forms)	C2. Number of cases notified (new confirmed)	C3. Case Detection Rate (all forms)	C4. Number (and percent) of TB cases among healthcare workers	**C5. Treatment Success Rate of confirmed cases	C6. Number of MDR-TB cases diagnosed	C7. Number of MDR-TB cases put on treatment
	2005	33,718	N/A	48%	N/A	79%	N/A	N/A
TB CAP	2006	35,632	18,275	50%	N/A	82%	129	48
	2007	38,044	18,214	47%	N/A	N/A	163	97
	2008	39,735	18,824	50%	N/A	81%	200	136
	2009	45,493	17,019	53%	N/A	84%	145	137
	2010	42,126	20,097	53%	N/A	85%	165	87
TB CARE I	2011	47,452	19,537	49%	N/A	85%	184	146
	2012	50,270	20,951	50%	N/A	86%	283	215
	2013*	53,272	23,115	51%	144	N/A	359	313

*new case definitions used since 2013

In general, under TB CARE I, performance increased. The number of cases notified and confirmed increased as did the treatment success rate and the number of MDR-TB cases both diagnosed and put on treatment. The increase in all cases of TB notified between, 2011 to 2013 can be associated with consolidation and expansion of CB-DOTS strategy, training of clinicians in TB case management and expansion of laboratory network including the use of new technologies in TB diagnosis. The challenge remains to increase CDR to the country target of 75% (NTP National Strategic Plan 2014 to 2018) and the initiation of treatment for all MDR-TB cases diagnosed.

Universal Access

For universal access, FHI 360, KNCV and MSH worked together to increase demand for TB services with FHI 360 leading in the consolidation and expansion of CB-DOTS services.

Technical Outcomes

#	Outcome Indicators	Indicator Definition	Baseline (Year/ timeframe)	Target	Result
				Y4	Y4
1	Number of facilities where quality of services is measured	NTP should measure the patient perception of the quality of services available/accessible and the appropriate health seeking behavior related to TB	50 (Year 3)	53	53 3 new facilities were covered with CB-DOTS in APA4 which was an increase from 36 in APA1, 45 APA2 and 50 in APA3. The main district health facility in each participating district was usually engaged.
2	TB personnel trained on the Patients' Charter	This WHO indicator measures the number of staff trained on the use of the patient charter in the last year.	38 (Year 3)	400 (25 districts to be covered; 150 health technicians + 250 Community health workers to be trained)	1,247 Trainings were conducted by CB-DOTS IA staff. After target setting, a decision was made to focus on CHWs who were the focus of the Community IC strategy. All CHW were trained in the 25 districts covered by the strategy, thus substantially exceeding the target.
3	Status of Public-Private Mix (PPM) implementation	This indicator measures the status of the PPM strategy and interventions	n/a	1 (support in the realization of one PPM National meeting)	The planned meeting was not held due to competing priorities of NTP.
4	Children younger than 5 (contacts of sputum smear positive (SS+) adults) that were put on Isoniazid preventive therapy (IPT)	This indicator measures the number of children under five years of age who are contacts of SS+ adults and were put on IPT. This is a WHO indicator	10,700 (Year 3)	12,000	A total of 11,392 SS+ contacts, children under 5 were put on IPT treatment in 2013 nationwide.
5	Childhood TB approach implemented	This indicator measures the level to which childhood TB is addressed in the NTP's strategy	Yes	Yes	Training provided to 211 clinicians to provide support in childhood TB case management, including diagnosis and treatment.

#	Outcome	Indicator	Baseline	Target	Result
6	Number of TB cases (all forms) diagnosed in children 0-4	This indicator measures the number of TB cases (all forms) diagnosed in children 0-4 years of age. When childhood TB is a priority, being able to report on and measure changes in case notification by age group is important.	3,890 (Year 3)	4,223	2,705 (Jan to June 2014)
7	Prisons with DOTS	This indicator measures the coverage of prisons providing DOTS services. Prisons should regularly diagnose and refer suspects and should put treatment in order to be qualified as providing DOTS.	n/a	7 (3 main regional prisons + 4 provincial)	Activity not realized as IEC materials meant for prison settings were not finalized due to competing priorities at the NTP. However, activities in prisons, especially awareness education were conducted through CB-DOTS volunteers.
8	CB-DOTS program is implemented	This indicator measures the level of implementation of CB-DOTS from introduction to piloting and scaling up	50 districts covered with CB-DOTS (Year 3)	53	Expansion to 3 more districts (Caia, Muecate and Tsanganano)
9	Population covered with CB-DOTS	This indicator measures CB-DOTS coverage by looking at the proportion of the national population CB-DOTS is servicing	11,467,170 (Year 3)	11,947,651	12,145,595 which is equivalent to 51.2% of the country population.
10	Health facilities offering CB-DOTS services	This indicator measures CB-DOTS coverage by looking at the percentage of health facilities providing CB-DOTS services	60% (637/1057) (Year 3)	61% (659/1089)	62% of health units within TB CARE districts have CB-DOTS, representing 52% in terms of national coverage of facilities.
11	<i>National ACSM strategy finalized</i>	The ACSM strategy developed and approved by the Ministry of Health (MOH)	National Strategy to be finalized	Finalized and merged with NTP community engagement strategy. Pending MOH approval.	Support provided by KNCV ACSM Consultant and a local consultant in finalizing the Community Engagement Strategy which incorporated many of the ACSM National strategy components.

#	Outcome	Indicator	Baseline	Target	Result
12	Number and % of mining companies which have TB listed as a priority in health plans and have signed an memorandum of understanding (MOU) with NTP Numerator: # of mining companies which sign the MOU Denominator: total # of registered mining companies	All mining companies committed in the control of TB by guarantying that TB diagnosis, care and treatment services are embedded in their health plans and implemented in their clinics through coordination with NTP at provincial and central level	N/A	75% (6/8) of all registered mining companies actively involved in TB control	Not realized due to NTP competing priorities. NTP/TB CARE I elaborated a list of existing major mining companies to participate in a workshop where MOUs were to be discussed and signed.
13	% increase in TB case detection through implementation of Hospital based SOPs to enhance health workers capacity to diagnose TB	n/a	n/a	One province, 3 health facilities (increase of 15%)	8% increase in TB case detection through implementation of Hospital based SOPs in Gaza province (May to Aug 2014) 13% increase in TB case detection through implementation of Hospital based SOPs in Nampula province (Aug to Sept 2014)

Key Results

Community DOTS

The project supported the NTP in expanding the CB-DOTS strategy to 28 additional districts, reaching a total of 53 districts by the end of project. Four thousand five hundred and thirty two (4,532 CHWs, 3,353 volunteers, 1,039 traditional healers, 55 health extension workers (APEs) and 85 field officers, and 18 project officers were trained to support the scale up over the life of the project. Seven hundred and forty two (742) peripheral health facility nurses were trained to support CB-DOTS volunteers through regular follow up and monitoring of volunteer activities. In addition, 130 nurses were trained in slide fixation as a way to expand access of the laboratory network.

Having CHWs provide CB-DOTS services on a volunteer basis supported the project in increasing the demand for TB and Malaria services. This approach proved vital in linking the community to health facilities, especially in rural communities.



A CB DOTS home visit to a beneficiary and her husband who is also her treatment supporter. Conducting the visit are 2 community volunteers and the NTP district supervisor visited

The CHWs act as a link between families and health facilities in the community. They are respected and generally accepted, especially in rural communities. They play a critical role especially in communities where the nearest health facilities are many kilometers and transport systems are weak or non-existent.

The trained CHWs referred a total of 99,600 presumptive TB cases to health facilities during the 4 years of project implementation. Of these, 95,931 (96%) successfully reached a health facility for TB diagnosis and treatment (Graph 1).

Graph 1: Presumptive cases referred by CHWs and reached the HF during project implementation – 2011-14



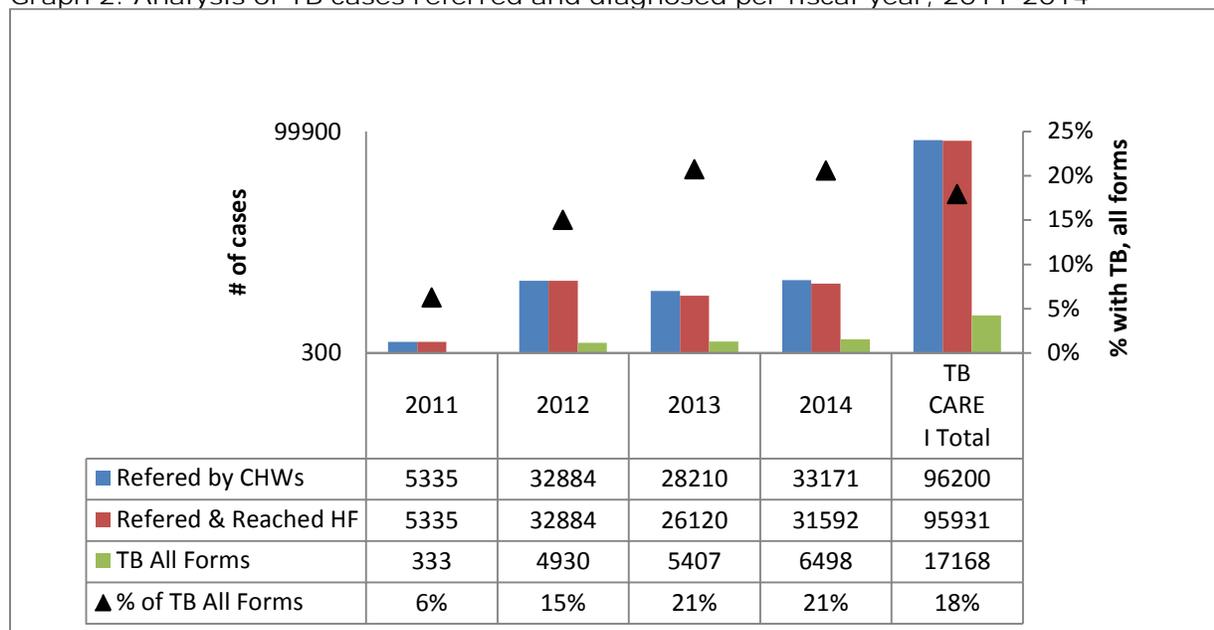
Note: 2014 data covers October 2013 to June 2014

The number of presumptive cases referred to the health facilities for TB services increased by more than five-fold between 2011 and 2012 (from 5,335 to 32,884) as the result of expansion of TB CARE I from 25 to 36 districts combined with the training of CHWs and IA field staff, increased frequency of support visits and improvements in data capturing and reporting. Unfortunately, the number of cases fell by 20% in 2013 as a result of political instability in two of the seven project target provinces (Sofala and Zambézia) and flooding in the southern region that affected Gaza province. In all, 24 of the 50 districts covered by the project in 2013 were affected by these problems. However, in 2014, performance is on track to vastly outperform 2013, with 21% more cases in the first half of year alone.

Of the total presumptive TB cases that reached health facilities (HF), 17,168 (18%) were diagnosed with TB (all forms). Among them, 65% (11,170) were diagnosed as bacteriologically confirmed TB and

35% (5,998) were clinically diagnosed or had extra-pulmonary (EP) TB. CHWs traced 9,182 contacts during the life of project.

Graph 2: Analysis of TB cases referred and diagnosed per fiscal year, 2011-2014



Over 99% of presumptive cases referred by TB CARE I CHWs successfully reached and received TB services at HFs (Graph 2), with 18% diagnosed with TB (all forms) and promptly put on treatment and received community follow up through CB-DOTS activities. The proportion of TB patients identified through CHWs in target districts was 11% (333/2,989) in 2011, 34% (4,930/14,602) in 2012 and 30% (5407/17,814) in 2013.

Intensified Case Finding (ICF)

To increase TB case detection, the project with MSH support provided technical assistance to the NTP in piloting the use of SOPs for TB case detection in 13 selected health facilities (3 in Gaza and 10 in Nampula). The strategy focused on TB case detection in hospital settings by using a simple and quick guide for TB screening. The SOPs were designed based on evidence that most TB suspects in Sub-Saharan Africa visit HFs several times for other health reasons before TB is suspected and diagnosed. The SOPs consist of a manual, diagnostic flow charts and simple job-aids to assist health workers in various departments to ask a series of questions in order to screen all clients for TB in a systematic manner. A monitoring plan was also developed for provincial TB supervisors to use during their monthly supportive supervision visit. Health facility heads and facility TB focal persons were oriented on the importance of formulating and/or strengthening a TB/HIV committee that met every two weeks in the initial period and then monthly when activities were fully operating. This committee reviews TB/HIV issues in their regular meetings including the use of SOPs, progress in the implementation process at each service outlet (general outpatient departments, under-fives, TB clinics, antenatal), identifies gaps and proposes ways of improvement so that every visitor to any service outlet is screened for TB irrespective of his/her presenting illness.

Implementation of the SOPs was conducted in close coordination and collaboration with National and Provincial NTP departments. A total of 178 health nurses (67 females and 111 males) were trained and equipped to implement the strategy. Overall, comparing base line data and data collected during ICF SOP implementation, positive results have been registered in the pilot sites especially in Nampula province (Graph 3), as there was an increase in the number of TB presumptive cases examined for diagnosis by sputum smear microscopy in 2014 compared to 2013. Three health facilities (Muecate, Namitil and Muhala Expansão) reported that 100% of identified TB Presumptive cases were examined for TB. Additionally, the percentage of TB suspects with SS+ result for each HF increased from 2% (1/36) in 2013 to 8% (17/207) in 2014.

The project also implemented a community based strategy for ICF of TB by conducting monthly cough days. Community volunteers were tasked with mobilizing the population, particularly those with health problems including signs and symptoms of TB, to gather at a specific spot/site where a clinician and laboratory officer were present to examine them and screen presumptive TB case by asking about symptoms. For patients with symptoms, the lab technician gave instructions on how to collect a sputum sample. The procedure included collection and processing of sputum samples using Ziehl Neelsen (ZN) in places where that was possible (in peripheral HF with adequate space) and the communication of test results on site. In one instance, in Zambézia province during 2013, 98 TB smear sputum positive cases were diagnosed out of 384 presumptive TB cases.

Childhood TB approaches

TB CARE I, through WHO, supported the participation of 2 clinicians in international TB Pediatric training in Cape Town in 2012. The trained MOH staff was actively involved in a step down National Training of Trainers course in pediatric TB funded by Ariel Glaser Pediatric Foundation where provincial level pediatric TB focal persons were trained to lead trainings and mentoring in their respective provinces. With TB CARE I funding, on the job training have been conducted in year three during integrated NTP/TB CARE I provincial level supportive supervision visits and in APA4 the project supported the NTP in conducting 5 Pediatric TB trainings for clinicians in three provinces (Zambezia, Niassa and Sofala). A total of 211 participants (89 female and 122 males) were trained. The target group was composed of district level pediatric TB focal points, maternal and child health care nurses, nurses working in the children in high risk departments, nurses in pediatric wards (internal admissions) and nurses working in child health.

Diagnosis of pediatric TB was also supported through procurement and distribution of 1,500, tuberculin kits (containing 25,000 units) and through the development and printing of 5,000 Purified Protein Derivative (PPD) job aids to be used by clinicians when applying and reading results. The project focused on strengthening screening of children under 5 years with SS+ patients' contacts and infection control measures at community level were stressed to reduce the transmission of infection to children.

Overall, the number of pediatric TB cases diagnosed in 2013 (annual) rose from 2,822, to 4,294 cases in 2014 (January to September) showing an improvement in pediatric TB interventions. In the provinces where training took place, the number of children identified as TB presumptive cases and consequently the number of cases diagnosed after training was greater than the number diagnosed in the same quarter one year earlier (Table 2), although the number of smear positive cases decreased in Sofala, likely due to lack of equipment for sample collection.

Table 2: Number of Pediatric cases diagnosed, by NTP before and after pediatric training for clinicians in three provinces

Province	SS+ *first semester 2013	SS+ **first semester 2014	%	SS- *first semester 2013	SS- **first semester 2014	%	EP *first semester 2013	EP **first semester 2014	%
Zambezia	48	50	4	218	316	45	76	94	23
Niassa	6	12	100	40	161	300	12	36	300
Sofala	36	30	-17	214	223	4	67	92	37

*First semester 2013 before training; **First semester 2014 after training

Contact tracing

Contact tracing was strengthened with strategies geared towards strengthening coordination and collaboration of CB-DOTS IAs and NTP at district level. Such strategies included: conducting home follow up visits by a clinician to all contacts of a TB smear confirmed case for screening and prophylaxis treatment; having CHWs follow-up on index cases to assist in registering all contacts using an NTP contact tracing form which when completed is kept at the health facility; and encouraging all TB patients to bring their contacts to the HF for evaluation and verifying those who visit against the registered contacts already at the HF. In situations in which contacts have difficulties in visiting a HF, the HCW, accompanied by the IA field officer and a CHW does contact screening at the patient's home. Motorbikes are used by HCWs and bicycles by volunteers to carry out these activities when distances

are long. Over the life of the project, 9,182 contacts were traced and referred to HFs, with an increase in the number of TB contacts traced in TB CARE I areas over time, from 0 in APA1 to 4,402 in APA 4.

Pilot Implementation of the Patient Chartered Approach (PCA)

With the need to make TB services more patient centered to improve universal access to diagnosis and treatment of TB, TB CARE I supported the NTP in the pilot implementation of the PCA strategy in two selected districts of two provinces. The country selected three of the five PCA tools (The Patient Charter, TB Literacy toolkit and Quote TB light) for the pilot and a before and after study was conducted to measure impact of the intervention.

To implement the approach, health facility nurses, community based volunteers and staff of CB-DOTS IAs were trained to lead the dissemination and distribution of PCA materials in selected HF and communities. A total of 12 nurses, 26 CB-DOTS volunteers and three IAs were trained; 2,280 copies of the patient charter, 36 TB literacy booklets, 36 teaching aids (Story of Thomas), 18 Quote TB light booklets and 12 sets of Quote TB pictograms were reproduced and distributed.

Results collected from the end line survey showed that after implementation of the three tools in selected facilities, 26% of respondents could correctly state their rights and responsibilities as TB patients compared to 0% at baseline. Likewise, whereas no patients knew about the Patient Charter at Baseline, 31.88% did at endline. Overall, 88% of respondents had shared their health information with their families after diagnosis for support purposes.

The end line survey also showed that with the introduction of teaching materials as contained in the TB literacy toolkit, awareness was raised and an increase in knowledge recorded which during endline the respondents pointed out the need to have education resources as a way to be participative in TB control (treatment and diagnosis). The results will be used to strengthen the implementation of the TB program but providing TB patients, ex-patients and community an opportunity to have a say in the mobilization, identification of suspects, diagnosis, treatment and infection control activities within households, the community and health facility level.

Based on the results of the endline assessment, the project developed a more holistic teaching job aid which includes essential TB facts and information and revised the Patient Charter to have more illustrations given the low literacy levels in Mozambique. The PCA strategy was expanded to 25 additional target districts in APA4 and further expansion will be considered under Challenge TB.

Malaria activities

One component of the TB CARE I project was support to the NMCP in Malaria case management. A total of 1,250 clinicians were trained in Malaria clinical diagnosis with such support. Suspect referral was conducted by CHWs who were trained in both TB and Malaria signs and symptoms for referral purposes. Malaria suspect referral began in APA2 and between years two and four a total of 78,127 malaria suspects were referred of which 56,858 (73%) cases were confirmed.

Laboratories

Access to quality assured laboratory services is crucial in the diagnosis of both TB and Malaria. The project addressed this through infrastructure rehabilitations, equipping laboratories with new technologies, and training of technicians in diagnostic technologies.

Technical Outcomes

#	Outcome Indicator	Indicator Definition	Baseline (Year/ timeframe)	Target	Result
				Y4	Y4
2.1	A national strategic plan developed and implemented for providing the TB laboratory services needed for patient diagnosis and monitoring, and to support the NTP	A National Strategic Plan has been developed that addresses strategic objectives on how the country will meet the national requirements for quality TB diagnostic services	No (Year 3)	Yes	Provided technical support to the NTP laboratory department to develop the lab component of the TB strategic plan; the plan is ready to be submitted to MOH for approval
2.1.2	Number of laboratories with working internal and external QA programs for smear microscopy and culture/DST	Laboratories have successfully established a mechanism for performing internal quality control for smear microscopy and culture/DST and are enrolled in an external quality assurance (EQA) program, which is supervised by a higher-level laboratory	80 smear microscopy, 3 culture, 2 DST (Year 3)	120 smear microscopy; 3 culture; 3 DST	138 smear microscopy laboratories conducting EQA, 3 culture, 2 DST (Maputo and Beira)
2.1.3	Number and % of laboratories demonstrating acceptable EQA performance	Performance of EQA is just as important as having EQA established. This WHO indicator measures the percent of labs enrolled in EQA for smear microscopy and/or culture/DST that successfully passed EQA in the last reporting period	28% (72/252) (year 3)	42% (108/252)	53% (123/232*) Note: This equates to 89% of the 138 labs enrolled in the EQA. EQA performance in Gaza province is unknown so these results likely underestimate performance.
2.1.4	Diagnostic sites offering advanced technologies for TB or DR-TB	Number of diagnostic sites, in which Xpert, HAIN MTB DR Plus or liquid culture/DST are implemented and routinely used for diagnosis, stratified by testing type	(3 Xpert) (year 3)	(3 Xpert and 60 LED microscopy)	3 Xpert, and 60 laboratories using LED microscopy

#	Outcome	Indicator Definition	Baseline	Target	Result
2.1.5	Rapid tests conducted	Number of rapid tests conducted using Xpert	1,269** (year 3) ** May not include unsuccessful tests	1,350 tests in 3 TB CARE I Xpert sites	1,376 rapid tests conducted in TB CARE I Xpert sites in quarters 3 and 4 of Year 4 3,984 rapid tests during the project life**
2.1.6	Patients diagnosed with Xpert	The number and percent of patients diagnosed using Xpert (disaggregated by rifampicin resistance)	233 MTB+; 73 rifampicin resistant (year 3)	300 positive; 105 rifampicin resistant	305 MTB+, 58 rifampicin resistant in quarters 3 and 4 of Year 4 865 confirmed (22%), 191 rifampicin resistant (22%) during the project life
2.1.7	Laboratory reagents and consumables procured to guarantee lab testing for TB Numerator: Yes-defined quantities of reagents and consumables.	Procurement for emergency purposes, laboratory reagents and consumables to guarantee functioning of the NTP lab department.	Yes	Yes	Yes, 5,550 Xpert cartridges, Hydro chloride acid, auramin and potassium permanganate procured and distributed
2.1.8	Increased TB lab diagnostic facilities Numerator: Number of health facilities with rehabilitated micro lab functioning	Expand the TB laboratory network by identifying and rehabilitating peripheral health facilities with usable space for rehabilitation to enable functioning of a sputum-smear examination lab	0/2012 (year 1)	7	2 Micro laboratories in Manica and Nampula province were rehabilitated in 2014 out of the targeted 7 because of delay in the process on the part of provincial directorates of health. Between 2011 and 2014, the project supported in the rehabilitation of 11 micro laboratories in the 7 target provinces.
2.1.9	No stock out of laboratory reagents and consumables registered Numerator: Yes-stock out averted by guarantying availability of lab reagents and consumables.	Availability of laboratory reagents and consumables will be guaranteed by training MOH staff in lab supply quantification to avert sock outs.	Yes	Yes	No lab reported stock out of reagents and consumables. As a measure to prevent stock out, the project trained 47 lab technicians from 11 Provinces in quantification of lab consumables and reagents in year 3.

* The baseline and target were based on the 252 laboratories nationwide at baseline. However, the total number of laboratories that perform smear microscopy nationwide increased to 345 and only 232 of those are located in TB CARE I provinces.

** In the first three years of the project, the number of Xpert tests reported only included successful tests. This was corrected in the second half of Year 4.

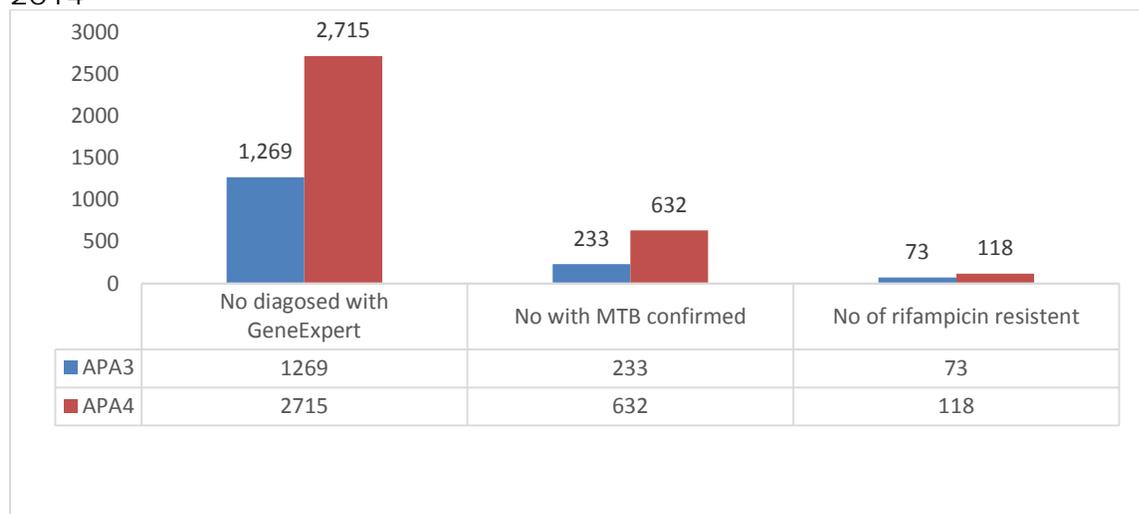
Key Results

A National Laboratory Strategic Plan was developed with TB CARE I support. This was the first National Laboratory Strategic Plan for TB developed by the NTP in Mozambique. Technical assistance was provided by the TB CARE I laboratory consultant from MSH. The plan includes step by step activities necessary to improve the quality management system for the laboratory network and expand Ogawa Kudoh culture diagnosis to the peripheral health facilities. The plan was submitted to the NTP for final review and approval. Following its approval, the NTP lab strategic plan will be integrated into the country laboratory strategic plan which includes others programs like malaria and HIV; this is anticipated in 2015.

Introduction of new technologies

Three Xpert units and 60 LED microscopes were procured by the project and installed in selected sites. Laboratory reagents, consumables and Xpert cartridges (14,520) were also procured to support the NTP's effort to introduce new technologies for TB diagnosis and increase the quality of lab diagnosis of TB. The sites and facilities to receive the Xpert units and LED microscopes were selected based on the results of need assessments done by NTP laboratory department with support from TB CARE I. To support the introduction of the new technologies, the project supported the development of Xpert implementation guidelines, and the training of 82 clinicians (27 from Gaza, 25 from Niassa and 30 from Zambézia provinces) in the three project Xpert sites (Carmelo; Cumba rural district hospital and provincial hospital Qelimane) in sample referral from remote areas to testing sites. As a result of this training, more presumptive MDR-TB patients were tested and an increase in confirmed MDR-TB cases was noted. A notable result was seen where a total of 3,984 patients were tested; 865 were MTB+ with 191 of those being rifampicin positive –a positivity rate of 22% (Graph 3).

Graph 3: Number of Tests conducted / MTB +/ RR TB with Xpert, Oct 2012 to Sep 2014



The project supported the NTP in procuring and installing 60 light emission diode (LED) units in selected laboratories and these have increased the absolute number of cases diagnosed given the better accuracy LED have in reading stained sputum than normal light microscopes. A review of the performance of one LED-FM microscope installed in Quelimane provincial hospital between October 2012 and September 2013 showed an increase of 163 in tests done compared to bright light with also a 33% increase in TB cases diagnosed.

Expansion of the Laboratory network

The project supported the NTP/National Institute of Health in expanding culture and DST to the Northern region by rehabilitating and refurbishing the Nampula TB reference lab. This reference laboratory is now used for the diagnosis of MDR-TB in the provinces of Nampula, Cabo Delgado and Niassa. These three provinces have a combined population of 7,540,224 inhabitants, representing 32 percent of the total population of the country. Between January and December 2013, a total of 511 culture samples were processed. One hundred and fifty (150) were positive. In the past the processing

of DST and culture was only done in the capital in Maputo, thus the functioning of the NRL is expected to reduce turnaround time for TB test results in the region.

In the past, the country peripheral laboratory network coverage was limited with some districts having only one functional laboratory located at the main district HF, and through TB CARE I support, expansion of peripheral health micro laboratories by rehabilitating existing structures for use at peripheral HFs to process smear microscopy was conducted. A total of 11 facilities were rehabilitated. These facilities have contributed to the increase in number of SS+ cases diagnosed in TB CARE I sites and throughout the country.

Fig 1: Rehabilitation of structure for smear processing in Chidenguele (before and after pictures)



In order to complete one of the conditions of accreditation of the National Reference Laboratory for Tuberculosis (NRLT) in Maputo, TB CARE I supported the placement of emergency exits and installation of negative pressure to enhance safety at the NRLT in Maputo. This was necessary for the NRLT to obtain international accreditation.

Supportive supervision and strengthening of EQA

Laboratory supervision visits were conducted twice annually in all provinces. The visits were important in introducing, and consolidating a quality laboratory management system which is an essential element of WHO Africa Regional Office laboratory accreditation. The common challenges identified during laboratory supervision visits were:

- Lack of a maintenance plan for the laboratory equipment;
- Poorly recorded data in the registries;
- Weak sample registration procedures;
- Weak stock management practices;
- Poor compliance with good laboratory practices;
- Lack of registers to capture the activities that were done;
- Limited analysis of quality indicators.

To strengthen the skills and performance of lab personnel, the project supported a Lab Quality Assurance workshop in Nampula Province in which 65 lab technicians from 21 districts were trained in EQA and random and systematic selection of Acid-Fast Bacilli (AFB) slides. In addition, a training of trainers (TOT) workshop was held in Maputo at which 22 laboratory technicians from all 11 provinces were trained as trainers in AFB microscopy, bio-safety, quality assurance, laboratory management and supervision. The second level training, also supported by the project, was conducted in all the provinces by the trained lab technicians, resulting in a total of 180 laboratory technicians trained.

Following the realization that many microscopes sent for repair were not broken but only needed routine maintenance, the project responded to a request by NTP to support the training of technicians in microscope maintenance. A total of 49 laboratory and maintenance technicians were trained in three regional workshops (Southern, Central and Northern) covering all provinces with support from TB CARE I. The training covered basic maintenance for microscopes, as well as repair techniques. The repair and maintenance process will continue in all provinces to ensure proper functioning of the microscopes with MOH support.

The project supported in the printing of 1,040 AFB microscopy manuals which were distributed to all TB laboratories nationwide to ensure quality smear processing.

The project also provided support to the NTRL in specimen referral to a reference laboratory in South Africa for suspected XDR-TB cases. From the results received, none of the samples were a confirmed XDR-TB case.

In order to improve the quality of AFB smear microscopy using ZN, 400 job aids were printed and distributed nationally. In addition, since ZN is being replaced by LED-FM in 55 laboratories with TB CARE I support, 100 job aids were printed and distributed throughout the country.

Infection Control

In the last two years of the project, TB CARE I expanded the scope of its infection control activities, previously limited to the production of infection control (IC) checklists and distribution to HFs, to include community-level IC interventions, the rehabilitation and renovation of TB service points (“TB corners”) and micro laboratories at designated HFs, and the introduction of the Finding TB cases Actively, Separating safely, and Treating effectively (TB FAST) strategy in health facilities in two provinces (Zambézia and Niassa).

Technical Outcomes

#	Outcome Indicator	Indicator Definition	Baseline (Year/ timeframe)	Target	Result
				Y4	Y4
3.2.1	FAST strategy has been adapted and adopted	NTP must have adopted a FAST strategy that prioritizes the four core interventions to implement a TB IC: a) active identification of coughing patients; b) rapid diagnosis; c) separation of TB suspects and infectious TB patients, and; d) early onset of effective treatment	3 Health facilities in 3 Provinces (year 3)	8 health facilities of 2 provinces implementing FAST Strategy	8 HF in 2 provinces piloted the FAST strategy with 53 cough officers trained; Implementation of pilot phase concluded in September 2014.
3.2.2	Facilities implementing TB IC measures with TB CARE support	Facilities that received support for implementation of TB IC measures through TB CARE out of the number of facilities planned to received support for TB IC implementation.	N/A	60 (53 TB CARE I district level hospitals + 7 prisons)	45.2% (24/53) Technical assistance was given to some facilities during supportive integrated visits in strengthening of TB IC measures. The project failed to complete planned activities in prisons as this activity was to be integrated with the training of prison services in DOTS strategy which could not be completed due to NTP competing priorities.
3.2.3	IC personal protection equipment procured Numerator: Number of mask procured and in use	N95 Masks procured for CB-DOTS Plus community health workers use in IC at community level	N/A (year 3)	6000 N95 masks procured	5000 N95 masks procured. Because of funds limitation, the project completed 83% of planned purchases.

Key Results

With continued investment in renovations of structures of the peripheral laboratory network, there was a need to ensure that these structures meet the national IC standards. To meet those requirements, the project supported the MOH in training national and provincial infrastructure technicians in IC and construction and rehabilitation of health facilities. The training was led by the FHI 360 infrastructure manager trained in Building Design and Engineering Approaches to Airborne Infection Control at the University of Pretoria, South Africa. This training was the first of its kind in the country, and 18 national and provincial level infrastructure technicians were trained. After their training, the technicians were actively involved in the design of infrastructure for the MOH, with support from the government and other partners, to ensure that buildings meet established IC standards aimed at reducing the risks of TB infection in work place settings. All rehabilitations (including TB corners) funded through TB CARE I were designed with support from the trained construction technicians and meet national TB IC requirements.

Pilot implementation of the FAST strategy

The project introduced the FAST strategy as a pilot intervention strategy in 8 health facilities in 8 districts across 2 provinces (Niassa and Zambézia). FAST stands for Finding TB cases Actively, Separating safely, and Treating effectively. The strategy emphasizes the importance of reducing exposure to infectious cases and effective TB treatment in reducing TB transmission. Training was provided to 53 cough officers from the 8 districts in the active identification of coughing patients in selected hospital areas (particularly those areas with the highest concentration of out-patients). All cough officers are support staff (hospital orderlies) already employed by the MOH, which increases the sustainability of the intervention.

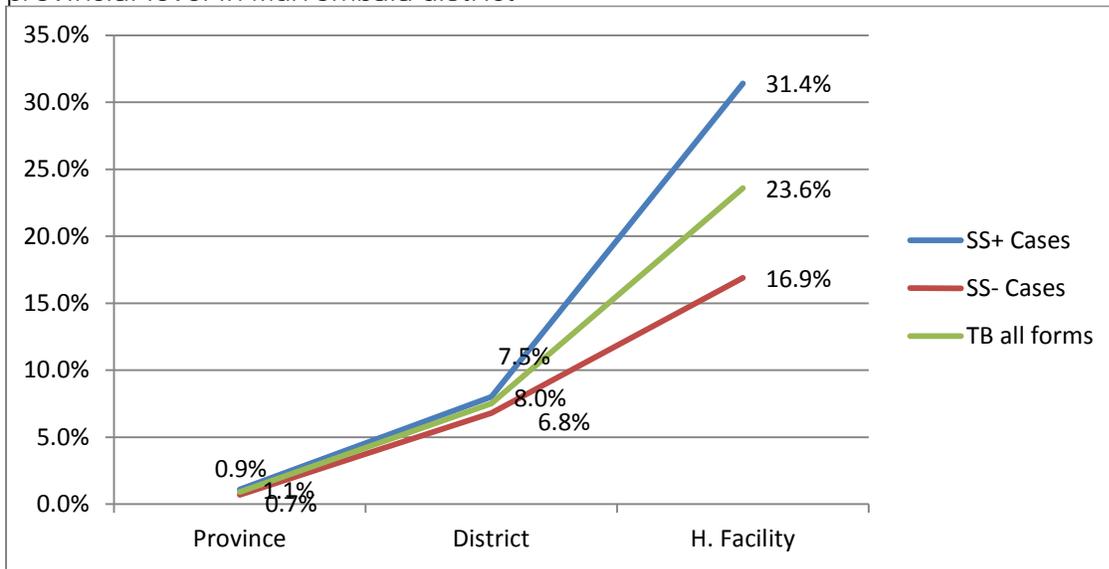


Training of Cough Officers in Mocuba district of Zambézia Province

By actively separating coughing patients from other patients, the officers' role is to reduce the risk of TB infection to other patients and thus reduce TB transmission. In Zambézia province, 80 smear positive and 45 smear negative TB cases were identified from 667 presumptive cases among patients who had entered the HF setting complaining of other pathologies, with a positivity rate of 18.7% in all forms of TB diagnosed. In Niassa, implementation was constrained but in 2 months of activity implementation, 293 patients were identified as TB presumptive cases and referred to TB corners for further examinations. Of these referred, 6 were confirmed cases.

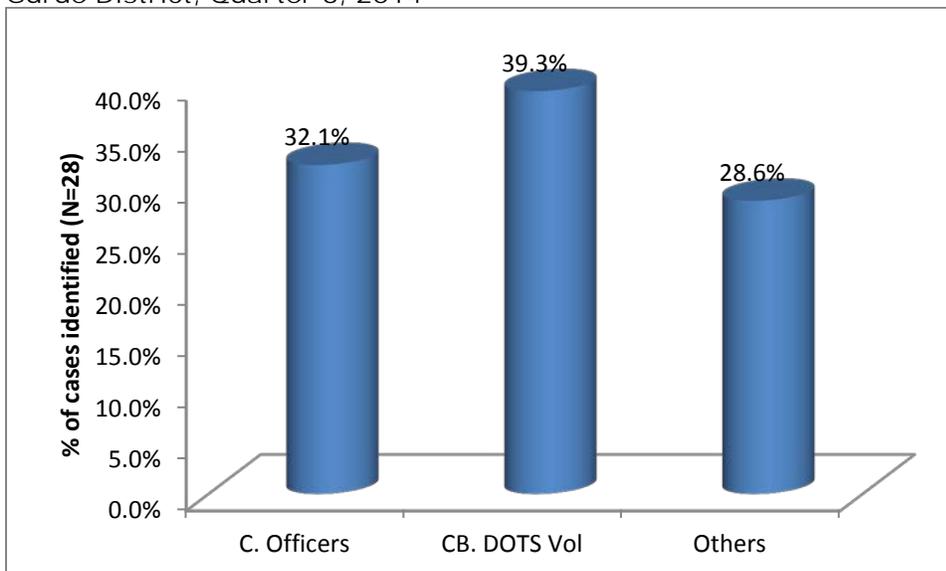
In Zambézia province where the strategy was fully executed with active participation of the NTP provincial department, 6% of all smear positive cases identified (80/1,401) in quarter three were identified via FAST. This was a substantial contribution given that the strategy was implemented in only one health facility in each of the 5 participating districts, out of a total of 93 HFs. The contribution of the strategy at three different levels in one district is highlighted in Graph 5.

Graph 4: Percent contribution of FAST to case notification at the health facility, district and provincial level in Murrombala district



FAST results on smear positive cases for the period July to October 2014, contributed 0.9% of provincial level results, rising to 8.0% at district level and to 31.4% at health facilities with FAST (n=5) for the reporting period July to October 2014 (Quarter 3). In terms of the contribution of TB CARE I interventions to total TB cases notified, in one district, out of a total 28 cases notified in a month, FAST cough officers working at health facilities and community volunteers conducting community referral activities in peripheral areas contributed 20 cases. Almost 40% of the cases were referred by CB-DOTS volunteers and an additional 32% were identified through FAST (Graph 5), thus these two interventions contributed 70% of all cases diagnosed and suggests that these two approaches, in combination, may contribute to increased TB case diagnosis. Further analysis is needed to assess whether or not these approaches identify new cases that would not be identified via traditional approaches.

Graph 5: Contribution of TB CARE I interventions (FAST and CB-DOTS) at district level, Gurue District, Quarter 3, 2014



Community Level IC activities

To increase awareness of TB IC measures among district-level health staff, managers and supervisors and CHWs, the project with support from FHI 360 HQ technical staff, developed a TB IC checklist and conducted two TOT workshops on the use of the checklist. The first workshop was designed mainly for TB managers from CB-DOTS IAs and the NTP. The second workshop was designed for district level supervisors and NTP staff working in health facilities. A total of 45 participants attended both trainings. Following their training, the TB managers from all CB-DOTS IAs conducted a step down training for CHWs in the seven TB CARE I target provinces. They trained 1,348 CHWs in community IC using the checklist and accompanying manual (TB Infection Control at Community Level: A Training Manual). The administrative and environmental IC measures presented in the checklist have contributed to increased community awareness about TB IC, especially simple practices such as opening of windows to facilitate the flow of air, observation of basic home hygiene, and cough etiquette.

Programmatic Management of Drug Resistant TB

The delay between diagnosis and treatment start of MDR-TB patients was and continues to be a challenge for the NTP in Mozambique. However, during its 4 years of implementation, TB CARE I has improved diagnosis by expanding laboratory diagnosis capacity and MDR-TB case management by training clinicians and creating DR-TB technical working groups at central and provincial levels to respond to issues related to DR-TB.

Technical Outcomes

#	Outcome Indicator	Indicator Definition	Baseline (Year/ timeframe)	Target	Result
				Y4	Y4
4.1.1	TB patients, suspected of MDR, dying between request for lab examination and start of MDR-TB treatment	The percentage of TB patients suspected of MDR-TB dying between request for lab examination and start of MDR-TB treatment	n/a	15% (53/350) Yes	The percentage of patients lost (lost to follow up or died) between diagnosis and start of treatment reduced from 24% (215/283) in 2012 to 12% (313/359) in 2013
4.1.2	MDR-TB patients who are still on treatment and have a sputum culture conversion 6 months after starting MDR-TB treatment	MDR-TB patients who are still on treatment and have a sputum culture conversion 6 months after starting MDR-TB treatment	n/a	60% (178/297)	Evaluation of MDR-TB patients after 6 months of treatment is improving due to trainings and on the job capacity building provided by NTP and partners. Data collection and semi-annual evaluation of MDR-TB is still a challenge for the NTP with the data not readily available.
4.1.3	MDR-TB patients who have completed the full course of MDR-TB treatment regimen and have a negative sputum culture	Percent of patients who have completed the full course of MDR-TB treatment regimen and have a negative sputum culture	n/a	50% (159/297)	Data for Y4 are not available. Data collection and reporting forms including electronics registers had been revised to capture this information with the full implementation expected in 2015 with data expected to improve afterwards. For the 2011 cohort which was evaluated in 2013, 38 of the 129 patients were reported as cured which is about 29%.
4.1.4	A functioning National PMDT coordinating body	National PMDT coordinating body has been established, is recognized by the MOH and is functional	Yes	Yes	A National PMDT body has been formed and is being led by the NTP with the mandate to coordinate the implementation of PMDT in the country. However the group is not yet officially endorsed by the Ministry of Health and it has not been meeting regularly.

Key Results

The project supported the development of the PMDT strategy with TA from a KNCV DR-TB specialist. The strategy was developed with input from NTP and its partners, following the new WHO guidelines on MDR-TB. The process included an exchange visit to Namibia by NTP, national reference lab, Machava hospital, TB CARE I and US Centers for Disease Control and Prevention. The strategy guided NTP in the implementation, and M&E of the MDR-TB related activities.

Supervision guidelines for DR-TB and the revisions of the DR-TB Manual were supported by the project with TA from the KNCV PMDT specialist. The DR-TB supervision guidelines were pilot-tested in Gaza and Sofala, and submitted to NTP for approval. Work on both the guidelines and the manual was a collaborative effort between the NTP, KNCV, The UNION and other MOH partners supporting TB activities. A checklist that was developed as part of the guidelines was pilot tested and adapted and has been incorporated in all MDR-TB supportive supervision visits.

The project has continued to build the capacity of local clinicians in MDR-TB diagnosis and case management through participation of trained project and NTP staff in joint MDR-TB focused supportive supervisory visits to the provinces, and mentoring and provision of on the job training activities to district and peripheral health facilities clinicians. Three such supervisions were carried out in year 4 with six more completed and funded by WHO under TB CARE I. The last six supportive were part of a nationwide campaign on MDR-TB focusing on DR-TB high burden provinces (Maputo Cidade, Manica, Gaza, Sofala, Zambesia and Nampula). The supportive supervision visits specific to MDR-TB are the first in the country. The visits aimed to increase working knowledge on MDR-TB clinical screening, sample referral and transport system, case management and treatment follow up and quality of TB data recording and reporting.



A DR-TB supportive supervision visit

The project has also supported a number of training events focused on MDR-TB, namely:

- A workshop on PMDT for participants from Portuguese speaking African countries (Mozambique, Angola, Sao Tome and Principe). This workshop was co-sponsored by WHO AFRO and held in Maputo in 2012. Twenty participants attended it, including 12 medical doctors from Mozambique;
- A TOT workshop on clinical care of MDR-TB (48 participants, including national and provincial MDR-TB focal points from all 11 provinces of Mozambique and clinicians from local non-governmental organizations (NGOs) involved in MDR-TB activities in Mozambique); and
- A provincial-level MDR-TB training workshop conducted in Zambézia province (33 participants).

TB/HIV

The country's TB/HIV co-infection rate had continued to decrease from 66% in 2010 to 56% in 2013, while HIV counseling and testing in TB patients has increased from 88% to 96% and ART enrollment of HIV-positive TB patients from 25% to 72%. In APA4, the project trained 30 clinicians in Niassa province to support the case management of TB/HIV patients, screening for TB and for HIV in both HIV and TB care settings, as well as diagnostic skills of DR-TB. Project staff participated actively in the central TB/HIV coordinating body.

Table Technical Outcomes

#	Outcome Indicator	Indicator Definition	Baseline (Year/ timeframe)	Target	Result
				Y4	Y4
5.1.1	New HIV patients treated for latent TB infection during the reporting period	This indicator is used to ensure that eligible HIV-positive individuals are given treatment for latent TB infection and thus reduce the incidence of TB in HIV-positive patients.	22% (48,330/ 221,595) Year 3)	60% (87,804)	21% (47,869/ 227,934) National data for Jan to Jun 2014)
5.2.1	HIV-positive patients who were screened for TB in HIV care or treatment settings	The purpose is to monitor an activity intended to reduce the impact of TB among HIV-positive patients. It will demonstrate the level of implementation of the recommendation that HIV-positive patients are screened for TB at diagnosis and at all follow-up visits.	85% (235,772/ 277,173) (Year 3)	85% (159,066)	41% (93,456/ 227,934) National data used for Jan to June 2014
5.2.4	Strengthen data registration at health facility level for TB/HIV co-infection activities within the TB care and treatment settings	Description: Data registration process is improved at peripheral health facilities by strengthening coordination and collaboration between the TB and HIV sectors through promoting regular meetings for data sharing and on job training for health technicians in proper registration. Value: Number Frequency: Quarterly Source: TB CARE I report Numerator: number of health facilities that complete registration process	0 (Year 3)	60 (one in each district)	42 sites visited. Supportive technical assistance for TB/HIV collaborative activities conducted during TB CARE I/NTP integrated supervision visits

Key Results

A number of provincial trainings were conducted under the project in response to identified needs:

- Improve the management of TB/HIV patients (221 clinicians trained; 95 female and 126 males).
- Strengthen collaboration and coordination across FHI-supported projects in the delivery of TA in TB and TB/HIV collaborative activities in three provinces (Manica, Sofala and Tete); 14 provincial officers trained.
- Respond to a request from National Institute of Health Sciences (ISCISA) to train students from the Institute on TB and TB/HIV collaborative activities; 177 students received the training.

In total 13 training courses were funded and technically supported by the project, with 469 health professionals and 177 students trained. These trainings have facilitated the implementation of the ONE STOP MODEL which offers the complete package of TB and HIV collaborative services including counseling and testing, prophylaxis, and specific treatment for both diseases in the same room by the same health worker. Despite remaining challenges, data suggest some encouraging results with regard to TB/HIV. For example:

1. Recording systems in health facilities have been strengthened with improved availability of forms and registers, and improvements in data recording and reporting;
2. TB/HIV indicators show improvement. For example, in 2013, 96% (51,172/53,272) of TB patients were tested for HIV; of the total patients tested for HIV, 56% (28,585/51,172) were HIV+; from these co-infected patients, 72% (20,449/28,585) initiated ART and 97% (27,624/28,585) initiated cotrimoxazole prophylaxis.

Health System Strengthening

All the project coalition partners provided TA and support to the NTP in this technical area. Priority areas were capacity building and training of MOH staff. The TB CARE I FHI 360 Lab officer and M&E officer provided on-the-job assistance to the NTP Lab Section and M&E department by sitting one day per week at the respective departments. The WHO NPO also provided support on M&E. A MSH Drug management specialist was placed at the NTP. Partners also provided numerous trainings to the MOH and NTP staff in all TB CARE I technical areas, to build staff capacity and strengthen the functioning of the MOH system. The NTP has also received support in through the Global Fund to Fight AIDS, Tuberculosis, and Malaria (GF) grants in conducting supportive supervision visits and drug management with one pharmacist contracted under GF sitting at the NTP. (More information of GF can be found in the GF section of this report).

Technical Outcomes

#	Outcome Indicator	Indicator Definition	Baseline (Year/ timeframe)	Target	Result
				Y4	Y4
6.1.1	Government budget includes support for anti-TB drugs	The annual government budget should allocate funding for anti-TB drugs (first and second line drugs). This indicator measures the percent of the annual anti-TB drug costs paid by the government.	Yes (year 3)	25% (1,061,010/ 4,244,040)	25% Government of Mozambique contributed with 25% of the budget for TB drugs
6.2.1	TB CARE I supported supervisory visits conducted	This indicator measures TB CARE I's support of NTP's supervisory activities by comparing the number of planned visits in the TB CARE I workplan (denominator) to what is actually conducted (numerator). These visits can occur at any level (intermediate, peripheral) so long as TB CARE I is providing financial or technical support for them to happen.	12	100% Total planned 17 (14 TB CARE I /NTP Integrated visits + 3 DR-TB visits)	82% (12 integrated + 2 DR-TB)
6.2.2	People trained using TB CARE I funds	Number of health care workers at all levels trained on any area of TB control using TB CARE I funds	500	606 (256 district supervisors + deputies; 350 others)	469 (259 males; 210 females). In Manica province Pediatric TB training was not done as there was financial and technical support from another organization. Also, Nampula province, the DPS did not regard this training as a priority for 2014
6.1.3	Participation in	Description: Support given to NTP to build capacity of staff	2	3	2 The project

#	Outcome	Indicator Definition	Baseline	Target	Result
	international events	through participating in international events and trainings Value: Number Frequency of collection: Annual Source: TB CARE I reports Numerator: Number of international conference and trainings participated			supported participation of 2 MOH staff at the 45 th UNION conference
6.2.4	TB CARE I close out activities implemented	Description: The last 3 months in the 15 month workplan will be reserved for close out which will involve inventory of materials, ascertain all program information is documented and all IA have closed finance information as well as conduct meetings with MOH Value: Number Frequency of collection: Annual Source: TB CARE I reports Numerator: number of close out visits conducted and meetings held at provincial level	0	7 Close out visits and meetings	7 provincial close out meetings conducted in all target provinces led by the TB CARE I team and with participation of provincial level staff including the Director of Health and Medical Chiefs.

Key Results

To support the implementation of CB-DOTS activities, which included patient and contact follow up, sputum transportation, CHWs supportive supervision visits and transportation of drugs, the project acquired a total of 50 motorbikes distributed to both NTP (11) and CB-DOTS IAs (39).



TB CARE I Provincial Technical officer for Gaza province handing over a motorbike to the CB-DOTS IA

Given the rough terrain in most of the districts where CB-DOTS activities are implemented, the use of motorbikes as opposed to other modes of transportation is most appropriate. The districts are primarily rural and roads are ill-maintained or unpaved. Weather conditions often exacerbate the poor road conditions. Therefore, durable motorbikes are required to ensure safe, reliable transportation for staff, equipment and supplies.

The project also supported the minor rehabilitations of “TB corners” in 15 targets districts. The rehabilitations varied from creating safer working conditions by promoting IC administrative measures to procuring furniture through IAs under sub agreements signed by TB CARE I. Interventions aimed to accommodate patient wellbeing in specially rehabilitated waiting areas (see picture below) where benches are provided. These improved waiting areas are also used as venues to promote health education on treatment adherence, infection transmission and IC to TB patients, their family members and community volunteers.

Fig 2: Rehabilitation of usable space for patient waiting room



Before

After (comfortable patient waiting area at a TB corner rehabilitated by TB CARE I)

The project supported the training of 143 NTP supervisors and their deputies in CB-DOTS program management at district level. The training equipped newly appointed NTP staff and refreshed already trained staff in the day to day management of the TB program. Topics included policies, program activity planning, data collection and reporting, case management and support, and coordination and collaboration with CB-DOTS implementing stakeholders. The training also provided a hands on approach for supervision and management of CB-DOTS CHWs.

To guarantee that NTP and other MOH staff have up to date knowledge and information about TB control, the project supported MOH staff, principally NTP personnel, to participate in international events, conferences. A total of 25 staff participated in such events during the 4 years of project implementation divided (Table 3).

Table 3: International Workshops and Conferences

Year	Place	Training/Conference title	No of participants
2014	Barcelona	45 th UNION Conference	4
2013	Paris	44 th UNION Conference	7
2013	Rwanda	TB/HIV	2
2012	Malaysia	43 rd UNION Conference	3
	Kenya	MDR-TB	1
2011	Nigeria	Africa TB Conference	4
	France	42 nd UNION Conference	1
	Namibia	PMDT	3

After the conferences and trainings, participants shared materials and information with other staff in their departments.



The Minister of Health for Mozambique during the commemoration of the SADC Malaria day supported by TB CARE I

The project also supported the NMCP and NTP in the commemorations of the SADC and International Malaria Days and World TB Day. The project provided logistics support (technical and financial) at central level for commemoration of these events providing advocacy, community mobilization, educational and IEC materials including banners and t-shirts. The project also supported IEC material development and dissemination at the provincial level. Project participation at the fore front was crucial in advocating for TB and Malaria to be considered as priority topics within the MoH and in raising awareness among the public and political figures about the diseases. During the commemorations, the project engaged the participation of the Minister of Health, Director of National Health and other important figures.

In its support to strengthen the NMCP, the project implemented activities at all levels (central, provincial and district level). The support included direct TA in activity implementation, training of staff, and procurement of equipment and consumables. In 2011, 1,137 laboratory technicians (95% of all technicians in the country in 2011) were trained on diagnosis of malaria. The training addressed lab management, bio safety and EQA. Furthermore, eight laboratory technicians from the Malaria National Reference Lab were trained in quality assurance, and 1,250 provincial-level clinicians were trained in clinical diagnosis as a complimentary element to the laboratory diagnosis component.

TB CARE I supported the acquisition of quality malaria consumables and reagents (slides, methanol, giemsa and 1,000 cell counters for parasite density) as well as the development of manuals and policy guidelines which were approved, printed, distributed and disseminated. These activities were followed up through 28 supportive supervision visits conducted in total of 4 years implementation of the project. Over the past two years, performance on key indicators of malaria case management has improved and a number of steps have been taken to strengthen the NMCP (Table 4).

Table 4: Contributions to NMCP (in TB CARE I Provinces)

Technical Area	Indicator/Parameter	First Supervision Findings (2012)	Special Supervision Findings (Sept 2014)
Laboratories	Malaria Consumables Stock-outs	Frequent	Absent
	Smear Quality	Fair	Good
	Other Species Identification	N/A	Improved in many provinces, except Cabo Delgado
Severe Malaria Case Management	Percentage of Severe Malaria Cases Managed Accordingly to the National Guidelines (Quinine)	60%	90%
	Percentage of severe malaria cases managed according to the National Guidelines (Artesunate)	20%	65%
	Antimalarial Stock-outs (artesunate)	Frequent	None
Health System Strengthening	Rebuilding of National Reference Lab	Contributed to improved malaria quality assurance implementation and created capacity for supervision	
	Acquisition of Office Furniture for the NMCP	Improved working conditions at the central level of the NMCP	
Monitoring, Evaluation and OR	Training of 292 Health Professionals on new M&E data collection tools	Improved malaria data quality and currently used to report malaria data	
	Antimalarial Drug Monitoring Study	Contribution to evidence-based malaria treatment policy definition	
	Publication of Antimalarial Drug Monitoring Study	Data dissemination	

Close out activities in all project target provinces were conducted by project staff with the aim of sharing project accomplishments in each provinces and the project's contribution to TB control, especially through CB-DOTS. In each province, the meetings were led by the Provincial Director of Health and the Provincial Medical Chief, with high level participation from provincial departments of laboratory, public health, planning and cooperation, and community health. The District Medical Chiefs and TB supervisors from target districts also attended. Lessons learned were collected as well as best practices which will be used in the follow up TB control mechanism (Challenge TB). Recommendations for future improvements were also shared. One such recommendation was the need to increase project coverage to 100 percent in each province in order to increase contribution level and leverage resources with other health partners. Moreover, participants advocated for monetary incentives for CHWs to address the high rate of turnover.



TB CARE I COP presenting project results in Tete province

Monitoring & Evaluation, Surveillance and Operations Research

Support to NTP in this area was provided by WHO and FHI 360. The WHO NPO Officer provided TA to NTP M&E department and the FHI 360 TB CARE I M&E Officer sat at the NTP offices one day per week to support their M&E department in strengthening its systems, tools and data collection techniques, including building capacity of the personnel allocated to the department.

Technical Outcomes

#	Outcome Indicator	Indicator Definition	Baseline (Year/ timeframe)	Target	Result
				Y4	Y4
7.1.1	An electronic recording and reporting (ERR) system for routine surveillance exists at national and/or sub-national levels	The routine ERR for TB surveillance for all TB patients is based on at least all standard variables which are included in the TB register. The record/case-based data flow from data collection level to national level (via intermediate/ regional levels) is digital. Note that having an ERR just for MDR-TB or at district level with case-based data (not aggregate) also fulfills this indicator	N/A	1	In process 12 servers/routers and computers installed in 11 provinces and NTP central offices. First draft ERR presented to NTP provincial supervisors; suggested feedback will be incorporated into the tools before finalization and piloting.
7.2.1	Data quality measured by NTP	Data quality has been measured in the last year (internal consistency, timeliness, completeness, accuracy, etc.) at national, intermediate/ regional or peripheral levels. If yes, list the dimensions being measured.	N/A	5	5 DQAs implemented in 5 districts of Manica and Zambézia provinces TB CARE supported and provided technical assistance on data quality assessment.
7.3.1	OR studies completed	TB CARE supported OR studies completed	3	2	4 studies completed: 1) Exploring individual and socio-cultural constraints to seeking TB care services in three provinces of Mozambique (Maputo, Tete and Nampula) (2014) 2) Rapid Expansion of microscopy (2012 -2013)

#	Outcome	Indicator	Baseline	Target	Result
					<p>3) Cost Effectiveness study of Community Based DOTS (2014)</p> <p>4) The TB literature review for Mozambique was completed and is ready for publication. The objective was to review the published literature on TB epidemiology, diagnosis and management in Mozambique to support the country's efforts to control the disease (2013)</p>
7.3.2	OR study results disseminated	The percent of completed OR studies (TB CARE supported) with results that have been disseminated (i.e. publication, meetings, presentation, report).	2	1 (50%)	<p>2 Studies completed in prior years were disseminated in year 4, thus exceeding the target.</p> <p>Disseminated studies in APA4:</p> <p>Exploring individual and socio-cultural constraints to seeking TB care services in three provinces of Mozambique (Maputo, Tete and Nampula)</p> <p>Rapid expansion of microscopy, cost efficiency in process of finalization (Dissemination done within MOH and final report shared with key stakeholders)</p>

Key Results

The project supported the NTP in developing a patient-based ERR system at district level to capture individual level patient data; the ERR is yet to be finalized. This database will also be used for TB suspected MDR-TB patients, allowing follow up of these patients. The system will be hosted by the MOH web. The project acquired 12 desktop computers and servers which were installed at the 11 provincial NTP departments within the provincial directorate offices and at the central level. The provincial computers will be linked to the central level computer which is the main harbor, allowing access to data from all provinces and districts in the country. A draft of the ERR was presented to NTP (central and provincial levels) and partners during a national workshop organized by the NTP with support from TB CARE I in October 2014, input was received from participants. Once the feedback has been incorporated, NTP will pilot these new tools in the first quarter of 2015, for gradual role out in 2015

TB CARE I supported the MOH/NTP to develop a national TB research agenda in close coordination with the National Health Institute and partners. The agenda highlighted key areas of OR to respond to TB control issues with evidence to guide policy decision making in the country. Major public institutions such as Universities and researchers are expected to use this tool as a guide for research topic selection. To date at least 3 researchers have used the agenda for topic selection for TB Control measures in the country, examples are a TB in prisons study and the planned TB prevalence study.

Two OR studies were successfully completed during life of project, with two more still to be finalized by end of December 2014. The completed studies are listed below with their titles:

1. Exploring individual and socio-cultural constraints to seeking TB care services in three provinces of Mozambique (Maputo, Tete and Nampula). The study aimed to explore and identify the current underlying individual and socio-cultural factors that influence care-seeking behaviors related to TB in selected key subgroups: health workers, APE, CHWs, TB patients, community members, and community leaders. Results from the study show that there is a general understanding of signs and symptoms of TB within the sampled population. However, there is a popular misconception on how TB is transmitted based on socio cultural beliefs and norms such as: TB can be transmitted through sexual intercourse with a widow, or with a woman who has had an abortion, or by having intercourse with a woman during her menstruation periods; TB can also be transmitted through witchcraft or due to lack of compliance with traditional ceremonies of a death of a family member. The study identified 3 three barriers to health care seeking behavior: 1) individual level which has to do with lack of correct knowledge, long treatment period, collateral advise side-effects of TB treatment; 2) discrimination and stigma; 3) social-cultural aspects – preference for traditional medicines, fear and lack of confidence in health services and health workers, weak family and community support system, and; 4) Institutional factors- limited collaboration with community structures, limited diagnostic capacity at health capacity, distance from community to health facilities, stock out of medication and laboratory materials. These findings will be used to develop new or update existing IEC materials, and identify priority groups among the general population that need to be targeted, and to guide the development of new policies and strategies for TB prevention and control.

Based on the findings of the study, the project presented two posters at the 45th UNION Conference. A paper based on the results is currently under development. The project plans to support development of IEC materials targeted at the less informed and marginalized groups to increase their awareness and knowledge in TB under Challenge TB.

2. Rapid Expansion of Microscopy Study. The study aimed to determine the outcome of rapid expansion of laboratory units and training of nursing personnel on the quality of TB sputum smear microscopy in the districts that they serve. The study results show that four years after training, half of the trained personnel are still active and working in the lab while the other half are no longer working in the laboratory. The main reasons for this drastic reduction is related to limited supervision visits, lack of continued training opportunities, and follow up by the district and provincial directorate of health. These findings will be used to expand microscopic lab units and increase access to rapid diagnoses; early diagnosis and treatment; revise and adequate national TB lab strategy and influence policy and decision makers. The results of the study and the final report were shared with the NTP.

One ongoing study will be completed in the last quarter of 2014:

1. Evaluation of the effectiveness of TB CARE I strategies on TB case detection, TB treatment outcomes and TB mortality in the project districts in Mozambique. This is a mixed method evaluation using both quantitative and qualitative methods of data collection to: a) determine whether TB case detection and treatment success rates increased significantly and mortality from TB declined significantly in districts where the TB CARE I/Mozambique project model has been implemented compared to rates in comparison districts where TB CARE I has not been implemented; b) determine whether the support provided by TB CARE I at facilities was perceived as improving TB care services and to identify strategies for strengthening this component.

Reporting of quality data has always been an important issue for TB CARE I Mozambique, as CB-DOTS IAs implemented activities in the communities, their M&E officers received technical assistance on data quality assurance (DQA). During APA4, DQA visits were conducted in three more provinces with data validation and verification conducted with CB-DOTS IAs. In cases where discrepancies in data were noted, a data cleaning exercise was done to improve the validity of reported data. On-the-job training and TA in M&E was provided to IA M&E staff to improve their M&E systems, including their data collection methods, analysis, and reporting to the project.

To strengthen NTP data quality assessment capacity, TB CARE I undertook a DQA exercise together with NTP that allowed for mentoring and hands-on-training of NTP and M&E staff. The DQA exercise was carried out in 4 district of Manica province in 2014 using FHI 360's Data Verification and Improvement tool. At the time of the review, four of the six indicators had a variance between reported and verified data of more than +/-5%, which is considered to be unacceptable (Table 4), although relative to our experience in other projects in Mozambique the level of variance seen here is relatively low. Indicators were identified/selected prior to field work and then were, reviewed and analyzed for variation using primary data sources. Following this activity, NTP carried out DQA exercises independently in Zambezia province.

Table 5: DQA result in Manica province

	Name of Program:	NTP			
	Name of Site:	Manica District			
	Composition of Team	ADPP, NTP Manica, NTP Central level and FHI 360			
Indicators	Primary source of data	Verified data	Reported data	Variance (%)	
SS+ Quarter 1 2013	NTP TB Register	76	82	7.9	
SS+ Quarter 4 2013	NTP TB Register	97	106	9.3	
Total TB new cases 4 quarter 2013	NTP TB Register	185	191	3.2	
Cured 2 semester 2012	NTP TB Register	35	42	20.0	
HIV tested 4 quarter 2013	NTP TB Register	214	212	-0.9	
Presumptive cases referred by ADPP CHWs in quarter 4 2013	Referral form (ADPP)	355	320	-9.9	

Finally, with TA from KNCV, the project is supporting the NTP in preparing for a national TB Prevalence survey that will be conducted in 2016 Stakeholders meetings were held to discuss and provide input on the diagnostic and screening algorithms, sampling frame, ethical considerations, and inclusion criteria for participants. The project also led meetings with the principal investigators, and clinical, epidemiological, logistical, statistical, radiological and laboratory experts to develop the protocol. Some resulting input and recommendations include: 1) TB experts estimated the point prevalence of TB in Mozambique to range between 400-600/100,000 (mean 510) which is consistent with the current WHO estimate of 552/100,000; 2) Chest X-ray (CXR) reading capacity and CXR infrastructure (n=60) is very low in Mozambique relative to the size of the population and should be enhance for the surveyd;3) A smaller scale TB/HIV active case finding effort should be conducted (in a very high burden area) in 2015 as a stress test/ training/ skills development/equipment testing exercise to refine the clinical skill sets and build the field experience needed for successful execution of the prevalence survey.

The team also calculated the sample size for the TB prevalence study and it is estimated to be 49,500 people nationwide. With support from key partners, including TB CARE I, NTP has developed a detailed timeline of activities. The table below shows major study milestones.

Table 6: Study milestones

Milestone	Date
First draft of the budget	8 August 2014
First draft of the protocol	8 August 2014
Acquire first portion of study funding	5 September 2014
Second draft of the budget	12 September 2014
Second draft of the protocol	12 September 2014
Begin procurement of large equipment purchases	1 October 2014
Submit for Ethical Review	20 October 2014
Acquire second portion of study funding	28 November 2014
Acquire third portion of study funding	19 December 2014
Submit for second round of Ethical Review	16 January 2015
Recruit personnel	31 January 2015
Approval by Ethical Review Committee	5 February 2015
Training of personnel	24 April 2015
Pilot Study	30 April 2015
Launch of National Study	30 June 2015

Drug Supply and Management

MSH is the lead partner for the drug management component. MSH supports NTP directly with the MSH drug management specialist sitting within the NTP department.

Technical Outcomes

#	Outcome Indicator	Indicator Definition	Baseline (Year/ timeframe)	Target	Result
				Y4	Y4
8.1.1	National forecast for the next calendar year is available	A national forecast of both first and second line TB drugs for the next fiscal year has been conducted. If yes, indicate when it was done and by whom (i.e. NTP, TB CARE I, other partner)	30 health professionals participated in drug quantification workshop (year 3)	Quantification exercise conducted for NTP and data made available	Forecast for 2015 to 2018 developed TOT successfully conducted for 50 participants (TB provincial supervisors, Provincial warehouse staff, provincial DR-TB focal points and other partners).
8.1.2	Updated SOPs for selection, quantification, procurement, and management of TB medicines available	Completed and agreed upon SOPs for drug management of both FLDs and SLDs available for NTP usage that are older than five years. FLDs and SLDs can be addressed through two separate documents or combine in one SOP	Updated SOPs (Sensitive TB and TB MDR) completed (year 3)	Drug Management module of the national SOP is finalized and approved and training of pharmacy technician completed	Conducted a TOT training targeting Provincial NTP supervisors and Pharmacy professionals at provincial level Drug Management module finalized and approved.
8.1.3	Strengthened LMIS through support supervision to ensure data from the district level collected at National level	Number of supervision visits conducted to each TB CARE I province	3 supervision visits conducted (Year 2)	8 supervision visits conducted using approved NTP checklist	2 Supportive supervision carried out to Sofala and Nampula provinces with participation of staff from the national drug warehouse – CMAM (Central Medical Stores). Planned visit were not completed due to staff change. The MSH drug management specialist left her position and the replacement person only joined the project 3 months later with NTP delaying also her contracting process for nearly 2 months affecting activity implementation

Key Results

Technical visits were conducted by two MSH International consultants who provided short term technical assistance to the NTP. The support visits were focused on improving drug management (storage and distribution) and forecasting planning. Trip findings and recommendations were provided and the NTP, with support from the TB CARE I Drug Management Officer, has addressed most of these recommendations which included: carry out a baseline assessment of TB commodity management and assist MOH in development of drug management guidelines and continued TA to ensure that data on commodity management from district provinces and regions is complete and timely.

The project supported the NTP in distribution of TB drugs which was completed with all 11 provinces receiving TB drugs on time. A distribution plan based on the PNCT11 forms received from the provinces and stock available at the drug warehouses (Central of Medical Stores, CMAM) was developed.

Data analysis related to the availability of the three main TB drugs (4FDC, 3FDC adult and pediatric) was conducted as part of the drug management system for 2011 and the first quarter of 2012. The NTP prepared a module for drug management to be included in CMAMs SOP training. The training commenced at central level with three regional trainings in 2013.

In addition to the long-term TA provided by MSH drug management specialist, Dr. Luis Reciolino, the NTP received two STTAs visits from MSH consultants – Dr. Samuel Kinyanjui and Dr. Charles Kagoma. The first visit was a quick appraisal of the TB commodity management situation in the country (document review & limited field visits), and the objective of the second visit was to review 2012 work plan and develop implementation plan; and participate in TB CARE I phase one work planning for 2013 and NTP 2013 -2017 Strategic planning activities.

During project implementation, five supervision visits were conducted by MSH technical advisers on drug management with TB CARE I support to Sofala, Tete, Manica, Nampula and Zambézia provinces.

The project supported the establishment of a coordinating mechanism to follow up shipments and national stock status. A technical working group (TWG) was created for this purpose, with Terms of Reference developed and institutionalized. The members of the TWG include NTP, CMAM, the Planning and Coordination Department from MOH, USAID and Pharmacy Department. The first activity implemented by the TWG was the pipeline update GF to Global Drug Facility (GDF) and World Bank (WB), which showed delays in almost all procurement processes but subsequent data show improvement in the availability of accurate and timely information on drug management MSH hosted the TB drug management TWG monthly meetings and coordinated the monthly/quarterly supply chain review meetings.

In order to have a rational distribution plan and facilitate stock management, an Excel database was designed to gather information from PNCT11 based on number of patients, stock on hand at the end of quarter, quantities requested, NTP distribution plan, quantities distributed and received at provincial level. Training Modules, including the one for Drug Management, were reviewed and finalized, and the training of TB Provincial Supervisors was conducted with TB CARE I support. CMAM led the training so the SOPs are now institutionalized. The training manual was disseminated in electronic version to nearly 50% of the country during the trainings of pharmacy personnel. TB CARE I supported the printing and distribution of all the forms used by the NTP to manage the TB drug management system.

A national TOT for MDR-TB clinical management was successfully conducted in Maputo during the month of May 2014 with approximately 50 participants (TB provincial supervisors, provincial warehouse staff, provincial DR-TB focal points and other partners). These newly trained trainers will replicate training at provincial level thus, facilitating better management of DR-TB at different levels.

Two national workshops for Annual Forecast and Quantification (F&Q) of TB Drugs were conducted by NTP with support from the TB CARE I Drug Management Specialist in March 2014 to November 2014. Immediate results of the workshop were the finalization of the Drug Pipeline update and presentation and updating of the QuanTB tool. Financial Gap Analysis for the next two years was also done for 2014

to 2018. Support was provided to the NTP in obtaining an advance procurement of anti-TB drugs from the MOH in order to avert an imminent stock out.

TB CARE I conducted a financial gap analysis in June 2014 involving 30 key TB drug management stakeholders and MOH provincial staff, including 5 MOH central staff. The exercise was part of a national training in drug management and quantification meant to equip provincial drug warehousing staff in correct quantification of drugs, stock management and pipeline analysis. In addition to the June gap analysis, a quantification exercise was conducted for 2014 to 2016. The initial forecast for first line anti-TB drugs was conducted centrally by the Technical Medicine Group (TMG) and was based on the case notification method, which used the GDF drug tool. Tools provided by the WHO were used to calculate needs and the factors were adjusted according to the treatment guidelines in place (in units, means tablets, or vials). Notably the results of the F&Q exercise revealed the following gaps in the medicine stocks status in the country as at May 31st 2013:

Table 7: Financial gap analysis 2014 - 2016

Funding source	Years			Grand Total
	2014	2015	2016	
CMAM	\$2,232,950.34	83,636.29	\$ 126,445.80	\$2,735,534.06
GF NFM Y1		\$4,961,181.51		\$4,961,181.51
GF NFM Y2			\$7,010,349.05	\$7,010,349.05
GF TFM Y1	\$1,847,785.75			\$1,847,785.75
GF TFM Y2	\$2,129,824.19	\$973,686.54		\$3,103,510.73
SCMS	31,454.06			\$324,135.01
TBD	181,099.32	\$791,913.62	\$1,018,106.92	\$1,991,119.86
VPP R07PhII				\$1,898,545.42
World Bank	\$232, 351.06			\$232, 351.06
Grand Total	\$6,655, 464.72	\$6,810, 417.96	\$8,154, 901.77	\$24,104, 512.45

Two quantification exercises were conducted with the Project support, coming to the conclusion that TB CARE I or another technical partner need to maintain support to CMAM in monitoring the coming shipments and updating the pipeline. Constant delays jeopardize not only the distribution chain but also the availability of medicines to patients.

TB CARE I's Support to Global Fund Implementation

Global Fund support has been essential in provision of FLDs and SLDs for people in treatment since July 2008 through Round 7 funding. Disbursement of funds is through direct payments to suppliers for the procurement of TB drugs and supply of laboratory reagents and supplies. The country ratings are currently as follows:

Table 8: Current GF TB grants to Mozambique

Disease	Total agreement amount	Total disbursed to date	Ratings since Jan 2010		
			Number	Average	Latest
Tuberculosis	\$25.6 m	\$20.6 m	3	B1	B1

In July 2013 the country - through the Country Coordination Mechanism - submitted a proposal under the Interim Funding Mechanism which was approved in January 2014 for an amount of U\$27 million and signed in September, for the period of 1 July 2014 – 30 June 2017. The principal focus of this grant is drug procurement and maintenance of essential services. TB CARE I supported this application with a consultant from KNCV, who also supported NTP and FHI 360 technical staff in the development of a National TB Strategic Plan 2014-2017. An MSH consultant provided support to the quantification and forecasting of the first and second-line drugs. The Global Fund Country team had expressed concern about management of MDR-TB patients (PMDT) and asked for a coordinated plan to address PMDT expansion in the country before moving forward to the Interim Funding application. This plan was developed with support from a TB CARE I consultant from KNCV.

On 15 October 2014 the CCM submitted an additional Single Concept Note application for TB/HIV for U\$18 million. TB CARE I provided support to this process with a KNCV consultant. As a part of the application, another KNCV consultant and a consultant hired in Mozambique supported the development of a strategy for Community Engagement and Behavior Change and Communication.

Over the life of the project, TB CARE I staff have provided ongoing support as requested for GF-linked activities (strategic document design and writing, target setting, data reporting, follow-up of drugs pipeline and shipments, quantification). The main TB CARE I contribution during the last four years was support to develop key strategic and programmatic documents (noted above). In addition, through the MSH Drug Management Specialist, the project was actively involved in first and second line TB drug quantification, procurement and management including TB drug pipeline development and analysis.

The Way Forward

Reflecting on TB CARE I results through the lenses of the US Government TB strategy and the Post-2015 Global TB Strategy, there are many lessons to learn from TB CARE I and new approaches to prioritize going forward. The lessons learned from the project and an analysis of strategic priorities for the country are summarized below, which can inform future work and investment in the country. These are summarized by technical area below.

Universal Access

- Identification of key population (miners, prisoners, children under 5 years old) for implementation of DOTS activities
- Coordinate with NTP at provincial and district levels on selection of IA based on previous performance
- Work with only one implementing agency per province
- Selection of IA key staff and volunteers should be based on identified criteria
- DOTS investment should be focused on provinces and district with high burden TB
- Provide HIV counseling and testing for TB Patients at community level
- Train community volunteers to support TB and HIV treatments
- Provide non-monetary incentives to volunteers and monetary incentives (60% of minimum salary) to activist.
- Reorganize the structure of volunteers per health area (1 activist and 10 to 15 volunteers linked to the peripheral health facilities)
- School based intervention on TB activities

Laboratories

- Expansion of new technology (LED and Xpert)
- Support in the expansion of the country lab network by constructing and rehabilitating infrastructure at the peripheral level
- Guarantee diagnoses capacity for TB in all health facilities with Laboratory capacity
- Establishing a solid specimen referral network from community, HF, district and provincial levels
- Mapping of all HC with or without laboratory and distance from one HC to the other
- Increasing awareness of biosafety in different levels of TB laboratory according to risk category
- Regular supportive visits to straighten blinded rechecking activities
- Strengthen supportive supervision
- Recruit more laboratory staff to support activities at provincial levels
- Participation in international training or events

Infection Control

At community level

- Continued education for community on TB IC measures
- Strengthens sample transportation especially at community level by providing proper equipment
- Procure personal protection equipment
- Improve contact tracing
- Provide IEC materials on TB IC
- Participation in international training or events

At institutional level

- Continued sensitization of HCW on TB IC
- Development, update and implementation of TB IC plan at facility level
- Improve working condition in risk area (administrative and environmental)
- Procure personal protection equipment
- FAST strategy

PMDT

- Reinforce national and provincial PMDT body
- Conduct supportive supervision and TA visits

- National MDR-TB meetings
- Training of new clinicians on MDR-TB management (including drug side effect management)
- Develop and printing of job aids
- Strengthen patient follow up
- Provide psychosocial support including nutritional support
- DOTS PLUS
- Participation in international training or events

*National Campaign on TB MR to be conducted in 7 provinces with funds from WHO
In November

TB/HIV

- Continue coordination meetings between the two programs
- Guarantee and expand ONE STOP model
- Provide ARV to all TB/HIV patients
- Revised tools to improve TB screening in HIV sector
- Increase access to IPT for all eligible patients

HSS

- Allocate transportation means (motorbikes) to NTP districts supervisors and bicycles for activist and volunteers
- Rehabilitation of TB sectors and micro laboratories
- Procure vehicles in country for each province to support in sample referral, supervision and follow up of DOTS activities

M&E, OR, and Surveillance

- Establishing better data management system
 - Training of district and provincial supervisors on new tools (registers and forms)
 - Implementation of new register and forms
 - Implementation of ERR system
- Evaluate the impact of the introduction of new tools
- Guarantee data integrity through regular quarterly meetings for data review at the district levels with participation of implementing agencies and districts supervisors
- Participate in quarterly M&E meetings for review, analyses and validation of data
- Align period of implementation and compilation of data to fit NTP calendar
- Develop an integrated reporting between CB-DOTS and NTP
- Recruit more M&E staff to support activities at provincial levels
- Promote data usage for reprogramming and or realigning of activities
- Perform semiannual DQAs for NTP and IA
- Conduct supportive supervision and TA visits to districts and provincial levels
- Evaluate the impact of new technologies (Xpert)
- Promote publication OR conducted in local and international conferences and journals
- Participation in international training or events

Drug Management

- Hold two national meetings on quantification
- Hold quarterly update meetings at national level on quantification
- Conduct supportive supervision and TA visits to districts and provincial levels
- Transfer TB drug management to pharmacist at all levels in coordination with TB supervisors
- Make available electronic drug and medical items management system (SIMAM) to all HF
- Sensitize and train HCWs on recording and reporting on all Adverse Drug Reactions (ADR) on TB drugs.
- Sensitize HF to send PNCT 11 form on time to provincial warehouse
- Training on drug management at all levels

Annex I: Knowledge Exchange

Below is a list of tools and publications that were developed with support from TB CARE I-Mozambique over the life of the project. Please contact the project staff for copies of or links to any of the listed documents.

Technical Tools:

- ✦ MDR-TB treatment manuals
- ✦ TB laboratory bench aids (using both de Ziehl-Neelse and Auramina techniques)
- ✦ TB Bacilloscopy Manual
- ✦ Malaria diagnosis and guidelines
- ✦ Malaria strategic plan and National malaria policy
- ✦ Malaria supervision manual
- ✦ Malaria Laboratory Bench aids CB-DOTS Training manuals for community volunteers, treatment supporters and health technicians

Scientific Publications or presentations:

- ✦ **Malaria Initiative** - North Carolina 2010
- ✦ Impact of Patient Centered Approach (PCA) in strengthening Health Service Provision: Results of a pilot study in 2 districts of Mozambique – 4th SA TB Conference, June 2014
- ✦ Views and Perceptions on TB transmission among mining population in Mozambique – Poster presentation, 45th UNION Conference, Barcelona, Spain
- ✦ Gender related barriers affecting health seeking behaviors for TB treatment in Mozambique – Poster presentation, 45th UNION Conference, Barcelona, Spain
- ✦ Time Trend Analysis on the impact of CB-DOTS on Case detection In Mozambique – Symposium Oral presentation, 45th UNION Conference, Barcelona, Spain
- ✦ Implementation of Patient Chartered Approach (PCA), Mozambique Experience – Symposium Oral presentation, 45th UNION Conference, Barcelona, Spain

Educational materials:

- ✦ Educational flyers on TB Essential Information