



# THE TAK TUBERCULOSIS BORDER INITIATIVE

The program for displaced population in Tak province and adjacent area of Myanmar

Through intensive case detection and case management, this project granted by DFID from January 2013 to June 2017 allows a significant contribution to control the Tuberculosis burden and the progression of drug resistance along the Thai Myanmar borderland area.

**Shoklo Malaria Research Unit, Mahidol University in collaboration with Première Urgence - Aide Médicale Internationale, Tak Public Health Office, and International Organization for Migration**



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## 2. ABBREVIATIONS

ART	Antiretroviral therapy
WHO	World Health Organization
CBO	Community based organization
CC	Contact Cases of TB patients
CHRO	Chronic patients
CXR	Chest X-Ray
DFID	Department for International Development, UK Government
DM	Diabetes Mellitus
DOT	Directly Observed Treatment
DOTs	Directly Observed Treatment Short-course
HW	Health care worker
HIV	Human Immuno-deficiency Virus
IOM	International Organization for Migration
IPD	Inpatient department
LFUP	Lost to Follow Up Patient
ML	Maela
MDR-TB	Multidrug resistant TB
M&E	Monitoring and Evaluation
MST	Maesot
MSH	Maesod Hospital
MTC	Mae Tao Clinic
NA	New Arrivals
NAP	National AIDS Programme for Myanmar
NGO	Non-Governmental Organization
NP	Nupoe
NTP	National Tuberculosis Programme
OPD	Out-patient department
PCF	Passive Case Finding
PHC	Primary Health Care
PLWHA	People Living With HIV/AIDS
PU-AMI	Première Urgence-Aide Médicale Internationale
PUI	Première Urgence Internationale
RIF	Rifampicin
SMRU	Shoklo Malaria Research Unit
t-ACF	targeted Active Case Finding
Tak PHO	Provincial Health Office of Tak
TB	Tuberculosis
TTBI	Tak TB Border Initiative
TBHW	TB health Workers
TBV	TB Village
TSR	Treatment Success Rate
UM	Umpiem
UMP	Umphang
VCT	Voluntary Counseling and Testing
WTBD	World TB Day
WAD	World AIDS Day

### **3. CONTEXT**

Between 2012 and 2017, the United Kingdom (UK) Department for International Development (DFID) funded a new project cycle called: Support to Conflict-Affected People and Peace Building (SCAPPB) in Burma. The SCAPPB programme comprised a broad package of 16 different components with multiple projects and activities tiered under each component. The geographic focus was mostly south-eastern Myanmar and across the border in Thailand. SCAPPB ran between 2012 and 2017.

The intended direct impact of SCAPPB was to “Improve the quality of life and reduce the vulnerability of refugees and displaced persons along Myanmar’s border, including their preparation for voluntary return”.

Tuberculosis is a major public health concern and has a severe impact on the life of the population without treatment. The Southeast Asia region accounts for one third of the global tuberculosis burden, and both Thailand and Myanmar were included in the WHO highest TB, TB/HIV and MDR TB top 30-burden countries list.

In 2012, the Thailand-Myanmar border, was home for a large number of refugees and displaced from conflict-affected areas in Myanmar with long term of refugee camp existence (over 30 years). This situation, along with the political and economic evolution in this borderland area is creating a high-risk environment for development of Infectious diseases. Both Refugees and displaced populations are included in the framework of high-risk tuberculosis groups.

In 2012, UK Aid decided to include TB control services in this broader SCAPPB programme under component # 8 (C8). The Tak TB Initiative (TTBI) project was funded initially with GBP 1.85 million pounds to be implemented by two partners: the Shoklo Malaria Research Unit and Premiere Urgence Internationale (PUI) [previously named AMI in the beginning of the project, then PU-AMI, and later PUI in 2016].

The TTBI project was developed to face urgent needs evaluated at the time of the initial proposal of increasing number of TB cases in the population including estimation of important caseload of hidden TB cases and the alarming increase of multi-drug resistant TB (MDR-TB). Many barriers for access to care and good quality treatment were identified and these lead to delayed access and late presentation of patients with severe medical conditions.

### **4. PROGRAMME OVERVIEW**

The initial programme covered activities for the first three years in 2013-2015. This was followed by a cost extension in 2016 to implement a new project aiming at optimizing case detection among the refugee population. Then a no-cost extension period from January to June 2017 allowed completing the treatment of the 2016 cohort of patients.

From the beginning the DFID-supported project supplemented existing activities already funded by the European commission (passive case detection and treatment of the Myanmar population on the Thai side across the border, and by the Global fund Thailand (passive case finding activities in the main Maela camp and treatment of only smear positive, non MDR-TB in the refugee camp). It was reasonable to think that those activities were not sufficient to cover the gap in TB control activities in ways that would result in a serious impact on the disease and on the life of the population. Then both EU grant and GF in Refugee camp ended in 2014. The DFID’s SCAPPB grant covered activities both inside and outside the camps in 2015 with complimentary funding from GF Myanmar for the displaced population for 2016.

In line with the Millennium development goal number 6, the project aimed to contribute to reduce the burden of TB and to control the progression of drug resistant TB amongst displaced populations in the five border districts of Tak Province and to develop local capacity for further handover to national programme on both sides.

## **5. PROGRAMME PERFORMANCE LOG FRAME**

The project was monitored through an extensive log frame of 17-18 performance indicators reported for each population separately on both quarterly and annual bases:

-Impact indicator: for the TB package, the main impact indicator was measured through TB case fatality rate among people from displaced/refugee population treated for TB.

-Outcome indicators: the three main outcome indicators to evaluate the overall outcome of the project were: number of TB cases detected, number of MDR-TB cases detected, and treatment success rate.

-Output Indicators: 13 output indicators in the first three years to monitor activity, and one additional for Year 4 for activity of mass screening.

## **6. PROGRAMME DESIGN**

### **6.1. Development of TTBI consortium**

As a result of observation of gaps in previous TB services provided through different grants (EU and GF) to both populations (the refugees at Maela camp and displaced on the border areas), TB control activities along the Thailand-Myanmar border received supplementary funding from UK Aid through the Department for International Development (DFID) included in a larger programme, SCAPPB. The TB component targeted both mobile displaced people and extended interest to people who were refugees in all three-refugee camps in the Tak province. SMRU began TB work in 2009 collaborating with Thai hospitals and TAK PHO. This partnership then extended to PUI and IOM, in 2013 to secure DFID's SCAPPB funding of TTBI.

### **6.2. Organization of collaboration**

TTBI members included Shoklo Malaria Research Unit, Premiere Urgence - Aide Medicale Internationale (also known as PUI), International Organization for Migration and the Tak Public Health Office. SMRU led the consortium taking responsibility for coordination of the project, funds distribution, ensuring compliance, reporting, TB case detection, and comprehensive treatment services in communities residing in Myanmar's Myawaddy district. Meanwhile PU-AMI covered TB controls activities in refugee settings. IOM and Tak PHO were supportive partner organizations, IOM for TB culture laboratory services and Tak PHO provided treatment to a proportion of cases for refugees in Umphang and Phophra areas.

The TTBI activity was animated and coordinated through regular quarterly meeting with representatives of the partners agencies.

Agenda and contents of the TTBI meetings were defined to review achievements, adjust strategies and prepare future plan. A new proposal for 2016 was prepared by the TTBI committee in 2015 at the request of DFID, and the No Cost Extension 2017 was suggested at the TTBI quarterly meeting in July 2016. Also in 2016, a TTBI partners meeting helped to overcome the funding crisis of PUI and to share the SMRU decision to take over to sustain the TB programme in the refugee camps.

During the project, all stakeholders had shared roles and responsibilities through a matrix of responsibility as follow:

	SMRU	PU-AMI	Tak PHO	IOM
Project co-ordination (distribution of funds, ensuring compliance & reporting)	X			
Targeted Active Case Detection (t-ACD)	Myanmar population @ SMRU border TB clinics	Refugee population in 3 camps		
Diagnostics (GeneXpert) for all partners	X			
Treatment of TB patients	Myanmar population @ SMRU border TB clinics	Refugee population in 3 camps	Facilitate project for treatment of TB patients	
Culture & Drug sensitivity testing for all partners				X

The coordination of the project followed this template with good cooperation among all partners until August 2016 when the sudden, unexpected phase-out of PUI due to funding issues forced SMRU to take over, in collaboration with TAK PHO, for the exit plan of PUI especially in the two camps of Nupoe and Umpiem in the South of Tak province.

### 6.3. Coverage area

The activities covered all refugees and Myanmar migrants residing in Thailand's Tak province and Myanmar's Myawaddy district.

-Populations of the three refugee camps namely Maela, Umpiem Mai and Nupoe situated in Maesot, Phoppra and Umphang district respectively, received support in terms of patient's care and treatment management as well as community awareness and health education measures.

- Migrant populations with presumptive TB who seek medical care through SMRU migrants' clinic situated in Thailand's Wampha and Mawkahtai villages as well as KoKo village of Myanmar's Myawaddy district in Kayin state.



The population covered by the project was estimated at about 80,920 people in three refugee camps, and about 40,000 in KoKo area on the Myanmar side.

The project also encompassed TB patients at the Mae Tao Clinic, which serves migrants. It covers a highly mobile cross border population.

The mobile migrant's population was difficult to assess, figures varied between 200,000 and 500,000 people, and estimation of the real denominator population is beyond the scope of this project.

#### **6.4. Initial TTBI activities Y1-Y3**

TTBI proposed to reduce the burden of TB and control the progression of resistance amongst displaced populations in five border districts of Tak province and develop local capacity for handover to National TB programmes of Thailand and Myanmar. Different activities were proposed:

1. to improve the detection of TB cases, both passive and targeted active case finding strategies for specific high risk groups by utilizing validated symptom questionnaires and screening algorithms and diagnostic tools such as sputum microscopy, molecular detection, and chest X-ray
2. to provide quality treatment for patients found to be infected with TB including TB/HIV care
3. to improve treatment outcomes for TB patients through "treatment centres"; community-based and home management
4. to assess drug resistance and manage for all patients found to be infected with DRTB.

#### **6.5. Y4 – 2016, Costed Extension and new TB screening project**

In 2016, DFID agreed to a one-year extension with a special focus on conducting a new activity called mass TB screening (population screening) in addition to conventional passive and targeted active screening in the Maela refugee camp which has the largest number of refugees along Thai-Myanmar border. The mass screening was prepared with a specific design in two phases. The first phase was to estimate the TB prevalence of the camp and the second was to screen the remaining populations (maximum 21000 population). If prevalence found in phase 1 was in line with our hypothesis of 500/100,000 or more, we planned to continue the mass screening in phase 2. However, if prevalence in phase 1 was found to be less than 500/100,000 population, the screening project would be discontinued, and the project would continue with revised t-ACF strategy and PCF only.

Under this Year 4 Project extension, all indicator targets were reviewed and adjusted for one more year of activities, and a new output indicator i.e. the number of population screened under this specific project, was added.

#### **6.6. Log frame changes and NCE January – June 2017**

DFID agreed to extend for six months in 2017 with no additional cost using savings from TTBI Y4 budget. DFID granted this NCE because many TB patients were still on treatment and could not be transferred to other agencies or government hospitals after 2016. The Log frame was also adapted in order to suit the NCE proposal. Within the NCE period no case finding activities were done under DFID, except continuing patient support for the remaining patients who started treatment in 2016 (i.e. no new patient enrolment or active screening were performed).

#### **6.7. Programme monitoring**

Programme monitoring was done through quarterly updates of log frame indicators and follow up of annual milestones set in the Activities Log for years 1 to 3.

SMRU and PUI provided timely to DFID all quarterly and annual reports based on their activity recording and information system.

Under the year 4 proposal, DFID required from SMRU a complete Monitoring and Evaluation plan, which was provided to DFID by June 2016.

The M&E protocol provided to DFID the concrete framework already in place at SMRU (related to monitoring tools, log frame, and indicators) for monitoring and measuring the performance and results on TB programme activities on both population targets and to prepare reporting.

Under this monitoring plan and close reviewing of all patient records, we have updated some previous results of the Log frame with more precise numbers. Some numbers may be slightly different from previous annual reports because of this update and cleaning of all data to get the most accurate data for final review. Data may have been changed also because of some late results, data cleaning and annual year census. This update does not bring any significant change in indicators and achievements of the programme, and overall analysis.

As one preliminary comment for the presentation of results and indicators for this DFID project report, we should highlight that as the first two years of project (2013-2014) were also covered by other grants, we will present activity of these two years with numbers of people contributed by DFID alone. For the following years (2015-2016), we present the whole programme activity under DFID.

The following indicators (expressed as rates and proportions): Death rate, treatment success rate, default rate, represent the quality of the programme, it was not possible to allocate specific follow up to specific grants. So we will present those indicators for the whole project as already done in previous evaluation and reports.

Under programme monitoring and supervision, SMRU received external financial audit each year. We had one external due diligence review undertaken by Crown Agents in December 2015, commissioned by DFID.

Two interim programme evaluations were performed during the 4 years projects: the first interim evaluation was done in April 2014; the second interim evaluation took place in June 2016 for evaluation of years 1-3. The final evaluation occurred as planned at the end of this programme in September 2017, and will be produced together with this report.

## 7. MAIN ACHIEVEMENTS

The achievements of this project are evidenced through the main indicators of impact and outcome.

Impact indicators on target:

- **Achieve overall TB death rate at 6% among TB patients enrolled, keeping it under threshold of 10%:**

Over the four years` programme, , the overall death rate was 6%, keeping the mortality much lower than the target threshold of 10% for both refugees and migrant populations, evidencing a significant impact of this programme . This threshold was set based on baseline mortality in both populations back in 2011. We noticed a significant reduction in TB mortality in both populations, probably due to the action of skilled and dedicated medical team in spite of the late presentation and severe condition of some patients presenting at clinics.

This indicator was also set as the impact indicator of the component C8 of SCAPPB project and we can confirm positive impact of the project on the quality of life for the most vulnerables.

Outcome indicators close to targets:

- **1870 TB cases detected for DSTB and 88 MDR-TB through all case finding activity:**

The case finding activity has been quite intense throughout the 4 years of the project and overall aligned with targets. A total of 22,508 population of both migrants and refugees benefited from active TB screening as part of t-ACF among high-risk groups. A further, 18,428 refugees from Maela camp received systematic TB screening in year 4. An overall, total of 8064 patients from PCF were evaluated for complete diagnosis.

Outcome 1: Number of Cases detected reached 100% of target with high loads of TB among migrants while TB cases among refugees remained at lower levels.

Outcome 2: Number of MDR-TB cases detected reached 96% of target due to inexact prevalence assumptions for refugees for MDR-TB

- **Treatment success rate (TSR) maintained above 82% for the overall four years` cohort:**

Given the situation of highly vulnerable population as well as their intense mobility, treatment success rate was overall well maintained above 82% over the four-year-long programme, which is slightly under the established target of 85%

Outcome 3: Treatment success rate reached 96.5% of target.

This treatment success result has to be compared to national statistics for both border districts on both sides of the border (Myawaddy township in Myanmar and Tak province in Thailand) where national figures presented for 2015 did not reach 80% of TSR (68% for Myawaddy TSR).

These figures indicate that the whole project contributed to the overall goal of reducing the TB burden and reducing the spread of MDR-TB among migrants and refugee populations.

As evaluation of contribution of TTBI to TB control activity in the border and to reduction of the TB burden, the number of TB cases detected under TTBI for the last three years (2014-2016), exceeded the national statistics for the same period of the 5 border districts in TAK province (1571 TB cases notified). Compared to Myanmar statistics on 2015, SMRU statistics for migrants represent one third of the number of TB cases detected in Myawaddy Township. Whatever side, the contribution of TTBI project is significant and valuable for both national programmes at local level.

Same comparison allowed for MDR-TB cases where for the last 4 years, SMRU and partners under TTBI detected 88 RR/MDR-TB cases. From Tak province for the same period, 43 MDR-TB were registered.

Although no indicator was planned in the framework, the development of patient referral to Myanmar National Programme is part of the programme achievements as under TTBI project, local capacity building and hand-over to both NTP, were part of our objective. The development of proper referral procedures to meet patient needs and allow Myanmar NTP to face the transition to full coverage is a step toward this objective.

For both population categories (refugees and migrants), we developed the referral process, but its effectiveness for completion of treatment and satisfaction of patients is yet to be evaluated. The feedback of this referral is still difficult to obtain from NTP.

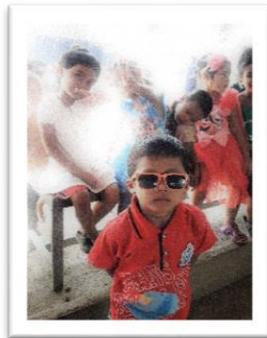
For refugees, although most of TB patients are camps residents, some are cross-border patients who come to seek care while their family or friends are living in the camps. After proper diagnosis and counselling, some of those were sent back to the Myanmar government hospital.

Amongst migrant` patients, this process became more frequent, facilitated by the political evolution in Myanmar and the signature of MoU with Myanmar NTP in 2015. Nearly 10%-12% of patients diagnosed on the Thai side have been referred to Myanmar hospitals to start treatment to facilitate their treatment process and adherence. No feedback from NTP could be obtained for those patients from past years. The development of this process takes time because we need to build a mutual understanding and trust between teams and patients.

From 2017, as SMRU is continuing its TB programme under GF, the implementation of a referral team in Myawaddy has allowed a better relationship and partnership and we started to get referral procedures with feedback for patients sent to Myawaddy either as initial referrals or during treatment.

Main achievements could also be highlighted through patient`s success story, and satisfaction of patients. Here, we present a typical mix of migrant/cross border story type with consequences of lack of appropriate access to health system in Myanmar.

MLM is now a nice 4 years` old little boy. He just recently went back home with his mother after he finished his Treatment for Rifampicin Resistant TB at SMRU TB Wang Pha. He and his mother went back to their hometown in Hpa Han and were referred to a government hospital for continuation of their ARV treatment.



- He had arrived in early 2016 with his mother and presented first at MTC with a month of fever, cough with skin infections and poor weight gain. He had a positive sputum and GeneXpert revealed it to be Rif Resistant, and the child was diagnosed as HIV positive and also his mother. They did not know that diagnosis before and it was carefully announced and managed through many session of counselling. Rifampicin resistance was confirmed by culture at IOM. From his mother story: they came from Hpa-An. His mother had just came back

from Bangkok to take care of his son as he became sick. He was under care of his grandmother and uncle in Hpa Han while his mother was working in Bangkok as a migrant worker. His uncle had passed away a few months earlier with TB-HIV co-infection at Hpa-An. The mother had previously taken care of him before going to Bangkok, but had to migrate for economic reasons. No screening was done for contact and no known diagnosis of MDR-TB for the uncle from Hpa An. They had no income to face another hospital care. They heard about MTC and SMRU clinic and went there by themselves.

After the child started MDR-TB treatment, he responded clinically well and ART was started after 2 weeks. His mother was also diagnosed with HIV infection, and she got a chance to start ART at the same time while her child was taking TB treatment at SMRU clinic. The mother never got PMCT while she was pregnant, and did not know her status. She was refereed to Myawaddy NAP to initiate her ART with full support from SMRU for transportation to appointments of follow up at MYWD.

Though the child needed to go for a long distance to complete his treatment course, the family was quite committed and showed good compliance for treatment and all the instructions provided by the clinic`s team. With the support of SMRU TB team, they understood the situation and believed that they could defeat TB infection entirely and be back to their normal life.

The child finished his treatment in September 2017 and is ongoing treatment with ART. They went home back to Hpa-An and were referred to continue ART supply there. The whole family is happy and his mother will stay with the family and try to find the job at their village to take care of the children and her health for access to ART.

**The Mass screening project:** another main achievement of the programme in 2016 was capacity of TTBI to implement and manage the whole mass screening project of Maela with mobilization and support of all camp authority and population leaders, and partners engaged in TTBI as they all contributed to that project.

Through this screening activity, 18,428 (65% of population) have been screened and 154 TB patients have been diagnosed for an estimated 836/100 000 infected. We enrolled 151 patients as one died before and two refused enrolment, and 145 have been treated with success (TSR: 96%).

During the 4.5 project years, there were many staff involved in that programme, significant training activity, capacity building among all staff and TB knowledge sharing among all partners.





## 8. PROGRAMME IMPACT

### 8.1. Keeping TB death rate under 10% for a 100% of target

Generally, TB death rate adversely affects programme success rate and TTBI has tried its best to maintain this death rate under control and below its target of less than 10%. As mentioned in the introduction to main achievements, **the overall TB death rate averaged 6% and was always maintained under the 10 % target for both populations of refugees and migrants for both males and females.**

**Overall death rate was 4.1% in refugees (27 of 658 TB patients enrolled between 2013 and 2016 died), and 7.3% for displaced populations (80/1099 total TB patients enrolled).**

As both programme for refugees and migrants enrolled patients presenting with TB/HIV coinfections, the overall death rate was affected by a specific higher level of deaths among HIV co-infected.

HIV related deaths in TB/HIV coinfections constituted about one-fourth of total mortality for refugees and nearly half (47.5%) of deaths of displaced population, with a clear relation between death rate and severity of HIV infection at diagnosis.

The death rate on migrant sites was 16.9% for TB/HIV positive patients, while for regular TB it was 4.8%. This threefold difference in death rate was due to TB/HIV co-infected patients presenting with advanced HIV WHO stage 4 and very compromised immune condition, and is similar to other settings in the region with high level of TB/HIV that show even higher death rates <sup>1</sup>.

Although the reduction of mortality is one of the main goals of new END TB strategy to achieve 90% of treatment success, this reduction is related to many factors that include timely and proper access to care in good health systems to avoid late presentation of cases and no delay in diagnosis and treatment.

As suggested by the external consultant during a final evaluation, we are planning a review study of mortality among our patients to better understand it in our cohort of patients.

## 9. PROGRAMME OUTCOMES ACHIEVED OVERALL NEARLY 100% OF CUMULATIVE TARGETS

These indicators are designed to reflect TTBI contribution to reduce real burden of TB amongst displaced population along the Thailand-Myanmar border – both migrant workers and refugees, and to understand the spread of DR TB among those vulnerable groups residing in westernmost Thailand, Tak province and in easternmost Myanmar, Myawaddy district.

### 9.1. High level of Tuberculosis case detection reached 100% of cumulative target

Among refugees, total cases of TB detected were 699 where mass TB screening in Maela camp solely accounted for 22% (154 cases).

Among migrant sites under the DFID grant, there were 1171 total cases detected; [overall for the programme for displaced population the total cases detected were 1398].

The target set as a cumulative number of cases detected from 2013 to 2015 was 450-500 in migrants and 730-930 in refugees where female percentage should be within 30-40%. For 2016 alone, according to results of previous years the anticipated target was 450-550 in migrants and 170-260 in refugees

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<sup>1</sup> Marcy and al CAMELIA study in Cambodia Mortality rate = 22.5%, Cain K.P. and all ; Thailand, mortality rate = 17%

where refugee target included a mass screening number of 90-110. Overall, female percentage was the same 30-40% for 2016.

**Overall, with 1870 TB cases diagnosed over the 4 years, the case detection activity was in range of the cumulative target of 1700-2190 cases detected.**

The following table and graphic represents annual number of TB cases detected between 2013 and 2016 for Refugees and Displaced (under DFID).

For refugees, the cumulative numbers from 2013 - 2015 was 473 patients which is below the cumulative target set as 730-930, however 226 patients found in 2016 fell within the target range. Overall, a total of 699 refugees were found to have TB during 4 years of DFID funded programme, but is still under total target of 900 (78% of target) for this population. This target was set in 2012 under high TB prevalence assumptions which was not verified although the further result of the mass screening project with a new detection strategy was more effective in case detection and allowed to reach the 2016 target.

Under case finding activity, targets were fixed based on assumptions from IOM screening results, however the strategy used for screening and diagnosis in TTBI could not be the same as the one IOM uses for people going for resettlement with systematic CXR and culture. Under TTBI, for the first three years, we used t-ACF and PCF with a specific algorithm that did not integrate systematic CXR and culture for all; CXR was used for specific contact screening for <5 y and >55 y and for HIV screening for TB, and for annual health worker screening. It was not used systematically for screening. Culture was done only for bacteriologically confirmed cases.

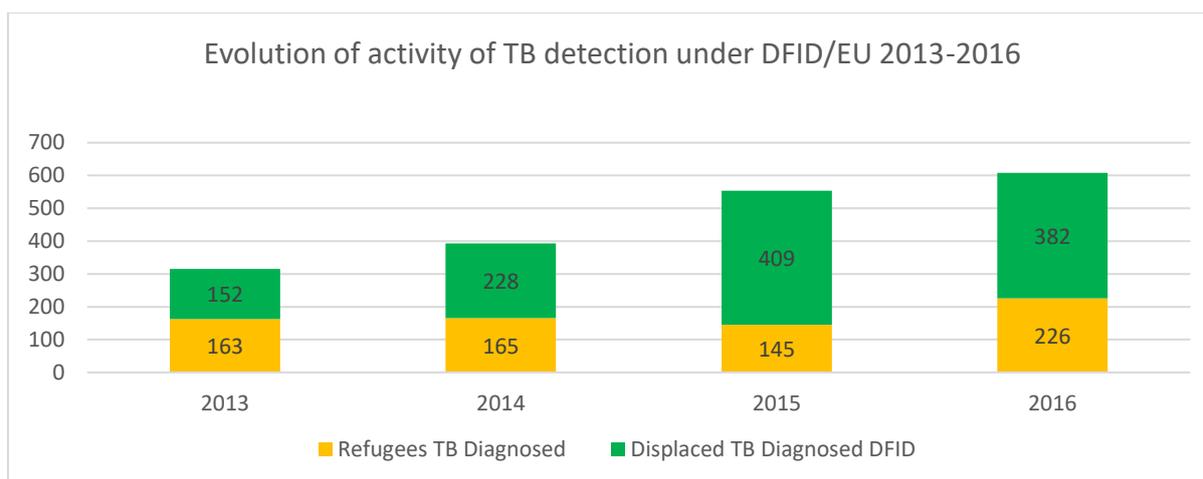
The difference in strategy is part of the justification for lower achievement in refugee population in the first years. When we implemented the mass screening and used screening algorithms with systematic CXR, the prevalence and achievement reached the target and were in line with previous IOM findings.

For migrant and displaced populations, the cumulative number from 2013-2015 resulted in 789 TB patients detected which was well above target for this period (350-450). Especially on years 2014 and 2015, with recruitment of patients settled at MTC, the project covered a very significant need and many TB patients were diagnosed. Nearly half of migrants TB detection activity came from patients detected at MTC and there was no real decreasing trend. The target of 2016 was fixed high according to this trend but activity remained stable and we could reach only 85% of the target. However, over the 4 years we reached cumulative targets for migrants. Proportion of women with TB detected was in expected range 30%-40% across the years.

The epidemiology of TB is not linear across the years and it is always difficult to predict especially in this mobile population, and is linked to prevalence in the populations as well as many environmental factors and project input.

Overall TTBI detected 1870 TB cases.

T1: outcome indicator 1	2013 (%F)	2014 (%F)	2015 (%F)	2016 (%F)	Total (%F)
Migrants	152 (38,3%)	228 (38, 4%)	409 (37%)	382 (36%)	<b>1171 (36.5%)</b>
Refugees	163 (38%)	165 (38%)	145 (41%)	226 (43.8%)	<b>699 (40%)</b>



## 9.2. Drug resistant tuberculosis case detection

We report here (T2) the number of patients presenting with Rifampicin resistance and / or Isoniazid/ Rifampicin resistance as they were associated with more than 80% of cases and treated under conventional MDR-TB regimen following the GeneXpert result as recommended by WHO and under Guideline of MNTP<sup>2</sup>. Within the TTBI project, we also benefited from culture results for all bacteriologically confirmed cases, which permit a more accurate and adapted treatment for patients according to final drug susceptibility results.

The number of MDR-TB detected cases was way above target during the first three project years and overall programme for displaced migrants, although the number of cases detected could not reach the target for 2016 as it was set too high.

For refugees, the number of MDR-TB always remained under the estimated one, which is altogether good news.

T2 : outcome indicator 2	2013 (%F)	2014 (%F)	2015 (%F)	2016 (%F)	Total (%F)
Target migrant	6	7	7-17	35-45	55-75
Migrants	16 (4=25%)	28(10=36%)	15(6=40%)	16(5=31%)	75 (25=33%)
Target Refugees	8-13	6-10	10-26	9-16	37-61
Refugees	6 (2=33%)	4 (1=25%)	1 M	2 (1=50%)	13 (4=30%)
<b>Total</b>	<b>22 (27%)</b>	<b>32 (34%)</b>	<b>16 (37%)</b>	<b>18 (33%)</b>	<b>88 (33%)</b>

The total number of RR / MDR-TB detected during this project is a significant contribution to the control of MDR-TB in this area, as 85% of them could be enrolled for treatment under SMRU.

The proportion of females is within the predicted range of 30-60% detected with MDR-TB.

## 9.3. Treatment success rate

The next table (T3) presents the overall achievement of treatment success rate across the years. The target was fixed at 85% of treatment success as per international validated target for TSR. With a total of 1467 patients treated with success, this programme reached 96.5% of the target. Also, to have full overview of this achievement, and its limitations, the TSR should be presented together with the other

<sup>2</sup> WHO treatment guidelines for DR-TB 2016 Update

outcomes of TB patients that affect final result: the death rate, the Lost to Follow Up rate, and rate of patients transferred out.

Death rate: One of the worst outcomes already discussed was death. Although the death rate remained under target of 10%, it remained a significant number. As explained above this is related to late presentation and number of co-infected TB/HIV patients who presented with advanced stage disease that could not be overcome although we provided all adequate treatment.

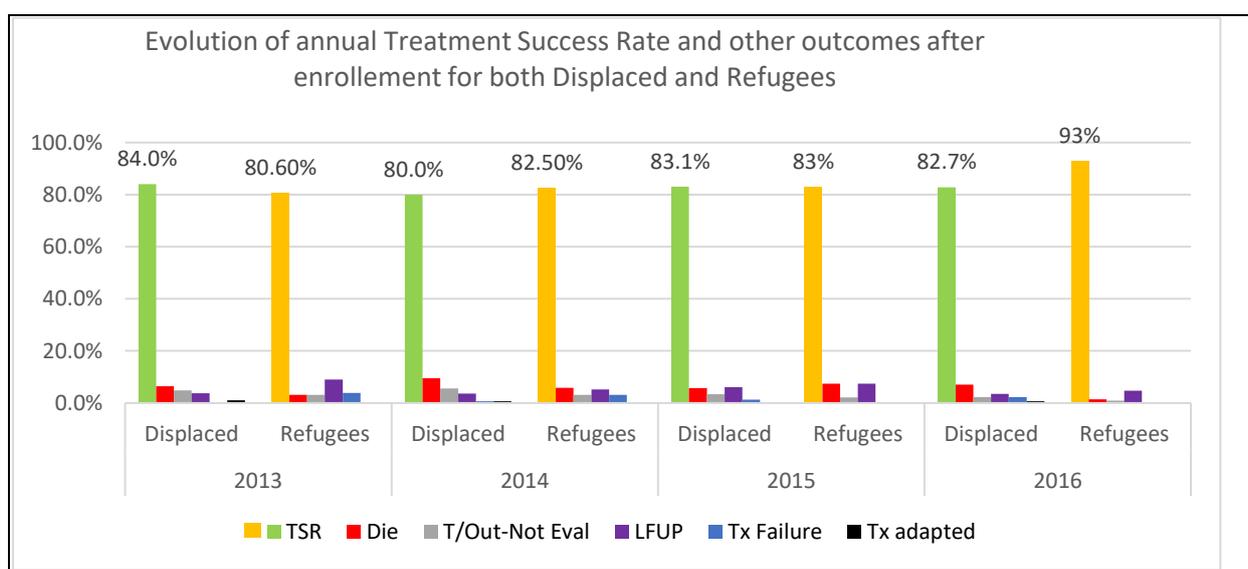
In contrast, the high success rate value in refugee in 2016 can be explained by a much lower death rate (1.4%) compared to other years mostly due to earlier diagnosis of disease under the project of mass screening in Maela, and also very few TB/HIV co-infected patients in that cohort.

Lost to Follow up rate: We can also link with output indicator 3.2 of Lost to follow up rate (previously named default rate). For this indicator, target for LFUP was set under 10%. For both populations, we remained under targets and mean rate of LFUP was 4.3% for migrants and 6.4% for refugees.

T3: Treatment Success rate	2013	2014	2015	2016	Mean TSR
Migrants	84%	80%	83%	83%	82%
Refugees	81%	82.5%	83%	93%	85.6%
T4: LFUP rate					Mean LFUP
Migrants	3.8%	3.6%	6.1%	3.5%	4.3%
Refugees	9%	5.2%	7.4%	4.7%	6.4%

Patients transferred out: Another outcome that affects the treatment success rate is the proportion of patients not evaluated because they were transferred out during the period of treatment for better patient's comfort and convenience. As patient's adherence is the basis for decision for place and strategy of treatment, treatment place was always negotiated with the patients and we prefer to refer patients with proper referral forms than to get them lost. However, until last year we never obtained feedback from other Myanmar facilities for patients referred out.

This graphic below represents evolution of TSR and other outcomes across the years of the programme:



## 10. PROGRAMME OUTPUT – REFUGEES

### 10.1. Diagnosis for suspected TB cases and high risk groups

This particular output comprises 4 different output indicators: (1) Number of people tested for TB using t-ACF methodology; (2) Number of people tested for TB using PCF methodology; (3) Number of people screened by Mass TB screening; (4) Proportion of enrolled TB patients receiving voluntary counselling and testing of HIV

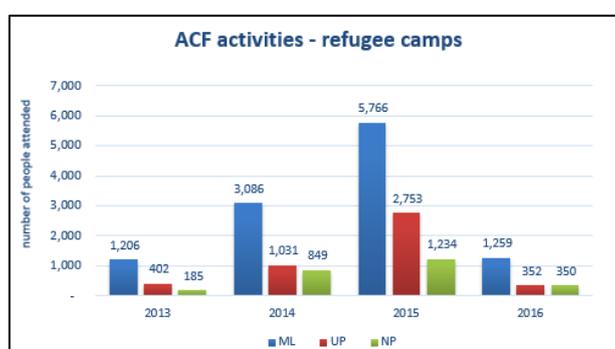
**Table 4:** Output indicators 1.1, 1.2, 1.3

		2013 (%F)	2014 (%F)	2015 (%F)	2016 (%F)	Total (%F)
t-ACF	Yearly target	2500 – 3600 (45-55%f)	5000 - 6200 (45-55%f)	7500 - 9800 (45-55%f)	3500 - 5500 (45-55%f)	16000 - 21500 (45-55%f)
	Achieved	1793 (53%)	4966 (53%)	9753 (53%)	1961 (54%)	18473 (53%)
PCF	Yearly target	1000 -1100 (45-55%f)	1000 -1100 (45-55%f)	1000 -1100 (45-55%f)	1200 -1500 (45-55%f)	4200 -4800 (45-55%f)
	Achieved	1070 (47%)	1047 (48%)	1155 (51%)	823 (49%)	4095 (49%)
Mass screening	Target				21000	21000
	Achieved				18428 (53%)	18428 (53%)

**Table 5:** Output indicator 1.4

		2013	2014	2015	2016	Mean %
% received VCT enrolled patients	Yearly target	>90%(M & F)	>90%(M & F)	>90%(M & F)	>90%(M & F)	>90%(M & F)
	Achieved	97.9%M 100% F	100%M 100%F	100%M 100%F	100%M 100%F	99.5%M 100%F

Overall, indicators for case finding activity were in the range of targets for the four years of the programme with some compensation for some year activity above target by others under target. In 2016, all targeted case finding and passive case finding activities were significantly impacted by the Maela mass screening activity, and it was initially difficult to predict how this would affect the level of routine case finding activity in the camp.



ACF target groups were revised during early 2014 where additional groups, chronic and boarding students, were added as risk groups. All groups apart from Health workers and PLWHA received questionnaires only as first screening tool. Chest radiography was offered to those who were suspected through questionnaires answers. In 2015, t-ACF activities in the camps were intensified in order to find

more TB cases through community health education activities. Those who expressed interest in TB screening from community-awareness programmes were invited to screen for TB by using ACF questionnaires, even if not belonging to specific risk groups which can explained the lowest yield.

Overall in refugees: 79 TB cases were identified through t-ACF giving a yield of 0.43%.

Overall, t-ACF activity contributes to 11% of case finding activity.

In 2016, t-ACF and PCF activity were at a lower level, as nearly two thirds of the population (65.4%) attended mass screening in Maela camp, most of the TB cases had a chance to get diagnosed before they decide to go to OPD, and mass screening also included parts of some groups previously included in t-ACF as new arrivals, students from boarding schools, and other chronic patients as well as contacts. Most of t-ACF and PCF also come from other camps. Activity of screening in the other camps was reduced as the team had focused on Maela mass screening to achieve this in one year time.

**Output Indicator 1.3 is 2016 Indicator for mass screening activity:**

During the project implementation in 2016, a total of 18,428 people attended the mass screening for an average participation under CCSDPT population count of 65.4%, and 88 % of the target number. We had assessed feedback from the beneficiaries, which give also some explanation for non-participants who mostly belong to two categories: either working or travelling outside the camps at the time of the screening, or did not understand and feel they were in good health and did not need to attend.

**10.2. Treatment of patients including HIV co-infection**

The indicator contains 4 sub-output indicators: (1) Number of patients treated (registered) for TB; (2) Number of HIV co-infected TB patients treated; (3) Proportion of patients diagnosed with TB who commence treatment; (4) Proportion of HIV/TB cases receiving ART or cotrimoxazole. (Tables 6,7)

**Table 6:** output indicators 2.1, 2.2

		2013 (%F)	2014 (%F)	2015 (%F)	2016 (%F)	Total (%F)
Number of TB patients treated	Yearly target	180 -230 (30-40%f)	290 – 370 (30-40%f)	260 -330 (30-40%f)	170 -260 (30-40%f)	900 - 1190 (30-40%f)
	Achieved	155 (38%)	154 (36%)	135 (44%)	214 (44%)	658 (41%)
Number of HIV/TB patients treated	Yearly target	36-48 (50-60% f)	36-48 (50-60% f)	20-26 (50-60% f)	15-30 (50-60% f)	71-104 (50-60% f)
	Achieved	18 (22%)	14 (43%)	8 (63%)	8 (50%)	48 (40%)

This indicator of number of patients treated was under target on the first three years in refugee population. It was in range of target for 2016 after reviewing target within the mass screening project.

The lower number of patients treated reflects the lower number of patients detected in first three years of programme as nearly 95% of all detected could enrol for treatment.

This question was discussed in early 2015 by the TTBI committee and a decision was made to apply new proposal with a different screening strategy using a more sensitive algorithm – systematic CXR to all population in the largest camp.

The proportion of TB/HIV co-infection showed a significant decrease over the years starting with 11% of patients in 2013, and 3.7% in the last year although more patients were tested. It is much lower as all the work done during the 4 years of the programme has identified most of patients with HIV in the camp population. As camps are still quite close and preserved environment, not many new HIV patients

appeared. We can also see this result as a positive effect of all the prevention and HE that have been disseminated to population in the camps since years.

**Table 7:** output indicators 2.3, 2.4

		2013	2014	2015	2016	Mean %
Proportion of diagnosed patients receive TB treatment	Target	≥80% (for M & F)	≥80% (for M & F)	≥80% (for M & F)	≥80% (for M & F)	≥80% (for M & F)
	Achieved	95% for M 95% for F	95% for M 90% for F	95% for M 95% for F	89.4 for M 98.3 for F	94% for M 95% for F
Proportion of HIV/TB cases receive ART or cotrimoxazole	Target	≥90% (for M & F)	≥90% (for M & F)	≥90% (for M & F)	≥90% (for M & F)	≥90% (for M & F)
	Achieved	ART 71% M, 100% F Cotri 100% both M and F	ART 75% M, 67% F Cotri 100% both M and F	ART 100% M, 60% F Cotri 100% both M and F	ART 100% M, 60% F Cotri 75% M, 100% F	ART 87% M, 75% F Cotri 94% M, 100% F

The proportion of ART in refugees stayed under 90% as there were some difficulties to engage TB patients in ART under the HIV programme in camps due to limitations in availability and sustainability of the HIV programme across the years.

Another reason was HIV related deaths, which affected the particular indicator. Throughout 4 years period, there were 5 patients (i.e. 10.4% of total TB/HIV patients in camps) who died before initiation of ART.

### 10.3. Improved treatment outcomes for TB patients

**Table 8:** output indicators 3.1, 3.2

	2013	2014	2015	2016	Mean %
Proportion of TB patients managed in community and in TB village (60/40)	50% community and 50% TB village	55% community and 45% TB village	51% community and 49% TB village	71% community and 29% TB village	58% community and 42% TB village
Defaulting treatment rate	11.5% M, 5.1% F	3.1% M, 8.9%F	5.3% M, 10.2% F	4.2%M, 5.3% F	5.9% M, 7.1% F
% of patients transferred out according to transfer protocol	100% for both M and F				

Refugee camps, widely known as protracted where in-out movement is highly restricted, are actually possible places for routine travelling and daily work outside. Refugees are able to travel through official approval from camp administration department in cases such as medical and training reasons. However, unofficial travelling took place for decades which seems quite difficult to control. This favoured loss to follow up for TB patients both pre-treatment and during treatment process. Nevertheless, only 4.7% in defaulting rate during 2016 indicated that the rate has improved dramatically.

#### 10.4. Drug resistance assessed and managed: output indicator 4.1

All sputum and non-sputum smears found to have AFB positive were sent for further culture and drug susceptibility testing at IOM Maesot TB laboratory. Level of achievement for this indicator was 100%.

### 11. PROGRAMME OUTPUT – MIGRANTS

Results in the following tables are presented on an annual basis and not cumulative as in Log frame.

#### 11.1. Diagnosis for suspected TB cases and high risk groups

Table 9: indicators 1.2, 1.3	2013 (%F)	2014 (%F)	2015 (%F)	2016 (%F)	Total (%F)
Target ACF	900-1100	900-1100	900-1100	900-1300	3600-4600
t-ACF	665 (62%)	1198 (61%)	1081 (61%)	1101 (58%)	4035 (59.5%)
Target PCF	280-320	750-800	1000-1100	1200-1600	2200-3700
PCF	407 (46%)	615 (48%)	1303 (42%)	1644 (49%)	3969 (44.7%)

Apart of the first year of the project for ACF activity, the numbers of people evaluated through t-ACF and PCF for Myanmar migrants were in line with targets and even over target for PCF as a result of high level of TTBI activity. This was probably also due to recognition of SMRU TB by partners and population, as PCF activity is based on people coming by themselves for diagnosis and out catchment area mapping showed that people came from distant places in Myanmar to seek quality care at SMRU.

After further analysis of the efficacy of these activities, both t-ACF and PCF contributed to significant levels of TB case detection.

From 4035 people screened under t-ACF, 156 TB cases were detected, giving a yield of 3.87% and contributing overall to 13% of cases diagnosed among migrants.

Targeted ACF among migrants had a overall yield of 3.9% which shows effectivity of screening for these high risk groups ; it was close to 7% for contacts screening and 1% for health workers.

Contact screening was especially effective for children under 5 years old where the yield of TB among contacts was 15% accounting for 32% of all TB cases among children under 5 years.

Health worker screening was also effective, detecting 19 cases among staff working with migrant population. They were all treated, evidencing this specific screening as part of Infection control measures to avoid further nosocomial transmission.

Among known HIV patients, the yield was high as expected about 4% or 8 HIV patients diagnosed with TB.

Targeted active case finding activity, although less effective than passive case strategy, contributed significantly to the number of cases diagnosed who otherwise could be missed and source of more transmission.

Diagnosis activities, which also included activity of counselling and testing for HIV, were successful as shown by the indicator, and nearly 100% of enrolled patients (including transferred patients) under TTBI received counselling and HIV testing.

	2013	2014	2015	2016	Mean %
% enrolled patients received PICT	100% F,M	100%F 99.5%M	98.7%F 98.6%M	98%F 99%M	98.8%F 99.2%M

## 11.2. Treatment of patients including HIV co-infections

Targets for output indicators were set carefully from baseline activity in the first years of TB programme for displaced, and last year targets were set higher according to the observed trend. However activity continued to increase, not reaching this high target in 2016, but overall activity for the four years was in target range and well above the lower target for both TB and TB/HIV.

	2013 (%F)	2014 (%F)	2015 (%F)	2016 (%F)	Total (%F)
Annual Target	125-175	155-165	170-210	360-440	810-990
Number of TB patients treated	143 (35%)	179 (38%)	295 (36%)	313 (36%)	930 (36%)
Annual Target	16-21	10-27	20-36	15-30	145-225
Number of HIV/TB patients treated	22 (24%)	49 (45%)	58 (41.5%)	56 (36%)	185 (40%)

The proportion of women who received treatment was within target range of 30%-40% females enrolled, in line with the usual F/M TB proportion as more males are affected by this disease. There is a higher proportion than expected for TB/HIV among women (40%) which might be related to specifics of the migrant life for women.

**Overall the rate of TB/HIV co-infection in this population of TB patients calculated at 20% was very high compared to both countries' statistics which remained around 10%.**

One important indicator in the table of the programme is the proportion of patients diagnosed who enrolled for treatment. Overall we managed to keep it at 80% online with target throughout the programme.

For proportion of TB/HIV coinfecting patients receiving Cotrimoxazole and ART, target was set at 90%, and was overall reached for migrant patients.

	2013	2014	2015	2016	Mean %
Proportion of diagnosed patients receive TB treatment (target >=80%)	94% (M,F)	84% (85% for M, 87% for F)	72% (75% for M, 71% for F)	80% (79% for M, 83% for F)	80% (79% for M, 82% for F)
Proportion of HIV/TB cases receive ART or cotrimoxazole (target >=90%)	ART: 91.7% M, 90% F Cotri: 97.4% M, 96.8 %F	ART: 92.3% M, 87.5% F Cotri: 97.4% M, 96.8% F	ART : 88% M, F Cotri : 93% M,F	ART: 91% M, F Cotri :92% M, 95% F	ART : 90% (92% M, 87% F) Cotri : 83% M, 88 % F

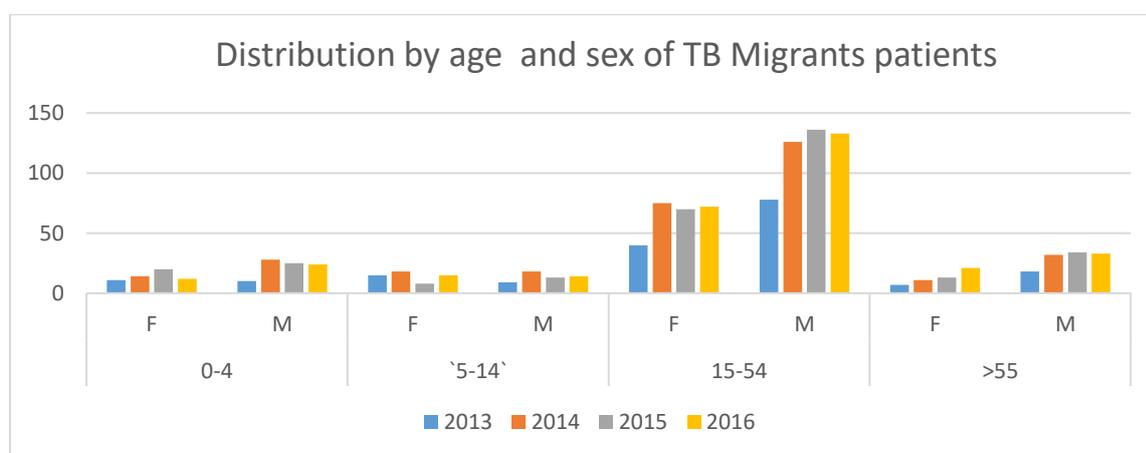
These indicators of proportion of patients enrolled for treatment are complex indicators to analyse as they include several components associated with treatment enrolment after diagnosis.

The proportion of patients enrolled after TB diagnosis reflects the choice of patients for further treatment place, as after TB diagnosis there is always discussion with patients to present the different option for treatment follow up. Some patients can choose to be treated at the Myanmar government hospital. In this case, they have been referred with the proper TB09 referral form. Over the 4 years, 11% of patients choose to start their TB treatment in Myanmar mainly at Myawaddy, but also other hospitals in Kayin state or Mon state. Especially in 2015 with evolution of the political situation, 17.6% of patients choose to start treatment in a Myanmar hospital. This is part of the drop of patient enrolment rate in 2015.

The proportion of enrolment is also related to the number of patients who arrived with very advanced medical conditions. They were diagnosed with TB but died before treatment. During the 4 years, 28 patients (2%) had died before treatment initiation. They were all diagnosed at MTC. In most cases, the death occurred within a few days of arrival at the clinic as they presented with very severe medical condition, TB meningitis or advanced pulmonary TB with lungs very impaired or advanced TB/HIV with another co- Infection.

There were overall 6% of patients lost to follow up after diagnosis and before starting treatment. Nearly 80% of them were diagnosed at MTC. This high rate of LFU from this clinic for migrants is related to the very fragile socio-economic condition of patients who seek diagnosis there as OPD patients but never come back and could not be reached by means employed (phone, family contact, etc.).

Category of patients enrolled and distribution for age and sex showed the usual patterns of higher burden of TB in patients aged 15-54: all young adults and working adults. As usual, TB was more frequent in men and not in elderly over 54 years



### Localization of TB disease

All over the TB programme, including TB patients from EU grant, the main types of TB were distributed as follows:

Table 11: TB sites	Pulmonary positive	Pulmonary negative	Extra pulmonary
TB patients (%)	53%	39%	9%

Extra pulmonary TB is represented by severe forms of TB meningitis, spine TB, bone TB, lymph node TB, pleural TB and some very rare form as skin TB, or peritoneal TB.

As for proportion of patients enrolled for TB treatment, the proportion of TB/HIV coinfectd patients who benefited from Cotrimoxazole and initiated ART after starting TB treatment was also linked to their

medical condition as ART cannot be started at once for all patients and some died or were referred before initiating ARV treatment.

After agreement with Myanmar NTP, SMRU followed the transition plan of Myanmar NAP starting in July 2016 and enrolled all HIV patients of its cohort to Myawaddy NAP. From the initial cohort of 227 patients under ART (include all SMRU patients also under EU), 70% are now referred to NAP to continue their treatment with support of SMRU for transportation and follow up appointments. From the 30% not treated, 19% had died later during the course of ART, and 13% defaulted.

This important result for patient treatment could be achieved because we managed to start HIV treatment with DFID support for all HIV patients co infected who can receive it at time of TB treatment.

### 11.3. Improved treatment outcomes for TB patients

Table 12: output indicator 3.1, 3.2

	2013	2014	2015	2016	Mean %
Proportion of TB patients managed in the community and in TB villages	40% community, 60% TB village	30% community, 70% TB village	27% community, 73% TB village	29% community, 71% TB village	9% community, 91% TB village
Defaulting treatment rate	3.8% (4.4%M, 2.7%F)	3.6% (4.2%M, 2.6%F)	6.1% (6.7%M, 5%F)	3.5% (4%M, 2.7%F)	4.2% (4.9%M, 3.2% F)

Although targets were initially set for displaced patients at 50%/50% in community and at TB village, the option of place for treatment depends on many factors and the choice was given to patients. Adherence to treatment is an important point to control. The severity of the medical condition, and the high proportion of positive patients prevented sending them back to the community before sputum conversion. Later it was suggested to move to a more realistic target as 30% in community/ 70% in TB village, and that was nearly reached. However in 2016 more than 90% of patients initiated their treatment at TB villages as their medical condition together with difficult condition of travelling and need for good compliance led the team to recommend TB village for most patients.

This is an important point linked also with the treatment success for more than 82% of them. This TSR for migrants and mobile population is quite successful when compared to similar situation contexts and even when to national statistics at local level for Myawaddy district and Tak Province which are under 80%.

The delivery of treatment at clinic level allowed patients to recover in better condition with less stress as they receive food and accommodation for them and their family. They receive psychosocial support and health education about the disease that helps them deal with initial stress due to diagnosis and have a better chance to complete their treatment. As some of them came from far remote places to get diagnosis and treatment, they had no other place to go and could not travel for follow up appointments. The accommodation in TBV allowed patients to receive clinic based DOT with good adherence.

The rate of loss to follow up remained overall under 5% annually although it was set under 10%.

The residential model of care brings together many positive factors that have been shown to be associated with better treatment adherence as a result of psychosocial support, patients` education, economical support for transport, food support.

One poster was presented at the 2016 conference of tropical medicine in Bangkok: “putting life on hold: when a clinic becomes a community for tuberculosis patients” which explained how from patients and staff perspectives, the challenges to stay in clinic are well balanced by the benefits, and patients mentioned that this is the best model for them. (annex 2)

#### 11.4. Drug resistance assessed and managed, achieved over 100% target

All sputum and/or non-sputum samples collected throughout the project, either positive or negative have been tested with GeneXpert to improve sensibility in MTB detection and to detect Rif Resistance at earlier stages.

All patients found to have AFB positive smear or GeneXpert were sent for further culture and drug susceptibility testing at IOM Maesot TB laboratory. All positive TB bacteriologically confirmed have been tested for drug resistance, thanks to good collaboration and partnership with IOM.

Across 4 years of activity, among displaced populations there were 75 patients detected with Rifampicin resistance alone or combined with Isoniazid and other DR to be defined as MDR-TB cases. Among those, 20 patients did not enrol, half of them because they were initially referred to start treatment at Myanmar hospital [10 (13%of all MDR detected)], 4 (5%) died before starting treatment as late presentation and very advanced medical situation, and 6 (8%) were lost to follow up. Among refugees, two patients out of 13 were not enrolled for treatment as one died before MDR treatment was established, and another was transferred out to Myanmar.

Also as part of TTBI platform, SMRU enrolled transferred IN patients from partner organisations for further management: 11 from PUI, and 5 from Thai hospitals. In total 75 MDR-TB patients were under SMRU management.

Table 13: output indicator 4.1, 4.2	2013	2014	2015	2016	total
Total MDR-TB patients enrolled and managed at SMRU	21	27	11	16	75
Died	2	2	1	5	10
LFUp	1	2	2	0	5
Transferred out/not evaluated	0	1	2	0	3
<b>Cure/Complete, TSR for MDR-TB</b>	<b>18 86%</b>	<b>22 81%</b>	<b>6 55%</b>	<b>2</b>	<b>48</b>
On going				9	9

Overall with 78%, the treatment success rate for the first three years of MDR-TB cohort remained well above the 60% target for this indicator.

Most MDR-TB patients (65%) were retreated cases and arrived with long history of delayed access, incomplete treatment, and advanced medical conditions. Among the 10 patients who died, 40% were HIV co-infected.

## 12. PROGRAMME IMPLEMENTATION UNDER OUTPUTS

### 12.1. Output 1: Diagnosis for suspected TB cases and high risk groups among displaced and refugee populations

#### 12.1.1. Targeted Active case Finding

In order to improve the early detection of TB cases, under TTBI the Active Case Finding strategy was developed as cornerstone of the project and at first t-ACD activities were implemented in the three refugee camps and for the migrant displaced population. These activity were implemented for high risk groups for TB utilizing validated algorithms adapted from WHO, MSF, CDC, Thailand guidelines and others published sources. At first there were four target groups: (i) contacts of TB patients, (ii) new arrivals to refugee camps, (iii) people living with HIV/AIDS, and (iv) health workers. Two more target groups were added for refugees in September 2014 – boarding students and diabetic patients upon agreement by all partners during TTBI supervision meeting. TB screening activities used validated symptom questionnaires and diagnostic tools such as sputum microscopy, molecular detection, and chest X-ray.

In 2015, the TTBI committee reviewed achievements of previous years, with number of patients detected lower than expected, and not matching targets and hypothesis of higher prevalence of TB in the camp. The committee decided to propose to DFID a more powerful ACD strategy with full population screening using CXR as a systematic tool for TB screening in a costed extension project for 2016.

The 2016 mass screening activity was under active case finding at population level using a WHO validated algorithm.

This graphic described the activity of ACF among the different high-risk groups screened

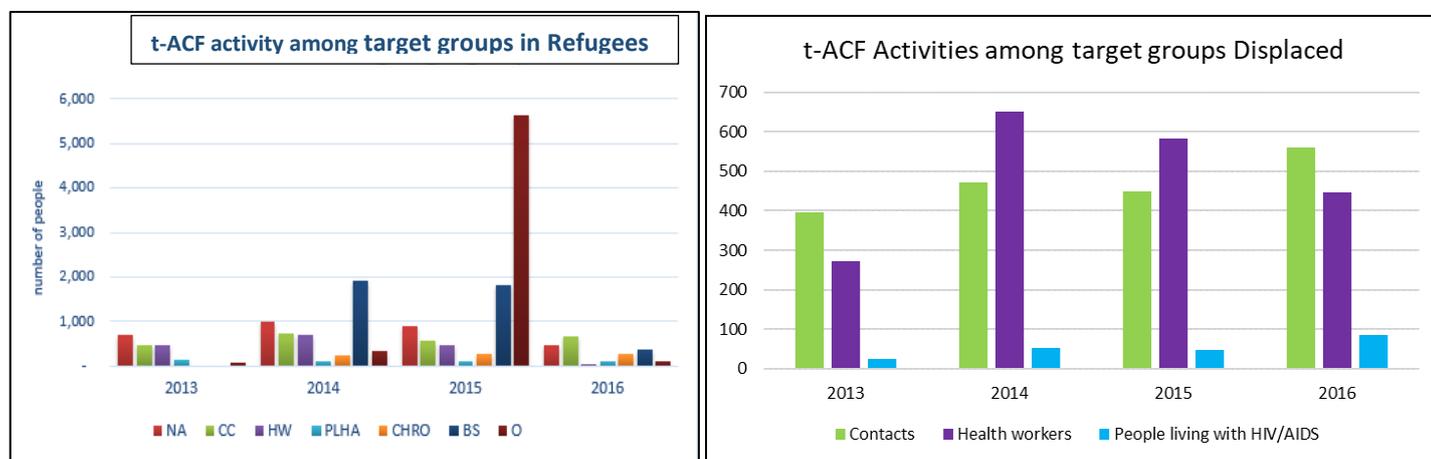


Table 14: Number of different target groups screened using t-ACF method for Refugees and Migrants

Refugees	2013	2014	2015	2016
New arrivals	563	1,117	924	449
Contact	411	720	569	646
Health workers	510	751	541	19

People living with HIV/AIDS	120	120	100	100
Chronic	-	268	264	274
Boarding students	-	2,032	1,805	358
Others	54	325	5,646	103
Mass screening Activity				18,428
<b>Migrants</b>				
Contacts	395	472	450	561
Health workers	271	651	582	446
People living with HIV/AIDS	25	51	47	84

The targeted active case finding activity was conducted extensively over the 4 years, leading to more than 18000 people screened among refugees, which nearly doubled with the mass screening in 2016 and more than 4000 among migrants where t-ACF was conducted only for the three specific risk groups: close contacts, health workers and PLWA.

Targeted ACF uses a structured questionnaire set including major symptoms, history of TB contact, and past history of TB disease. It also needs to examine the targeted person physically and to test sputum and arrange for chest X-ray if necessary. *(Please see the annex 1 ACF algorithm)*

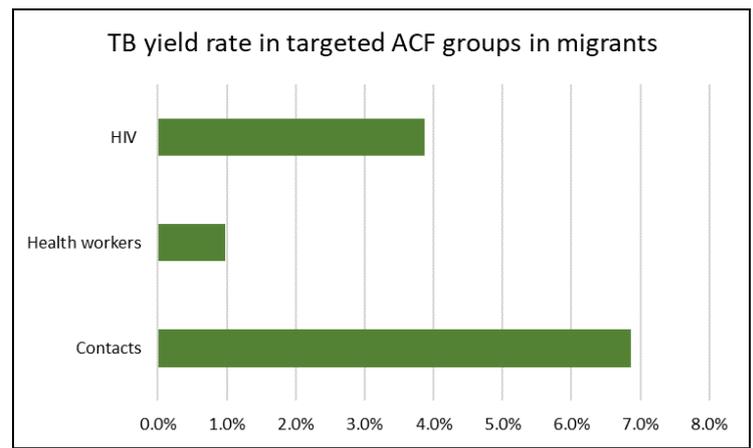
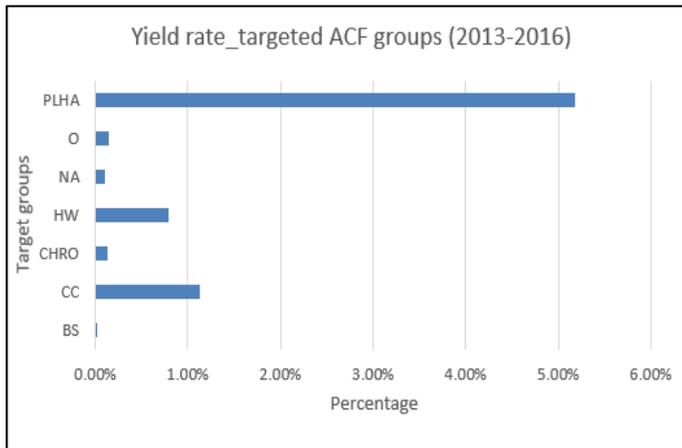
Criteria for t-ACF chest X-ray were, at first, only for children under 5 years of age who were in contact with source TB patients. The criteria were changed in October 2014 to offer chest X-ray to all TB contacts under 10 years of age and more than 55 years old.

The tuberculin skin test was introduced at the end of 2014 to assist childhood TB diagnosis and LTBI diagnosis especially in children under 5 with TB contact history. Isoniazid prophylaxis was then offered to those under 5 years of age with bacteriologically confirmed source cases.

#### **Yield of Case detection in t-ACF**

The yield of screening among the different groups is dependent from the strategy and the level of risk in that specific group. Besides, we had given priority and focused on contact screening for children less than 5 years old as they have a much higher risk of TB when in contact with a TB patient.

The yield from those refugee t-ACF groups was very low except for PLHA where it was above 5%. The main reason behind low yield rate for other groups was a lack of chest radiography as ACF primary screening tool that was shown to be effective in 2016 mass TB screening activity where a mobile CXR machine was deployed. Many factors such as transportation and security including refugees' limited travelling authorization were also important to address in finalizing a programme conclusion. Close contacts screening in refugees did not show high yield as in migrants.



In addition, in 2014, among refugees some groups were chosen as target groups for ACF however they were not specifically significantly at risk and case detection rate was always low in those groups (e.g. boarding students, chronic patients, new arrival). By analysing t-ACF yield rate of refugees' TB programme, PLHA showed a dominant yield rate amongst other target groups.

For migrants, the most significant yield was under close contact screening with a yield close to 7%, and more effective among screened children, between 13% to 18%. This is consistent with published results and WHO recommendations.

In addition to TB control measures while doing screening of contacts, 90 children under 5 received IPT as close contacts of TB patients.

For both populations, refugees and migrants, the yield of TB detection among health workers was close to 1% and more over for staff working for migrant populations, it averaged 1% across the years with 19 HW diagnosed at SMRU with TB including 1 MDR-TB. This is a very important activity as it is part of Infection control and prevention of further nosocomial transmission.

**In refugees: 79 TB cases were identified through t-ACF resulting in 11.3% t-ACF contribution to overall case finding activity.**

**In migrants, t-ACF activity contributed 156 TB cases or 13% of cases diagnosed.**

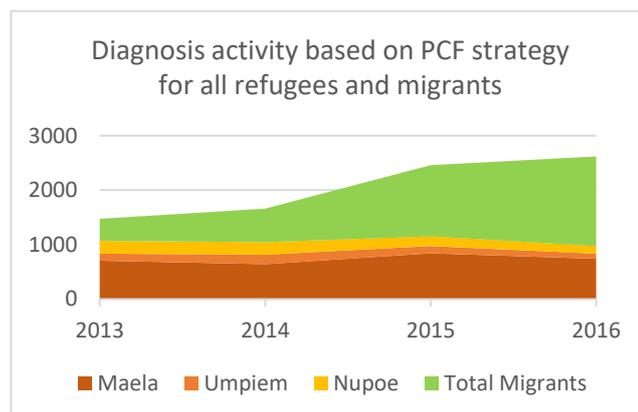
**Overall cumulative results: with 235 TB cases identified through t-ACF, it contributed to 12.6% of all TB detected. If we add mass screening results of 154, ACF activity contributed 21% of all cases.**

### 12.1.2. Passive Case Detection

Passive case finding strategy usually took place in OPDs and IPDs of refugee camps, at SMRU clinics for migrants and at the MTC for migrants in Maesot. People with suspected signs and symptoms were screened by qualified medics supported by TB clinical doctors. Every suspected patient was then asked to produce sputum for further examination at a specific TB laboratory. Chest X-rays were also conducted for further completion of diagnosis especially for sputum negative patients on a case-by-case basis depending on individual patient clinical condition. A final diagnosis was made by a clinical doctor upon sputum results, chest X-ray, patient's symptoms and general clinical situation.

Table 15. Number of refugees/migrants screened using PCF method

	2013	2014	2015	2016
Maela	709	641	842	739
Umpiem	125	175	133	98
Nupoe	236	231	180	139
Total Refugees	1070	1047	1155	823
Total Migrants	407	615	1303	1644
Total	1477	1662	2458	2472



**PCF activity stayed in range of target; it was over target for migrant's population and slightly under for refugees as during the last year PCF activity in Maela was overridden by mass screening.**

### 12.1.3. Mass screening activity in Maela Camp

For the whole year, and as planned in the year 4 proposal, the population target was set at half of the population: 21,000 people at the time of the proposal with 42,000 people living in Maela. However by the time of the project the population was down to 38,000, and the screening following WHO guideline recommendations only targeted individuals over nine years of age, whose size was 28,000 people.

Following the proposal, we planned this screening in two phases with a first phase designed as a prevalence survey with cluster random sampling to estimate the TB prevalence in the camp, and decide further strategy for the second phase. The prevalence threshold for decision was set at 0.5%. The decision also considered the camp environment and further situation of refugees.

After the results of the first phase, prevalence was estimated at 0.756% with a confidence interval above 0.5% (0.534 – 1.028), significantly high and well above 0.5. It was decided through all partners of TTBI to go for a second phase and to extend the systematic screening to all populations in all sections. The prevalence estimate in some sections was alarming at above 1% and it was another reason to continue this project.

This project had operated with several steps, all operating as planned with both organizations involved:

- Advocacy
- Community mobilization
- Voluntary registration for screening with planned appointments given by PUI team of TB HW
- All steps of registration and CXR screening with SMRU team, and partners hospitals
- Results of CXR, evaluation of presumptive cases for complete diagnosis with sputum collection going for GeneXpert
- Complete and individual results feedback to every registered person
- Referral to PUI TB OPD/IPD for initiation of treatment, case management and follow up
- Preliminary analysis and evaluation to decide second step

The second phase started on 2016 September 5th and lasted until October 31<sup>st</sup> of 2016 with 4,982 additional people screened from the remaining 6 sections.

There was a new intensive phase of advocacy and community mobilization with support of a specific movie produced by the FILM AID Team which depicted basic knowledge on TB and on the screening process. It helped to prevent further stigma and discrimination. It was screened in all sections and was effective in active mobilization.

A total of 18,428 residents from the Maela camp participated in the TB screening during March and December of 2016, leading to a total participation of 65.4% of the TBC registered population (28,162 people >9y); although we know that the census data from Maela are unstable and vary between different sources.

Overall 154 patients from the mass screening were diagnosed with TB: 65 with pulmonary TB bacteriologically confirmed (42%), 83 pulmonary TB clinically diagnosed, and 5 extra pulmonary TB with pleural effusion.

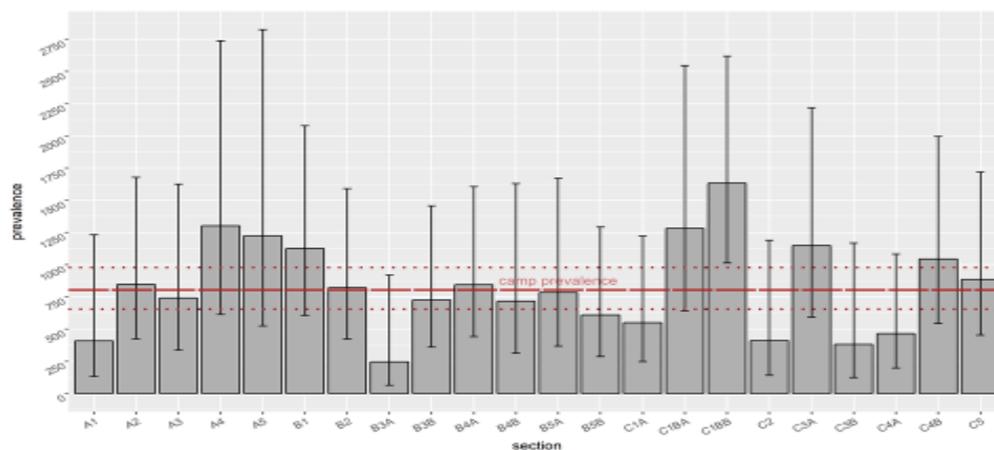
These results confirmed the first phase results and yield of screening overall was 0.83%. It was way above 0.5% and confirmed the initial hypothesis of hidden cases and the need for more active case finding.

The mass TB screening in Maela camp was a new ACF activity for both organizations, using CXR as the primary diagnostic tool and confirmation using Genex'pert. TTBI conducted close advocacy with all camp authorities from KRC as well as the Thai camp commander to provide a detailed explanation of the project and expected impact. This project obtained approval and strong commitment from all local leaders as they felt TB as a preoccupation and a burden for their population.

We had full support from the Thai Hospital whose radiologist specialist supported CXR diagnosis after the mobile CXR. The first interpretation of CXR was reviewed by independent readers, and a final diagnosis was confirmed with all results at hand after conciliation among the team of TB doctors.

The results also confirmed the validity of the CXR screening strategy followed by GeneXpert as we were able to detect smear negative patients by GeneXpert positive results. All those were confirmed as bacteriologically positive by culture. This action was able to detect early TB cases and has an important impact on infection control as we prevent many cases from becoming more contagious.

This project is interesting in several aspects, and we had started further results analysis. The overall estimated prevalence as calculated is above 0.8% with a precise prevalence estimate of 803.38 per 100,000 [CI: 654.26, 977.64]. Some sections as shown in below graphic, presented significantly higher prevalence of TB cases than camp average above 1% and these results will be communicated to existing organizations in charge of PHC in the camp.



The results of this project are appealing and should have led to further action to implement adapted case finding activity especially among sections with prevalence 3 to 4 times higher than camp average.

With a proportion of 35% of camp population not screened, and given the estimated population prevalence of 0.8%, there is concern about the unscreened population especially among these 7 sections with prevalence among 1%. There is a potential of 60-80 TB cases still going undiagnosed.

This information had been transmitted to the IRC, which is the current NGO in charge of PHC in the camp.

**The camp situation and funding crisis had blocked all capacity to further action although the goal to control TB is a top priority for public health authorities.**

### **Community feedback report after mass TB screening**

In order to assess community satisfaction following mass TB screening in Maela camp, SMRU conducted a community feedback survey between October and December 2016. The objectives were:

- To obtain community satisfaction feedback following mass TB screening activity
- To assess the knowledge and attitude towards TB in the vulnerable population, the refugees, after this campaign

The survey was designed based on a qualitative research approach using individual interviews and focus groups. It was done to assess community understanding and feelings following mass TB screening activity whereby identifying challenges in order to enhance future community related activities. We measured the outcome by words and statements. We decided to do a randomized selection of people from different backgrounds according to their participation in the project. We conducted individual interviews as well as focus group discussion with semi-structured questionnaires.

Results were recorded as data by four interrelated ways by which the participants who represented their specific group attitude towards TB and mass TB screening: general knowledge on TB; understanding TB symptoms and prevention; the purpose of mass TB screening; TB programme support measures and its effectiveness.

Conclusion of feedback mechanism: most of the participants in the survey provided positive feedback on the organization and process in carrying out mass screening programme, while some suggested that they should receive more food ration for TB patients (patient`s family). In general, the TB patients and their families provide very positive feedback

We found two possible explanations to understand why people did not participate in the programme although they were invited. First, some were outside of the camp at the time of screening because of family or personal circumstances, or starting to explore further relocation in Myanmar, or busy with their work. Others believed they were quite healthy and therefore needed no screening. Certain groups such as section leaders claimed that they were not informed in advance so the community participation was not so efficient, although both organizations participated in meetings with camp authority and community leaders. They were all informed through different media from general advocacy meetings at the beginning of the project for individual appointment. But these comments suggested a need to review methods of communication and advocacy to ensure that the message is timely and well received for those that should be involved in the project. They might have missed the start of project and only became aware at the end.

#### 12.1.4. Strengthening TB laboratory services

There was overall 4 TB laboratories to support TB diagnosis: one at SMRU in Maesot, and one TB lab in each camp able to perform sputum smear and prepare sample collection for further management at the SMRU IOM laboratories.

All laboratories kept record of activity with a logbook and database in Maesot.

SMRU TB lab was operating the first GeneXpert machine starting April 2013. In January 2016 two new machines were purchased to run for the mass screening project and overall activity as SMRU also provide GeneXpert testing for all camps under PUI and for diagnosis at MTC.

With support by DFID, SMRU total capacity was 12 cartridges testing at a time and enabled the mass screening project to run the full activity from February to October 2016 with high achievement. For the purpose of mass screening only, the TB lab performed testing for more than 50 GeneXpert/week during the 9 months of the screening project with some very intense weeks (7 days running Lab 7 days/7) in order to hand the results to the patients on the planned timeframe to avoid long delays. The TB laboratory also managed to run the diagnosis for the other setting activities at the same time without any significant delay in results.



SMRU microbiology laboratory at the SMRU office is annually monitored with external QC from UK NEQAS for both SSM and GeneXpert, and there is regular internal QC. This external observation was also done for SMRU's microbiology laboratory on 30th March 2016. A last one was done in March 2017 as planned.

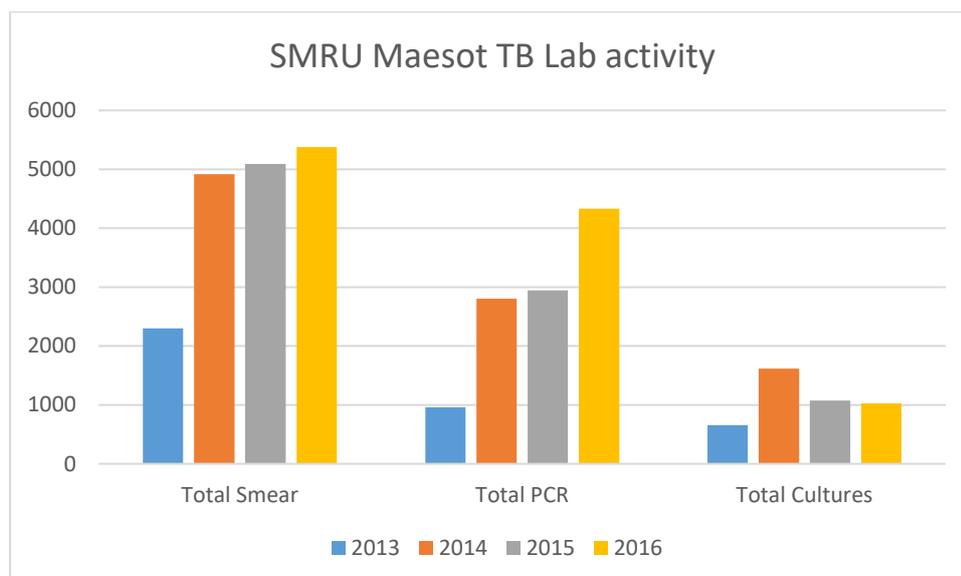
Sputum AFB laboratories were internally controlled by PU-AMI which included cross checking among three camps' smear slides and randomly checked by laboratory officers based in Maesot. External quality control was performed by the No. (9) Office of Disease Prevention and Control (ODPC 9) in Phitsanulok. There were annual external observation visits by ODPC9 laboratory team and a feedback report was produced a few months later to send to the PU-AMI laboratory officer.

Since 2013, thousands of specimens were checked in the refugee camps' TB laboratories that includes all samples from suspects from PCF and ACF. The Table below shows the number of patients per year who had new smears tested by TB laboratories across all 3 camps. It must be noted that there was a major transition period from PUI to SMRU in September 2016 as well as mass TB screening at Maela camp, which had some effect over case finding strategies so that laboratory activities seemed to be relatively lower. Mass TB screening used GeneXpert and chest X-ray as first line diagnostic tools.

Table 16. Number of samples tested at SMRU for the different TB testing activity diagnosis and follow up, including PUI samples testing for geneXpert, and Cultures, and MTC

	2013	2014	2015	2016
Total Smear	2302	4920	5092	5378
Total PCR	959	2801	2947	4331
Total Cultures	655	1617	1074	1027

Overall, 17,692 smears, 11,038 PCR and 4373 cultures were performed to support TB diagnosis on sites.



Smear microscopy was performed mostly but not limited to, sputum since there were some other specimens such as pleural fluid, lymph node aspirates or cerebral spinal fluid (CSF) that also needed AFB smears. The GeneXpert machine was installed at SMRU TB laboratory and first initiated in April 2013 in addition to smear microscopy to perform earlier resistance testing. Culture and DST services were performed only for positive result cases (either smear or geneXpert). All samples from the refugee camps were sent to SMRU for GeneXpert, and further to IOM in Maesot by SMRU for molecular testing identification of MTB, culture and drug susceptibility testing services.

**Table 17.** Number of sputum smear microscopy done at camp-based TB laboratories in all 3 camps for diagnosis and follow up of patients

	2013	2014	2015	2016	Total
<b>Maela</b>	2461	2610	2743	2469	10283
<b>Umpiem</b>	317	421	425	345	1508
<b>Nupoe</b>	551	599	524	402	2076



#### 12.1.5. Trainings

Several trainings were carried out and every staff received proper TB knowledge training at least once in a year. Some important staff such as medics, TB health workers, and lab technicians received refresher trainings often. The Table below shows the number of training sessions to various staff in refugee camps. Sometimes several trainings on the same topics had to be organized in order to manage flexibilities with duty rosters among medical staff. Occasionally, specific trainings were organized for particular staff groups when there were major changes in algorithms or treatment guidelines.

There was a significant training activity to prepare the mass screening project in 2016 for all TB health workers in Maela and all new staff to run the project.

Among SMRU staff working for displaced population, there were regular annual training for all category of staff to adjust to new protocol and review the M&E issue of proper recording especially in 2016 to apply the new WHO definition for recording.

**Table 17.** Number of TB trainings across all 3 camps both medical and supportive staff (2013-2016)

	2013	2014	2015	2016	Total
Medics	6	7	3	3	19
Nurses	3	3	3	3	12
TB HW	4	4	4	4	16
Lab staff	12	12	3	3	30
Psychosocial worker	3	3	3	3	12
HIV counsellor	3	3	3	3	12

## **12.2. Output 2. Case management and Treatment of patients found to be infected with TB (including management of HIV co-infections)**

The following activities were implemented to reach the output:

- provision of TB drugs for first line and second line treatment regimens following WHO recommendations. They were purchased through Thailand GPO and drug stock management was ascertained by specific dedicated staff.
- provision of prophylaxis therapy in <5yrs old contact group
- develop quality assurance and ensure supervision of protocols for all patients under SMRU migrants and refugee care by trained TB doctors
- promote an efficient process of monitoring 1<sup>st</sup> line and 2<sup>nd</sup> line treatment courses and follow up of patients conditions and outcomes
- provision of ART and OI management for co-infected cases

For SMRU, as well as for PUI, TB staff (medics and nurses) followed guidelines for management of cases with direct monitoring and supervision of TB doctors at each site (SMRU TB clinics and the 3 camps) and within MTC. In February 2016, a specific 2-day training from NTP Myanmar WHO experts was organized to review quality of care delivered by SMRU, especially on MDR-TB.

TB patients in severe critical condition were referred to Thai hospitals when required laboratory investigation and medical care were not available at SMRU and PUI/ARC health facilities. If MDR was suspected through GeneXpert testing or culture confirmed cases, all patients received related MDR-TB patient management at SMRU migrant clinics.

In the Maela camp, quality first line TB treatment was provided by trained TB doctors and medics strictly following WHO recommendations. Isoniazid prophylaxis was also given to all under 5 years old contact cases especially when the source patient was bacteriologically positive. For Umpiem and Nupoe camps, TB treatments were provided at Umphang Thai hospital and TTBI usually reimbursed the cost related to diagnosis and hospital treatment. However, DOT was made mandatory to all TB patients by using our TB health worker force.

### **12.2.1. TB/HIV Collaborative Activities**

HIV diagnosis occurred at the camp level but confirmation test was only done at the Maesot hospital. In camps all OI treatments and ARV initiation were managed by HIV doctors in collaboration with TB doctors. At SMRU Clinics, TB doctors were also in charge of ART as they are all skilled TB/HIV doctors with extensive experience.

Through this grant, ARV and OI drugs were available to treat TB patients with HIV resulting in real progress for those patients although for refugee populations there was concern regarding sustainability of ART. However, treatment of HIV infection by the time of TB is essential for recovery of patients.

As for displaced populations, half of HIV patients arrived very immunocompromised. A good capacity of treatment for HIV and OI together with TB is essential to avoid higher mortality. The proportion of TB/HIV patients starting ART at SMRU was above 90% for all years.

Starting mid 2016, in line with the TTBI objective to test capacity to hand over to national programmes in Myanmar and within GF support, SMRU started significant activity of referral for all cohorts of HIV patients who were previously TB patients. Cooperation with NAP through the Myawaddy hospital was effective and within one year time all cohorts of TB/HIV patients were transferred to Myawaddy NAP.

By June 2017, all previous patients under SMRU migrants were referred as smooth transitions for patients and the programme.

### **12.3. Output 3: Improved treatment outcomes through treatment centres and community-based as well as home management of TB**

#### **12.3.1. On refugee setting**

The following activities were implemented to reach the output

- > Promote treatment adherence and psychosocial support
- > Provide transportation, accommodation and social support for patients in TB clinics

To promote treatment adherence as well as provide psychosocial support and life skills to TB patients during the course of treatment, different forms of support were implemented:

- Home based non-family DOT, individual patient counselling, monthly food supply and living support materials supply, patients gathering.
- TB Health Workers and outreach adherence supporters were the primary staff in carrying out daily DOTs supervision to every TB patient after discharge from IPD to their homes.
- Income generating activities were provided with the collaboration of COERR during Q3 so that TB patients could find ways to promote their income and get useful skills. A total of 124 patients and family members participated in 4 different trainings. (Liquid soap making, shampoo producing technique, training in growing beansprouts and mushrooms).

At the Maela camp there was a separate area called TB village which was well known among refugees since before 2009, all the TB patient regardless of sputum smear positivity were sent for the whole course of TB treatment. PU-AMI started home-based care in 2010 after taking over the programme from MSF. TB patients were then able to go back home after successful conversion of sputum at month 2 with strong support of TB health workers who support home DOT in the camp community.

#### **12.3.2. On migrant sites and in SMRU TB Clinics**

To provide the best adapted answer to the situation of TB patients during the TTBI years, SMRU developed a specific model of residential care for TB patients who need to face very high costs because of their disease and cannot work and support their family due to their condition. Within the TB clinic we provide them with counselling and education, psychosocial care and peer support.

TTBI project also supports maintenance of clinics and accommodation and food for patients and their caretakers and family when needed.

We adjust the strategy of treatment to the medical and social needs of the patients and propose a mixed combination of stay in the clinic, home DOT and self-administered treatment with weekly follow up according to an evaluation of the patient's situation. Through the DFID grant we could support cost of transportation, which can be a real barriers for them and lead to considerable patients loss.

However due to their specific condition of economic vulnerability and weakness, most patients stay at the clinic for the duration of treatment, and **the clinic can become a temporary shelter to recover from TB.**



The model of patient centred care at SMRU TB centres provides a home and treatment to people who otherwise might have neither and it brings an alternative model to the DOT approach. It shows good adherence, observed through our results on Treatment Success Rate (TSR) for TB and MDR-TB, higher than in Myawaddy township statistics for 2015. However, many challenges remain on patients' holding and complete adherence especially for MDR-TB.

Many of these challenges are related to the long-term nature of TB treatment and the fact that most TB patients are migrant workers and highly mobile people looking for daily wages, or come from far away villages. This is one of the reasons for default as once their condition has improved they want to go back to work although they have not finished their treatment. Although we developed social activities and patients' education, some patients still can feel lonely and isolated and if specific motivations, social and psychological factors are not understood and addressed, we can face discontinuation in treatment. It can also be physically and psychologically challenging for health care providers.

We are working to evaluate the possibility of a shift in treatment strategy with extension of DOT strategy in the villages where the patients come from with support of the community.

We also developed a specific nutrition project for severely undernourished patients, and other food quality improvement strategies. Since the implementation of social activities, patients have been involved in several activities such as gardening, sewing, knitting different handicrafts, and nutrition and cooking workshop according to their physical capacity, skills and willingness.

### 12.3.3. Providing general public awareness

To improve general public awareness on TB as well as CBO awareness campaigns, the TB HWs conducted door to door health education activities. Moreover, ACD target groups like chronic and

patients' contact groups were fully educated before they received TB screening. All households in Maela camp were educated about TB mass screening thoroughly.

Additionally, TTBI produced an awareness video film in collaboration with FilmAid (a non profit Foundation working in Maela with the camp population) that emphasised the second phase of screening, and we found that this visual aid in awareness raising was one of the most powerful tools. The participation of the sections following film projection was found quite satisfactory since nearly 65% of our target population participated in the screening process.

Both organizations led awareness raising activities on TB and HIV through World TB day and World AIDS day thereby leading to local authorities and camp community to be involved and participate in those events.



12.3.4. Direct feedback from beneficiaries: This activity could be well illustrated through success stories, which we have been doing for the past years for some TB or MDR-TB patients.

These stories are quite important to understand the real issues of transmission and access to quality care for the patients and the difficulties they faced while looking for better care, but also for an overview of the complexity of their psycho social and economic conditions.

**KPS:** is a typical complex case: he is a young man of 26 Y old with amphetamine addiction. He was diagnosed as RR resistant with geneXpert and confirmed with culture as HRS resistant. He had already been treated for TB in the past. His management required a lot of effort from the clinic staff... "He always wanted to stop treatment, and wanted to go back to his addiction, left the clinic without informing staff and we had many times to look for him wherever he stayed. Fortunately, we never lost his track. The difficulties were also related to the need to adjust the right doses for TB treatment and avoid side effects due to his addiction.

On the first week of treatment, the team had to catch him every day after he left the clinic to look for his drug, but with involvement of staff and a counselor, we succeeded in keeping him since 11 months, and now he has good adherence but still complex medical issues due to side effects and interaction with his addiction, he is still under treatment and holding this patient s still challenging.

**KHT:** interesting success story of collaboration between SMRU and Myawaddy hospital for severe migrant patient with spine TB. A young man of 28 years of age that became an orphan at age of 10, lived with his grandfather and then moved to Thailand when he was 16y to start working as a daily worker in an orange plantation close to Maesot. He had also moved to work in Bangkok and stayed there in poor living conditions with one friend who had TB. He stayed as his caretaker, and also got TB as he did not know how to prevent infection. He also got Tx at Bangkok for 6 months. But after few years he became sick again and tried to get diagnosed in a Thai hospital where they did CXR and spine X-rays for spine TB. It took time and it cost him 20,000 THB which he could not afford, and he could not stay there more. He went back to Myawaddy and attended Myawaddy hospital where they confirmed spine TB diagnosis and provided a specific TB regimen with oral drugs and daily injections for 2 months. He also had to pay 10,000 THB for hospital fees and could not afford to stay in hospital for the 2 months of injections. His condition became worse, when Myawaddy request support of SMRU and transferred the patient to SMRU.

He had started to improve and felt less stress about his future. Although he had spent time around TB disease, he knew very little about it before receiving health education at the TB clinic. He did not know how to prevent it when he was taking care of his friend as he could not really communicate with Thai medical staff.

## **13. REPORTING**

### **13.1. National and regional reporting**

Refugees' TB reports were shared regularly with Thailand's Tak province public health office on a quarterly basis since 2010 – the time of GFTB project initiation in Maela camp. National TB programme of Thailand obtained the TB data through the national network from Tak PHO.

For migrants, as they were Myanmar population SMRU did not register them under TAK PHO although provided regular reports on its TB activity to TAK PHO.

Starting 2015 and collaboration with Myanmar through its MoU, SMRU provided all required data to Myanmar NTP on specific reporting format on quarterly and annual basis.

### **13.2. International reporting (donor reporting and SMRU website)**

For the refugees population, CCSDPT HIS system included TB reports from all 9 refugee camps along the Thailand-Myanmar border. Tak refugee camps' TB data were regularly shared with CCSDPT on a monthly basis. The SMRU website also contains TB programme specific reports both for migrants and refugees. GFTB-Thailand through BTB, Maela camp TB reports were shared during the period from 2010 to 2014. TTBI has provided semester and annual reports to DFID from 2013 to 2015. In 2016, TTBI shared quarterly TB reports along with financial reports.

## 14. MONITORING AND EVALUATION

### 14.1. Organizational monitoring system

Quarterly TTBI meetings allowed project monitoring through presentation and discussion of performance indicators between all TTBI partners.

There were also regular bilateral meetings between PUI and SMRU medical coordinators and doctors to adjust protocol and screening algorithms and some case management issues.

-In the refugee TB programme, all TB patients were specifically supervised through camp-based TB programme staff such as medics, nurses and TB health workers. A TB doctor based in Maesot was responsible for providing professional care and support especially for complicated patients. Maesot-based TB supervisors mainly took care of health promotion events as well as ACF activities, which included compiling data and closely monitoring DOTs activity. Overall programme activity was supervised by the TB programme manager who directly controlled both financial arrangements as well as programme data verification. Reports prepared by the TB programme manager were then further revised and verified at the coordination level before sending out to donors and external stakeholders.

At SMRU for project on migrants sites, the monitoring and evaluation system had improved since the beginning of 2016 through different mechanisms of regular and intensive staff training, recruitment of a dedicated data clerk, reviewing and updating recording templates with improvement of all steps from data recording, verification and updating. Monthly reporting at organization level and quarterly reporting for donors helped also to strengthen the information system.

### 14.2. External evaluation

Two interim evaluations were performed during the 4 years of the project, and the final evaluation will be produced together with this report.

- The first interim evaluation was done in April 2014 and conclusions overall stated solid achievements and high cost effectiveness of the TB services delivered by SMRU and PUI for both migrants and refugees.

More specifically, the consultant suggested systematic cultures for all samples collected whether negative or positive, and to repeat GeneXpert if the first one turned out to be negative. TTBI partners did not follow this recommendation, as it would have required a significant extension of budget for a marginal gain.

It appears that SMRU was the only stakeholder providing MDR-TB treatment in the project area for the project population, and it was highly recommended that SMRU discuss these data with national TB programme Myanmar and Thailand and other stakeholders.

Same recommendation applied for TB/HIV collaborative activity and capacity of sustainability for HIV care for patients after completion of their TB treatment.

That was done and led to interest from the Myanmar NTP for the SMRU TB programme and further support of this programme by GF Myanmar for 2016- 2017.

- The second interim evaluation took place in June 2016 for evaluation of years 1-3 of project.

From its conclusion: *“overall, this programme represents again a highly relevant intervention, addressing a recognized public health threat, for vulnerable communities living along the Thai-Myanmar border. The comprehensive review of the project indicators demonstrates solid*

*achievements and impact. The services have demonstrated good inclusion of women in all activities, as well as provision of care to children. They are also highly cost-effective or cost-effective for all key outputs”.*

One specific recommendation was on data collection and data reporting as the system implemented at the beginning of the TTBI did not allow to monitor specific patients contributed by DFID for displaced people. Although as mentioned in this report, all activities had been delivered as a whole programme under the same level of quality and the indicators presented as proportions remained relevant to ascertain the programme quality programme.

This recommendation was also underlined by Crown Agent audit in November 2015: *“SMRU has put systems in place to ensure regular monitoring and evaluation of the programme. The programme has embedded monitoring processes and external evaluators are employed. There has been some performance issues in the existing programme (example target of identified cases of TB not met)”* at the time of the audit in 2015.

From its Recommendation: *“Going forward, the programme managers should monitor all indicators (both programme and performance indicators) but should make a point of distinguishing between the two set of indicators”.*

Aware of this issue, with support of the GF Myanmar in 2016 we have built a more comprehensive database with a unique coding for patients which will allow extensive cohort analysis of patients from the beginning of their entry point at screening for TB until the end of treatment or other outcomes. This data set will help also to get easier indicators for programme.

Although we follow the suggestion of Crown Agent, this distinction remains artificial for TB activities as performance indicators are also programme indicators.

All performance indicators have been regularly reviewed and discussed by the TTBI committee and led to some adjustment of strategy as for t-ACF and mass screening and in 2016 for the whole mass screening project.

### **14.3. Monitoring & Evaluation (M&E)**

In 2016, as part of the grant project, there was a requirement of DFID to propose a full M&E plan. It was sent to DFID in June 2016.

Programme monitoring was already part of the SMRU 2016 action plan aiming to build a reliable and sustainable monitoring and evaluating system for performance and impact of TB control on the cross border programme

- To organize monitoring activities of PU-AMI within TTBI meeting to monitor activities and progress against targets
- To provide quarterly reports to DFID and follow the M&E Plan.
- To impulse M&E committee to review and discuss result and strategy.

As part of this objective, a comprehensive, integrated data monitoring system was planned to be developed for a better evaluation of cohorts of patients who enter the programme from screening to treatment and adherence analysis.

The implementation of the M&E plan was progressive as it takes time to embark all concerned staff in proper data management with standardized, exhaustive, and valid data recording and registration.

We conducted several workshop and staff training sessions on this important issue. In 2016 and 2017, GF Myanmar supported implementation of a new database which is now used within SMRU TB clinics and at MTC.

This allows for a better Health Information system for 2016 and further years and we are also working to import all previous data into the new system to get a complete cohort of our TB patients as suggested by the last external consultant.

From that M&E protocol, we had provided a full table of all Indicators used in TTBI with the construction and scope of interpretation we mainly use in our reports.

## **15. CHALLENGES AND LESSONS LEARNT**

### **-Working with mobile displaced population lead to uncertainty in assumptions:**

Working in borderland areas with displaced population lead to specific issues related to the mobility of the population and the difficulty in estimation of the population size.

This in turn affects the assumptions to build targets. As the population “In and Out” is impossible to assess, precise predictions of activity are somehow difficult and need to be readjusted regularly.

Although this project had mixed success in meeting log frame indicators targets, its overall results bring a real contribution to TB control activities and control of TB burden. Its epidemiological impact is impossible to precisely evaluate, as there are no proper denominators for the displaced population. Even in the camps that are officially closed communities, there are always people moving in and out and census data are not reliable.

### **-Reporting Issues:**

There are no clear mechanism for data reporting for cross border migrant populations.

This population had no clear residential status. For a significant proportion (50%-60%), they are living in Thailand at the time of diagnosis but as migrants they are non-Thai citizen and related TB data are reported to the Myanmar NTP. However, those data are of interest for Thai NTP to evaluate the real burden of TB transmission in this area.

### **-The population is really concerned by the TB disease and gained better TB awareness:**

Real concern and preoccupation for TB in the population were evident during the mass screening project in Maela, when the camp authorities, community leaders of KRC, and population participated to this project. With community leaders’ support and serious commitment of the team of TB health workers, we achieved important project’s objectives. Several years of mixed, vertical and horizontal programs in PHC have brought important public awareness about TB and reduce stigma.

### **-Although the situation is improving, there are still poor medical services in Myanmar. This leads to delayed access to care and late presentation at our clinics when patients present with very severe medical conditions.**

One of the important challenges is the circumstances of the population facing this disease. TB patients are vulnerable poor patients who need specific support and real care to achieve good outcomes. Main issues are particularly due to the length of treatment and need to stop working whilst receiving treatment. This economic shock through loss of income deters patients from seeking treatment until they are very sick.

In this borderland area, the mobility of the population due to ongoing political transition in Myanmar and the dynamic of economic activity in the Greater Mekong region have an impact on the socio-economic status of the people and their mobility and lead to a challenging situation to achieve good outcomes and capacity to implement sustainable activity to control TB.

Although the Myanmar government is taking serious measures to implement TB and MDR-TB control interventions with the new National Strategic plan, the reality of the situation in Myanmar still shows substantial disparities in health and health access between regions and states and ethnic groups<sup>3</sup>. The situation of Kayin state remained with a very low level in access to care for the people and especially for the rural poor who will cross the border to seek care in Thailand and face the catastrophic cost of the disease if they have to pay for the hospital fees. The TTBI project covers an important gap in this area that neither Myanmar nor Thai NTPs are ready to face.

### 15.1. Risk management

From the tables of risks set initially and reviewed in 2015 for the 2016 grant, we can update the analysis and give feedback on those issues

Y1-Y3 / Activities Log Under SMRU/migrants and additional Y4 risk matrix	Risks	Management	Feedback
Diagnosis of presumptive TB patients in high risk population	Risk of Infection to Health workers	Regular supervision of Infection control measures in TB clinics Regular and sufficient provision of masks to staff and patients Annual screening of Health worker to avoid further transmission	No staff working in TB centres got TB. But we found TB by screening other health staff from other migrant clinic
	Delayed procurement of equipment	Begin dialogue with Crown agent as soon as possible	Although this was done, there was some delayed process waiting answer from DFID to work out of Crown Agent procurement supply
Treatment of TB patients	Risk of infection, risk of default cases, drug resistance, adverse reaction to drugs	The case management model set at SMRU for this population and psycho-social support of patients and staff alleviated the burden of treatment	Level of Lost to follow up patients well maintained under 10% all over the program and even overall is less than 5% for displaced population
	Sustainability of ART	Through the DFID funding and careful drug stock management, there was no break in supply for ARV	No gap in ARV supplies, and more than 90% of TB/HIV started ART and 70% of them were properly

<sup>3</sup> Health Policy and Planning, 32, 2017, ii22–ii31  
doi: 10.1093/heapol/czx062  
Original Article

			transferred to Myanmar NAP
Improved treatment outcomes for TB patients Coordination with TB stakeholders for treatment follow up	Breakdown of peace process, high mobility of patients	The residential model set by SMRU allows to get shelter during treatment and recover from the disease. Although the transition to the peace process is still going on, the situation remains uncertain and patients in post conflict area need to have a place to stay safely.	Most of TB patients choose to stay in the TB clinic
	Unable to establish effective linkage with partners in Myanmar	Through MoU signed in November 2015 with Myanmar ministry of health and sports and participation to all coordination meetings at central level Follow all Myanmar protocol and Regimen.	Partnership established with Myanmar NTP at central, regional and local level to support SMRU program with TB drugs and Lab supply and registration of TB/HIV/MDR-TB patients
Drug resistance assessed and managed	Difficult to treat, high cost and severe reaction to drugs	In 2015, there was a gap in funding with high number of cases in 2014. New MDR_TB were managed by Thai hospital partner of program, to cover that gap, until coverage of 2015 funding.	No MDR-TB enrolled remained without treatment
	Risk of transmission to health workers	Same as above, with strict infection control measures	No MDR-TB in TB staff
<b>Y1-Y3 / Activities Log Under PUI / Refugees and additional Y4 risks</b>	<b>Risks</b>	<b>Management</b>	<b>Feedback</b>
Diagnosis of presumptive TB patients in high risk population	TB prevalence assumptions found to be inaccurate	The targets set as hypothesis for number of cases detected were too high according to strategy use in the first years, but it did not affect the Lab work	Strategy was reviewed and new strategy decided for 2016 project
Treatment of TB cases	Community doesn't accept home-based DOTs for TB treatment.	Recruitment of important team of TB community workers and Implementation of regular and intense health education and TB awareness activities supported by community leaders and camp authority	High level of Community Dots in the refugees and good acceptability from population.
Improved treatment outcomes	Lack of qualified HR	Recruitment at camp level accompanied by adapted training allows to overcome this issue	No gap in health staff for this reason

	Not able to identify NGO for livelihood activities	Partnership with several NGO providing livelihood activity in the camps	Many activities were implemented and appreciated by patients
	Unable to establish effective linkage with partners in Myanmar	No available partners for PUI as need specific MoU to start linkage with NTP or government hospital.	Very few referral for refugees
Drug resistance assessed and managed for all patients found to be infected with TB	No external organization to perform quality laboratory testing	Within TTBI partnership with SMRU and IOM, all positive smears were further processed to SMRU for GeneXpert and IOM for cultures and DST	No gap

## 15.2. Programmatic challenges

Most of important programmatic challenge were due to gaps in funding in 2015 waiting for another funding from Global Fund Myanmar. Another issue in 2016 came from delayed in grant approval, procurement plan approval and disposal of funding in 2016, as the main project of mass screening in 2016 was to start early in 2016 to be achieved on time.

Another challenge was the unexpected and unannounced phase out of PUI in June-July 2016, with very short notice and challenge for SMRU to achieve the project in this condition.

SMRU had managed to take over the TB program from PUI and to absorb staff and work smoothly at the same time to achieve the second phase of the mass screening project.

It was made possible by the overall commitment of all administrative support staff from both organizations and capacity of adaptation to new situation of camps staff.

## 16. VALUE FOR MONEY

Over the 4 and half years of activity, total expenses consumed 93% of the total budget including budget of the year 4-costed extension.

	Total approved budget	Expenditures	Total 4 years	Expenditures 4 years Q1-Q16	Total approved budget and modification January 2016-June 2017 including savings from 2016	Final expenditures Q1-Q18	
2013	1,851,506 GBP	1,813, 730 GBP	3,264,889 GBP	2,785,170 GBP	3,264 889 GBP	3,041,789 GBP	
2014							
2015		98%					
2016	1,413,383 GBP	970,385 GBP					85%
		69%					
Q17-Q18 2017 NCE	1,413,383	1,228,059					
		87%					
						93%	

To take only few outcome indicators of our project, this budget has supported three important pillars of the TB programme:

- Case finding and case management with availability of full treatment of all TB patients
- TB/HIV collaborative activity with diagnosis and treatment of nearly 90% of all TB/HIV coinfecting patients
- Programmatic control of MDR-TB with diagnosis and treatment for all DR TB

Across all case detection and diagnosis activities, and further case management, the project supported diagnosis and treatment for more than 1,500 (1,588) patients from both refugees and displaced populations. Although it is slightly under the lower target fixed at 1,710 for the 4 years project, this number of TB patients represents an important achievement. The target was set making assumptions of TB prevalence in the camps based on the best available data at the time when targeted active case detection have not been deployed and its likely yield was hard to estimate. The project's contribution to the number of TB patients registered and local TB control activity is substantial.

From those 1,588 patients who started treatment, more than 82% of patients (1,466 patients) have been treated with success, not including those not evaluated because they were transferred to their home country for treatment follow up for better chance of treatment completion. This is an important achievement given the mobile nature of the population and compared to results of other stakeholders in the same area.

This grant also supported a very effective TB/HIV collaborative activity that was essential in this population especially among displaced given the high rate of co-infected TB/HIV patients we observed.

The duration of the grant allowed time for preparing a smoothly the transition plan for those HIV positive patients to be referred with good support to Myanmar`s National HIV/AIDS Programme.

The programmatic management of MDR-TB patients has been made possible by the effort in strengthening laboratory capacity and by the excellent collaboration with IOM.

The number of RR/ MDR-TB detected cases provides epidemiological information on the level of drug resistance in this displaced population. Although slightly under target due to a high hypothesis for the refugees population, the number of 75 MDR-TB patients enrolled for MDR treatment is an important achievement, and 48 of them were treated successfully. Also nine patients from that cohort are still under treatment on their long path to achieve a minimum of 20 months duration of treatment.

A complete cost effectiveness analysis of this project that combined diagnosis and treatment for very different groups of patient such as regular TB patients, TB/HIV coinfections and MDR-TB would be very useful. But it is outside the scope of this project and will require a specific project and an external consultant or internal specialist for this deep analysis, and to work on all data as all running costs have been shared between activities to keep costs down.

The consultant of the final external evaluation mentioned that he could not do it properly due to the importance of this analysis.

In these circumstances, we can just summarize as above to conclude that this project has saved many lives, not only those of TB patients but also their families as treating patients is the best way to limit further transmission especially to close contacts.

## **17.POLITICAL SITUATION**

In June 2012, in the initial proposal, it was written that : “the promise of recent political reforms in Myanmar, bringing with them some nascent progress on national reconciliation, have inspired hope for the international community of addressing public health issues on the ground within Myanmar.” Since then Myanmar has entered in a transition period with new political situation after election in November 2015. However the situation remained uncertain for the people, and there are still important gaps to cover for a better access to health.

At the beginning of this project within the broader SCAPPB programme, there was an overarching assumption that : “displaced people from Myanmar – both refugees in Thailand and IDPs within Myanmar – will begin to return within a period of one to three years from now” . But in the evaluation of this project published earlier this year, the current validity of this assumption was questioned and highlighted that many of the assumptions have not held in practice.<sup>4</sup> The current situation in October 2017 show no change in the situation of the displaced people, refugees as well as IDP, and there is currently no precise and definite timeline for the return of the Refugees. However most funding agencies have drastically reduced their contributions and lead to a serious funding crisis for the access to health for the displaced population living in the borderland area.

At the 30<sup>th</sup> Anniversary of SMRU in December 2016, a seminar opened to all SMRU partners and both countries` stakeholders, including donors was organized. It was entitled:” *Myanmar: Health Care in a Changing National Landscape, Lessons, challenges and aspirations on the way forward*”. An overview report of this seminar was prepared and published<sup>5</sup>. To quote part of the conclusion: “In health delivery

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<sup>4</sup> Evaluation of DFID Support to Conflict-Affected People and Peace Building in Burma Final Report, Joanna Buckley and Robert Morris, May 2017.

<sup>5</sup> Myanmar: Health Care in a Changing National Landscape

terms, the seminar recognised that a defining moment of opportunity, and also risk, has now been reached in the three areas of particular focus in discussion: malaria, TB/HIV and maternal health. This requires serious consideration in both domestic and international circles with regards to health planning and priorities in the years ahead.”

“Health progress, however, is unlikely to be smooth or easy to incorporate, within one national plan in different parts of the country. Serious problems remain, and new challenges, such as land and livelihood loss, are emerging that underpin health deficiencies for marginalised communities. Health initiatives therefore need to be prioritised for the most needy and vulnerable populations. Displacement and migration are also significant features of Myanmar’s health landscape, and special attention needs to be paid to population movements within the country as well as to and from neighbouring states.”

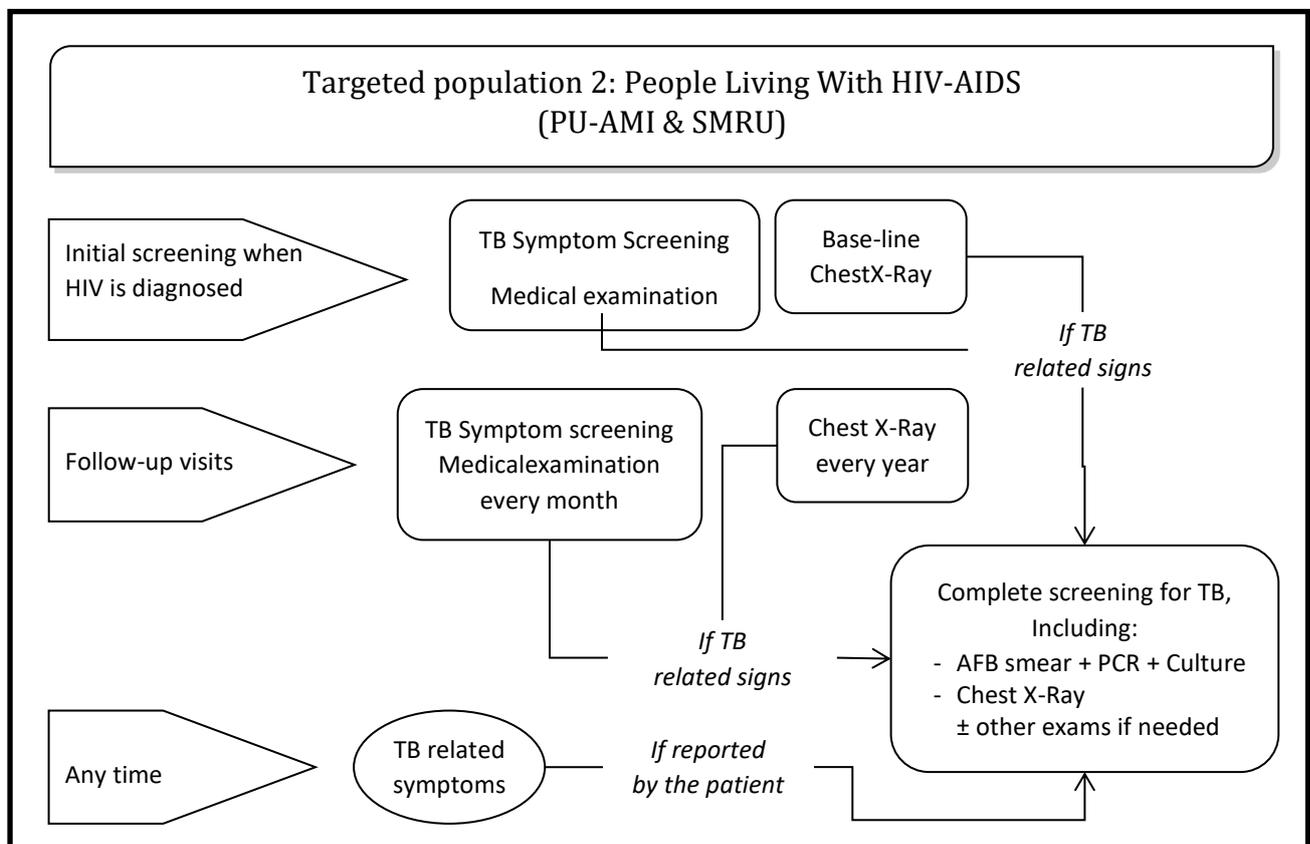
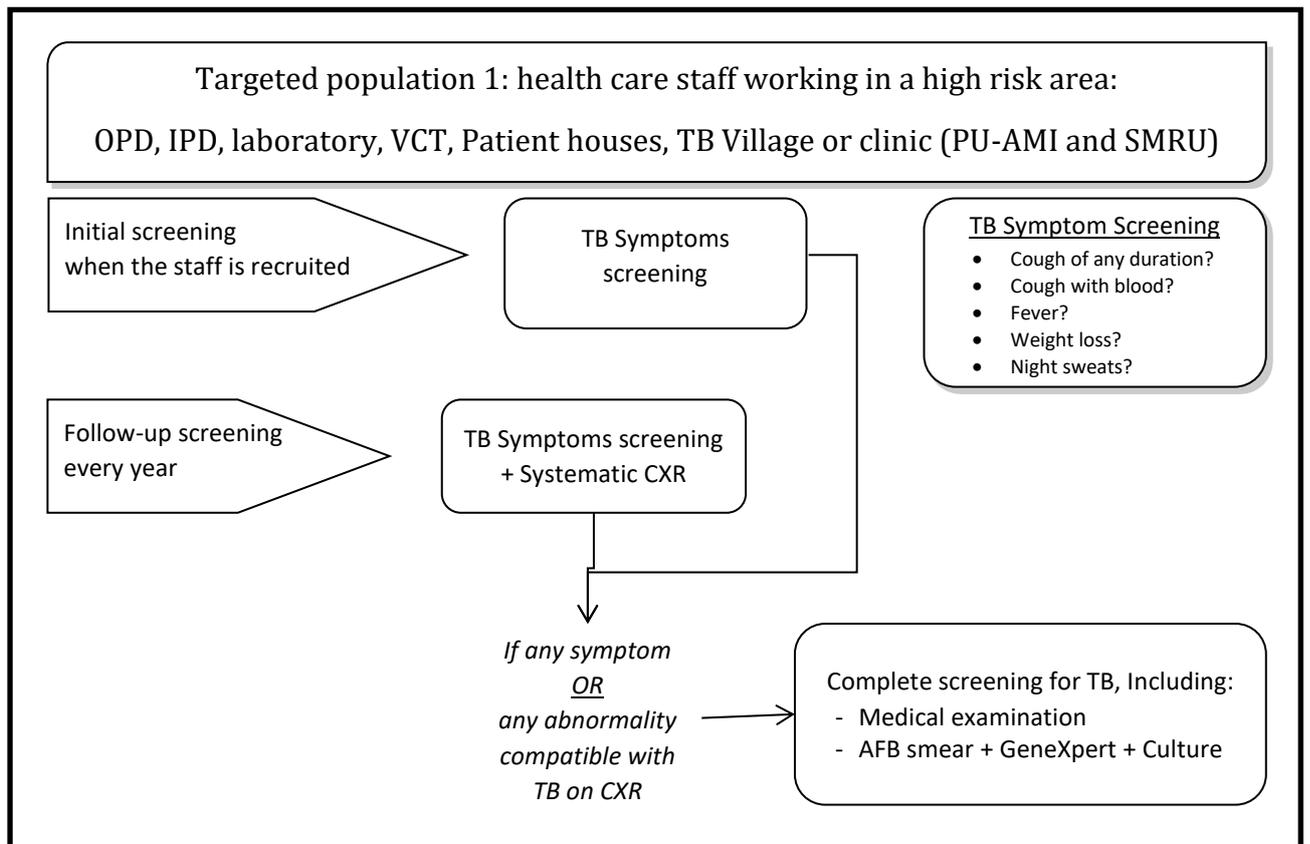
In conclusion: “An important caveat, however, should be articulated. Despite encouraging trends, concerns remain that the country may still be at a ‘tipping point’ between ‘emerging democracy’ and ‘continued militarisation’. This is evident in ethnic conflicts that continue to flare in several borderland regions and also in the new ‘hybrid’ government that includes both NLD and military representatives. For this reason, the achievement of nationwide peace and transition towards a decentralized form of national government are still regarded as essential. Without these two benchmarks of change, political impasse and national fragmentation will continue, and this will impact negatively on aspirations for national reform.”

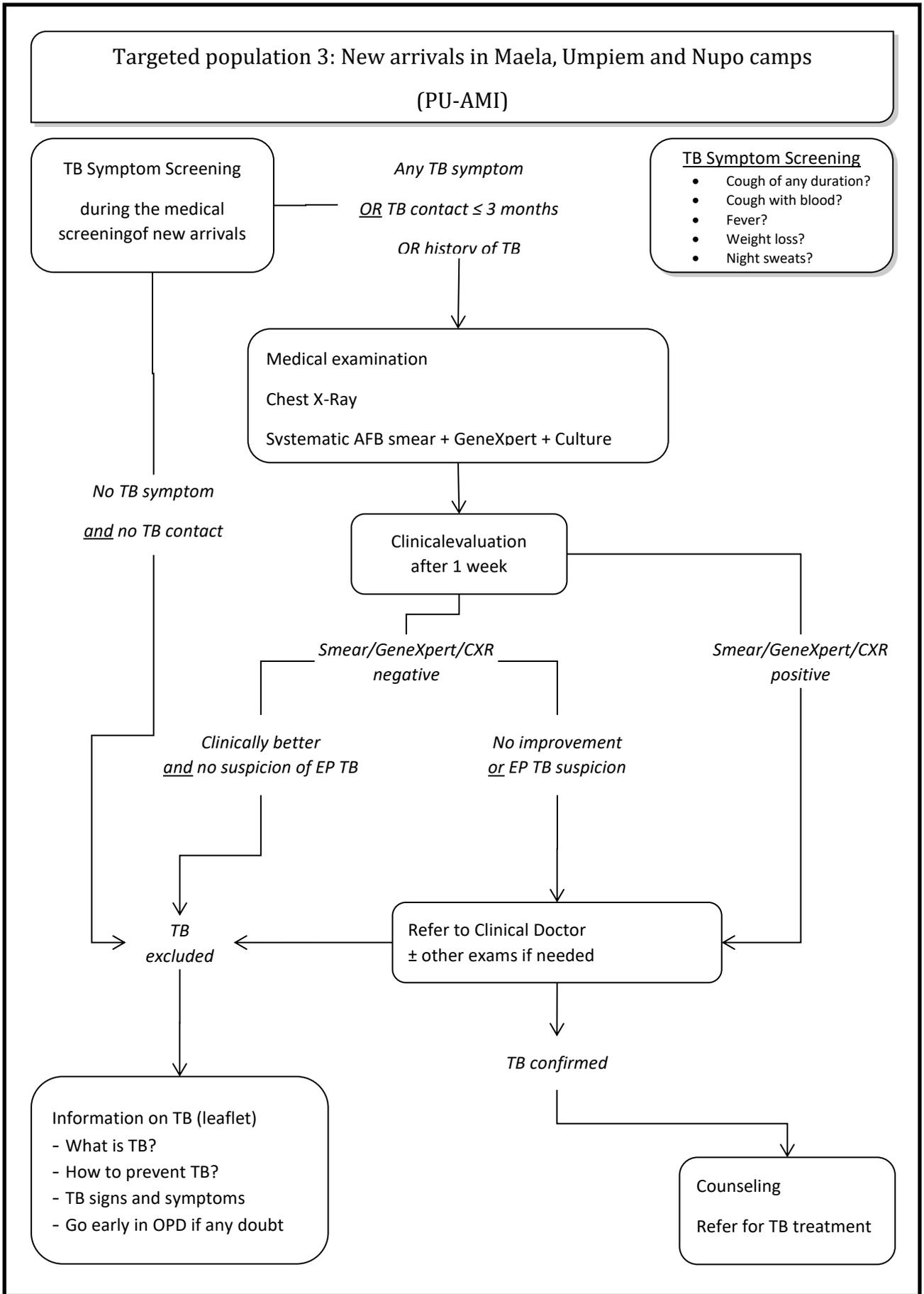
“Health therefore has a central role to play in national transition and building a better future for Myanmar’s peoples. Health progress is a key indicator of national reform and an essential element in the achievement of peace and stability. During the past three years, hopes have been engendered by greater health focus in peace and reform discussions. It is vital that this momentum continues.”

This conclusion summarized the reality of the current environment in which our TTBI project is ending in 2017, and the remaining question for sustainability of TB control services for borderland population until government can organize sustainable solutions for this vulnerable population and decrease the situations of inequalities in access to care.

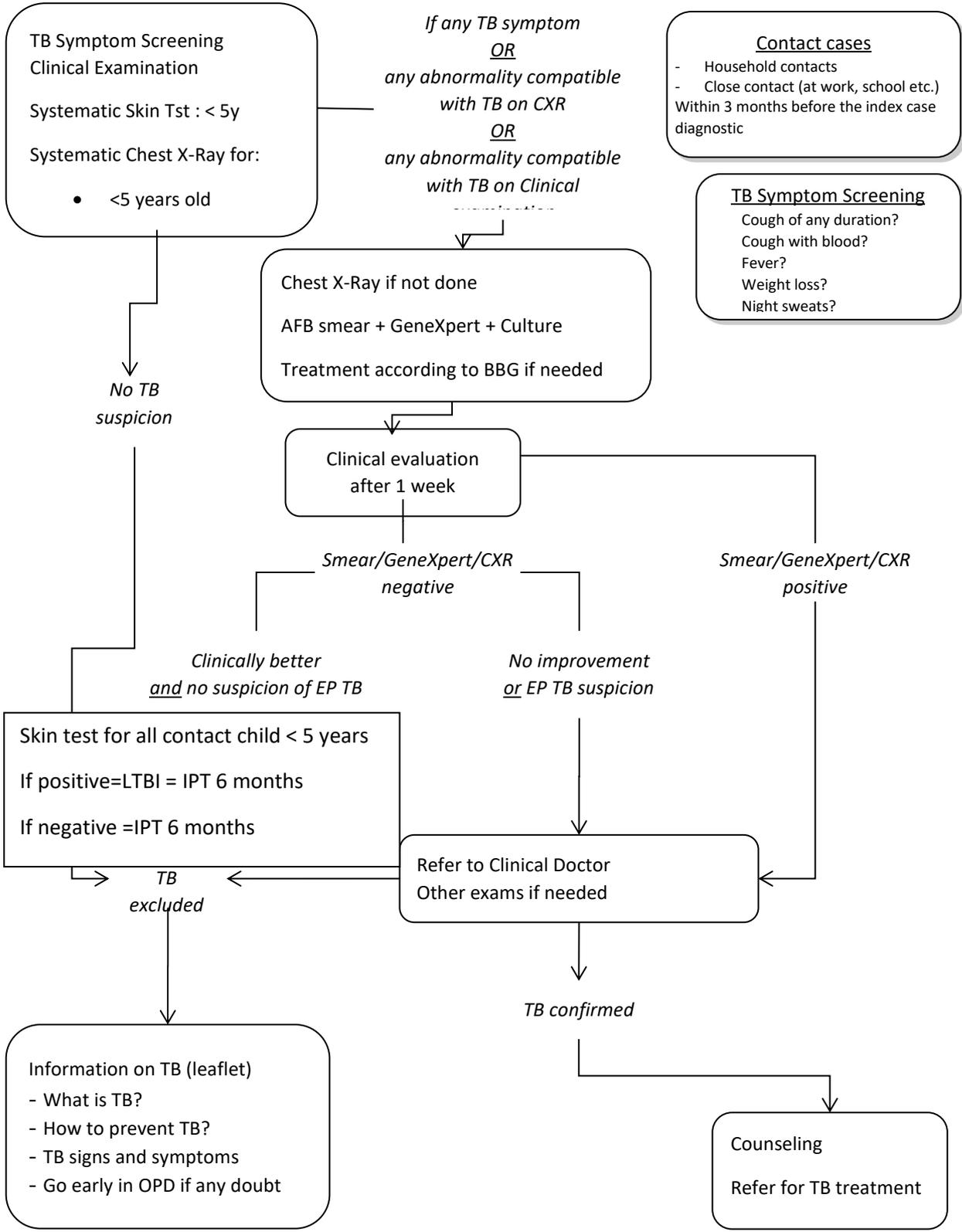


## Annex1 : Algorithms for TB Active case detection among targeted populations





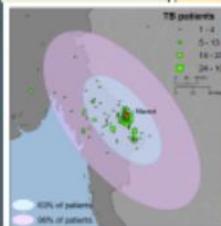
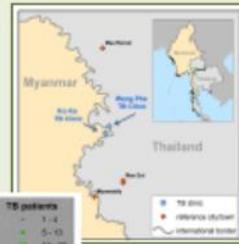
**Targeted population 4: contacts cases living in or attending to the health facilities in Maela, Umpiem and Nupo camps (PU-AMI) and in TB clinics (SMRU)**



# Putting life on hold: A clinic becomes a community for tuberculosis patients

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## BACKGROUND

While there have been improvements in detecting and treating regular tuberculosis (TB) and multi-drug resistant TB (MDR-TB), major challenges remain, especially with regard to case holding and follow up.

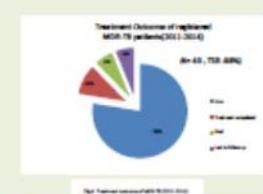
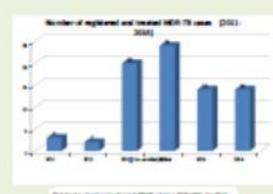
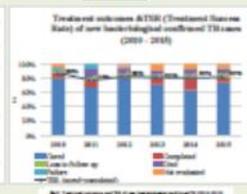
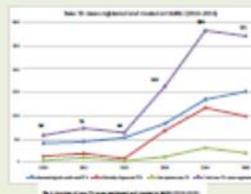
The time commitments associated with diagnosis and treatment of TB represent very difficult issue for patients especially for the people who live in the Thai-Myanmar border who belongs to ethnic minorities, are often highly mobile cross border population, and migrant workers with historically low access to TB care. People here face all category of barriers to TB health services ( geographical, economical, cultural and still living in conflict areas).

Shoklo Malaria Research Unit noticed increasing numbers of TB cases presenting at border clinics for migrants and started establishing a live-in TB treatment program in 2009, with residential TB centers where we provide TB care and case management for TB, MDR-TB, TB/HIV patients.

## METHODS

We use mix methodology to present some results on our activity. Quantitative data come from clinical data and routine monitoring and Qualitative data come from interviews of patients and staff and participant observation.

## RESULTS



### Patient perspective

#### Challenges:

- Social isolation as being away from home, family, friends and communities/environment
- Depression and loneliness, can feel like in prison
- No income generation during treatment, no family support being the so called "Catastrophic costs for TB patients"
- Nutrition and Food items can become monotonous

#### Benefits:

- Living at the health care center can help to prevent transmission of the disease to family and community.
- Health care is easier to access, readily available, and provided by medical staff without discrimination and free of charge
- Don't have to worry about food and shelter
- Can have their family members who take care and stay with them during treatment
- Several patients mentioned that this was the best available model of care for them.



### Provider perspective

#### Challenges:

- As a consequence of delayed access to care, patients present with severe medical condition and staff have often to face very severe medical conditions
- Health care providers must take care of patients in all aspects, including nursing care, personal hygiene, finding clothing, etc.
- Patients holding is sometimes difficult and follow up become an issue because of their mobility (no permanent address, contact persons or phone numbers)
- Medical staff must cope with social, financial, psychological issues (including alcoholism) for many patients
- Struggle to sustain funding for the program

#### Benefits:

- Succeeding to see patients become healthy
- The staff are devoted and become close, like a family
- Feel positive about the health care model as it seems to address a need (to treat mobile people)
- Efforts at addressing the social needs of long-term patients have positive effects (e.g. finding local jobs, farming, festive activities...)



## DISCUSSION

That model of patient's centered care TB center SMRU is implementing provides a home and treatment to people who otherwise might have neither and it brings alternative model to DOTs approach. It shows good results on adherence which can be observed through our results on Treatment Success Rate (TSR) for TB and MDR-TB (TSR is 82% in DS-TB and 88% in MDR-TB). However, many challenges remains on patients holding and complete adherence especially for MDR-TB and the implementation of short MDR-TB regime as WHO recommendation in 2016 will be one solution, once national program could adopt it.

Many of these challenges are related to the long-term nature of TB treatment and the fact that most of TB patients are migrant workers and highly mobile people looking for daily wages, or come from far reach villages.

Although we develop social activity and patients education, patients can feel lonely and isolated and if specific motivations, social and psychological factors are not understood and addressed, we can face rupture in treatment.

It can also be physically and psychologically challenging for health care providers.



For more information please visit our TB website  
[www.tbrc.or.th/en/eng](http://www.tbrc.or.th/en/eng)  
<http://www.tbrc.or.th/en/eng/medication>  
<http://www.tbrc.or.th/en/eng/medication>



### CONCLUSIONS

We would like to thank to all TB patients participating in the interview and the health care workers contributing the amazing effort to TB control program.

### References

1. N. S. Ottaviani, et al., An emerging adherence based a patient centered model of care for drug-resistant tuberculosis and HIV-1 (TUBNET) (2014) BMC Public Health, 14:1002 (2014)





