

Tak Tuberculosis Initiative (TTBI)

External Interim Evaluation

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Introduction

The Tak Tuberculosis Initiative (TTBI) is a tuberculosis (TB) detection, treatment and control program conducted by the Shoklo Malaria Research Unit (SMRU) and Première Urgence - Aide Médicale Internationale (PU-AMI), in collaboration with the Tak province Public Health Office (PHO), among Myanmar displaced/migrant persons and Myanmar refugees living along the Thai-Burmese border.

The project, initiated in January 2013, is supported by a 3-year grant from the United Kingdom Department for International Development (DFID).

The present document reports on an independent interim evaluation of the first year of activities, and will cover successively the program relevance, achievements/effectiveness, cost-effectiveness, and sustainability.

A. Program Relevance

With an incidence worldwide of nearly 9 million new cases of active disease per year, well over 1 million deaths per year, and estimations that around 2 billion people may have latent infection, tuberculosis (TB) is one of the most pressing global public health threats.¹ The specific occurrence of drug-resistant forms of TB - mono-resistant, poly-resistant, and most importantly multidrug and extensively drug resistant TB - poses further considerable challenges to the control of the epidemic.¹

Myanmar and Thailand figure among the world 22 “high-burden countries” of TB. In 2012, it was estimated that the prevalence and incidence of TB were 489 and 377 per 100,000 in Myanmar, and 159 and 119 per 100,000 in Thailand.¹ Within these countries, geographical pockets of very high burden have been observed. With important population movements taking place across and along the border, weak health and specific TB services on the Myanmar side, and poor access to public health services for Myanmar migrants and refugees on the Thai side (to name only a few factors), the areas along the Thai-Myanmar border at the level of Tak province present particular risks for high TB burden. Precise incidence estimates from the migrant population are not available. However, work from the International Office of Migration (IOM) has revealed that the prevalence of confirmed TB in registered Myanmar refugees candidates for resettlement may be as high as 603 per 100,000 (2013 figures). Furthermore, there is also anecdotal evidence that there is an increasing prevalence of MDR-TB among Myanmar persons living along the border, and that almost all cases of MDR-TB seen in Tak province come from Myanmar. TB and MDR-TB represent indeed a pressing health burden and threat among Burmese migrants and refugees living along the Tak border area. Medecins Sans Frontieres (MSF), and later World Vision (WV), used to conduct TB care services among migrants in Maesod, but the later have been discontinued in 2012. Although the Thai and Myanmar National TB Programs receive support from the Global Fund to Fight AIDS, TB, and Malaria, services for migrants and refugees are poorly covered.

¹ World Health Organization. Global Tuberculosis Report 2013. Available at: http://apps.who.int/iris/bitstream/10665/91355/1/9789241564656_eng.pdf

In the past few years, SMRU reported seeing a substantial number of TB cases among Myanmar migrants. The organization sought specific support, and between 2009 and 2011, implemented a pilot project of screening and treatment of TB among Burmese migrants with a first TB grant from DFID (grant reference: 114532-105). In 2011, the organization received further funding from the European Union, through an on-going 4-year grant, to channel support for free screening and treatment of unregistered Burmese migrants in Thai public hospitals of Tak province, and conduct passive TB case detection and treatment among Burmese migrants on the Thai side of the border, in its 5 Tak province border clinics. However, despite this work, it was felt that several gaps remained to improve TB case detection and treatment among the target population. Through the present grant, SMRU and PU-AMI, in collaboration with the Tak PHO and with the participation of the International Organization for Migration (IOM), aimed to implement the following key activities, to address these gaps:

- TB Active Case Finding (ACF) among Burmese migrants on both sides of the border in the SMRU clinics and TB center, and among refugees living in 3 camps managed by PU-AMI (Maela, Umpiem, and Nupo). This activity is highly relevant, as it may indeed further increase case detection, allow early TB treatment initiation in cases promptly identified with the disease, and therefore offer additional individual health benefits and further improve control of TB transmission. It also importantly follows clearly established recommendations of the WHO to systematically screen active disease among high-risk groups and populations.²
- Resume/continue TB passive case detection among Burmese persons, in the SMRU TB center, on the Myanmar side.
- Support adequate screening and treatment of TB and MDR-TB among refugees living in the 3 camps managed by PU-AMI, as previously, PU-AMI received support for the sole provision of treatment of smear positive, drug-sensitive TB, in Maela camp.
- Introduce use of GeneXpert, to improve TB case detection/confirmation among smear negative TB suspects, and allow very rapid screening/identification of Rifampicin resistance (which very often correlates with the presence of MDR-TB) in TB cases. This is also highly relevant, and in line with recent recommendations from the WHO.³
- Implement systematic HIV counseling and testing among TB patients, and provide HIV care including antiretroviral therapy in HIV-TB co-infected patients.

B. Achievements, Effectiveness

The evaluation/presentation of the project effectiveness is essentially based on a review of results achieved for each of the project indicators and targets, established by the SMRU and PU-AMI at the outset of the project. A few additional key indicators of TB care and control have also been examined.

² World Health Organization. Systematic screening for active tuberculosis. Principles and recommendations. WHO/HTM/TB/2013.04.

³ World Health Organization. WHO endorses new rapid tuberculosis test. Available at: http://who.int/mediacentre/news/releases/2010/tb_test_20101208/en/

I. TB Screening

I.1. Screening through Active Case Finding (ACF)

The volume of active case finding (ACF) screening of tuberculosis (TB) conducted by the 2 project partners in the first year of the project is presented in Table 1.

Table 1: Active Case Finding Activities (*Output Indicator 1.1*)

	Number of Persons Screened thru ACF	
	Baseline	2013
SMRU Clinics	0	
Target		900-1,100
Result		692
PU-AMI Camps	0	
Target		2,500-3,600
Result		1,792

Both partners did not meet their indicator targets. Active case finding (ACF) started as planned at the beginning of 2013, but ACF by PU-AMI among refugees was conducted for the first 2 quarters of the year in Maela camp only. ACF was extended to the other 2 camps in the second half of the year only, as planned.

Although targets set before the initiation of this new activity were not met, coverage of the overall target population by ACF (Table 2) was indeed well above target, close to 100%. This supports that although the target “volume” was not reached, the later may have been over-estimated, and that all the screening needs/indications were addressed.

Table 2: Active Case Finding “Coverage” (*Output Indicator 1.4*)

	Proportion of eligible persons screened	
	Baseline	2013
SMRU Clinics	n/a	
Target		>80%
Result		692/708 = 97.7%
PU-AMI Camps	n/a	
Target		>80%
Result		1,738/1,755 = 99%

As shown further below, this resulted in an appreciable number of persons being diagnosed with TB through this new intervention.

I.2. Screening through Passive Case Finding (PCF)

Passive case finding (PCF) showed results above target for both the displaced and the refugee populations, in the SMRU clinics and in the camps. (Table 3)

NB: activities reported include only those supported by DFID, and exclude screening supported by the EU grant among migrants, on the Thai side of the border.

Table 3: Passive Case Finding Activities (Output Indicator 1.2)

	Number of Persons Screened thru PCF	
	Baseline	2013
SMRU Clinics	250	
Target		280-320
Result		409
PU-AMI Camps	1006	
Target		1,000-1,100
Result		1,070

Both screening approaches combined led to good case detection, as discussed in the next section.

II. TB Case Detection

The number of TB cases detected through the combination of both ACF and PCF in 2013 is shown in Table 4.

Table 4: TB Cases Detected (Outcome Indicator 1)

	Number of Cases Detected	
	Baseline	2013
SMRU Clinics	73	
Target		125-175
Result		155
PU-AMI Camps	98	
Target		210-270
Result		163

The SMRU detected TB cases within the expected range, whereas PU-AMI was somewhat short of its target. This is despite the large volume of screening conducted (within target for PCF) as previously shown in Table 3. In the camps, case detection yield from PCF was only 13.6%. (Table 5) It was substantially higher (30.1%) in the SMRU clinics. As both partners serve different populations, conclusions on achievements for this parameter (which was not a given indicator) cannot really be made. Both partners have discussed and follow essentially similar screening algorithms, and one may rather appreciate that as refugees living in the camps have been receiving health care services in a continuous manner for long periods of time, they are likely in a better health condition than migrants seeking care in the SMRU structures. Some TB patients seen by the SMRU have been referred by other stakeholders such as the Mae Tao clinic, and for a good number of them, suspicion of TB may indeed have been high.

Table 5: TB Case Detection Rates (no given indicators)

	SMRU Clinics	PU-AMI Camps
In Passive Case Finding (detected/screened)	123/409 (30.1%)	145/1,070 (13.6%)
In Active Case Finding (detected/all screened by questionnaire)	32/692 (4.6%)	18/1,792 (1.0%)
In Active Case Finding (detected/suspects further tested)	32/180 (17.8%)	18/112 (16.1%)

ACF yielded a total of 32 TB cases at the SMRU clinics, and 18 in the camps, or 20.6% and 11.0% of all TB cases detected in the respective structures. The case detection yield, out of ACF suspects further tested, was basically equivalent for the 2 populations/settings and appears satisfactory. An earlier evaluation of this project (and its associated component of activities supported by the European Union) performed after only 6 months of TTBI (Q1 and Q2 2013), had found that case detection yield out of all screened through ACF was only 1.6%. Adjustments to the questionnaire used for identification of TB-suspects were made by the 2 partners, which resulted in, or coincided with, better yield of TB cases by the end of the year at the SMRU, with 4.6% of all persons targeted in ACF eventually found to have TB.

Further insights into the case yield of ACF (Table 6) show that it was particularly good among contacts of TB patients and HIV-infected patients.

Table 6: ACF Case Detection Details (not a given indicator)

	Cases Detected/Suspects Tested	
	SMRU Clinics	PU-AMI Camps
Health care workers	3/57 (5.3%)	3/37 (8.1%)
Contacts of patients	25/108 (23.1%)	4/33 (12.1%)
HIV-infected patients	4/15 (26.7%)	8/30 (26.7%)
New arrivals (camps only)	n/a	0/1
Others	0/0	3/11 (27.3%)
ALL	32/180 (17.8%)	18/112 (16.1%)

Even though the total number of cases identified from ACF is not large, it still represents an important and valuable part of the case detection in the project. Patient individual benefit (with “earlier” detection of disease and expected/possible better outcome of earlier treatment) is noted. For the program, these efforts and the case yield represent direct benefits in terms of TB control. The approach used for ACF in this project follows the specific technical recommendations and guidance on the subject from the WHO referred to earlier, and it may be that, through this, TB case detection may “almost” have been optimized in the target population.

The TB cases presentations, and diagnosis methods, are shown in Table 7 below. Concordant with literature on the challenges of diagnosing TB by smear microscopy, the results show that only 44.5% and 55.2% of patients diagnosed with TB in the SMRU clinics and the camps had positive smear microscopy.

Table 7: TB Cases Presentation (not a given indicator)

	SMRU Clinics	PU-AMI Camps
Smear positive TB (out of all cases detected)	69/155 (44.5%)	90/163 (55.2%)
Smear negative TB (out of all cases detected)	63/155 (40.6%)	40/163 (24.5%)
Extra-pulmonary TB (out of all cases detected)	13/155 (8.4%)	22/163 (13.5%)
TB cases (smear negative) detected by GeneXpert (out of all cases detected)	10/155 (6.5%)	11/163 (6.7%)

As much as 40.6% of the TB cases in the SMRU clinics had smear negative, clinically and radiologically suspected TB. Importantly, the use of GeneXpert, since March 2013 and made possible through the present grant, allowed detection/confirmation of 10 and 11 cases in the 2 settings, in patients who showed smear negative microscopy. This convenient and rapid method has a sensitivity of around 60-70% in smear negative TB cases against the gold standard of liquid media base culture, and it is felt that use of systematic liquid culture among all smear negative, GeneXpert negative, TB suspects could lead to an additional case detection/confirmation.

III. TB Treatment

The total numbers of TB patients treated in the project during the year are shown in Table 8.

Table 8: TB Cases Treated (*Output Indicator 2.1*)

	Number of Patients Treated for TB	
	Baseline	2013
SMRU Clinics	73	
Target		125-175
Result		136
PU-AMI Camps	98	
Target		180-230
Result		155

Here again, stemming from the lower-than target case detection in the refugee population, the number of cases treated by PU-AMI is slightly below target. The SMRU met the indicator target, treating 136 subjects during the year.

The proportion of patients diagnosed with TB being started on treatment was within target for both populations (Table 9), although higher among refugees. This is not surprising given the more mobile character of the migrant population. Some cases cared for by the SMRU come from far inside Myanmar, and it is understood that some patients may opt after diagnosis to receive treatment either elsewhere, or in the same setting, with some delay.

Table 9: Proportion of Patients Diagnosed being Treated (Output Indicator 2.3)

	Proportion of Patients being Treated	
	Baseline	2013
SMRU Clinics	95%	
Target		>80%
Result		87.7% (136/155)
PU-AMI Camps	64%	
Target		>80%
Result		95.1% (155/163)

The proportions of cases treated and cared for in their community (home) and in the project residential TB centers (TB villages) are shown in Table 10.

Table 10: Proportion of Patients Treated in Community & TB Villages (Output Indicator 3.1)

	Proportion of Patients being Treated	
	Baseline	2013
SMRU Clinics	60 vs 40%	
Target (community vs TB village)		50 vs 50%
Result (community vs TB village)		38 vs 62% (52 vs 84 cases)
PU-AMI Camps	0 vs 100%	
Target (community vs TB village)		60 vs 40%
Result (community vs TB village)		71 vs 29% (110 vs 45 cases)

The SMRU intended to treat as in-patients in its residential center only patients presenting social or clinical conditions not adapted to ambulatory/community-based treatment. The “indicative target” (perhaps more than a true program objective) was not met, and rather than a performance indicator, this may indeed illustrate the social hardship, and poor clinical condition that a large number of migrant TB cases cared for by the SMRU were in. Furthermore, all MDR-TB cases are treated in the residential center. In contrast, it is welcome that a good majority of refugee/TB cases treated by PU-AMI could be treated in their community/house setting, which undoubtedly represents greater convenience for the patients, and may possibly have benefits in terms of infection control.

IV. TB Treatment Outcomes

TB treatment outcomes are presented separately as per each defined project performance indicator. Only outcomes among patients treated in the first and second quarter of 2013 are considered/presented; indeed, large numbers of patients treated in quarter 3 and 4 are still on treatment, making treatment outcomes interpretations unsuitable for these 2 groups. Therefore, outcomes are presented for a denominator of 55 and 77 patients treated respectively by the SMRU and PU-AMI in Q1 and Q2 of 2013.

Table 11: TB Death Rate in Patients Treated for TB (*IMPACT Indicator 1*)

	TB Death Rate	
	Baseline	2013
SMRU Clinics	10%	
Target		<10%
Result		5.45%
PU-AMI Camps	10%	
Target		<10%
Result		3.9%

The death rate is found at 5.45% and 3.9%, substantially below the project target. This can only be commended, as this represents the only project IMPACT indicator.

The overall treatment success (Table 12) was just at or just below the project target. The target was aligned with the WHO designated target of treatment success (85%), and meeting or closely approaching this target is a mark of good treatment outcomes.

Table 12: Treatment Success in Patients Treated for TB (*Outcome Indicator 3*)

	Treatment Success Rate	
	Baseline	2013
SMRU Clinics	87%	
Target		>85%
Result		85.4%
PU-AMI Camps	82%	
Target		>85%
Result		83.1%

Treatment default, another important indicator, was also kept at low levels, below the project targets. (Table 13) It appears even rather remarkable that the default rate among migrants/displaced persons treated by SMRU was as low as 3.6%.

Table 13: Treatment Default in Patients Treated for TB (*Output Indicator 3.2*)

	Treatment Default Rate	
	Baseline	2013
SMRU Clinics	3%	
Target		<10%
Result		3.6%
PU-AMI Camps	7%	
Target		<10%
Result		7.8%

Finally, treatment failure (another critical outcome indicator, but not given as a project indicator) showed no treatment failure among patients treated by the SMRU, and only 3.9% of patients failing treatment in the camps. (Table 14)

Table 14: Treatment Failure in Patients Treated for TB (not a given indicator)

	Treatment Failure Rate	
	Baseline	2013
SMRU Clinics	n/a	
Target		None
Result		0%
PU-AMI Camps	n/a	
Target		None
Result		3.9%

Patient transfer (Table 15) was low (even though not meeting exactly the project target).

Table 15: Transfer of Patients Started on TB Treatment (Output Indicator 3.3)

	Percentage of Patients Transferred Out	
	Baseline	2013
SMRU Clinics	0%	
Target		0%
Result		1.8%
PU-AMI Camps	0%	
Target		0%
Result		1.3%

In conclusion, even though they are only available for a subset of the patients treated in 2013, the project treatment outcomes appear very satisfactory.

V. TB and HIV

The TB-HIV outcomes are examined again as per (the) distinct project indicators.

The proportions of TB patients being offered HIV counseling and testing are shown in Table 16. Both SMRU and PU-AMI met the indicator targets.

Table 16: TB Patients Receiving HIV Counseling and Testing (Output Indicator 1.3)

	Number of Patients	
	Baseline	2013
SMRU Clinics	96%	
Target		>90%
Result		90.4% (123/136)

PU-AMI Camps	100%	
Target		>90%
Result		100% (155/155)

Although this does not represent a project indicator, the proportion of TB patients found HIV co-infected is important to examine. (Table 17)

Table 17: TB Patients co-infected with HIV (not a given indicator)

	Number of Patients	
	Baseline	2013
SMRU Clinics	n/a	
Target		None
Result (HIV positive/tested)		11.4% (14/123)
PU-AMI Camps	n/a	
Target		None
Result (HIV positive/tested)		11.6% (18/155)

A strikingly comparable proportion of co-infection was found among the refugee and the migrant populations. Both partners met the target indicator of treating TB in those co-infected with HIV. (Table 18) The numbers presented include both TB patients tested for and diagnosed with HIV, and known HIV-infected patients found to have TB disease (including through ACF).

Table 18: TB-HIV Co-infected Patients being Treated (*Output Indicator 2.2*)

	Number of Patients	
	Baseline	2013
SMRU Clinics	14	
Target		23-35
Result		27
PU-AMI Camps	13	
Target		16-21
Result		18

Finally, offer of ARV therapy and cotrimoxazole (CTX) prophylaxis was, overall, good. (Table 19). It must only be noted that PU-AMI initiated ART well below target. One of the possible explanations is that although PU-AMI gives access to its health services to non-camp residents living near the camps, including TB care, the provision of ART is restricted to the refugees. Data were not explored further, but it may be that some of the TB cases co-infected with HIV cared for by PU-AMI were from areas outside the camps.

Table 19: TB-HIV Patients Receiving ART and Cotrimoxazole (Output Indicator 2.4)

	Number of Patients	
	Baseline	2013
SMRU Clinics	78%	
Target		>90%
Result		CTX: 96.3% (26/27) ART: 96.3% (26/27)
PU-AMI Camps	100%	
Target		>90%
Result		CTX: 100% (18/18) ART: 44.4% (8/18)

Overall, these indicators show good management of TB-HIV co-infection, in consistence with the project targets.

VI. TB Drug Resistance (DR)

Data on screening, detection and treatment of multidrug resistant TB (MDR-TB) are summarized here below, in Table 18-23.

Both the SMRU and PU-AMI met the perfect target of screening for drug resistance by phenotypic drug susceptibility testing (DST) 100% of the smear positive TB patients, as per the given indicator. (Table 20)

Table 20: Proportion of smear +ve TB Patients Tested for DR (Output Indicator 4.1)

	Number of Patients	
	Baseline	2013
SMRU Clinics	100%	
Target		100%
Result		100%
PU-AMI Camps	100%	
Target		100%
Result		100%

The exhaustive conduct of DR screening among smear positive patients is an important achievement, for both patient individual benefit, and for tackling MDR-TB at the public health level. As a result, the SMRU detected 16 cases of MDR-TB (15 were confirmed by DST, and 1 is pending confirmation after detection of rifampicin resistance by GeneXpert), well above target, and PU-AMI detected 6 MDR-TB cases in the camps. (Table 21)

Table 21: Number of MDR TB Cases Detected (Outcome Indicator 2)

	Number of Patients	
	Baseline	2013
SMRU Clinics	4	
Target		6
Result		16 (13.7%*)
PU-AMI Camps	0	
Target		8-13
Result		6 (6.7%)

The estimated prevalence of MDR-TB* however, is best calculated for SMRU out of a total of 117 TB cases tested for DR-TB. These represent patients screened as part of the overall SMRU TB activities (with additional support from the European Union). The resulting prevalence of MDR-TB among these cases is 13.7%. 2 of these cases are from new TB patients (prevalence among new cases (2/92) = 2.2%), and 14 cases are from re-treated tuberculosis cases, giving a concerning prevalence or rather proportion of **56% (14/25) of MDR-TB among these retreatment cases**. Data were not fully explored, but the SMRU confirmed that many of these cases were referred to SMRU, after treatment in another location in Myanmar. Interpretation warrants caution as these cases are not “representative”, but these figures are nonetheless concerning. Prevalence of MDR-TB in the camps does not contrast much with reported prevalence in Thailand and Myanmar.

Almost all the patients diagnosed (+ 1 suspected) with MDR-TB (21 out of 22 = 95.4%) have been started on second-line TB treatment. (Table 22) That is above target.

Table 22: Proportion of DR TB Cases Diagnosed and Managed (Output Indicator 4.2)

	Number of Patients	
	Baseline	2013
SMRU Clinics	4-12.5%	
Target		15
Result		21
PU-AMI Camps	n/a	
Target		None
Result		0

PU-AMI is not meant to treat MDR-TB patients under this project, and refers such patients to the SMRU for treatment. 5 of the 6 patients diagnosed in the camps were received/seen by the SMRU; 1 case died before he could be referred.

As second-line TB treatment of these patients has started in 2013, no results of treatment outcomes are yet available. (Table 23) However, interim indicators appear very satisfactory, as among the 21 patients started on treatment, no one died, 1 patient only defaulted, and all others patients are still on treatment.

Table 23: Proportion of DR TB Cases Treated Successfully (Output Indicator 4.3)

	Number of Patients	
	Baseline	2013
SMRU Clinics	n/a	
Target		60%
Result		Not available yet
PU-AMI Camps	n/a	
Target		None
Result		Not available yet

VII. Gender and TB

As a last insight into the project achievements/effectiveness, gender and TB is examined in a specific section for all the important/relevant indicators. (Table 24)

Table 24: Proportion of Females for Main Indicators

	Target	SMRU	PU-AMI
Active Case Finding	45-55% females	61.9% (429/692)	53.5% (959/1792)
Passive Case Finding	45-55% females	39.6% (162/409)	45.7% (489/1070)
Cases Detected	30-40% females	36.8% (57/155)	38.0% (62/163)
Cases Treated	30-40% females	36.8% (50/136)	38.1% (59/155)
Death Rate in females	<10% M & F	6.25% (1/16)	3.4% (2/59)
Treatment Success Rate in females	>85% M & F	87.5% (14/16)	93.3% (28/30)
MDR TB Cases	30-60% females	18.7% (3/16)	33.3% (2/6)

Overall, the indicators largely support that the screening and care services provided through the project meet the expectations of balanced gender inclusions, and comparable treatment benefits. This is an indicator of strength/quality of the program, implemented by the 2 project partners.

C. Cost-Effectiveness

The project contractor SMRU provided detailed budgetary figures, including a specific presentation of the monetary input/budget allocation for each of the 4 Outputs of the project (see Table 25). These figures were available for each of the 2 partners, SMRU and PU-AMI. They were presented as a total for the 3 years of the project. For the present cost-effectiveness evaluation, costs were annualized, and considered for 1 year/2013 only.

The cost-effectiveness is presented and discussed for each of the 4 Outputs. Remarks are given on the cost-effectiveness “ranking” of the different components, as per existing WHO categorisation.⁴

⁴ http://www.who.int/choice/costs/CER_thresholds/en/index.html

The WHO defines the cost-effectiveness of a health intervention as follows:

- Highly cost-effective if the intervention is < 3 times the country GDP/capita.
- Cost-effective if the intervention is 1-3 times the country GDP/capita.
- Not cost-effective if the intervention is > 3 times the country GDP/capita.

For the findings interpretation, the World Bank 2012 GDP/capita figures⁵ were used: Thailand GDP/capita = 5,474 US\$, i.e. 175,168 TBH. (TBH 32 : 1 US\$)

Table 25: Services/Outputs Cost-Effectiveness

	SMRU	PU-AMI
Output 1: Diagnosis for suspected TB cases		
Money Input (GBP) annualized	29,620	74,267
Number of patients diagnosed	155	163
>> Cost per TB case diagnosed (GBP)	191	456
>> Cost per TB case diagnosed (TBH)	9,359 (Highly CE)	22,344 (Highly CE)
Output 2: Treatment of patients found infected with TB		
Money Input (GBP) annualized	100,385	133,083
Number of patients treated	136	155
>> Cost per TB case treated (GBP)	738	859
>> Cost per TB case treated (TBH)	36,162 (Highly CE)	42,091 (Highly CE)
Output 3: Improved treatment outcomes for TB patients		
Money Input (GBP) annualized	60,853	97,162
Number of treatment successes	116 (85.4%)	129 (83.1%)
>> Cost per TB treatment success (GBP)	525	753
>> Cost per TB treatment success (TBH)	25,725 (Highly CE)	36,897 (Highly CE)
Output 4: Drug resistance assessed and managed for all TB patients		
Money Input (GBP) annualized	55,402	18,718
Number of patients found MDR-TB and treated	21	
>> Cost per MDR-TB case diagnosed and treated (GBP)	3,529	
>> Cost per MDR-TB case diagnosed and treated (TBH)	172,921 (Cost-effective)	

(TBH 49 : 1 GBP)

These figures are self-explanatory and demonstrate that the services are overall highly cost-effective. The differences in cost-effectiveness observed between services provided by SMRU and PU-AMI stem mainly from larger budgets allocated to PU-AMI for each of the 4

⁵ <http://data.worldbank.org/indicator/NY.GDP.PCAP.CD>

project outputs, and in regards to output 1 in particular, from a lower case yield observed from passive case finding in the camps.

D. Sustainability

The sustainability of the services reviewed in this report may best be discussed separately for the migrant and the refugee populations.

Thirty years into the existence of the refugee camps along the Thai-Burmese border, health services in the camps remain the necessary or de facto attribute of non-government organizations and agencies. Little indicates that this may change, and it appears more likely that the situation will remain the same until the camps close. Although the Global Fund has supported the Thai National TB program, TB services for the refugees have only been marginally supported by GF funding. In this context, the sustainability of the TB services in the camps appears realistically dependent on other donor funding. Given the importance of these services, as well as their cost-effectiveness, it appears critically important that sustained funding be secured to indeed maintain these services, until the camps close.

For the migrants (that will likely include many of the refugees when the camps close) sustainability of the TB services more logically calls for the involvement of the Thai and Myanmar National TB Programs. The very good treatment outcomes observed in this program, and the cost-effectiveness of the components of the intervention should serve as an opportunity to continue advocating for increased ownership and responsibility of the TB services for the migrant population by the 2 country programs. During the 1st year of this project, the project partners have held/participated in 2 formal meetings with representatives from the Thai and the Myanmar TB programs, as well as the WHO and other NGOs, and have indeed advocated for increased collaboration and coordination in TB services for the migrant populations, with an ultimate objective of developing increased ownership of these activities by the national programs. However, here again, realistic expectations may be warranted. The migrant population served by this project under DFID funding consists in Burmese persons living on the Myanmar side of the border. Some of the patients cared for by the SMRU come from far inside Myanmar, and some of the figures observed in this report (notably the proportion of MDR-TB cases in re-treatment cases) are concerning. Both may to some extent illustrate some of the challenges faced within the Myanmar national program, for delivery of quality services for the target population.

E. Conclusions and Recommendations

Overall, the comprehensive review of the project indicators demonstrates solid achievements and high cost-effectiveness of the TB services delivered by the SMRU and PU-AMI for the migrant and the refugee populations in the project area.

Although TB active case finding has not led a large case detection, it has contributed to more TB cases being detected, with both individual and public health benefits. As discussed above, it is possible that case detection in the project has almost been optimized. The use of GeneXpert for the screening of smear negative TB suspects has also led to increased case

detection/TB confirmation. This is also highly relevant, and fully in line with established recommendations. To work further towards optimization of TB case detection, the 2 project partners could next give consideration to systematically using liquid-media based culture for screening of TB in smear negative, Xpert negative, TB suspects. It is noted actually that PU-AMI has started to pilot this approach since October 2013. Currently, the project partners use 1 GeneXpert test per TB suspect; consideration may also be given to conduct a 2nd GeneXpert test after a first negative result (this may increase the yield by 10-15%), before resorting to doing culture in cases with 2 negative tests. Finally, further use of GeneXpert in extra-pulmonary TB suspects/cases could also increase TB case detection/confirmation and screening of drug resistance.

The figures of MDR-TB found among re-treatment cases cared for by the SMRU are also concerning. Although caution is again warranted in the interpretation of these results because these cases self-referred or referred by other stakeholders (including Mae Tao clinic) are not representative of other re-treatment cases in Myanmar, or indeed within the ethnic minorities in Myanmar, these figures are nonetheless concerning. The SMRU is currently the only stakeholder, through the present funding, providing treatment of MDR-TB in the project area, for the target population. It is critical that the SMRU be able to maintain the possibility to offer this element of care. The SMRU is encouraged to proactively discuss these data, and this particular element, with the national TB program of Myanmar and Thailand, and all other stakeholders.

More broadly, the SMRU and PU-AMI, in collaboration with the Tak PHO, are encouraged to continue discussing collaboration in, or increased ownership of, TB services for the target population with and by the Myanmar and Thai national TB programs. Similarly, the long-term continuation of HIV care (ART) by the Myanmar national HIV program and/or other stakeholders in Myanmar, in migrant patients who have completed TB treatment, may also warrant specific advocacy efforts from the SMRU.