USAID
FROM THE AMERICAN PEOPLE

Control and Prevention of Tuberculosis Project

Final Report: Burma

October 14, 2011 through December 31, 2015

Submission Date
January 29, 2016

Cooperative Agreement No.
AID-486-A-12-00002

Cooperative Agreement Period
October 14, 2011 through October 13, 2017

AOR Name
Mr. Aaron Schubert

Submitted by

Anh Innes, MD, Chief of Party, USAID CAP-TB,

Family Health International, Asia Pacific Region Sindhorn Building, 19th Floor, Tower 3
30-132 Wireless Road, Lumpini, Pathumwan, Bangkok 10330, Thailand

Phone: +662.263.5200 | Fax: +662.263.2114 | Email: ainnes@fhi360.org

CAP-TB
CONTROL AND PREVENTION OF TUBERCULOSIS

fhi360
THE SCIENCE OF IMPROVING LIVES

This document was produced for review and approval by the United States Agency for International Development/ Regional Development Mission for Asia (USAID/RDMA).

Contents

Contents 2
Acronyms 4
Executive Summary 5
Country Context: TB and MDR Situation in Burma 8
National Response to MDR-TB 8
Implementation Strategy and Implementing Agencies 9
Program performance/achievements and key challenges encountered 10
MDR-TB Prevention 10
Output 1.1 Mobilized communities to advocate for and use TB services 10
Output 1.2 Scaled-up implementation of TB infection control in health facilities 14
MDR-TB Management 17
Output 2.1 Ensured capacity availability and quality of laboratory testing to support the diagnosis and monitoring of TB patients, including the rapid diagnosis of MDR-TB 17
Output 2.2 Strengthened case finding and referral for MDR-TB 17
Output 2.3 Strengthened human resource capacity for MDR-TB Management 20
Output 2.4 Scaled-up quality treatment and community approach for PMDT 23
Monitoring and Evaluation (Strategic Information) 25
Output 3.1 Strengthened capacity of TB programs to collect, use and analyze data for management 25
Output 3.2 Increased TB research activity 29
Capacity Building and Technical Assistance 31
Output 4.1 Improved capacity of NTP to develop finance, and implement national TB controls strategies in line with global strategies 31
Output 4.2 Strengthened partnerships for quality TB care, including private sector 35
IR 5. Model programs expanded and use of best practices strengthened 36
Output 5.1 Created crosscutting mechanism to support health portfolio 36
Annex 1: Method used to estimate total number of individuals reached and adjustment factor to calculate for potential overlap among different partners and other USG 37
Annex 2: CAP-TB Burma Financial Report (FY12 through FY16) 38
Annex 3: Summary of accomplishments against the work plan and targets (as per M&E plan) 39
Annex 4: Map of operating areas 42
Annex 5: Cost-effectiveness Analysis of CAP-TB Patient-centered Package of Support 44
Annex 6: Snap Shots 48

Annex 7: List of presentations and publication 54
Annex 8: List of IEC Materials 55

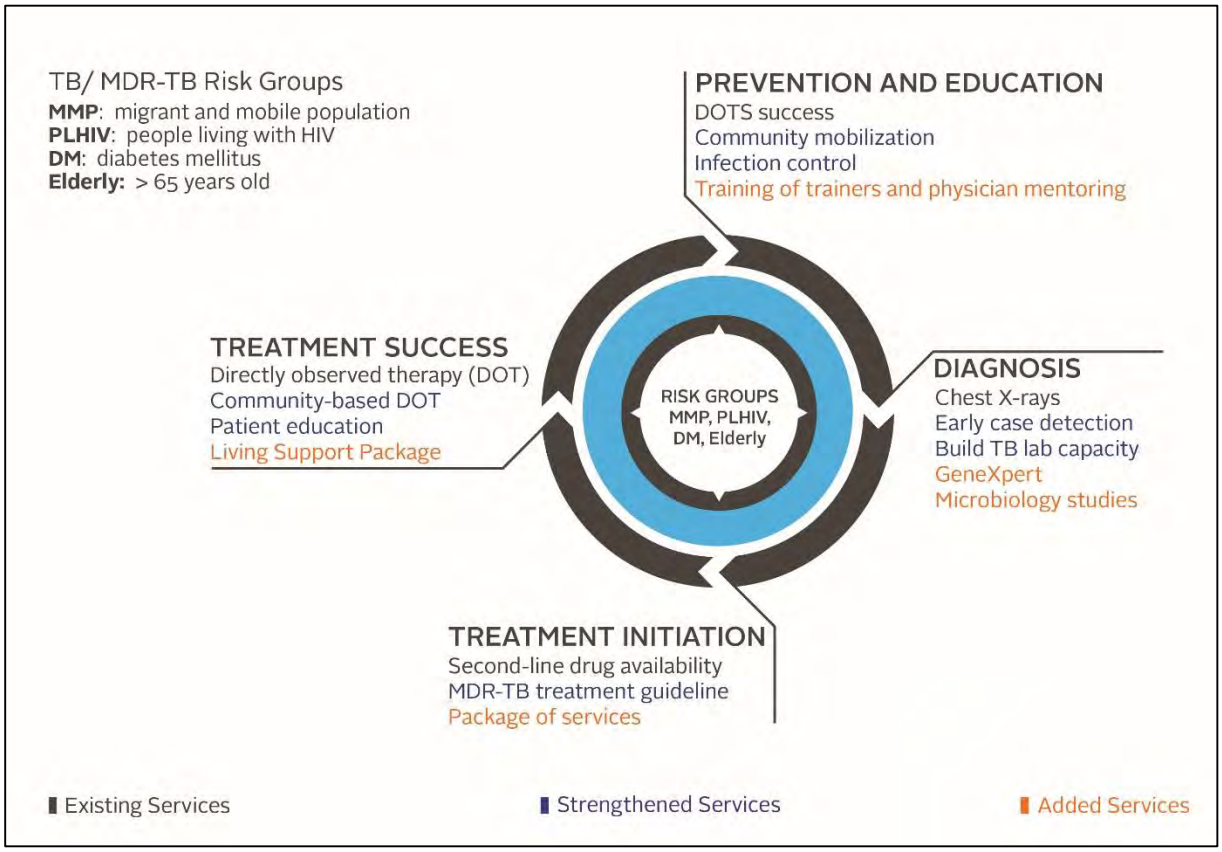
Acronyms

3MDG Fund	Three Millennium Development Goal Fund
AOR	Agreement Officer's Representative
CAP-TB	Control and Prevention of Tuberculosis
CI	Confident Interval
CME	Continuing Medical Education
COP	Chief of Party
CoPC-TB	Comprehensive Prevention to Care for Tuberculosis
DOT	Directly Observed Treatment
DOTS	The basic package that underpins the Stop TB Strategy (Directly Observed Treatment Short Course Strategy)
FHI 360	Family Health International
FY	Fiscal Year
GMS	Greater Mekong Subregion
GP	General Practitioners
HIV	Human Immunodeficiency Virus
IA	Implementing Agency
IC	Infection Control
IEC	Information, Education and Communication
INGO	International Non-Government Organization
IR	Intermediate Result
MBCA	Myanmar Business Coalition on AID
MDR-TB	Multidrug Resistance Tuberculosis
MDR-TB	Multidrug Resistance Tuberculosis
MHAA	Myanmar Health Assistant Association
MMA	Myanmar Medical Association
MOU	Memorandum of Understanding
NGO	Non-Government Organization
NTP	National Tuberculosis Programme
OPH	Office of Public Health
PGK	Pyi Gyi Khin
PMDT	Programmatic Management of Drug-resistance Tuberculosis
QA	Quality Assurance
RDMA	Regional Development Mission for Asia
TB	Tuberculosis
The Union	International Union Against Tuberculosis and Lung Disease
TOCAT	Technical and Organizational Capacity Assessment Tool
USAID	United State Agency for International Development
WHO	World Health Organization

Executive Summary

The U.S. Agency for International Development's Control and Prevention of Tuberculosis (USAID CAP-TB) project has been implemented in Burma from October 2011 through December 2015. The overall goal of the CAP-TB project is to develop a model for multi-drug resistant tuberculosis (MDR-TB) control and prevention in the Greater Mekong Sub-region of Burma, China, and Thailand, with impact on incidence and mortality from MDR-TB in these countries. The CAP-TB model is a patient-centered, community-driven approach to strengthen health systems for MDR-TB control.

The cornerstone of the CAP-TB model (below) is based on the foundational building blocks for tuberculosis (TB) control. Effective MDR-TB control is a challenge for TB platforms and health systems, as evidenced by the gaps in diagnosis and treatment reported from global data. Despite progress since 2009, fewer than 50% of estimated MDR-TB cases worldwide were diagnosed in 2013, a gap that persisted in 2014. The global treatment success rate remains no higher than 50%.



Starting in 2012, the CAP-TB project developed an MDR-TB model using a "patient-centered" perspective to identify gaps in the health system. The approach starts with finding presumptive TB and MDR-TB patients in the community ("Prevention and Education"); linking presumptive patients with the TB system for early diagnosis and initiation of treatment; and supporting those diagnosed throughout their 20-24 month regimen for treatment success. The community was mobilized to support patients using both standard and innovative methods: by engaging community volunteers and outreach workers to provide support and accountability through a bundle of patient-support interventions; as well as through technology and innovation, introducing Burma's first mobile health application for TB control. CAP-TB's implementation has been led by FHI 360,

working in close partnership with local implementing agencies (IA) and with the Myanmar National Tuberculosis Program (NTP). The Myanmar Medical Association (MMA), the Myanmar Health Assistant Association (MHAA), Pyi Gyi Khin, and the Myanmar Business Coalition on AID (MBCA) successfully implemented the CAP-TB model in Yangon, Mandalay, and Monywa over the course of the project's lifetime.

This report summarizes the CAP-TB project over four years of implementation (fiscal year [FY] 12 through FY15). Key strategies underlying the project's patient-centered, community-driven model are highlighted in this Executive Summary and further described in the Program Performance section (pages 10-36).

Community driven solution: Directly observed therapy (DOT) by community health workers

In FY13, MMA collaborated closely with the Myanmar NTP and basic health staff (BHS) to provide directly observed therapy (DOT) for MDR-TB patients. Community supporters were recruited from existing community networks in these townships, who volunteered their time, working alongside BHS to conduct daily, evening home visits to MDR-TB patients. They provided DOT during these visits, along with psychosocial support and health education to patients and family members. These were the country's first community supporters to provide DOT for MDR-TB patients, and the community-driven DOT model was recognized by the international sector for its potential. The NTP also valued this model to support rapid scale-up for the programmatic management of drug-resistant tuberculosis (PMDT) and is supporting its expansion to other project townships. Through the Three Millennium Development Goal Fund (3MDG), the CAP-TB model has now been scaled up to 43 townships to support MDR-TB treatment using community mobilization.

Innovation and Technology:

1. Solar-powered GeneXpert machine

The NTP recognized the underutilization of Gene Xpert machines installed at MDR-TB treatment centers where access to the electrical grid and voltage stability were major concerns. To address this problem, CAP-TB procured the country's first solar power system for Gene Xpert machines. This system was installed for the two machines at Yangon's Lower Myanmar TB Center and has provided stable, continuous power enabling uninterrupted analysis of sputum for MDR-TB. This helped to pave the way for the NTP to scale up solar-powered Gene Xpert machines at the district level and more remote facilities, improving access to diagnosis in unreached areas of the country.

2. DOTsync: Integration of Mobile Technology in the MDR-TB response

In 2014, the CAP-TB team launched DOTsync, a mobile application for community DOT that was developed using Dimagi's open-source CommCare software. DOTsync was developed to create a tool to train community volunteers to provide DOT and support for MDR-TB patients. The application was also piloted to test the use of "Information Communication Technology" to strengthen project management and to reduce burdensome data recording and reporting procedures.

Social and mass media for effective communication: Cover Your Cough campaign

Leading up to World TB Day 2014, the CAP-TB "Cover Your Cough" campaign used creative social and mass media to reach patients, families, and communities on simple methods to reduce TB and MDR-TB transmission. Through effective partnership with Burma's top hip hop celebrity, publicizing over the airwaves on FM radio stations and working with event organizers and different stakeholders, the CAP-TB team conducted public quiz shows at selected hot spots on TB and infection control-related health messages. Radio listeners' live feedback through the FM radio station was also solicited during popular spots on the air.

Thousands of stickers with photos of the campaign's celebrity spokesperson demonstrating good cough etiquette were posted on hundreds of buses and taxis on the crowded roads of Yangon. These methods combined conventional communication with social media—demonstrating the impact of social and mass media to teach a simple, life-saving message.

Human resource strengthening for Programmatic Management of Drug-resistant Tuberculosis (PMDT)

The NTP scale-up of PMDT covered 22 townships in 2011, 38 townships in 2012, 53 townships in 2013, 68 townships in 2014 and 108 townships in 2015. To strengthen human resource capacity during PMDT scale-up, CAP-TB supported "Training of Trainers" for non-TB clinicians from the public sector in 2012. Along with the expansion of MDR-TB treatment townships, 2 PMDT trainings were conducted in Yangon and Mandalay during 2014, with participation from clinicians in the expansion townships.

In addition to training on MDR-TB treatment, there was a notable gap in identifying presumptive MDR-TB cases. To address this, community based organizations were trained on TB and MDR-TB knowledge, and private sector engagement in TB management was strengthened. According to the NTP's reports, there has been an increased contribution by the private sector in TB case notification; as of 2014, the contribution from private sector care providers on total TB case notification was 18%. CAP-TB recognized the importance of strengthening referral systems for MDR-TB and organized trainings for private clinicians in collaboration with the MMA-Public-Private Mix project, with the objective of strengthening referral linkages between private and public sectors.

Evidence-based program planning and implementation

In the initial phase of designing CAP-TB's patient-centered, community-driven model, the project launched the "TB Trends" module in March 2013 to clarify health seeking and purchasing behavior for diagnosis and treatment of TB. Communities were also asked where they purchased their medication to better understand access to quality-assured TB drugs. Data were collected for a total of 1,022 beneficiaries in Yangon, Mandalay, and Monywa. Results from this survey helped the CAP-TB team to design strategies for patient support, which was the project's primary intervention.

From April 2013 through September 2015, the CAP-TB team supported 983 patients for the full duration or a portion of the 20-24 month MDR-TB treatment. The main CAP-TB intervention was the monthly "package of support" comprising home visits (counseling, infection control, contact referrals); food; and transportation allowance: 510 patients received this monthly package of support, of whom 485 have completed treatment to date, with 85.3% treatment success. The highest level of intervention comprised the monthly package of support with the addition of daily, evening DOT by community volunteers: 110 patients received this level of support, of whom 94 have completed treatment, with 92.6% treatment success. The "minimal support" group (usual care by the NTP with intermittent home visits) had a total of 329 patients of whom 26 have completed treatment, with 38.5% success: these results are still preliminary as most patients in this minimal support group are currently on treatment, thus the results cannot be fully interpreted at this time. However, these preliminary data can inform the NTP on the most cost-effective strategies to successfully support MDR-TB patients throughout their lengthy and toxic treatment.

Country Context: TB and MDR Situation in Burma

Burma is on the World Health Organization's (WHO) lists for the 22 countries with high TB burden, the 27 countries with high MDR-TB burden, and the 41 countries with high TB/HIV burden. In 2014, the WHO estimated that TB prevalence was 457 per 100,000 and TB mortality (excluding HIV/TB) was 53 per 100,000. TB incidence in 2014 was estimated at 369 per 100,000. Prevalence of HIV sero-positivity among new TB patients was 9.7% according to the sentinel surveillance done at 25 sites in 2012.

In 2014, a total of 141,957 TB patients (all forms) were notified in Burma, with a case detection rate of 70 per 100,000 of which 42,608 patients were new smear positive cases. The NTP achieved treatment success of 87% for all new and relapse cases and 71% for previously treated cases registered in 2013 (Global TB report, 2015).

MDR-TB prevalence was initially reported as 4.2% and increased to 5% among new TB patients in the second and third nationwide drug resistant TB survey, conducted in 2008 and 2013, respectively. The most recent data show that the percentage of TB cases with MDR-TB in 2014 was 5% among new TB cases and 27% among retreatment TB cases. Estimations for MDR-TB cases developing each year are as follows: 5,600 MDR-TB cases among notified new pulmonary TB cases and 3,400 MDR-TB cases among notified relapse pulmonary TB cases.

National Response to MDR-TB

The Myanmar NTP was organized in 1966 and currently has 14 Regional and State TB Centers with 101 TB Teams at district and township levels. All townships in Burma have been covered with DOTS since 2003.

The National Drug-Resistant TB Committee was established in September 2006. In 2013, the NTP and the WHO Country Office published revised MDR-TB guidelines, which are fully in line with current global WHO recommendations, and which also contained diagnosis protocols for the use of Xpert MTB/RIF. The DOTS-Plus pilot project was launched in 10 selected townships in Yangon and Mandalay Regions in July, 2009, with approval of the Green Light Committee and in close collaboration with WHO and Medecins Sans Frontieres- Holland (MSF-H). A total of 309 patients were enrolled in this pilot project with the support of UNITAID. The DOTS-Plus Pilot Project (2009-2010) concluded with a treatment success rate of 71.3% among enrolled MDR-TB patients. MDR-TB management was then expanded up to 22 townships in Yangon and Mandalay Regions in 2011 with Global Fund support. The total number of townships with MDR-TB diagnosis, treatment and care services was scaled up to 38 townships in 2012 and 53 townships in 2013 in Yangon, Mandalay, Sagaing, and Magway Regions as well as Shan (Lashio) and Shan (Taunggyi) States. From mid-2009 to end of 2013, 1468 MDR-TB patients were enrolled on MDR-TB treatment, of which 80% were enrolled in the Yangon Region. Among these, approximately 350 MDR-TB patients have completed treatment with success rates > 71% (note that all these patients had failed two TB treatment courses, with some cases being co-infected with HIV).

The NTP's main financial partners for MDR-TB are the Global Fund, UNITAID, USAID and the 3MDG Fund. The major technical partners are MSF-H, FHI 360, FIND and WHO.

Implementation Strategy and Implementing Agencies

All activities under the CAP-TB Project strictly followed the USAID policy and legal restrictions for Burma for each fiscal year of funding. Throughout the fiscal years, CAP-TB supported the NTP in its PMDT expansion strategy and aligned its implementation sites with the NTP's priority townships to ensure support of the national program and sustainability of the project's activities.

The overarching goals for FY15, the final year of CAP-TB implementation in Burma, were as follows:

- To transition the CAP-TB patient-centered, community-driven model to local non-governmental organizations.
- To successfully advocate for the CAP-TB model to be adopted into health policy and for its inclusion into the NTP's National Strategic Plan; and to advocate for the CAP-TB model's inclusion into the next Global Fund concept note.

Accomplishing these goals would enable the NTP to use the CAP-TB model for standardizing its MDR-TB prevention, diagnosis, and treatment strategy.

Implementing Agencies

Myanmar Medical Association (MMA)

As the largest academic body of general practitioners, MMA's role on the CAP-TB project focused on improving screening and case finding of MDR-TB patients by strengthening referral linkages between private and public sectors. The MMA CAP-TB team also trained the country's first community volunteers to provide DOT for MDR TB patients. Those volunteers were also trained to provide health education and basic counselling services both to patients and family members, a model that is being scaled up under the 3MDG funded project. Innovative m-Health integration (DOTsync) was also piloted by the MMA CAP-TB team, recognized as the first m-Health integration for TB in Burma.

Pyi Gyi Khin (PGK) and Myanmar Health Assistant Association (MHAA)

PGK is a local community-based organization which was originally founded to work with the HIV population through self-help groups and networks. PGK's foundation among people living with HIV was an asset for the CAP-TB project in reaching its target populations; the PGK CAP-TB team worked among HIV networks to conduct health education sessions and refer presumptive TB cases to Yangon township health centers.

MHAA contributed its strengths in coordinating with government counterparts and strong experiences in field implementation. MHAA's experience in community outreach also contributed to the CAP-TB strategy for providing comprehensive home based care, comprising infection control, side effect monitoring and household contract tracing. This comprehensive package was designed to ensure continuity of care for MDR-TB patients, with the overall goal to maximize treatment success.

Myanmar Business Coalition on AID (MBCA)

Under the CAP-TB project, MBCA utilized its existing strengths in engagement with the business sector to advocate for workplace policies on TB. In the Monywa industrial zone and businesses, MBCA conducted health education sessions and recruited volunteers with the goal to improve case finding. These volunteers were trained as "TB Champions" to serve as focal points within their workplace for referring presumptive TB patients and other TB related services.

Program performance/achievements and key challenges encountered

In FY12, the focus of the CAP-TB project was on project planning and start-up.

1. **Country Assessment**: The Burma CAP-TB Country Assessment was conducted in Yangon and Mandalay from March 12-17, 2012 by representatives from FHI 360 and the Union. The team met with representatives from Mandalay and Yangon NTP, MMA, WHO and Population Services International to introduce the CAP-TB Project and assess site capacity, gaps and needs. A final assessment report was produced and used to revise the FY12 work plan.
2. **Staff Recruitment**: At the end of FY12, there was a total of 18 project staff on the CAP-TB team: one program manager, two TB medical coordinators, 12 TB field supervisors, two data management operators, and one finance and administrative assistant.
3. **Financial Review**: The Union finance manager conducted pre-award financial reviews for two local IAs in June and July. The FHI 360 CAP-TB team later assumed responsibility for conducting contract and grant orientation of local partners.
4. **Coordination**: The CAP-TB program manager and medical coordinators conducted regular monitoring in 7 townships in Mandalay and held local-level coordination meetings with the TB regional officer. A supervision visit from the CAP-TB FHI 360 team was conducted in August to monitor program activities. During this visit, FHI 360 was also oriented on the activities of the TB volunteer network implemented by the Union (with other funding) to determine how CAP-TB supported interventions could coordinate with existing programs.
5. **Work planning**: Meetings were held between the CAP-TB FHI 360 team, the Union, and the NTP in June and August to discuss the FY12 and FY13 work plans. FHI 360 and the Union also conducted assessments in 11 townships in Yangon.

MDR-TB Prevention

IR 1. Strengthened MDR-TB Prevention

CAP-TB's MDR-TB prevention strategy was focused on the two well-recognized pathways that lead to the development of TB drug resistance. Primary spread of existing MDR-TB from patients is prevented by reducing delays in diagnosis of MDR-TB, getting patients diagnosed with MDR-TB on effective treatment, and implementing facility-based infection control policies. Secondary development of drug resistance is prevented by reducing mismanagement of TB treatment from lack of quality drugs, non-adherence and non-standardized or unmonitored treatment.

Output 1.1 Mobilized communities to advocate for and use TB services

Activity 1.1.1 Conduct training on TB and MDR-TB for staff from CAP-TB partner organizations to support the CAP-TB model implementation

Outreach worker trainings

The CAP-TB team conducted outreach worker trainings during the early phase of the project (FY13) for field staff from the CAP-TB IAs (PGK, MHAA, MBCA and MMA) to effectively implement TB/MDR-TB community outreach. The objective was to promote early case detection and referral and to enhance community awareness through health education and home visits. The following topics were covered:

- Case finding strategies

- Laboratory aspects of MDR-TB
- Burma PMDT overview
- Infection control
- DOT provision
- Basic concepts of MDR-TB counselling
- Management of adverse reactions
- Monitoring treatment

With the objectives to strengthen TB/MDR-TB capacity and to share experience among partner organizations, the CAP-TB project conducted refresher trainings in FY14. Experts from MSF Holland were also invited to provide training on patient counseling.

Community Supporter trainings

The CAP-TB IAs (MHAA, MMA and PGK) organized training sessions for community supporters from 12 CAP-TB townships (2 in Mandalay and 10 in Yangon). These sessions for patient-centered community-based MDR-TB care aimed to train these community supporters to provide evening DOT for MDR-TB patients; to provide health education, infection control checks, and social support for MDR-TB patients. The 2 day training package ensured that community supporters had essential knowledge and skills in conducting MDR-TB DOT, including:

- Introduction about CAP-TB project, FHI 360, USAID and their role as CAP-TB Implementing Agencies
- Basic knowledge about TB, diagnosis, treatment and side effects
- Contact tracing
- DOTS strategy and STOP TB strategy
- Basic knowledge about MDR-TB, diagnosis, treatment strategy and side effects
- Infection control
- Basic knowledge on adherence counselling to MDR-TB patients
- Components of home based care
- Role of community supporters
- Reporting and recording of DOT activity

The trainings were provided through collaboration between the NTP, the CAP-TB FHI 360 team, and MSF-Holland. A total of 156 community supporters (34 male and 122 female) were trained in 12 townships in FY14 and FY15. Follow up meetings were conducted to strengthen capacity and MMA conducted refresher trainings in its project townships in Yangon during FY15.

TB champion trainings

In FY13 and FY14, MBCA conducted trainings on basic knowledge of TB, infection control, and case finding for "TB Champions", who were volunteers among factory workers and their family members within the business and industrial sectors of Monywa. The objective was 'To train TB Champions on the basic knowledge of TB to conduct case finding in their respective factories in Monywa industrial zone'. The topics covered included:

- Introduction about CAP-TB, basic knowledge about TB, diagnosis and treatment of TB
- Infection control and Case finding strategies

Facilitators and trainers were the MBCA CAP-TB project manager (medical doctor), area coordinator and outreach workers. A total of 92 TB Champions (34 male and 58 female) were trained during this activity. Follow-up meetings were conducted after these trainings, where the TB Champions shared best practices, discussed challenges and were updated on TB and MDR-TB information.

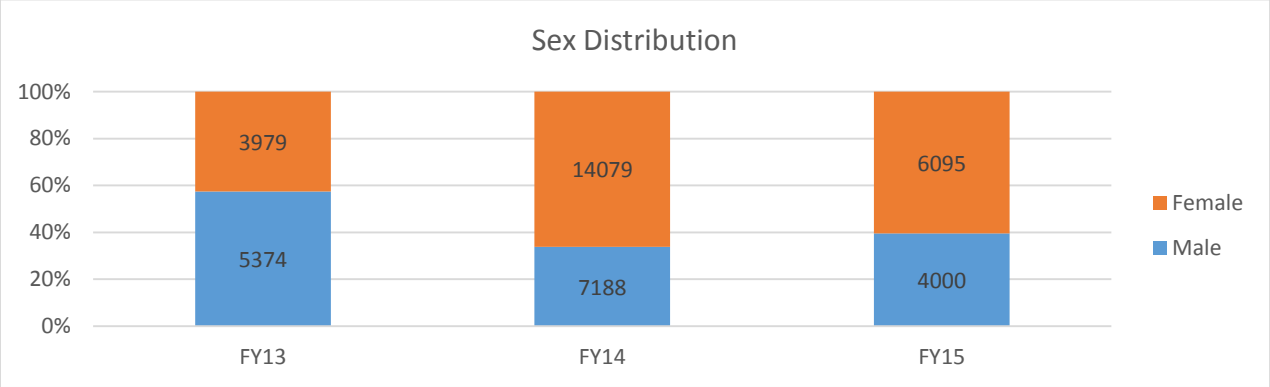
Activity 1.1.2 Conduct community outreach activities in project sites to support CAP-TB model implementation

Starting from March 2013 (FY13), CAP-TB IAs conducted community outreach in project townships by providing health education and information on TB symptoms, diagnosis, treatment, and available health services using information/education/communication (IEC) materials. Outreach activities included small group discussions, with an emphasis on two-way interaction to disseminate basic TB information and identify presumptive TB patients. Community events were conducted for targeted at-risk populations and communities in 20 CAP-TB coverage townships: 11 townships in Yangon region, 7 townships in Mandalay region and 2 townships in Sagaing region. The trained CAP-TB outreach workers built linkages between families, communities and the TB centers by coordination with township health centers, a broad range of activities and strategies that included individual contact and service promotion events. MMA community supporters conducted TB awareness sessions among neighborhoods of MDR-TB patients to whom they provided evening MDR-TB DOT.

MBCA conducted small group discussions on general TB knowledge and TB signs and symptoms in factories within the Monywa industrial zone. These discussions were aimed at promoting screening for employees with TB symptoms, advocating for workplace TB policies, providing TB/MDR-TB IEC materials, and linking workers to TB services at the MBCA non-profit clinic and nearby township health centers. Trained TB champions also strengthened community outreach activities by raising awareness within their workplaces, conducting monthly experience-sharing with outreach workers, and assisting referral services. MBCA conducted DOT supervision to 177 TB patients who were registered under the NTP in Monywa Township, Sagaing Region. MBCA built linkages between NTP and TB patients to support regular clinic and sputum follow up; to give health education on TB and infection control; to check the pill count and side effects; and to look for presumptive TB cases among close contacts in the household.

Figure 1. Number of individuals reached by Community Outreach Activities

Figure 2. Sex distribution for individuals reached by Community Outreach Activities



Activity 1.1.3 Commemorate World TB day with activities to advocate for TB services

On World TB Day of each year, the CAP-TB team participated in the central World TB Day Ceremony at the Ministry of Health Office, Naypyitaw and the regional World TB Day Ceremonies in Yangon, Mandalay and Sagaing Regions. CAP-TB also joined the district and township World TB Day ceremonies in the project's coverage townships, coordinating with Township Medical Officers (TMO) and BHS, through distribution of information and materials, video CD presentation, TB and MDR-TB quizzes, TB network volunteer award presentations and photo exhibitions.

Special World TB Day events

FY14:

1. MBCA conducted a 'Road Show' event at Monywa Industrial Zone, where videos about TB and MDR-TB knowledge were displayed in an open space, and the Cover Your Cough campaign quiz show was also held during intervals of the road show.
2. MMA conducted a special Continuing Medical Education session (CME) regarding 'Fighting the TB Battle', at Myanmar Medical Association, Mandalay, on 1st April 2014. The participants were professors and clinicians from specialist hospitals, professors and students from medical/paramedical universities, representatives from the NTP, and responsible persons from WHO and CAP-TB IAs. The CAP-TB Chief of Party and Senior Program Officer from FHI 360 attended the event in Mandalay.

FY15: MMA commemorated World TB Day with a ceremony in Yangon, with participation from the Ministry of Health, local authorities and community members. An engaging approach to communication was used during this ceremony, with well-known physicians and writers speaking from different perspectives to deliver simple messages on TB control. Professor Win Naing, a Pulmonary expert, explained to the community about the epidemiology of TB disease ('Superb TB and Great Man') highlighting the linkages between health providers and the community for successful TB management. This was followed by well-known pediatrician and writer, Professor Ye Myint Kyaw, who discussed how pediatricians handle presumptive childhood TB cases differently than adult cases, and identified wrong perceptions from the community. The two topics focused on community mobilization and engagement for MDR-TB and TB management in the community. Photo exhibitions were also held and MMA projects displayed their activities and distributed IEC materials.

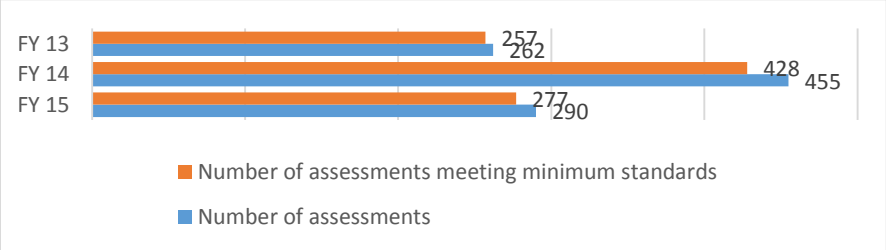
Output 1.2 Scaled-up implementation of TB infection control in health facilities

Activity 1.2.1 Strengthen TB-IC in health facilities, households and communities

Household level infection Control (IC) checklist

CAP-TB IAs conducted infection control (IC) activities in MDR-TB patients' households as part of home based care activities in the project townships. The objectives were to increase awareness about IC in households of TB and MDR-TB patients, to set minimum requirements of IC, and to provide education to improve IC. With guidance from the NTP, the CAP-TB team developed an IC checklist in FY13 using regional references and a QA checklist. This checklist was a tool to assess IC at the household level, intended for use by field staff and volunteers during home visits. It covered 3 main levels of IC: 1) Administrative controls 2) Environmental controls and 3) Personal Protection. MDR-TB patients were evaluated on the 10 critical points from the checklist, of which 7 out of 10 points must be met for a satisfactory review. In FY15, with scale up of CAP-TB model, the checklist was assessed and revised according to feedback from the field and a total of 9 critical points were scored.

Figure 3. Infection Control Assessment



Temporary shelter

During FY13, MDR-TB treatment was available in 68 PMDT townships out of 325 townships in the country. As a result, patients from different parts of the country often moved to temporary housing in crowded urban areas in Yangon and Mandalay in order to access MDR-TB care. The CAP-TB project learned through home visits by PGK and MHAA about the "real situation" in these homes: some patients stayed in very small, enclosed spaces promoting disease transmission, because they either could not find or afford appropriate housing. CAP-TB partners sketched diagrams of MDR-TB patients' households during home visits to better gauge the issues at the household level and consider potential solutions. It was then planned to provide temporary shelter for patients for a maximum of 6 months to improve infection control.

The CAP-TB team organized a brainstorming session during early FY 14 among the 4 IAs to gather consensus on eligible criteria for these shelters, provision procedures and monitoring methods, with the goal to provide temporary shelter for infectious MDR-TB patients during the intensive phase of their treatment. With recommendation from respective NTP personnel and TMOs, 49 MDR-TB patients (from 13 project townships) were provided with accommodation rental or renovated homes, in order to meet the IC standards. This intervention was not continued beyond FY14 due to difficulty in assigning patients to receive this service: although the project developed a list of criteria that identified patients with the greatest need, the TMOs found it difficult to choose impartially. The CAP-TB team also noted that the most effective IC is prompt initiation of appropriate treatment and compliance with medication, thus focusing our attention on this latter strategy for IC following FY14.

Mask distribution

Insufficient second line drugs and long wait times for MDR-TB treatment are major threats to effective IC in communities, since the disease continues to be transmitted by patients who are infectious. Through the Lower Myanmar TB center, the CAP-TB project provided 35,000 surgical masks to MDR-TB patients on wait lists and 3,900 N95 masks to care givers. Health education on proper cough etiquette was also provided as a part of IC measures at home and in the community.

Cover Your Cough Campaign: 2014 and 2015

With the objective to increase the awareness of cough etiquette in the general community and reduce the risk of transmission of TB and other airborne diseases, CAP-TB launched the 'Cough Your Cough" (CYC) campaign in March of 2014 and March 2015.

March 2014: During FY14, the CYC campaign included seven main activities through various channels, ranging from mass media to individual quiz shows. Facebook was used to promote public attention towards the campaign's Photo contest, Facebook "Like and Share" contest and other activities. Mass media was also used by messaging through two popular radio stations (Mandalay FM and City FM). Through FM radio, the message was delivered through short announcements, health talks, short stories shared by the radio announcers, and live feedback from the community. Burma's renowned pop star and actor donated his celebrity status for the campaign, and posters, banners and stickers were distributed with his photo throughout the community. Sticker posting was targeted at stations for taxis, in-town buses and high way buses. Posters and banners were posted at health facilities, bus terminals and public places, targeting the community to improve awareness among health care providers. Promotional events were conducted at nine project townships in Yangon Region by eight outreach workers and program staff from the CAP-TB team. Two to six hotspots (such as bus stops, markets, road junctions and public places) in each project township were chosen to reach the targeted community and to increase participation. During each event, a cough quiz show was conducted using 15 TB/Cough hygiene related questions, including short health education messages at intervals. On 6th April 2014, a celebration event was conducted at Kandawgyi Karaweik Oo Yin, with participation from CAP-TB project staff. Mr. Chris Milligan, USAID Mission Director and Saskia Funston, Senior Development Outreach Specialist, attended this event along with officials from Yangon Regional Health Department, Department of Medical Research and township health centers. The closing ceremony of the CYC campaign had broad representation from local and international partner organizations who work to fight against TB.

Achievements of FY 14's CYC Campaign included the following: 94 promotion events (Quiz shows) were conducted at 34 at bus stops and major road junctions, 49 markets, 5 at highway bus terminals, 2 at rail way stations and 4 at other public places. Outreach teams brought an estimated 3,731 community members (1,698 Male and 2,033 Female) to the quiz shows. During promotional events, 6,989 IEC materials including 247 cups, 312 T-shirts, 1,945 pamphlets, 1,242 masks, 1,895 tissue paper packs, and 1,348 towels were distributed. 2,320 stickers were posted on public transport vehicles (taxis and buses) and 132 posters/banners were posted at health facilities and public places.

March 2015: According to the national census in 2014, approximately 14% of the population resides in the Yangon area. A public transport survey by the Japanese International Cooperation Agency in 2014 found that public buses were used by nearly half of people travelling in Yangon. In addition, the third nationwide drug resistance survey found that 'Living in Yangon' increased the risk of MDR-TB by an adjusted Odd Ratio of 3.0 (95% CI, 1.5–5.8) compared to those not living in Yangon. Considering all of these factors, the FY15

CYC campaign conducted field activities by posting stickers with health education messages within public transportation vehicles. During 5 field activity days, the field workers and volunteers posted 9,633 stickers on 856 buses, 599 mini-buses and 639 taxis. 1,861 T-shirts with health education messages were distributed to transportation workers. One bus stop near the Lower Myanmar TB Center was also renovated, with vivid and colorful education messages on cough etiquette for patients and the community.

Mass media was also emphasized for FY15's CYC campaign, with the goal to reach a broader population in Yangon city. With collaboration from two popular radio stations (Mandalay FM and City FM), CAP-TB spread the message on cough etiquette "on air", during a live radio program with calls taken from listeners to share their experiences. This live program was hosted by the radio hosts and facilitated by CAP-TB's Program Officer. The CYC campaign was also featured on a talk show with the NTP Program Manager discussing TB disease and prevention. Campaign activities were also broadcast on television in collaboration with Sky Net Health Channel.

The "Cover Your Cough Campaign 2015" was launched on 3rd March at the Park Royal Hotel in Yangon. Mr. Chris Milligan, USAID Burma Mission Director, Mr. William Slater, Director Burma Mission Office of Public Health (OPH), Ms. Saskia Funston, Senior Development Outreach Specialist, and Ms. ThuVan T. Dinh, Burma Mission OPH Health Technical Advisor joined the event. The NTP Program Manager, along with officials from Yangon Regional Health Department, Department of Medical Research and Township Health Centers also participated in the event. Representatives from partner organizations and reporters from various media channels also attended. The launch ceremony and campaign activities were also reported in the following print media: 7 Days News Journal, Eleven Newspaper, The Street View Journal, Myanmar Post Global Journal and Health Digest Journal.

Lessons learned

Coordination at field level to avoid duplication of activities: In the Mandalay region, CAP-TB partner MHAA planned to carry out community outreach for the general population (urban poor). The Union (International Union Against Tuberculosis and Lung Disease) also conducted active case finding, DOT supervision, and contact tracing at TB patients' homes in Mandalay funded by TB REACH. Initially, MHAA planned to cover the area not reached by the Union, as Mandalay has a large population as Burma's second largest city. During implementation, however, MHAA discovered that about half of the audience in most health education sessions had already been given health education on TB by the Union. Also, presumptive TB cases had already been referred by Union volunteers. The Union had assigned 2 TB supervisors to each township and 20 volunteers to each township. There was service overlap with the Union, and therefore MHAA faced challenges to reach their targets. Thus, MHAA reprogrammed activities to focus on family members and contacts of MDR-TB patients, avoiding overlap with the Union, whose strategy focused on the general urban poor population.

Using epidemiology to inform communication strategies: The CAP-TB Cover Your Cough campaign was designed based on evidence and inputs from IA field workers. The balance between strong evidence and sound practice was the key to reach specific targets with simple and effective communication. During the second year of the CYC campaign, the new information on disease epidemiology from the 2013 drug resistance survey influenced the campaign's strategy, to increase coverage in Yangon using mass media among targeted communities.

Strategies for World TB Day: Two CAP-TB IAs, MMA and MBCA conducted special events for 2014 and 2015 World TB days. The 'Road Show' of MBCA targeted factory workers who were unable to attend events

due to their work schedule at the factories. This show brought the workers' attention to TB knowledge during their commute to their workplace. MMA's CME event in 2014 targeted clinicians at all levels (professors to general practitioners) and advocated current NTP MDR-TB management practice and global updates in participatory approach. In 2015, MMA organized an event that combined elements of the community with the clinical, bringing together strategies from the previous years. In 2015, well-known clinicians were invited to give simple presentations to the community. Opportunities were created for the community to ask questions directly of the professors, and misbeliefs and wrong conceptions were corrected.

MDR-TB Management

IR 2. Strengthened MDR-TB management

Output 2.1 Ensured capacity availability and quality of laboratory testing to support the diagnosis and monitoring of TB patients, including the rapid diagnosis of MDR-TB

Activity 2.1.1 Procure GeneXpert machine and consumables

One GeneXpert machine, cartridges and accessories for the solar power system were procured by the CAP-TB project and successfully installed at the NTP's Lower Myanmar TB Center in early August 2013. The CAP-TB-supported GeneXpert machine was the first machine in Burma to receive continuous power supply through solar panels. During FY14 and FY15, using the CAP-TB procured Gene Xpert machine, 11% of newly diagnosed presumptive MDR-TB cases and 22% of previously treated presumptive MDR-TB cases were diagnosed with MDR-TB (MTB + and rifampicin (RIF) resistance plus RIF indeterminate).

Table 1. Gene Xpert reporting from NTP registry.

	Gene Xpert results	New	Retreatment	Unknown	Total
FY 14	MTB -	139	435	4	**578**
	MTB + / RIF sensitive	126	264	4	**394**
	MTB + / RIF resistance	48	201	2	**251**
	MTB + / RIF indeterminate	13	20	0	**33**
	Total	326	920	10	**1256**
FY 15	MTB -	294	409	77	**780**
	MTB + / RIF sensitive	395	288	137	**820**
	MTB + / RIF resistance	40	156	36	**232**
	MTB + / RIF indeterminate	11	17	5	**33**
	Total	740	870	255	**1865**

Output 2.2 Strengthened case finding and referral for MDR-TB

Activity 2.2.1 Screen all retreatment TB cases for MDR with GeneXpert machine

Presumptive MDR-TB cases in Yangon are screened for TB and rifampicin resistance using GeneXpert tests following the NTP guidelines. This screening of retreatment TB cases for MDR-TB was done by the CAP-TB project along with other stakeholders working with the NTP on MDR-TB control.

Activity 2.2.2 Provide education on population at high risk for MDR-TB

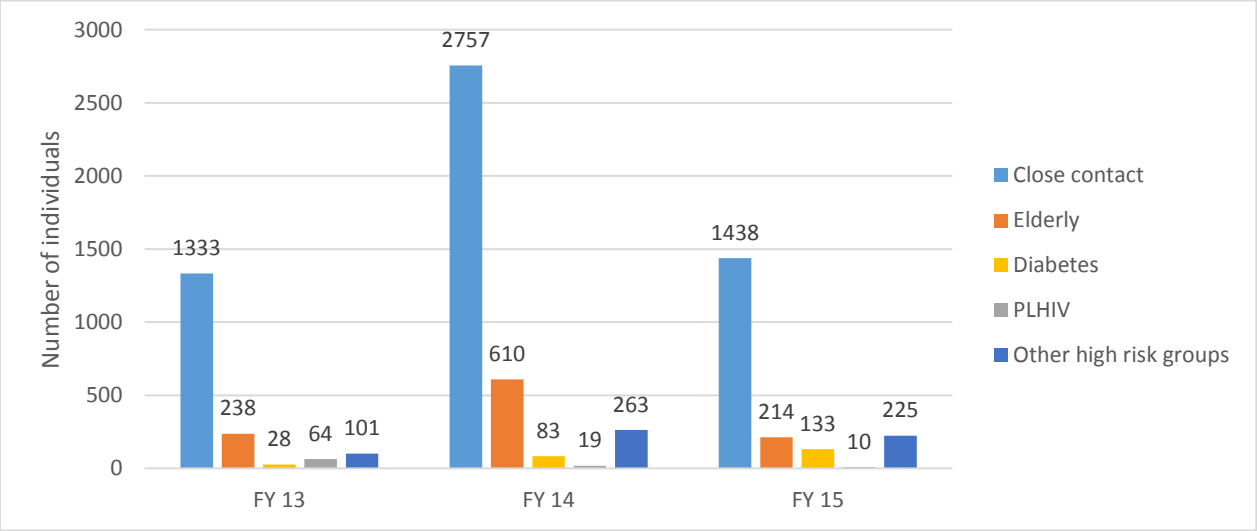
CAP-TB IAs visited MDR-TB patients to provide education on early case detection among populations at high risk for MDR-TB. One such strategy was to provide health education to MDR-TB household members during home visits to the patients. These home visits were intended to harmonize support for MDR-TB patients and ensure sustainability and continuity of care. During home visits, patients and household members were educated to detect presumptive TB cases early.

CAP-TB IAs conducted monthly home-based care activities in 20 townships (11 in Yangon region, 7 in Mandalay region and 2 in Sagaing region) covering households of MDR-TB patients and TB patients in Monywa Township.

Activity 2.2.3 Strengthen referral linkages for presumptive MDR-TB patients and patients between concerned services providers

Strengthening referral linkages for presumptive MDR-TB cases between general practitioners (GP), outpatient departments and NTP treatment centers was the priority for this activity. Specific risk groups included those with a known history of treatment failure, those lost to follow-up, patients who were smear positive at two months, close contacts of MDR-TB, and people living with HIV (Figure 4).

Figure 4. High risk populations reached by community outreach activities (FY13 – FY15)



As a follow-up for the PMDT trainings (Activity 2.3.1), a referral tracking mechanism at GP clinics was discussed during FY14. With collaboration from the CAP-TB Senior Program Officer (FHI 360), MMA agreed to collect the referral data (from all trained 18 townships) on a quarterly basis. The trained GPs referred 120 presumptive MDR-TB cases (65 men and 55 women) to Township Health Centers, where they had access to Gene Xpert diagnosis. Among them, 107 accessed services, resulting in a successful referral rate of 89%. Among these, 53 received Gene Xpert test and 14 were diagnosed as MDR-TB; the MDR-TB rate among presumptive cases tested by Gene Xpert was 26 %.

Referrals of close contacts was also a focus for CAP-TB outreach workers and community supporters; tracking referral success and rate of diagnosis was also done to identify the most effective screening strategy. These data are shown in Figure 5.

Figure 5. Referral of presumptive cases for diagnosis by CAP-TB (FY13 – FY15)

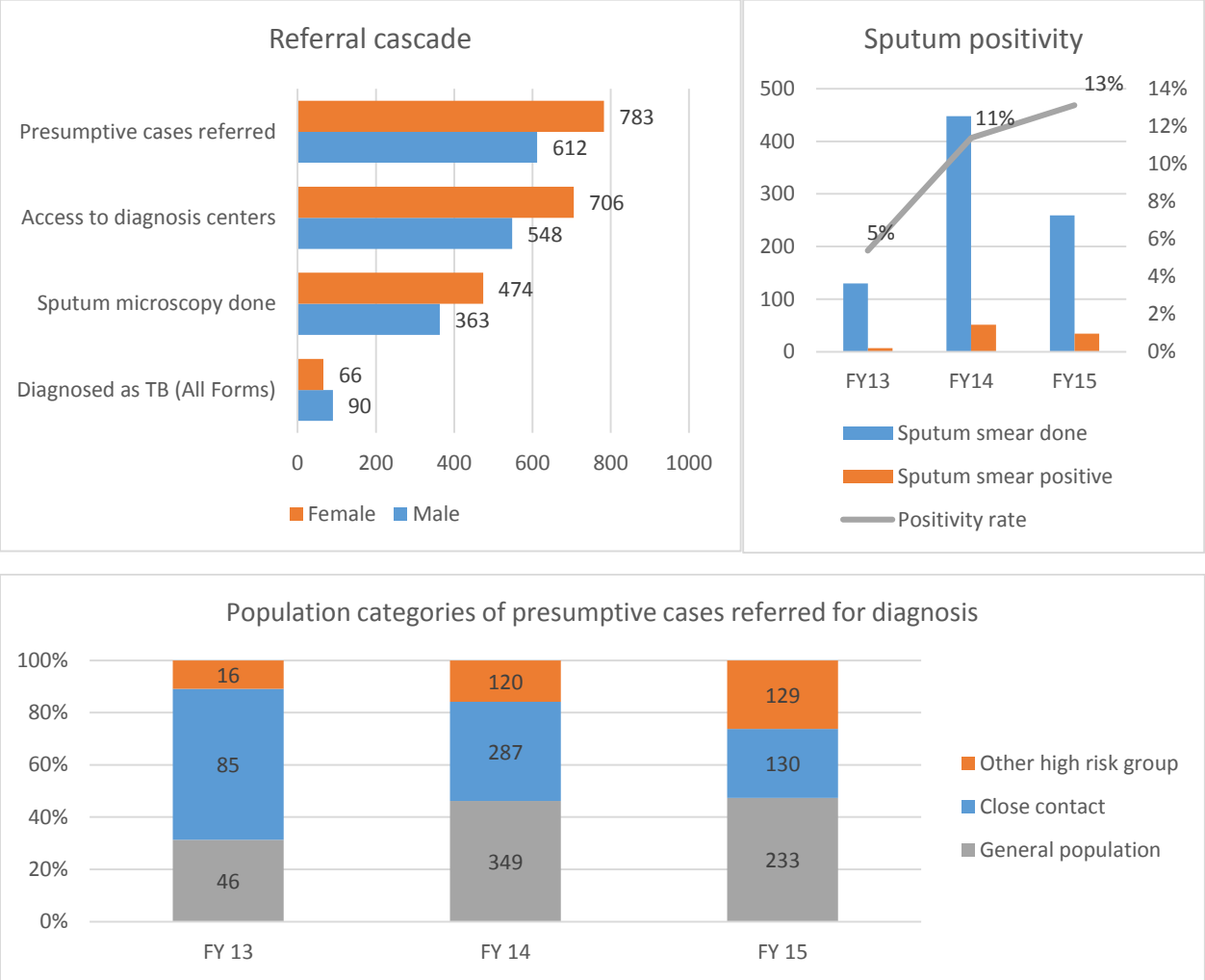
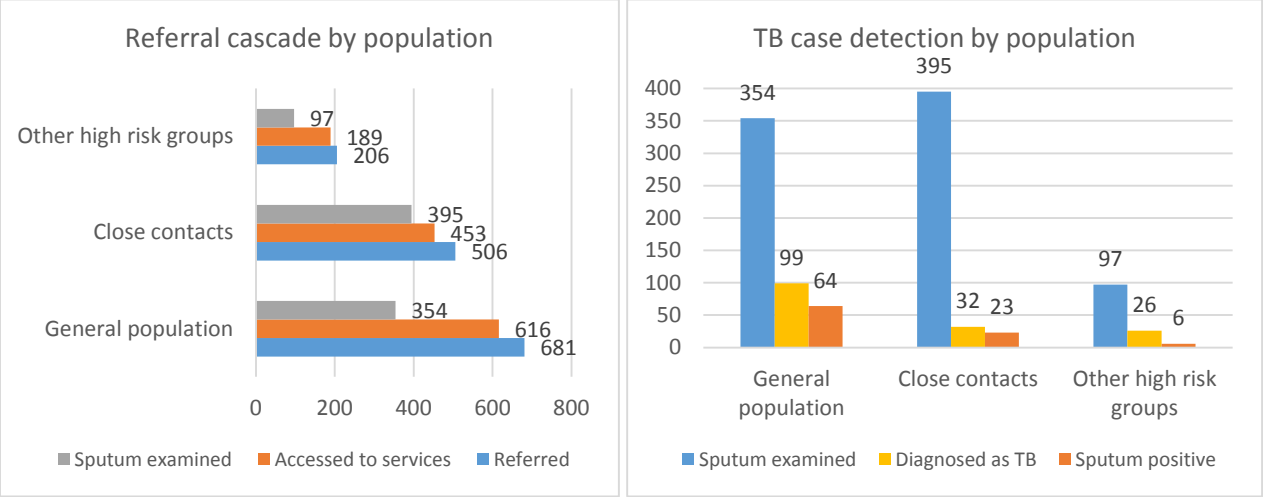


Table 2. High risk groups with access to diagnosis services and testing (FY13 – FY15)

Population type	Number referred	Accessed Services	Accessed Sputum microscopy	Sputum smear positive	Diagnosed as TB	Gene-Xpert accessed	Diagnosed as MDR-TB
Close contacts	506	453	395	23	32	6	2
Elderly	77	70	50	2	11	3	0
Diabetes	26	25	16	1	7	1	0
Migrants	18	15	14	0	1	0	0
General population	681	616	354	64	99	26	5
Other categories	85	79	17	3	7	15	3
Total	**1,393**	**1,258**	**846**	**93**	**157**	**51**	**10**

Figure 6. Referral tracking for presumptive TB/MDR-TB cases (disaggregated by population)



In addition to referrals for diagnosis, the CAP-TB team also tracked referrals for managing side effects and symptoms: during home visits, 32 MDR-TB patients (20 men and 12 women) were referred for side-effects and follow up visits. CAP-TB also assisted in follow up visits for 5 TB cases (3 men and 2 women) and one female TB patient was referred for adherence counseling. CAP-TB referral linkages and procedures including documentation of referrals were discussed and agreed upon by CAP-TB IAs and the NTP.

- The referral system was implemented through coordination reports and coordination meetings with the NTP and stakeholders (as in activity 4.1.2), health education activities (as in activity 1.1.2, 2.2.2, 4.2.2) and training activities such as case finding (as in activity 1.1.1). During CAP-TB implementation, a total of 1,432 cases were referred (for all reasons, including diagnosis and side effects) and among them 1,288 accessed to referral destinations, with a successful referral rate of 90%.
- Case finding was done during health education sessions and presumptive TB/MDR-TB cases were referred to TB/MDR-TB related services. Referral tracking services were provided to ensure linkage between TB related services.

Output 2.3 Strengthened human resource capacity for MDR-TB Management

Activity 2.3.1 Conduct training for public and private sector General Practitioners (GPs) on Standard Treatment of TB and diagnosis of MDR-TB and Infection control

The objective of these trainings was "To build capacity to be ready in future years to treat patients after the NTP expands to include GPs in treatment of MDR-TB patients" and "To learn about the management of MDR-TB in Burma and the referral mechanism". The training curriculum was adapted from the NTP PMDT training guideline and reviewed by the NTP. Trainers and facilitators were drawn from the NTP, WHO, FHI 360 and MSF-Holland.

MMA organized trainings for GPs in collaboration between the MMA-PPM (Public-Private Mix) project and the MMA-CAP-TB team. These GPs were from the private sector and were not currently treating MDR-TB patients, although they were responsible for referring them into the NTP. The CAP-TB FHI 360 team presented the CAP-TB strategic model, which is based on strengthening the TB health system for prevention, diagnosis, and treatment for MDR-TB. A total of 280 GPs (179 men and 101 women) from 18 PMDT

townships were trained through 9 training sessions in FY13 and 2 sessions in FY14. A total of 50,842 materials (50,580 pamphlets and 262 posters) were provided to GPs for distribution to beneficiaries at their clinics. MMA followed up with trained GPs for effective referral of presumptive MDR TB cases to township health centers. In FY15, the MMA-PPM project extended their workplan to presumptive MDR-TB referral; the CAP-TB team therefore handed over its referral tracking procedure to the MMA-PPM project.

Activity 2.3.2 Conduct training for Township Medical Officers in standard diagnosis of TB, x-ray reading, general clinical practice, infection control, community mobilization, financial management, data management

International consultants Dr. Greg Symons (Pneumologist, UCT Lung Institute, South Africa) and Dr. Calligaro Symons (Pneumologist, UCT Lung Institute, South Africa) conducted two three-day trainings in Mandalay and Yangon. One training in September 2012 covered general clinical practice, infection control, community mobilization, financial management and data management, supported by TB REACH. This training was expected to facilitate development of effective and sustainable partnerships among the public and private sectors and civil society to ensure delivery of quality services by the NTP. The participants were BHS, medical doctors, TMOs, GPs from MMA, and partners' field staff.

The TB REACH training laid the groundwork for the CAP-TB-supported training which covered standard diagnosis of TB and the chest X-ray recording and reporting system (CRRS). This was targeted to train clinicians from the government and private sectors to build capacity on clinical reporting of chest radiographs to identify TB. These trainings were conducted during October 2012 (1-3 Oct in Mandalay and 4-6 Oct in Yangon) by the NTP and the Union, with support from CAP-TB. Attendees included a total of 57 clinicians (26 in Mandalay and 31 in Yangon) including public sector TMOs and TB Team Leaders from 22 project townships and private sector general practitioners (32 public and 25 private.)

A test was done after each CRRS training, and two grades were defined from the results.

1. "A-grade" readers were members who attended the CRRS training course but did not pass the course evaluation, and were thus certified only to take part in readings involving the CRRS in collaboration with one or two more reporters, provided that one reader had a B grade rating.
2. "B-grade" readers attended the CRRS training course and attained the required score, and were certified to take part in readings using the CRRS with other "A-" or "B-grade" readers.
3. An "A-grade" reader who wished to upgrade to a "B-grade" rating did not need to re-attend the CRRS course, but must pass the formal evaluation at a future date with support from the Union. 51 participants gained "B-grade" (22 from Mandalay and 29 from Yangon) out of 57 participants in total.

Activity 2.3.3 Conduct TOT for MDR-TB clinical management training in 15 additional townships under the NTP extension plan for MDR-TB

CAP-TB supported the training-of-trainers (TOT) on PMDT organized by the NTP during November 5-12, 2012. In total, 93 public and private sector participants attended the training, including representatives from each of the four CAP-TB IAs. Following this TOT, all physicians, TMOs and TB coordinators who attended provided community-based training to government BHS. After this training, CAP-TB partners also participated as trainers for their field staff together with the CAP-TB FHI 360 team.

During FY14, two refresher trainings for PMDT were conducted in collaboration with the NTP and WHO. These trainings aimed to build the capacity on management of MDR-TB for the physicians, TMOs and TB

coordinators from the expansion PMDT townships. One training was conducted in Yangon during 15-16 May 2013, with 36 participants and a second was conducted in Mandalay during 29-30 May 2013, with 31 participants. A total of 67 participants (30 men and 37 women) attended the trainings.

Childhood TB

Given the high priority focus on children as a risk group for TB, CAP-TB supported the National Workshop on Childhood TB Management organized by the NTP in collaboration with WHO on 19-20 August, 2013. During 11-18 August, Professor Stephen Graham from the University of Melbourne conducted field visits and reviewed the NTP guidelines on childhood TB management. On the first day of the workshop, the current situation and findings were presented, followed by international recommendations and best practices. A total of 75 participants from throughout Burma (3 chest physicians, 41 pediatricians, 19 from NTP including regional TB officers, 4 from WHO and 8 from NGOS) were divided into groups and held discussions on the second day. Group discussions focused on the rationale behind diagnosis, current practices, challenges, and the way forward. The workshop successfully concluded with a draft action plan and recommendations.

Activity 2.3.4 Provide peer support to MDR-TB patients

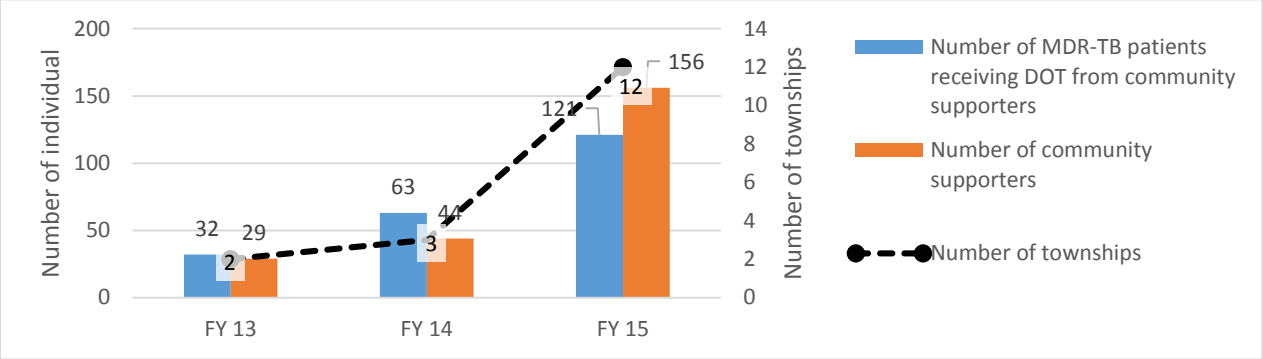
In FY14, MHAA recruited 4 Peer Educators (PEs), 2 in Yangon and 2 in Mandalay, who had successfully completed treatment and were microbiologically cured. These PEs were trained by CAP-TB's Senior Program Officer (FHI 360) on TB/MDR-TB, infection control, counselling and psychological support. In 9 CAP-TB townships under MHAA, PE activities were implemented to share common experiences and adherence counselling in group sessions and home visits. There were two training sessions, one in Yangon and one in Mandalay, for recruited PEs. The trainings were provided by the CAP-TB FHI 360 team, and topics included basic knowledge about MDR-TB, importance of treatment adherence, infection control measures, and overview of common treatment side effects. The PEs conducted home visits together with MHAA township community facilitators.

Activity 2.3.5 Conduct community DOTs for MDR-TB patients in selected pilot townships

Prior to CAP-TB, the NTP's BHS at the township health centers provided DOT to all MDR TB patients, leading to very large workloads. Through CAP-TB, community supporters were trained to provide DOT with each evening dose for MDR-TB, filling a critical gap and shifting work from the BHS who were often unable to provide both daily morning and evening DOT. During home visits, community supporters also educated the patients on early recognition of minor side effects and referred cases to township health centers.

- During FY13, MMA in close collaboration with the NTP and TMOs piloted MDR-TB DOT through Community Supporters in 2 pilot townships: South Okkalarpa in Yangon Region and Chanmya Tharzi in Mandalay region.
- With successful implementation, MMA expanded in FY14 to one additional township in Yangon region, Thingangyun with recommendation from the NTP.
- Further scale up took place in FY15, during which all CAP-TB IAs conducted similar activities in 12 selected townships, 10 townships in Yangon region and 2 townships in Mandalay region. Under 3MDG funding, the CAP-TB IAs have now further scaled up community MDR-TB DOT to a total of 43 townships.

Figure 7. Evening MDR-TB DOT by community supporters (FY 13 – FY15)



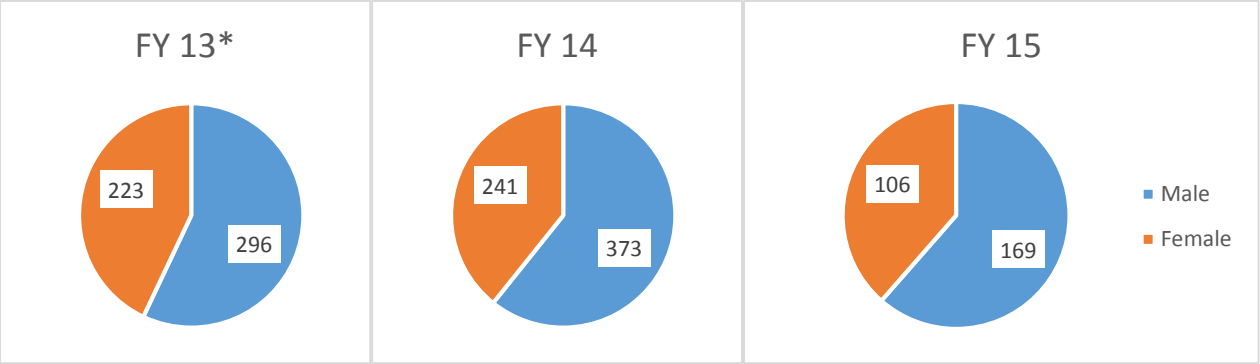
Output 2.4 Scaled-up quality treatment and community approach for PMDT

Activity 2.4.1 Provide package of services to MDR-TB patients

The CAP-TB project developed a patient-centered, community-driven model to support MDR-TB patients, using an approach that leveraged funding from other donors to minimize duplication of efforts. Second-line drugs (SLDs) were provided through the Global Fund to Fight AIDS, TB and Malaria (GFATM) Round 9 grant in the first year that CAP-TB supported MDR-TB treatment. The GFATM provision of SLDs enabled the project to complement other donor funding by focusing on strategies to support these patients who had initiated SLD treatment through GFATM support, with the goal to maximize treatment success.

The comprehensive CAP-TB "package of support" included a monthly supply of nutrition and transportation support to enable follow up visits to the NTP, along with monthly home visits to provide psychosocial counseling, advise on side effects (and refer if needed), and check on infection control and close contacts who might be presumptive patients. CAP-TB provided this package of support for MDR-TB patients in 18 project townships in Mandalay, Yangon and Sagaing regions, working through 4 implementing agencies from April 2013 through September 2015. Although elements of the CAP-TB model are also being implemented by other organizations, the consistency and quality of services were keys to the treatment success for patients supported by the CAP-TB project. Further detail on outcomes are described on page 36 and in Annex 5.

Figure 8. Number of MDR-TB patients receiving the CAP-TB package of support



** As of September 2013*

Lessons learned

Identifying strengths of existing community networks: CAP-TB successfully overcame issues around volunteer retention, which is a common challenge facing organizations working with community volunteers. The project trained a total of 156 volunteers, who were selected in close collaboration with existing, strong community networks. The recruitment and selection process was done alongside training activities, using the trainings as a screening process. During the trainings, the volunteers were taught about MDR-TB disease epidemiology and the nature of the work to be done. After the recruitment process, the workload and compensation package was designed to ensure that the volunteers were able to conduct the daily visits for DOT (to fit with the program's needs) while also considering their own schedules—if they were otherwise employed or had families. The retention rate for CAP-TB volunteers was 98% during the project's lifetime: only 3 out of 156 trained volunteers resigned, demonstrating success in the selection and retention methods.

Stigma and discrimination: In some parts of the coverage areas, discrimination against MDR-TB patients continued due to misconceptions about the disease. This prevented outreach workers from visiting certain homes because the patients were afraid of their health status being known to the neighbours.

Engaging with private care providers: During the first year of CAP-TB implementation, many GPs who were practicing in their private clinics were not willing to treat infectious TB disease without profit. Some GPs did not attend the CAP-TB PMDT training because they thought they would be forced to manage MDR-TB patients who are highly infectious. Advocacy through the existing strong MMA PPM network was used to advertise the objective of the training to encourage their participation. Although the trainings were primarily focused on Scheme 3 PPM GPs, some were not active in referring presumptive MDR-TB patients. In order to increase GP exposure to PMDT principles, MMA recognized that some Scheme 1 and Scheme 2 GPs were enthusiastic and motivated to attend the trainings, so these GPs were then included. This will increase the NTP's capacity to scale up PMDT in the future, once GPs in all Schemes are included among certified practitioners to manage MDR-TB patients.

Contact tracing of MDR-TB patients: Because of the limited number of townships offering MDR-TB treatment, one of the biggest challenges was the movement of MDR-TB patients between townships (from where they lived to where they received treatment). This led to patients not being in the MDR-TB township for the entire treatment, due to movement back to their home townships for economic reasons. It was difficult for outreach workers to carry out contact tracing and to provide the package of support in a consistent fashion. However, due to the NTP's rapid PMDT township expansion, most of these cases were able to be transferred back to their original townships, where trained TMOs then assumed their care.

Patients as Expert: Through experience in the field, CAP-TB recognized that peer support is key to treatment adherence, especially when the patients are on 20-24 months of burdensome MDR-TB treatment. Knowing this, the MHAA CAP-TB team recruited the most committed, former MDR-TB patients (who had been cured) to support outreach workers during home visits. With extra caution to prevent re-infection among these peer educators, CAP-TB successfully piloted this activity in 9 townships with 4 peer educators.

Monitoring and Evaluation (Strategic Information)

IR 3. Improved strategic information for MDR-TB

Overview of CAP-TB routine data management

Data collection: Data generated from field activities were collected by IAs using standardized templates and served as primary sources. Some data were gathered through coordination between the NTP and other stakeholders.

Review of data: Those responsible for the data collection of performance indicators (as identified in the PMP within the individual performance indicator data sheets) reviewed the data with the appropriate implementing partner, cooperating agency, or partner responsible to ensure data consistency and quality. Data and data collection methods were reviewed during site visits.

Data analysis: Most data were analyzed by the CAP-TB FHI 360 team (Burma and regional) after initial collection and review by IAs who were responsible for carrying out the activity as identified in the performance indicator reference sheets. For any discrepancies in the data from surveys and program statistics, the team triangulated the data to better understand the dynamics of data disparity. Activities were carried out to ensure data accuracy captured in the data quality assurance (DQA) sheets. User-friendly raw data was provided to other partners, as appropriate.

Presentation of data: Data were presented in a variety of formats, including tables, graphs, and charts as appropriate. Key findings were summarized in Microsoft PowerPoint presentations, brochures, and posters. The data were presented at dissemination workshops sponsored by USAID.

Reporting of data: Data were reported in annual reports, budget justifications, annual strategy meeting presentations, mission strategy/portfolio reviews, performance plans and reports, regional meetings, external USAID presentations, and international conferences.

Output 3.1 Strengthened capacity of TB programs to collect, use and analyze data for management

Activity 3.1.2: Improve routine recording and reporting systems, monitoring tools and skills, and analysis/evaluation of program data

At the community level, FHI 360 conducted site visits in the initial phase of implementation to regional TB centers and township health centers to introduce the CAP-TB project, advocate for data sharing, align NTP and CAP-TB reporting and data requirements, and explore current practices in order to identify gaps and potential challenges. CAP-TB monitoring and evaluation (M&E) tools and USAID requirements were introduced to M&E staff from the four CAP-TB IAs during the MEASURE

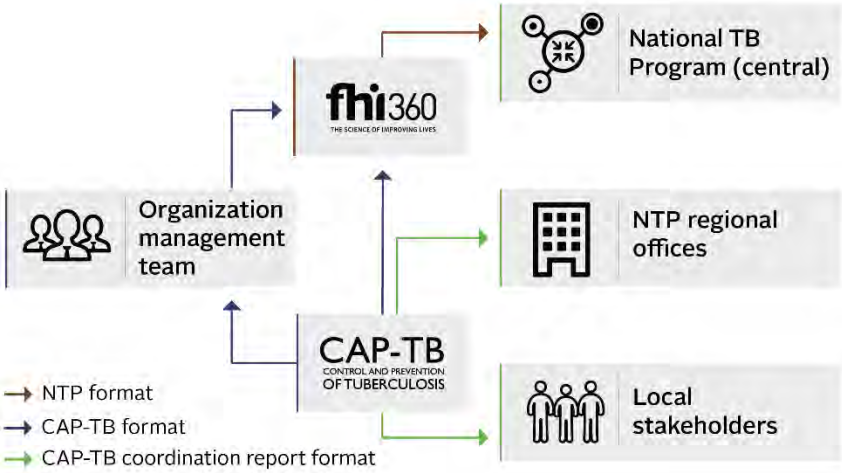


Figure 9. Data coordination flow chart

M&E training, which was held in Bangkok during December 2012. Ms. Shanthi Noriega, FHI 360 Associate Director, Strategic Information, conducted a one day training in the FHI 360 Myanmar office in February 2013 before field activities were launched. Details about the CAP-TB M&E tools were discussed and finalized together with program and M&E staff from IAs.

1. After 3 months of field implementation, information sharing with stakeholders was a priority for M&E system improvement. During June 2013, a one-day training was provided to IAs regarding "Data communication and coordination" with the objective of imparting awareness of service overlap and double counting, strengthening of coordination efforts with NTP and local partners, and standardizing the reporting system outside of the CAP-TB project.
2. In August 2013, MDR-TB community based DOT activities were launched, a major milestone as these were the country's first community supporters providing DOT for MDR-TB patients. To ensure accurate recording and reporting of data, the CAP-TB FHI 360 team worked with MMA to prepare the required M&E documents. After pilot testing, the existing recording and monitoring tools were reviewed and discussed to improve efficiency and effectiveness of the data collection system.
3. The CAP-TB Program Manager, Program Officers and Senior M&E Officer conducted regular field monitoring visits to strengthen community based MDR-TB management and the recommendations were shared with the relevant IAs. From July 2014, quarterly data analysis workshops (presentation sessions), led by the CAP-TB regional team or FHI 360 country team were conducted. These sessions were designed to share achievements and experiences among partners, to strengthen data analysis and presentation skills and to promote the data utilization practice among IAs.

Capacity building activities

Outreach workers were trained on CAP-TB M&E basic concepts, procedures and tools through M&E sessions during outreach worker trainings in the initial phase of the project. During FY14, an M&E refresher training was conducted. The main focus was to develop M&E experience among the IAs, to update on CAP-TB M&E practices, to share challenges and common errors and to introduce mobile technology for data management.

Implementing agencies also organized M&E related training with external consultants. During January 2014, the MHAA CAP-TB team conducted a 3 day M&E training delivered by Dr. Phyo San Win (M&E consultant) on project cycle management, data processing and other M&E related topics. A report writing training was organized by MHAA during September 2014, which was delivered by Dr. Min Nwe Tun (External consultant). The PGK CAP-TB team also organized one M&E training with Dr. Phyo San Win (M&E consultant) during June 2014.

During 23rd and 24th April 2014, Research Design & Methods Training Workshop (Nay Pyi Taw) was led by the LSHTM team and National University of Singapore (NUS) in collaboration with CAP-TB. The trainers were Dr. Mishal Khan (LSHTM), Dr. Samantha Watson (LSHTM), Dr. Coll Hutchison (LSHTM) and Dr. Joanne Yoong (NUS). This training was attended by 10 participants (6 men and 4 women), consisting of 3 Assistant Directors, 5 Regional Officers and 2 Medical Officers from the National TB Program. Preparation for implementing the "Case-Control Study of Risk Factors for MDR-TB in Yangon, Burma" was started in May in close collaboration with the NTP.

DOTsync

CAP-TB's DOTsync mobile app was developed using Dimagi's open source CommCare platform. DOTsync was launched as a training and tracking tool for community supporters to conduct DOT for MDR-TB patients.

The primary objectives of this mobile technology were to train community volunteers and to track their work during home based care activities. DOTsync takes the user step-wise through separate screens for DOT, health education messages, side effects, and referrals for presumptive patients; the application also contains drawings and audio instruction to facilitate understanding. The contents were developed based on the NTP's guidelines and were approved by the NTP. Following the launch, further trouble-shooting and development for more advanced utilization of the application was done in close collaboration with Dimagi.

Table 3. Timeline of DOTSync implementation

6th to 9th May 2014	DOTsync: Dimagi's team of Saijai Liangpusakul, Senior Field Manager and Devika Sarin, Project Manager conducted their field testing visit. This visit was facilitated by CAP-TB FHI 360 team in collaboration with the MMA CAP-TB team. 5 selected community supporters were trained and field testing was done in 4 MDR-TB patient homes, to get feedback from both field users and beneficiaries. During afternoon session of 9th May, the team from Dimagi, FHI 360 and MMA discussed plans and timeline for the DOTsync pilot and launch.
3rd to 7th June 2014	CAP-TB Senior M&E Officer and Senior Program Officer from CAP-TB FHI 360 joined 'Application building training of CommCare' at FHI 360's Asia Pacific Regional Office, Bangkok, together with M&E persons from other countries.
9th June 2014	One day ToT training was conducted by Dimagi, with participation from 5 selected Community Supporters and 5 CAP-TB staff from different IAs. The objective of this training was to conduct direct training to community supporters in the future.
June – July 2014	The participants from ToT conducted direct trainings to Community Supporters in South Okkalapa Township (10-13 June), Chan Mya Tharzi Township (2-5 July) and Thingangyun Township (7-8 July). After training, mobile phones were distributed to Community Supporters to implement 'Test application' for beta-testing during their activities in the field.
August 2014	Review of the test application and launching of full application was done in 3 project townships.
September 2014	The information collected from DOTsync was reviewed during feedback sessions
October 2014 onwards	The information reported using DOTsync was reported to USAID starting from 1st October in FY15.

In January 2015, Dimagi organized an event for CommCare users, with participation from CAP-TB, PU-AMI, PACT, Marie Stopes International, UNICEF and Proximity. The discussion session was held around current projects and the CommCare maturity model, which involves taking a mobile application from demonstration to full implementation and scale-up. Pitfalls and challenges were shared among participants and solutions shared from other's experiences.

Information Communication Technology integration in health sector

1. In August 2014, CAP-TB participated in the ICT4D (Information Communication Technology for Development) workshop, facilitated by Wayan Vota, Technical Advisor, Socio and Economic Development, FHI 360. The main theme of the workshop was to allow development actors to seek opportunities and discuss challenges in Burma, which currently has the lowest internet penetration in Southern Asia.

2. CAP-TB presented an overview of DOTsync at the mHealth Networking and Lessons Learnt workshop, organized by 3MDG and UNOPS in January 2015. Other organizations with activities in m-Health presented their projects. FHI 360 was a panelist for discussions centered on sharing perspectives on different platforms.
3. The CAP-TB project also participated in "Consultation on HIV-TB-Malaria Information Systems in the context of eHealth development towards UHC in Burma" organized by Asia eHealth Information Network (AeHIN) in collaboration with WHO, ADB, UNICEF, and University of Oslo, in Nay Pyi Taw in August 2015. This was a three day meeting with the objective "To review the current HIS status, priorities, and barriers and discuss potential steps to be taken towards developing and implementing a comprehensive HIS / eHealth roadmap." The CAP-TB team presented about 'DOTSync' in the meeting.

Activity 3.1.3: Strengthen Data Quality Assurance (DQA) and data analysis to Myanmar Medical Association (MMA), PyiGyi Khin (PGK), Myanmar Business Coalition on AID (MBCA) and Myanmar Health Assistant Association (MHAA)

CAP-TB has used a regional support model for M&E and provided support to MBCA, MMA, PGK, and MHAA to review and strengthen their routinely reported data, including DQA/QA reports and data analysis. Data originate from the field, generated by outreach and community workers who conduct the activities. The data quality was checked at each level of reporting and feedback was provided as in the figure below. The mechanisms for data quality assurance helped to strengthen the project's M&E, with the goal to ensure high quality of data collected and reported as well as to build capacity in M&E for all CAP-TB IAs.

Figure 10. Data flow and feedback mechanism of CAP-TB Project

In May 2013, a one-day training for Data Quality Assessment was conducted using USAID and FHI 360 templates with the objective of learning "Basic principles of DQA, knowledge, and concepts about CAP-TB DQA and knowledge on current practices and future plans." In June 2013 (FY13), FHI 360 conducted a DQA visit to IA field sites in Mandalay and Monywa as well as their headquarters in Yangon, using the CAP-TB DQA guidance and checklists. The DQA reports were shared with partners with action items reviewed. During FY 14, CAP-TB conducted M&E system review visits at IAs field offices and headquarters, in which each component of M&E system and tools were discussed in detail together with staff from each IA. The FHI 360 CAP-TB team conducted a second DQA visit to the IAs in May 2015 (for FY15). The findings and recommendations were shared with IA M&E and program persons. USAID Burma also conducted a DQA

visit to the FHI 360 CAP-TB team during August 2015 and the CAP-TB M&E system was reviewed. The USAID DQA visit found no discrepancy with reported numbers for PMP and CAP-TB additional indicators.

Output 3.2 Increased TB research activity

On 8 January 2014, CAP-TB joined the 42th Burma Health Research Congress at the Department of Medical Research (Lower Burma) and observed the latest information about TB/MDR-TB research conducted in Burma. CAP-TB also joined the Myanmar Demographic Household Survey (MDHS) 'National Questionnaire Design Workshop' at the Ministry of Health on 26th June 2014. It was conducted by USAID Burma, the Ministry of Health and ICF international. After the presentation sessions, 10 working groups were formed to review each technical area. FHI 360 joined the 'HIV/AIDS' group.

CAP-TB participated in the 'Workshop on Prioritizing New Research Areas for Tuberculosis Control in Burma', organized by Burnet Institute and the NTP in Nay Pyi Taw during 2nd - 5th September 2014. It was the second research workshop led by the NTP (the first workshop being conducted in 2009). During the first workshop in 2009, 10 topics were prioritized that guided the research activities of NTP and partners. During this second workshop, discussion sessions were held in 5 different domains, which were identified by the NTP based on current TB/MDR-TB management experiences. The CAP-TB Senior M&E Officer joined the 'Epidemiology and social determinants of TB' group and the Senior Program Officer joined 'Treatment and prevention of TB, including DR TB and infection control'. After the workshop, 59 prioritized research topics were submitted to the Ministry of Health for further approval and finalization.

Activity 3.2.1: Conduct community survey on consumer demand and health seeking/purchasing behavior for diagnosis, treatment and drug

In March 2013, during the initial phase of implementation, CAP-TB launched the TB Trends survey within target communities to better understand consumer service preferences and health seeking/purchasing behavior for diagnosis, treatment and drugs. Data were collected over one month from March 25 to April 26, 2014 and a total of 1,022 beneficiaries (410 MBCA, 410 MHAA and 202 PGK) responded and completed the survey. Figures 11 and 12 show results from the survey, which were used to inform strategies on reaching and supporting patients.

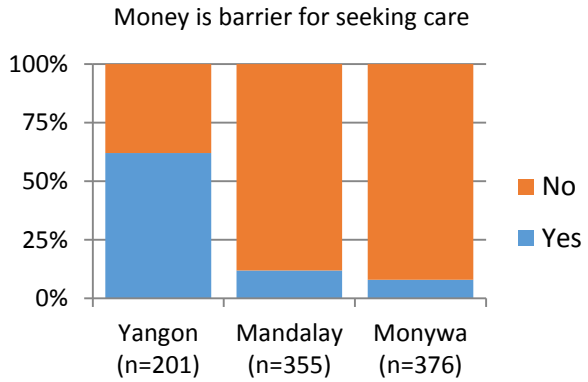
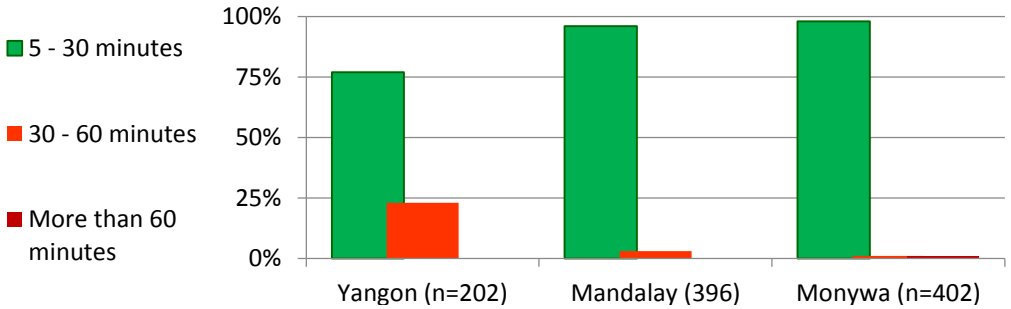


Figure 11. Data showing differences by region for financial barriers in seeking care.

Figure 12. Time to travel to the nearest health facility.



Activity 3.2.2: Disseminate gender assessment findings among partners in Mandalay and Yangon

The LSHTM team analyzed data from the original case-control study (described below and attached to this final report submission) and compared these with the nationwide prevalence survey (2010). The objective of this secondary analysis was to explore lower tuberculosis case notification from women in Burma. The analysis (also attached) showed that socio-demographic and health service-related factors may influence sex differences in TB case finding. Improving the sensitivity of TB diagnosis at township health centers could reduce sex differences in case finding.

Activity 3.2.1: Conduct three inter-linked projects on incentives, gender, and economic modeling to predict effective TB/MDR-TB control and prevention

CAP TB's regional team and partner (LSHTM) planned to conduct three inter-linked projects in Burma, comprising a case-control study to evaluate MDR-TB risk factors; an economic analysis using modeling methods to evaluate TB and MDR-TB control; and a qualitative study on incentives and barriers. During November 2014, the team from London School of Hygiene and Tropical Medicine (LSHTM) led by Professor Richard James Coker met with the NTP and discussed the research questions, the rationale behind the proposed case control study, and received input from the NTP program manager. It was decided to proceed with the case-control study alone, rather than to pursue the inter-linked studies originally conceived. The case-control research protocol was approved by the Ministry of Health and National TB Program in September, 2014.

The study design for the case-control study was led by the LSHTM team with field activities led by the CAP-TB FHI 360 project team. A total of 606 patients (202 MDR-TB patients and 404 TB patients) were recruited from 10 study townships over 7 months of data collection. An official advocacy meeting to launch the study was held in November 2014 with participation from Yangon Regional Health Department, the NTP and Township Health Centers. Data collector training was conducted for 10 data collectors at the FHI 360 office on 26th November. The field data collection was started on 1st December and was closely monitored by the study manager and study supervisors (CAP-TB FHI 360 team). On 25th June, the final data collector meeting was held to close out field activities. There were 202 MDR-TB patients and 404 TB patients who were enrolled through primary and secondary data collection. Multivariable logistic regression analysis identified the following risk factors for developing MDR-TB: being diabetic, missing TB treatment more than once weekly, having a household member diagnosed with MDR-TB or dying from TB, and higher socioeconomic status or education. It was thought that the higher socioeconomic status or higher education, while counterintuitive at first glance, could lead to MDR-TB through patients seeking care through the private sector. This case-control study helps to identify potential risk factors that can be further investigated by the NTP and other researchers in the future. For example, interventions to improve TB care for patients with diabetes and stronger linkages with the private sector could be planned as public health programming in response to the case-control findings.

Lessons learned

Data quality assurance practices: During FY13, although data verification and error checks had been done at two levels, the IAs needed strengthening of their routine DQA practice. Routine DQA at the IA level was encouraged within their data management process and the CAP-TB FHI 360 team provided necessary support. However, staff turnover at implementing agencies (a common issues for most national NGOs) hindered

achievement at expected levels during routine DQA. M&E trainings and continuous mentoring visits were thus provided to ensure data quality and technical competency.

Technology integration: Health Management Information System (HMIS) data may not reflect actual disease burden due to inaccurate diagnosis, poor record keeping, and cases not accessing facilities using the HMIS. CAP-TB piloted m-Health integration using DOTsync to lessen the burden on the NTP by strengthening field workers on implementation, data recording, and data reporting. Data errors were reduced with built-in data validation protocols and data security and availability were enhanced with cloud hosting services. Because the NTP is now focused on facility-based e-Health integration to be compatible with the National HMIS system, m-Health scale up at the community level was considered to be a lower priority at the national level. Thus, DOTsync will not continue following CAP-TB close-out. However, the CAP-TB project was able to demonstrate the feasibility and effectiveness of m-Health utilization by community supporters and integration with M&E systems, and this will be helpful for the NTP in the future.

Evidence based program planning: At the project's initiation, general health care seeking behaviours were explored through the TB Trends survey to understand patient preferences and barriers. MDR-TB risk factors in Yangon region were also assessed through a case-control study, the first to be conducted by the NTP, during FY14. Finally, CAP-TB's major interventions in patient support were analysed for treatment success and cost-effectiveness during FY15 to provide data to the NTP that will help to inform future programming. These results are discussed in greater detail in IR 5 and Annex 5.

Capacity Building and Technical Assistance

IR 4. Strengthened enabling environment for MDR-TB

Output 4.1 Improved capacity of NTP to develop finance, and implement national TB controls strategies in line with global strategies

Activity 4.1.1: Support strategic planning, resource mobilization, and implementation of the MDR-TB program

The CAP-TB project worked in close collaboration with the NTP to effectively utilize data collected from routine recording and reporting, routine M&E, research studies and gender analysis to support the development of the NTPs strategic plan and PMDT.

The cost effectiveness analysis (Annex 5) was done by Dr. Rick Homan, Health Economist, Health Services Research from FHI 360. The CAP-TB team provided programmatic and budgetary information for each component of the project activities for the cost-effectiveness analysis.

Technical assistance

FHI 360 has actively participated in all technical assistance missions in the country for TB control and continued support for strategic planning, in close collaboration with the NTP and WHO.

- April 2013***: Annual technical mission on MDR-TB management.*** Led by Dr. Michael Rich together with Dr. Fraser Wares, determined recommendations for MDR-TB treatment scale-up.
- August 2013: ***Childhood TB Management Workshop.*** Conducted by Professor Stephen Graham, this workshop developed ways to improve diagnosis quality and treatment among children.

- September 2013: Technical Mission of Dr. Pierre-Yves Norval on ***laboratory diagnosis of TB***. This mission was supported by CAP-TB jointly with WHO, and laid out a TB diagnostic and expansion plan for 2014-2018.
- February 2014: Prof. Aimé De Muynck, Ms. Carina Stover and Ms. Amy Bloom visited CAP-TB project sites in Yangon and Mandalay to conduct the ***mid-term project performance evaluation for CAP-TB activities in Burma***. They also visited the program manager from the NTP, regional TB officer from Lower Myanmar TB Center and two township health centers.
- November 2014: Dr. Nguyen Nhat Linh from Global TB Program, WHO Geneva accompanied by WHO country office and the NTP visited one of the MMA GP clinics in Yangon and community supporters in Yangon and Mandalay. The purpose of the visit was to conduct a ***situational analysis of the existing Public Private Mix (PPM) for TB activities and the Programmatic Management of Drug-resistant TB (PMDT) activities***. In addition, the visit also aimed to assess the preparedness of the NTP and non-NTP health care providers for implementing PPM for MDR-TB management (PPM-MDR-TB) activities. Dr. Phyo Wai Tun, Program Officer from FHI 360 and MMA CAP-TB project staff joined the visit and described the CAP-TB project activities. On 8th November, a meeting was conducted at the NTP office where WHO, NTP, CAP-TB/FHI 360 and the 4 IAs attended and discussed CAP-TB project activities. Dr. Nguyen Nhat Linh recognized the CAP-TB strategic model for its potential to improve prevention and management of MDR-TB in Burma and recommended its scale-up by the NTP.
- December 2014: FHI 360 joined ***the technical visit from USAID*** Washington TB team, William Wells, Senior TB Technical Advisor and Amy Bloom, USAID Bureau of Global Health. The USAID TB team visited CAP-TB sites, MMA GP clinics, and one patient's house in Yangon and met with community supporters from MMA. The CAP-TB FHI 360 team also hosted a round table discussion with the technical partners including WHO, MSF, MSH, PSI, Clinton Foundation and CAP-TB IAs. In the meeting, the TB team discussed the current TB landscape in Burma and opportunities for improving impact of USG investments and to discuss broader partnerships including GFATM investments.
- December 2014: members from ***5th Joint Monitoring Mission (JMM)*** visited CAP-TB project sites in Yangon and Mandalay. In Yangon, the FHI 360 Country Director and CAP-TB program manager together with IA staff presented the CAP-TB project activities. In Mandalay, CAP-TB Sr. M&E officer and IA staff joined the visit. DOTsync, the country first's mobile application used by MMA community volunteers to track patient care was recognized as a very promising tool for strengthening data collection and monitoring MDR-TB care and prevention. The JMM recommended that the project identify a single model that was cost effective for broader rollout from the current CAP-TB model. This was done and is now being scaled up by the CAP-TB IAs through 3MDG funding.

Community-based strategy and scale-up

In March 2013, a National evaluation of partners' contributions to community based TB care workshop was held, providing an opportunity to share lessons learned and best practices. The development of a national guideline on community-based TB care was recommended, by means of WHO input and the partners' experiences. The CAP-TB FHI-360 team was involved on the writing committee to draft 'Guidelines on Community-Based TB Care', and contributed to sections on planning community-based TB care at the township level.

The primary focus for CAP-TB's community-based strategy in FY15 was to advocate with the NTP for the CAP-TB MDR-TB model to be adopted into health policy; to be added to the NTP's National Strategic Plan; and to be funded by the GFATM for the next round (which starts 2016). The model has been successfully

included in the NTP's NSP as of January 2016. Adoption of the model is also being scaled up and funded by 3MDG, in Yangon's PMDT townships by CAP-TB's three IAs (MMA, MHAA, and PGK), further described below.

- In October 2014, an experience sharing session was held on CAP-TB's community-based MDR-TB care model. The session was led by MMA, the first among the CAP-TB IAs to work with community volunteers on MDR-TB DOT. The objective was to give the CAP-TB IAs exposure to the model and to MMA's input, with the goal to plan for scale up with support from 3MDG. The event was attended by program staff from PGK and MHAA.
- In December 2014, the CAP-TB program manager participated in an MDR-TB planning meeting conducted at the 3MDG office for direct granting of 3MDG funds to CAP-TB's three IAs (MMA, MHAA, and PGK). This was one of the major achievements of the project, as CAP-TB's local partners have now successfully received direct funding from this international donor to expand the CAP-TB model. The CAP-TB FHI 360 team continues to be involved in monitoring implementation and supervising scale-up of the project's patient-centered model, in close collaboration with the NTP and 3MDG Fund.
- On 12th January 2015, the CAP-TB FHI 360 and IA team joined in a discussion session on scaling up the CAP-TB model. This detailed discussion was in close collaboration with the NTP and 3MDG to ensure coordination of strategies to provide food from the World Food Program (WFP) to MDR-TB patients. Standardizing the training package for community supporters at the national level with technical assistance from the CAP-TB FHI 360 team was also discussed.

Technical Strategic Group meetings

CAP-TB maintained close coordination with the National TB Program and WHO by regular participation in quarterly technical strategic group (TSG) meetings. In these TSG meetings, higher level staff from the MOH, Professors in Respiratory Medicine and HIV/AIDS, INGO leaders, and local NGO representatives discussed priority topics for TB control:

- The results of the third nationwide drug resistance survey conducted in 2012-2013
- The achievement of programmatic management of MDR-TB in Burma
- The latest science on new anti-TB drugs and shorter MDR-TB treatment regimens
- Future directions to curb MDR-TB in Burma

As a member of the TB TSG Core Group, the CAP-TB team discussed draft strategies and plans on MDR-TB expansion 2014-2016, and contributed inputs during the development of 1) a narrative showing gap analysis and realistic scale-up plan and 2) the Costed-Operational plan on MDR-TB expansion 2014-2016.

CAP-TB participated in an ***International TB Symposium***, which was organized by MSF in collaboration with NTP and WHO. The main objectives of the Symposium were to reach consensus for challenges in TB care and prevention, to identify opportunities to meet demands for universal access to MDR-TB care, and to advocate for shorter MDR-TB treatment regimens for improved rollout of MDR-TB care in the country.

Activity 4.1.2: Enhance the integration/coordination of services at all levels in Yangon and Mandalay with other divisions

The CAP-TB team continued working closely with the IAs, the NTP and other partner organizations to improve the coordination and collaboration with stakeholders and avoid duplication of services. This was

particularly critical to ensure coordination with other donors (GFATM and 3MDG Fund) and projects (USAID Challenge TB). With technical support from the CAP-TB FHI 360 team, the IAs submitted coordination reports to NTP and Department of Health, at township (monthly) and regional levels (quarterly).

A key component of enhancing the integration and coordination of services at all levels of the TB network has been the active participation of the CAP-TB staff in meetings organized by the NTP, by the USAID Burma mission, and by the CAP-TB team itself.

Coordination at Central and Regional level

- The CAP-TB FHI 360 team organized 2 regional level advocacy meetings with all stakeholders and partners in Yangon and Mandalay region during the project start-up phase, April 2013. More than 40 individuals attended these meetings, which included leaders from the Regional Health Director and regional TB officers.
- During FY13 (July 2013) and FY 14 (August 2014), CAP-TB participated in the biannual regional TB evaluation meeting organized at Yangon Regional Health Department and presented CAP-TB project activities and achievements. The deputy regional health director and regional TB officer appreciated the overall CAP-TB strategies, especially community DOT activities and the CYC campaign.
- CAP-TB continued to participate in each year's ***NTP Annual Review Workshop***, where organizations working on TB/MDR-TB participated in presentation, discussion, and evaluation of the achievements and challenges from the year's TB control activities. Program updates and planning were also discussed, concluding with recommendations for the coming year.
- As the year end activity, CAP-TB IAs conducted regional level yearly 'Review and Evaluation meetings', with participation from government counterparts, the responsible person(s) from the NTP, Township Health Centers and BHS. CAP-TB FHI 360 staff also joined.
- During FY14 (July 2014), the CAP-TB team attended the 2014 INGO coordination meeting organized by the MOH. The meeting was conducted in a participatory manner to review the implementation status of INGOs in 2013, to collect the action plan for 2014, and to develop a monitoring sheet collectively among the INGOs for future joint assessment.
- During FY15, CAP-TB participated in a Global TB conference in Bangkok from 2-6 March, 2015.

Coordination at the Township level

- During FY13, in addition to regional launching events organized by the CAP-TB FHI 360 team, the CAP-TB IAs organized a series of township level advocacy meetings specifically for project promotion and coordination with key stakeholders.
- MMA conducted quarterly coordinating meetings in project townships, with participation by TMOs, Township TB Coordinators, BHS, and the CAP-TB FHI 360 Program Officer. Community supporters also attended the meetings. A discussion session between BHS and Community Supporters was conducted. This meeting provided solutions for day-to-day challenges of MDR-TB DOT in the presence of focal persons from NTP, Township Health Centers, FHI 360, and field staff.

Coordination with USAID Burma Mission

The CAP-TB FHI 360 team participated in all partner meetings organized by USAID, where the project was presented, sharing program updates, challenges, and lessons learned.

Coordination among CAP-TB partners

The CAP-TB FHI 360 team organized both regular and ad hoc meetings with all CAP-TB IAs, discussing issues around monitoring and evaluation and coordination. In FY14, Jackie McPherson, Regional Deputy Director, FHI 360 APRO participated in coordinating meetings at the FHI 360 Myanmar office to review the activities and to plan for FY15 (the final fiscal year for CAP-TB Burma).

Other partners

- The "Closing ceremony of Japan's grant aid for 1st Line anti-TB drugs (2011)" at Nay Pyi Taw was held on July 25, 2013 where CAP-TB had an opportunity to connect with government programs, donor agencies and other NTP partner organizations.
- The CAP-TB FHI 360 team visited the IUATLD office and sites in Mandalay in June, 2013 to ensure integration of TB control activities between CAP-TB partners and the Union, and to avoid possible overlap of service delivery.

Output 4.2 Strengthened partnerships for quality TB care, including private sector

The CAP-TB FHI 360 team conducted quarterly supervision and monitoring visits to project sites to ensure that activities are implemented as planned and in compliance with USAID requirements as well as to address and respond to any challenges.

The CAP-TB team conducted regular internal weekly meetings and the CAP-TB Country program manager attended the Project's Management Team meeting in Bangkok once annually to discuss semi-annual and annual performance reports, as well as strategic planning for the next fiscal year.

Activity 4.2.1 Build the organizational capacity of national partners (MMA, MBCA, MHAA and PGK) to plan, implement, and report on MDR-TB Scheme I (education and referral) training project for private service providers in Yangon and Mandalay

During the first implementation year (FY13), CAP-TB FHI 360 staff received trainings on:

- USAID rules and regulations, including compliance and USAID Forward
- Project management tools and techniques
- Training of trainers
- Grants management and training for effective management of CAP-TB.

During November 2014, the CAP-TB program manager attended USAID Rules and Regulation training in Bangkok, for effective contribution to implementation, logistics and financial management of CAP-TB.

The FHI 360 Myanmar Team, together with the program manager from the NTP and representatives from the 4 IAs, participated in a Strategic Planning Meeting at FHI 360 APRO office, Bangkok, on August 1-2, 2013. The team prepared the draft strategy for FY14.

Engagement of the private sector through training on skills in MDR-TB diagnosis and treatment is critical to prevent the generation of MDR-TB through improper antibiotic utilization. This is one of the key priorities for CAP-TB's partnership with MMA, which is the country's largest association for physicians and thus the ideal partner to train the private general physicians on MDR-TB diagnosis and management.

Activity 4.2.2 Advocate with employers of large industries to provide TB/MDR-TB health education to employees through local partners

MBCA organized formal advocacy meetings with the selected industries in Monywa industrial zone and businesses in Monwya Township to advocate for TB/MDR-TB education for employees and TB screening. Informal meetings were also organized with these industries to advocate for and support the provision of TB/MDR-TB health education for employees. The goal of these advocacy activities was to develop a guideline for TB and MDR-TB screening that is approved and issued by the Ministry of Labor, with which MBCA is closely engaged. Given the complexities of working with both the Ministries of Health and Labor for this activity, development and finalization of this work-place guideline may be possible in subsequent years after CAP TB.

Lessons learned

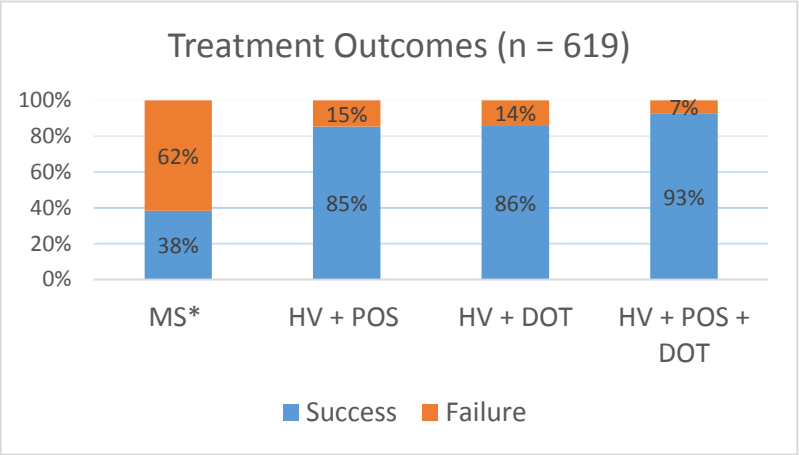
Coordination as a key of success: Throughout the project lifespan, CAP-TB continued to maintain coordination efforts with various stakeholders (NTP, related health departments, WHO, UN agencies, implementing partners and local authorities) at all levels (central, regional, township level) through various activities (meetings and reports). Within the CAP-TB strategy, the identified gaps in MDR-TB management by the NTP were filled through community based activities, and this patient-centered, community-driven model was successfully included in the NTP's National Strategic Plan that is currently being finalized for the next five years (2016 – 2020).

IR 5. Model programs expanded and use of best practices strengthened

Output 5.1 Created crosscutting mechanism to support health portfolio

Activity 5.5.1 Document, package, and disseminate results for the CAP-TB Model and prepare SOPs of the project's model in preparation for scale-up and scale-out

We analyzed the project's patient-centered, community-driven approach to measure the treatment outcomes, the best measure of effectiveness, and cost of the CAP-TB model. The project's model comprised two primary interventions: one with monthly support (home visits, food, transportation); and the second with daily support through evening DOT. Patients receiving monthly support (Figure 13, HV +POS) had 85% treatment success, far surpassing the WHO standard of 75%. This suggests that for patients without complicated clinical or adherence issues, a monthly package of support supplementing the standard care provided by the NTP may be acceptable. Further information on treatment outcomes and cost-effectiveness analysis can be found in Annex 5. The final analysis of the CAP-TB cohort (including the "control" group receiving minimal support through intermittent home visits) can be conducted later in 2016 once this control group has completed treatment.



** = "minimal support" group who received occasional home visits; HV = home visits; POS = monthly package of support, DOT = daily evening directly observed therapy*

Figure 13. Final treatment outcomes for patients who have been supported by CAP-TB from April 2013 - September 2015.

Annex 1: Method used to estimate total number of individuals reached and adjustment factor to calculate for potential overlap among different partners and other USG

No estimations were made in Burma data; all data reported represent actual numbers recorded and reported. To avoid overlap, all township and activity coverage was coordinated by the National TB program to avoid duplication among its partners.

Annex 2: CAP-TB Burma Financial Report (FY12 through FY16)

Project:	Greater Mekong Sub-region: Multidrug Resistant Tuburculosis Prevention and Management
Project Term:	Oct 14, 2011 - Sep 13, 2016
Financial Report:	**Burma Expenditures (Preliminary)**
Period:	**As of December 2015**

No	Line item	Total	Year 1 (FY 2012)	Year 2 (FY 2013)	Year 3 (FY 2014)	Year 4 (FY 2015)	Year 5 (FY 2016)	LOP Expenses	Committed Expenses	Total Expenses	Remaining Balance
		Approved Budget	Actual	Actual	Actual	Actual (Preliminary)	Dec'15 (Preliminary)	Through Dec'15			
		A	B	C	D	E	F	G = (B+C+D+E+F)	H	I = (G + H)	J = (A - I)
I.	PERSONNEL	$ 720,416	$ 43,991	$ 176,066	$ 186,535	$ 239,727	$ 54,277	$ 700,596	$ 25,288	$ 725,884	$ (5,468)
II.	FRINGE BENEFITS	$ 287,505	$ 14,575	$ 82,809	$ 52,613	$ 104,051	$ 9,004	$ 263,052	$ 24,604	$ 287,656	$ (151)
III.	CONSULTANTS	$ 52,108	$ 9,985	$ 123	$ -	$ 24,000	$ -	$ 34,108	$ 12,900	$ 47,008	$ 5,100
IV.	TRAVEL	$ 197,888	$ 25,731	$ 55,729	$ 43,029	$ 34,611	$ 11,369	$ 170,470	$ 7,590	$ 178,060	$ 19,828
V.	EQUIPMENT	$ 57,619	$ 3,029	$ 41,534	$ 13,056	$ -	$ -	$ 57,619	$ -	$ 57,619	$ -
VI.	SUPPLIES	$ 49,222	$ 1,168	$ 10,768	$ 10,034	$ 26,868	$ 422	$ 49,259	$ -	$ 49,259	$ (37)
VII.	CONTRACTUAL	$ 1,545,206	$ 131,792	$ 341,408	$ 560,155	$ 513,172	$ (13,507)	$ 1,533,021	$ -	$ 1,533,021	$ 12,185
VIII.	OTHER DIRECT COST	$ 412,295	$ 17,628	$ 117,441	$ 83,725	$ 140,149	$ 21,078	$ 380,022	$ 8,872	$ 388,894	$ 23,401
IX.	SERVICE CENTER	$ 67,013	$ 13,477	$ 44,774	$ 8,761	$ -	$ -	$ 67,013	$ -	$ 67,013	$ -
X.	INDIRECT COSTS	$ 714,322	$ 50,332	$ 182,471	$ 158,473	$ 239,256	$ 36,393	$ 666,924	$ 25,507	$ 692,431	$ 21,891
XI.	**GRAND TOTAL**	**$ 4,103,593**	**$ 311,707**	**$ 1,053,125**	**$ 1,116,382**	**$ 1,321,834**	**$ 119,035**	**$ 3,922,083**	**$ 104,762**	**$ 4,026,844**	**$ 76,749**

Notes:

- This budget is based on the pipeline budget submitted to USAID RDMA for the CAP-TB China and Thailand cost extension
  - The budget above represents Burma Expenditures only
- LOP Expenses as of December 2015 are preliminary; final budget close-out for CAP-TB will occur at the end of the cooperative agreement.

Annex 3: Summary of accomplishments against the work plan and targets (as per M&E plan)

**Note that this table contains both CAP-TB and USAID PMP indicators: for the USAID indicators alone, please refer to the Excel sheet*

	INDICATOR	FY13		FY14		FY15	
IR 1: STRENGTHEN MDR-TB PREVENTION		Target	Achieved	Target	Achieved	Target	Achieved
1	***Number of TB patients newly registered for DOTs through USAID supported sites***	3,500	0 (0%)	278	240 (86%)	222	121 (55%)
2	***Number of individuals reached with TB prevention and treatment messages, through outreach and small group activities***	9,576	9,382 (98%)	22,910	21,267 (93%)	9,100	10,095 (111%)
3	Number of individuals referred to TB and MDR-TB related services	870	197 (23%)	770	909 (118%)	590	512 (87%)
4	Number of IEC materials distributed through outreach and clinical interventions	152,000	79,390 (52%)	58,250	70,649 (121%)	87,845	97,120 (111%)
5	***Number of facilities with quality infection control standards with USAID support***	2	0 (0%)	2	0 (0%)	44	0 (0%)
6	Percentage of households with MDR-TB patients meeting quality infections control standards	100%	98%	100%	94%	100%	99%

	INDICATOR	FY13		FY14		FY15	
IR 2: STRENGTHEN MDR-TB MANAGEMENT		Target	Achieved	Target	Achieved	Target	Achieved
7	***Number of individuals trained in TB laboratory diagnosis techniques with USAID support***	40	0 (0%)	NA	NA	NA	NA
8	***Number of laboratories provided with TA for the rollout of new diagnostics***	2	0 (0%)	2	0 (0%)	NA	NA

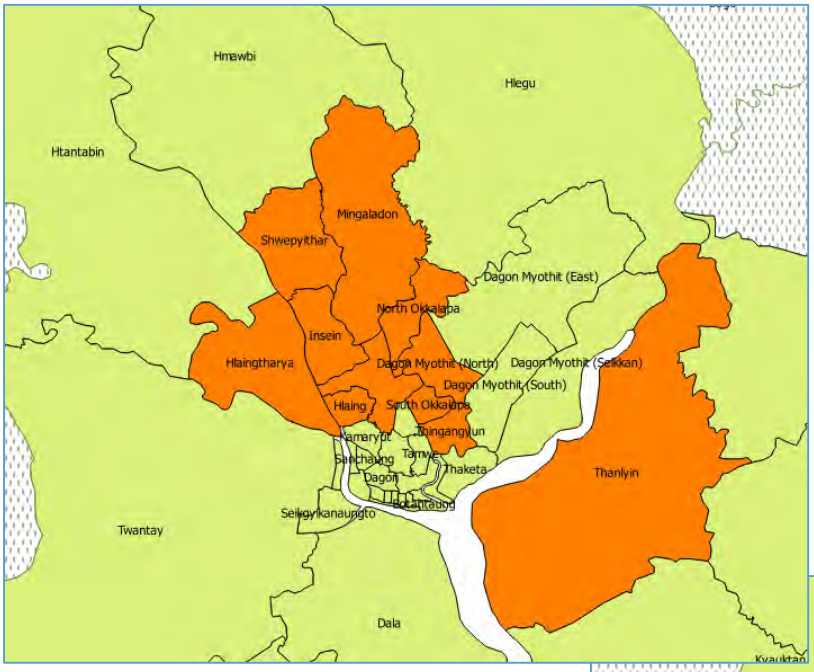
	INDICATOR	FY13		FY14		FY15	
9	***Number of MDR-TB cases diagnosed***	270	48 (18%)	360	284 (79%)	280	265 (95%)
10	Percentage of samples sent for external quality assurance that are verified as correct diagnosis by national reference laboratory	>90%	NA	>90%	NA	NA	NA
11	***Number of new MDR-TB diagnosed patients initiated on treatment***	400	156	NA	NA	600	103
12	***Number of USAID-supported facilities with strengthened MDR-TB referral system***	4	0 (0%)	2	2 (100%)	91	91 (100%)
13	Percentage of successful referrals	75%	94%	75%	89%	75%	90%
14	***Number of individuals trained in TB-case finding activities***	53	117 (221%)	121	88 (73%)	170	134 (79%)
15	***Number of individuals trained in programmatic management of MDR-TB***	315	324 (102%)	140	114 (81%)	NA	NA
16	Number of individuals trained	10	14 (140%)	14	9 (64%)	9	8 (89%)
17	Number of individuals received package of TB/MDR-TB services through USAID supported sites	200	519 (260%)	655	614 (94%)	396	275 (69%)
18	***Number of local organizations provided with TA for strengthening community-based approaches for PMDT***	4	4 (100%)	4	4 (100%)	3	3 (100%)
19	Percentage of MDR-TB cases on MDR-TB treatment regimen with negative culture by six months	>80%	NA	>80%	100%	>80%	99%
20	Percentage of MDR-TB cases on MDR-TB treatment regimen who died by six months	≤12.5%	NA	≤12.5 %	3.8%	≤12.5%	3%

		FY13		FY14		FY15	
IR 3: IMPROVED STRATEGIC INFORMATION FOR MDR-TB		Target	Achieved	Target	Achieved	Target	Achieved
21	***Number of individuals trained in the collection, use, and analysis of data and strategic information management of the TB program***	27	9 (33%)	23	28 (122%)	13	0 (0%)
22	***Number of operational research studies supported with USAID funds***	2	1 (50%)	1	1 (100%)	1	1 (100%)
23	***Number of studies published or conference presentations given as a result of USAID support for research programs***	NA	NA	NA	NA	1	1

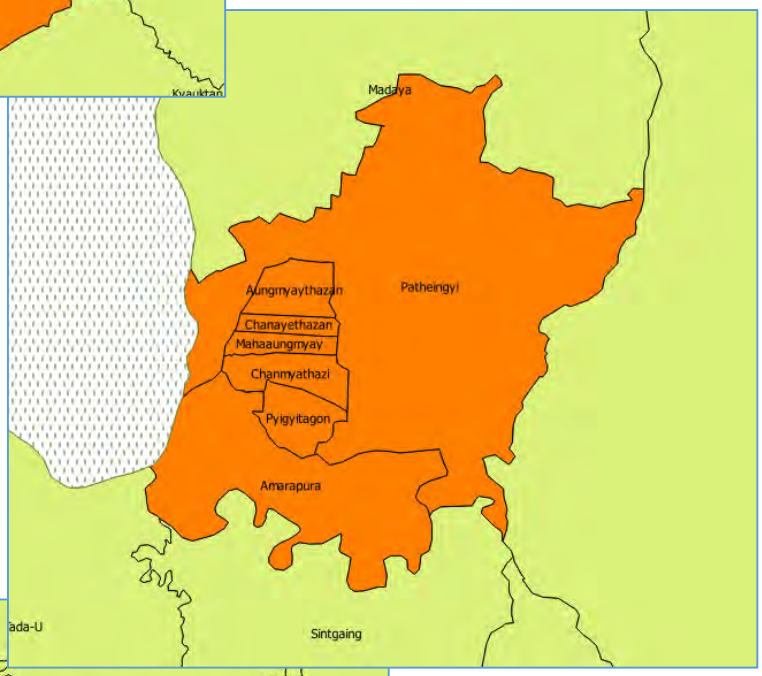
		FY13		FY14		FY15	
IR 4: STRENGTHEN ENABLING ENVIRONMENTS FOR MDR-TB		Target	Achieved	Target	Achieved	Target	Achieved
24	***Number of national strategies developed and/or revised with USAID support***	NA	NA	NA	NA	NA	NA
25	Percentage of providers following NTP patient management guidelines in the management of MDR-TB patients	80%	NA	80%	NA	NA	NA
26	***Number of private-sector partners working with the national TB control program with USAID support***	104	237 (228%)	254	284 (112%)	73	73 (100%)

Annex 4: Map of operating areas

Yangon Region

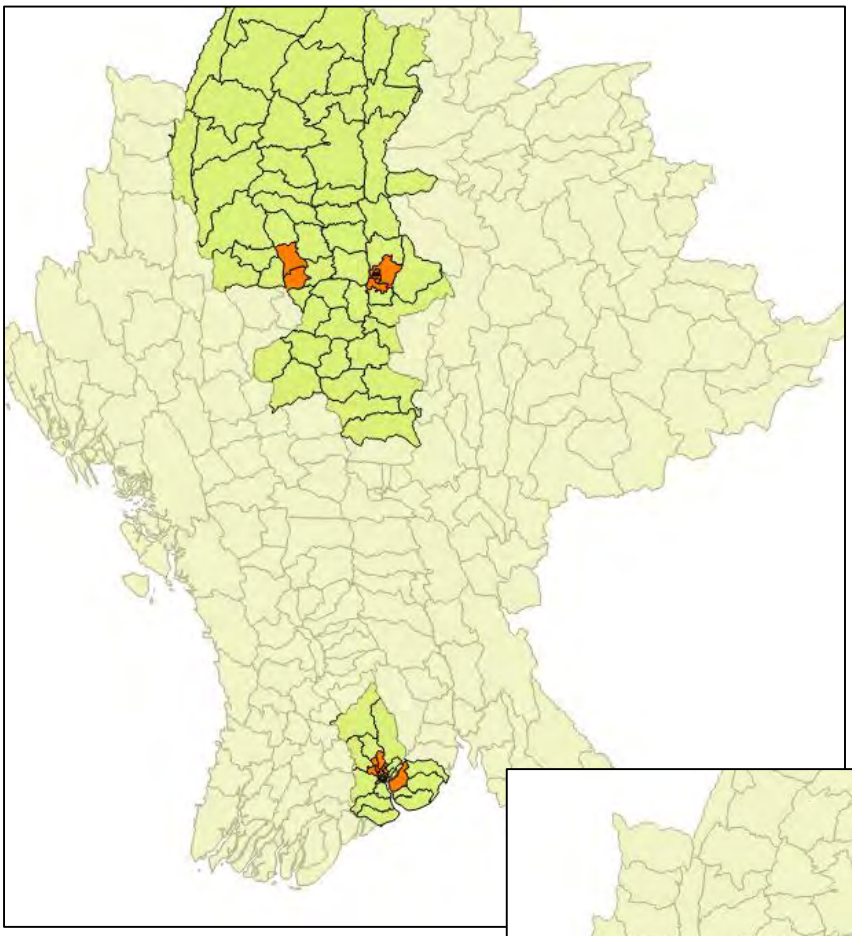


Mandalay Region



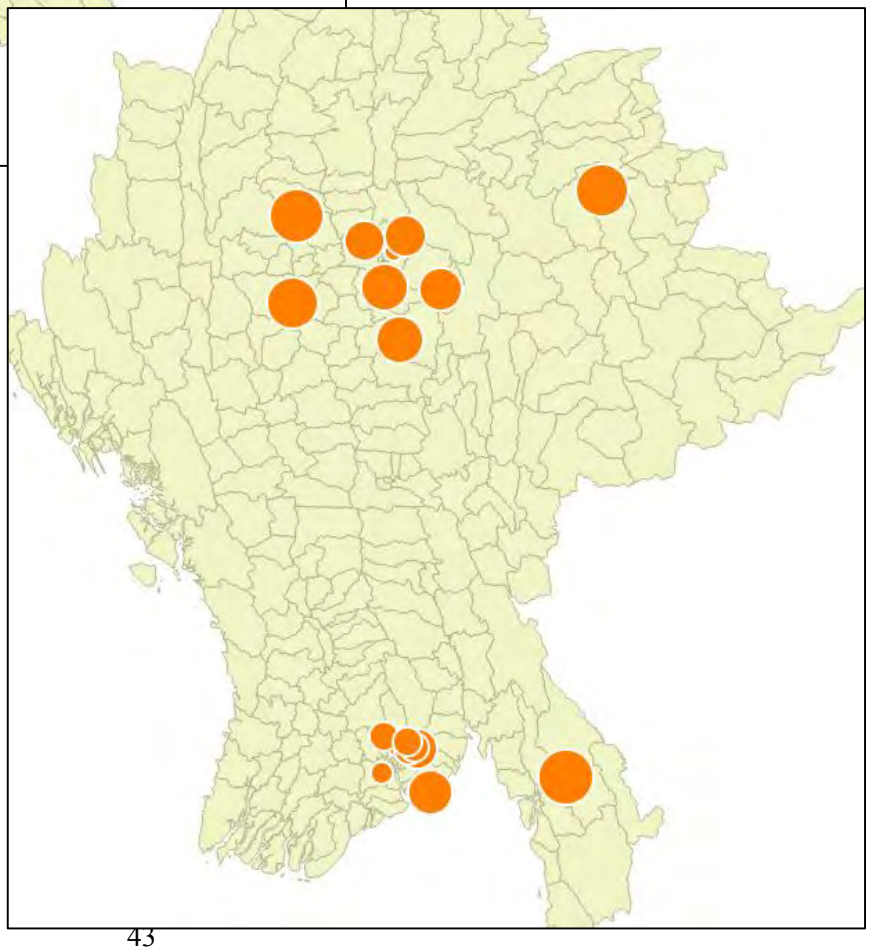
Sagaing Region

Community Based activities (20 townships)



PMDT training activities

(18 townships)



Annex 5: Cost-effectiveness Analysis of CAP-TB Patient-centered Package of Support

Problem Statement: Successful management of MDR-TB requires continued support of patients over a 20-24-month period from identification and diagnosis through treatment initiation, treatment completion, and cure. There are currently a number of potential gaps in the health system that can limit the success of interventions. The CAP-TB model is designed to strengthen existing services and introduce new interventions designed to increase the retention in care of MDR-TB patients and maximize treatment success. Assessing the cost-effectiveness and sustainability of proposed interventions to the current health system is crucial as the Myanmar National TB Program (NTP) is rapidly scaling up diagnosis and treatment for MDR-TB patients, and it is critical to identify the most cost-effective strategy for supporting these patients successfully.

Research Question: How does the cost and effectiveness of alternative combinations of patient support services vary as intensity increases?

Design: This was a retrospective cohort study of 1,101 MDR-TB patients enrolled on CAP-TB interventions from April 2013 until January 2014. All patients were initiated on treatment for MDR-TB with the standard WHO-recommended 20-24 month regimen. Some patients were enrolled on CAP-TB interventions at the start of their treatment, while others were enrolled after initiation of treatment. Patients were assigned to one of four comparison groups based upon the intensity of services received from the CAP-TB project. The four groups analyzed were:

1) Minimal support (occasional home visits)
2) Home visits plus monthly package of support (monthly home visits, travel allowances and food supplements)
3) Home visits plus daily evening DOT
4) Home visits plus monthly package of support plus daily DOT.

Of note, the main CAP-TB intervention planned at the start of the project was the monthly package of support (n = 510). During implementation, the Myanmar NTP valued the project's strategy for patient support and requested home visits for additional patients who had not been officially enrolled on CAP-TB support. These patients comprise the "minimal support" group, who received occasional home visits as requested by the NTP, and they were enrolled to receive occasional support throughout CAP-TB implementation. The enrollment period from April 2013 – January 2014 was designed in consideration of the project's timeline, to ensure that patients receiving the main CAP-TB interventions (Groups 2 and 4) would complete their 20-24 month treatment before the end of the project.

Distribution of Patients across Intervention Groups

Group ID	Level of Support	# of Patients †
1	Minimal Support (occasional home visits)	329
2	Home Visits + Packages of Support	510
3	Home Visits + DOT	34
4	Home Visits + Packages of Support + DOT	110

† Total less than 1,101 as 118 patients had incomplete service utilization data

Cost of CAP-TB Supported Services: The cost of specific services were computed by reviewing the detailed budgets of the CAP-TB project lead (FHI 360) and their local implementing partners (MHAA, MMA, and PGK). Finance staff from FHI 360 and CAP-TB program staff reviewed each detailed budget and allocated budget line items across one or more services (home visit, packages of support, DOT and/or accommodation support) or other program activities (M&E, health systems strengthening, and/or program management). In addition, line items were allocated to one or more townships or to the national or above-national level. These allocations were then used to allocate total project expenditures to either direct services or as overhead costs ("other program activities" noted above). Overhead costs were allocated to services as a fixed percentage increment corresponding to the share of overhead compared to total expenditures by organization. The in-country costs of the project lead (FHI 360) were then applied as a fixed percentage overhead across all implementing partners based upon the FHI 360 costs relative to the total costs across all implementing partners. The volume of services provided by implementing partners were then used to compute service-specific unit costs for the different services they provided.

Total Unit Cost Per Service Item		Partner-Specific Unit Costs		
Service Item	Total Unit Cost (USD) †	MHAA	MMA	PGK
Home Visits ($/visit)	$ 23.50	19.42	45.15	5.34
Packages of Support ($/package)	$ 67.10	52.73	104.20	44.33
DOT ($/month)	$ 133.50	155.65	112.95	131.99
Accommodation Support ($/month)	$ 252.40	283.91	n/a	220.96

† Weighted average across implementing partners including overheads

Total Patient-Specific Costs and Average Cost per Patient: Based upon which implementing partner provided the services to the patient, the corresponding partner-specific unit costs were used to compute the total cost for the combination of services received by the patient. Costs were then aggregated across patients in the different comparison groups corresponding to different intensities of support services described above to provide the total cost of services for patients in each comparison group. The number of patients receiving the level of support was used to compute the average cost per patient within each level of support.

Cost by Level of Support		
Level of Support	Total Cost (USD) †	Avg. Cost Per Patient
Minimal Support	$ 73,402	$ 223.11
Home Visits + Packages of Support	$ 431,728	$ 846.52
Home Visits + DOT	$ 64,678	$ 1,902.30
Home Visits + Packages of Support + DOT	$ 275,966	$ 2,508.78

† Aggregation of patient-specific costs based upon volume of services received and partner providing service

Effectiveness by Level of Support: To estimate the effectiveness of the different intensities of support services, the patient level outcome data was aggregated across the different comparison groups. Effectiveness was measured as the percentage of patients within each comparison group who had successful treatment outcomes, as defined by WHO guidelines: treatment completion or microbiological cure. Treatment failure was also defined using WHO criteria: loss to follow-up, death, treatment failure, or "not evaluated" (e.g., transfer out or those for whom treatment outcome was unknown).

Treatment Success Rates by Level of Support

Level of Support	# Patients with Outcome Data †	# Treatment Success	Success Rate
Minimal Support	26	10	38.5%
Home Visits + Packages of Support	485	414	85.4%
Home Visits + DOT	14	12	85.7%
Home Visits + Packages of Support + DOT	94	87	92.6%

† Not all patients had been enrolled in care long enough to have outcome data at time of analysis

Cost-Effectiveness Analysis: In order to assess the relative cost-effectiveness of different levels of support, the results on cost per patient and success rates were used to estimate the costs and expected outcomes for a hypothetical cohort of 1,000 patients. This allows for a comparison of costs and outcomes across groups without distortions due to varying group sizes. The groups were sorted in order of increasing intensity (cost per 1,000 patients) and the average and incremental cost-effectiveness ratio (change in total cost divided by change in number of patients cured) associated with increasing levels of cost were calculated. The average cost-effectiveness ratio is a measure of the productivity or efficiency of resource use while the incremental cost-effectiveness ratio reflects the relative gain per additional dollar spent on increasing the intensity of support.

Cost-Effectiveness Analysis of Alternative Levels of Support

Level of Support	Costs for 1,000 Patients	Expected # with Treatment Success	Average Cost-Effectiveness Ratio	Incremental Cost-Effectiveness Ratio
Minimal Support	$ 223,105	385	$ 579.49	$ 579.49 †
Home Visits + Packages of Support	$ 846,525	854	$ 991.25	$ 1,329.25
Home Visits + DOT	$ 1,902,300	857	$ 2,219.72	$ 3,557,62
Home Visits + Packages of Support + DOT	$ 2,508,781	926	$ 2,709.27	$ 8,789.58

† This level of support with the lowest cost per 1,000 patients implicitly assumes an option of "no support" with zero costs and zero treatment success

As shown in the table above, the most cost-effective option (least costly per additional patient cured) is the minimal level of support (occasional home visits) with a cost of approximately ~$580 per patient cured. However, if affordable, the addition of the monthly package of support is associated with a dramatic increase in the treatment success rate (from 38.5% to 85.4%) and could be considered an attractive option.

This highlights the issue that cost-effectiveness is not a guarantee of affordability and this information is only one piece of evidence to be used by program stakeholders when making decisions about how best to respond to the needs of MDR-TB patients.

Limitations: The outcome estimates for the Minimal Support and Home Visits plus DOT groups are based upon very few patients so must be interpreted with caution. However, the cost estimates are based upon more than 30 patients in each group so the estimates of the incremental cost of moving from minimal support to alternative levels of support should be reliable.

Because the in-country support costs of FHI 360 were applied as a fixed percentage on top of all the implementing partner costs, the total cost estimates may be artificially high. To the extent that international NGO costs are substantially higher than costs of indigenous groups (due to higher operating costs or more intensive program support) this introduces an upward bias in the cost estimates. However, as this was applied at the same rate across all implementing partners, this is a consistent bias.

Annex 6: Snap Shots

Living support to inspire patients and families for treatment success

"I really appreciate the MHAA CAP-TB team, including FHI 360 and USAID, who have supported me throughout my MDR-TB treatment."

Ko Aung Myo Min is a 31 year old from Chanmyatharzi Township who provided maintenance for truck water tankers. While on the job, he noticed cough, fever, loss of appetite and weight loss and he was encouraged by his friends to visit Patheingyi TB hospital. He learned that he had tuberculosis (TB) and was treated for 6 months for simple, drug-susceptible TB. After six months, he completed treatment and returned to his life as usual.

Unfortunately, Ko Aung Myo Min's symptoms returned, and after visiting the TB hospital again, he was treated for eight months with "Category II" drugs, the next level of TB treatment. After five months on this treatment, he learned that he had multi-drug resistant tuberculosis (MDR-TB), which requires at least 20 months of treatment. On MDR-TB treatment, he frequently suffered from severe joint pain, joint swelling, and muscle cramps leaving him unable to work. Losing this source of income, his family faced many challenges. What greatly encouraged his family was the monthly nutrition package from the CAP-TB team, provided through the Myanmar Health Assistant Association (MHAA) and the transportation support enabling him to visit his doctor each month. With this support, he and his family were able to face the long treatment knowing they were not alone. His peer supporter from MHAA also empowered him to stay on treatment. Ko Aung Myo Min is now completing his two year treatment successfully and says ," I am very grateful to everyone who has contributed to this project especially MHAA, FHI 360 and USAID".

Peer support: Using personal experience to empower and encourage MDR-TB patients

An MDR-TB Peer Supporter in a patient's home, teaching about TB, along with a township community facilitator from MHAA

In 2005, Ko Htin Kyaw was working as a waiter in Yangon, Myanmar when he was diagnosed with tuberculosis. When Category I treatment (treatment for TB that is drug-susceptible) failed, he underwent Category II (CAT II) treatment. After only two months of CAT II, he felt better and decided to stop treatment.

Four years later, his symptoms returned and he learned that he had multi-drug resistant TB (MDR-TB). He was reluctant to start treatment and waited until May 2013. At that time, he began MDR-TB treatment at Lower Myanmar TB Center while also receiving support from CAP-TB's partner, the Myanmar Health Assistant Association (MHAA). Each month, Ko Htin Kyaw received support from MHAA---home visits from the township community facilitator, who provided encouragement and also reminded him of the importance of taking his medications. He also received food and transportation support each month so that he could visit his TB clinic.

After 20 months of treatment, he has returned to full health and is now volunteering as a peer supporter for CAP-TB's MHAA team. Since he had to stop working during treatment, he is currently looking for a job so that he can support his wife, son, and daughter. Luckily, none of his family members have been infected with TB.

Peer support: Using personal experience to empower and encourage MDR-TB patients

"I really appreciate the MHAA CAP-TB team that has supported me throughout my MDR-TB treatment and has also given me a chance to volunteer to help others going through experiences like mine." (MHAA).

Ma Kyi Kyi Swe is a 31 year old from the 7th ward of Hlaingtharyar Township. When she was a young high school student in 2003, she was diagnosed with drug-susceptible tuberculosis (TB) and was cured after eight months of treatment. Eight years later, she started coughing and felt symptoms similar to when she had TB years before. She was tested and was diagnosed again with TB at Hlaingtharyar Hospital. At this time, she was also working for a famous pharmaceutical company producing organic, herbal drugs. Although she took the TB drugs regularly, her cough did not improve, and she did not gain weight. After further tests at Aung San TB center, she was diagnosed with multi-drug resistant tuberculosis (MDR-TB) and started her treatment in May 2013.

From the start of her MDR-TB treatment, Ma Kyi Kyi Swe was supported by the CAP-TB team through the Myanmar Health Assistant Association (MHAA). She loved to spend time with her MHAA community facilitator because it made her feel empowered and helped her to stay focused on the priorities for her treatment. Her community facilitator also spent time with her family whenever she visited her home each month. In addition, Ma Kyi Kyi Swe was visited at home each evening by a community volunteer, who provided directly observed therapy for her MDR-TB treatment. This was encouraging and also provided her with daily accountability, reminding her of the importance of taking each dose of medicine.

After 20 months of treatment, Ma Kyi Kyi Swe was cured of MDR-TB. Now, she encourages others as a peer supporter, sharing her experience from her many months of MDR-TB treatment. She is now a part of the CAP-TB family, not only as a beneficiary, but also as a peer supporter, helping others to be successfully cured of this disease.

Building trust: Overcoming resistance to treatment against all odds

Daw Aye Thuzar, 55 years old, is a widow whose husband passed away 4 years ago from tuberculosis. Since then, her 32-year-old son was treated twice for TB and finally diagnosed with MDR-TB in April, 2013. Because he was concerned about the family losing its sole source of income -- he works in a factory making iron doors -- he refused to initiate MDR-TB treatment.

Like her son, Daw Aye Thuzar developed signs and symptoms of TB and was treated with Category I and II drugs without success. She, also, was diagnosed with MDR-TB and began treatment in June, 2013. But after 2 months on MDR-TB medication, Daw Aye Thuzar experienced severe joint pain and stopped her treatment. This impacted her son, reinforcing his resistance to treatment, and finally resulted in his treatment default. Basic Health Staff from their township health center counseled Daw Aye Thuzar and her son to restart treatment without success.

About 3 weeks of missed doses, Myanmar Medical Association's community supporter, trained through CAP-TB's initiative for community-based DOT for MDR-TB, reached out to these patients. This community supporter was also a familiar neighbor from within Daw Aye Thuzar's community and with this rapport, succeeded to overcome her resistance. Daw Aye Thuzar agreed to restart TB treatment after an interruption of 45 days. And just as a familiar neighbor was able to regain Daw Aye Thuzar's trust, her son was swayed by a voice of reason close to home. Seeing the kind support of the MMA CAP-TB community supporter, he agreed to restart his medications. Experiences like this remind us that a "community-based" focus is not just a buzzword, but a strategy that can lend greater influence than instructions, even those from a medical authority.

Rising above challenges to beat MDR-TB

Ma Phyu Swe is a student who was pursuing a law degree through a distance learning program when she started to feel sick in 2012. She first noticed cough and breathlessness, and she lost her appetite. After three weeks of symptoms, she visited her general practitioner, who diagnosed her with TB and referred her to the NTP's township health center at South Okkalapa. There, she was treated for a total of 14 months, but was still not cured. After further testing, she was found to have multi-drug resistant tuberculosis (MDR-TB) and started her treatment in June 2013. After two months of MDR-TB treatment, she received support from the CAP-TB team through the Myanmar Medical Association (MMA) with visits each evening by a community supporter to provide directly observed therapy. In addition to daily encouragement and accountability from the community supporter, she also received monthly nutrition and transportation support from the MMA CAP-TB team.

Her MDR-TB treatment had many serious side effects, including severe joint pain, dizziness, and loss of concentration. This made it difficult for her to study law, since she continued her distance learning curriculum while on treatment. Her community supporter connected her with the nearby township health center, where she was quickly treated for her side effects, and also provided encouragement and motivation to keep her from quitting treatment. With this support, Ma Phyu Swe was able to take all of her medications each day. After 20 months of treatment, she successfully completed treatment and was cured. She also completed her studies and received her law degree, a great accomplishment in the midst of her lengthy MDR-TB treatment, and now she works within the government. Her story shows that it is possible to fight MDR-TB and to rise above difficult circumstances to achieve success in education and in life.

Facing a bright future: Life without MDR-TB

Daw Mya Mya was working at a private company in Yangon when she first noticed that something was wrong in 2011, when she had fevers and lost her appetite. She went to a general practitioner, where she was diagnosed with pneumonia. After no improvement, she then visited the MMA Private-Public Mix Clinic, where she was tested for and diagnosed with TB in the lungs. She started treatment and received her TB drugs each month at her clinic, but there was no one to provide her with accountability or treatment support.

After a lengthy course for TB that was complicated by air leaks outside of the lung and removal of parts of her lung, her course was changed to "Category II" TB treatment since her TB was not responding to the initial regimen. She completed the eight month Category II treatment, complicated by tubes in her chest wall and a long hospital stay. Finally, after one year of struggling with a poorly healing chest wound, her doctor suspected multi-drug resistant tuberculosis (MDR-TB). In April 2013, she was diagnosed with MDR-TB and started on treatment. She was hospitalized for one month at Aung San TB hospital; thankfully, the chest wound healed after starting MDR-TB treatment, and she left the hospital to continue her treatment from home. Health staff from the nearby township health center visited her each day to administer her medication, and after four months, a community supporter from the MMA CAP-TB team also visited her each evening to provide directly observed therapy. She felt strong encouragement and support from these daily visits from the community supporter, as they enabled her to feel connected to the world even though she was not able to spend much time outside her home. During her treatment, she suffered severe side effects such that she was forced to resign from work in order to heal at home. She also received monthly nutrition support and transportation allowance from the MMA CAP-TB team during her treatment.

After two years of MDR-TB treatment, Mya Mya completed her treatment and was successfully cured. She credits her MDR-TB treatment team, both within the community and from the township health center, for supporting her through her treatment. Now, she feels healthy and is happily back to work as an administrative staff at a private company. She has goals and dreams for her future---to progress in her career and to continue her education. With the past behind her, she is free to pursue her dreams, free of MDR-TB.

Using education, support, and encouragement to combat MDR-TB

Daw Ei Shwe Win is a student from Hlaing township who excelled in her studies, graduating from university with plans to study English in graduate school. Then, she noticed chest pain and weight loss, along with fever and exhaustion, making it difficult for her to carry out her normal daily activities. Her brother took her to the nearby township health center, where she was diagnosed with tuberculosis (TB). She was very frightened and depressed when she first heard about the diagnosis and the long treatment course. After four months of treatment, her symptoms did not improve, and further investigations revealed that she had multi-drug resistant tuberculosis (MDR-TB). Daw Ei Shwe Win then spent two years being treated for MDR-TB, losing time from her studies while on treatment. She also suffered hearing loss from the MDR-TB drugs. But, with support from CAP-TB's partner, Pyi Gyi Khin, she was able to understand the importance of taking her medications and continued her treatment.

Daw Ei Shwe Win was very grateful to Pyi Gyi Khin's team for the nutrition that she received each month as well as the home visits, which encouraged her each month. Through these home visits, she received health education and psychological support, and these helped her to complete her 24-month treatment. Now, she is cured and can look forward to pursuing her dreams and her education.

Turning mistakes into mentoring: a story of MDR-TB success

Tun Hein is an 18 year old who lives with his grandmother in Latha Township, where he is pursuing a distance learning degree. He had previously attended Government Technological College in Hlaingtharyar Township before becoming sick with multi-drug resistant tuberculosis (MDR-TB), which made him feel very depressed, as if his dreams of education and his future were destroyed.

Tun Hein's story first started with drug-susceptible TB, for which he took several months of treatment but then stopped, because he felt better. Not knowing this was the wrong decision, he noticed his symptoms returning after one year and was then diagnosed with MDR-TB. After this diagnosis, he felt lost and hopeless and refused to receive treatment for MDR-TB---similar to when he was first diagnosed with drug-susceptible TB. Then, he met the CAP-TB Pyi Gyi Khin team, who counselled him on the importance of taking his medications and taught him about the risk for developing extensively drug resistant TB. This education, counselling, and encouragement from Pyi Gyi Khin made the difference, and he decided to complete his MDR-TB treatment and also agreed to receive monthly support from the Pyi Gyi Khin team. Now, he has completed his treatment course and is very grateful to Pyi Gyi Khin for their help, support, and encouragement through the hard times. He says, "I can live happily for the rest of my life and share the "Dos & Don't about TB/MDR-TB" to others", passing on what he learned from Pyi Gyi Khin so that others can be successfully cured of MDR-TB.

Annex 7: List of presentations and publication

Sr.	Type	Remark
1	Newsletter (MMA CAP-TB) • Drug-Resistant Tuberculosis: Global Emergency • Case-Finding Strategies For MDR-TB • Patients Categories to be tested for MDR-TB • Improving Case Detection (Finding TB Patients) • MMA CAP-TB Project Implementing PMDT Townships (18tsps) • Improved Strategic Information for MDR-TB among Private GPs • Directly Observed Therapy (DOT) • Adherence • Social Package in South Okkalapa Township by MMA CAP-TB Project • Voices close to home: Combating MDR-TB with trust and reason • Control and Prevention of Tuberculosis, Infection Control	
2	Mobile health as a tool to strengthen case finding and treatment success for MDR-TB in Burma	46th Union World Conference on Lung Health 2 to 6 December 2015 - Cape Town, South Africa
3	Factors driving the emergence of multi-drug-resistant tuberculosis in a transitioning health system: results from the first case-control study on tuberculosis in Burma.	Submitted to Lancet ID
4	Lower Tuberculosis case notification from women in Burma: Analysis of operational data from Yangon and the nationwide prevalence survey	Submitted to BMC Infectious Diseases

Annex 8: List of IEC Materials

Sr.	Type	Contents	Targeted audience
1	Pamphlets	MDR-TB information • Sign and Symptom of TB • Sign and Symptom of MDR-TB • Transmission of MDR-TB • How MDR-TB can be infected? • How to cure MDR-TB?	MDR-TB Patients, Close contact /families of people living with HIV (PLHIV) and current and previous TB cases, general population
2	Pamphlets	TB sing and symptoms, diagnosis and treatment information • Sign and Symptoms of TB • How to diagnose TB? • Treatment of TB • What is DOT? • Treatment Adherence • Sputum follow-up • Complication of Treatment Failure	MDR-TB Patients, Close contact /families of people living with HIV (PLHIV) and current and previous TB cases, general population
3	Pamphlets	Sputum Collection Methods and Procedures	MDR-TB Patients, Close contact /families of people living with HIV(PLHIV) and current and previous TB cases, general population
4	T-Shirts and Polo shirts	Logo: Project and Organization logo Slogan: "In Our Hands, Local action to Stop TB".	National TB program, BHS especially TMOs and staffs, CAP-TB staffs and volunteers (Outreach workers)
5	T-Shirt	Images: Demonstration of how to cover your cough Message: "Cover your mouth and nose with handkerchief or tissues or mask whenever you sneeze or cough" (In Burmese Language) Logo: Project and Organization logo	General Population
6	MMA CAP-TB Flyer (Bilingual)	Information on Myanmar Medical Association Key achievements in Patient-centered community-based MDR-TB care and treatment support activities of MMA CAP-TB Project Mobile Technology for Tuberculosis care (DOT Sync) in Burma	Donor community, stake holders and implementing partners
7	Back Pack	Images: Demonstration of how to cover your cough	General Population

8	Posters (paper and vinyl)	Demonstration of a celebrity Message: "Cover your mouth and nose with handkerchief or tissues or mask whenever you sneeze or cough" (In Burmese Language)	General Population
9	Mask	Images: Cover with demonstration of how to cover your cough	MDR-TB patients
10	Cup	Logo: Project and Organization logo	General Population
11	Cap	Logo: Project and Organization logo	General Population
12	Stationary Bags	Logo: Project and Organization logo	National TB program, BHS, TMOs and staffs, CAP-TB staffs and volunteers (Outreach workers), and Volunteers and Volunteer Monitor
13	Umbrella	Logo: Project and Organization logo	National TB program, BHS, TMOs and staffs, CAP-TB staffs and volunteers (Outreach workers), and Volunteers and Volunteer Monitor
14	Towels	Logo: Project and Organization logo	National TB program, BHS, TMOs and staffs, CAP-TB staffs and volunteers (Outreach workers), and Volunteers and Volunteer Monitor and MDR-TB Patients.
15	Key Chains	Logo: Project and Organization logo	National TB program, BHS, TMOs and staffs, CAP-TB staffs and volunteers (Outreach workers), and Volunteers and Volunteer Monitor and MDR-TB Patients.
16	Rain Coat	Logo: Project and Organization logo	For Pyi Gyi Khin Staffs, Volunteers and BHS.
17	Handkerchief	Logo: Project and Organization logo	General Population