rGLC COUNTRY SUPPORT MISSION REPORT

Country: Thailand

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The programme has agreed with open sharing of this report ☒

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Abbreviations and acronyms

AFB	acid-fast bacilli
AIDS	Acquired immune deficiency syndrome
ART	Antiretroviral therapy
ARV	Antiretroviral drugs
Bdq	Bedaquiline
BoE	Bureau of Epidemiology
BPS	Bureau of Policy & Strategy
BTB	Bureau of Tuberculosis Control
CEM	Cohort Event Monitoring (a method for active pharmacovigilance)
CET	Clinical Expert Team
Cfz	Clofazimine
Cs	Cycloserine
CSMBS	Civil Servant Medical Benefits Scheme
CSO	Civil Society Organization
CXR	Chest X-Ray
DDC	Department of Disease Control
Dlm	Delamanid
DM	Diabetes mellitus
DOT	Directly Observed Treatment
DRS	Drug resistance survey
DR-TB	Drug Resistant Tuberculosis
DSM	Direct smear microscopy
DST	Drug Susceptibility Testing
E	Ethambutol
EQA	External Quality Assessment
Eto	Ethionamide
FDC	Fixed Dose Combination
FHI360	Family Health International 360
FLDs	First line anti-TB drugs
GDF	Global Drug Facility
GF/GFATM	The Global Fund to fight AIDS, Tuberculosis, and Malaria
GNI	Gross National Income
GPO	Governmental Pharmaceutical Organization
HAIN	HAIN GenoType MTBDR® plus (line probe assay)
HIV	Human immunodeficiency virus
IC	Infection Control
IPT	Isoniazid Preventive Therapy
Km	Kanamycin
LED	Light-emitting diode (fluorescence microscopy)
L-J medium	Löwenstein-Jensen medium
LTBI	Latent Tuberculosis infection
LPA	Line-probe assay
M+	Positive on direct microscopy

MDR(-TB)	Multidrug-resistant (tuberculosis)
MGIT	BACTECTM MGITTM 960 Mycobacterial Detection System
Mfx	Moxifloxacin
MoPH	Ministry of Public Health
MODS	Microscopic Observation Drug Susceptibility assay
NEC	National Expert Committee for DR-TB
NFM	New Funding Model (for GFATM grants)
NHSO	National Health Security Office
NRL	National TB Reference Laboratory
NTM	Non-tuberculous mycobacteria
NTP	National Tuberculosis Control Programme
ODPC	Office for Disease Prevention and Control (regional)
Ofx	Ofloxacin
OR	Operational research
PHO	Public health offices (provincial)
PLHIV	People living with HIV
PPD	Purified Protein Derivative (tuberculin skin test)
PR	Principal Recipient (of GFATM)
rGLC	Regional Green Light Committee
RR-TB	Rifampicin-resistant tuberculosis
SAT	Self-administered treatment
SLDs	Second line anti-TB drugs
SMS	Short message service (texting on mobile phones)
SRL	Supranational TB reference laboratory
SS-	Sputum smear negative
SS+	Sputum smear positive
TALF	Treatment after loss to follow up
TAF	Treatment after failure
TAT	Turnaround time
TB	Tuberculosis
TBCM	TB Clinical Management
TUC	Thailand MoPH-US CDC Collaboration
UHC	Universal Health Care scheme
VCT	Voluntary HIV counselling and testing
VMI	Vendor-managed inventory
VOT	Virtual (video) observed treatment for TB
WHO	World Health Organization
XDR-TB	Extensively drug-resistant tuberculosis
Z	Pyrazinamide
ZN	Ziehl-Neelsen

Executive summary

i. TORs of the mission

PMDT

- Review the PMDT progress against the expansion plan as well as against recommendations made in the last mission
- Identify bottlenecks to expansion of diagnostic and treatment services including treatment adherence issues
- Site visits to PMDT implementation hospitals and clinics
- Review country guidelines and transition plan for shorter regimen and use of new drugs
- Review pharmacovigilance/ aDSM implementation and progress
- Assessment of recording and reporting system and streamlining of reporting processes
- Assess infection control management and practices
- Review the current coordination mechanisms between the NTP, implementing and potential partners, and community;
- Make recommendations for nationwide PMDT expansion within and beyond public sectors to reach the NTP PMDT long term plan

Laboratory component

- Assess the current laboratory capacity in the country, expansion plan and specifically its alignment with the PMDT expansion plan
- Site visits to national reference laboratory and other key labs to evaluate their capacity to undertake the assigned load
- Review the guidelines and algorithms for diagnosis of drug-resistant TB
- Review the national roll-out of rapid molecular diagnostics including SL LPA and their utilization, including networking of labs to enhance utilization
- Assessment of LIMS
- Prepare and submit a report of visit including suitable recommendations for laboratory infrastructure, human resource needs and capacity building to strengthen the diagnostic capacity

ii. Overall implementation status of PMDT

There has been a perceptible improvement in PMDT implementation and various related aspects in past year. The programme has shown progress in enrolment of RR/MDR-TB cases nearly doubling between 2015 and 2016 with improved treatment outcomes, though still below the expected targets of at least 75% treatment success rates. The programmatic achievements are mentioned in the next section. There are some aspects like aDSM that need strengthening and areas like recording and reporting where the progress needs to be expedited to achieve the programme goals and be able to achieve the desired goals. It must also be stated that while programme goals as per the plans are being achieved or nearly achieved, the programme needs to be more ambitious with its targets.

iii. Significant achievements since last visit

- Nearly doubling of RR/MDR-TB case notification in past one year to 952
- Treatment success rate of 58% better than global and regional average
- ~ 50% RR/MDR-TB cases tested for second-line resistance
- Shorter regimen being introduced at 7 sites and being expanded to another 12 sites, with increasing demand at sub-national level
- Active case finding for TB and MDR-TB started among high risk groups

iv. Key challenges identified in this mission in relation to the ToRs

a. Only 59% of the estimated TB cases being diagnosed currently. This has direct implication on the number of TB cases screened for RR/MDR-TB and potentially diagnosed
b. Continued wide gap between estimated RR/MDR-TB cases and the number enrolled, despite improvement in past year
c. High death rates among RR/MDR-TB patients on treatment in certain provinces
d. There were some deviations observed in the draft guidelines for use of shorter MDR-TB regimen as well as drugs to be used for pre-XDR and XDR-TB, as compared to WHO recommendations. These need to be corrected at the earliest as the programme is in early stages of implementation of these guidelines
e. Infection control not being adequately followed in some TB clinics
f. Patient support mechanisms not uniformly available for all patients across country
g. aDSM needs further strengthening through training and capacity building of those who need to implement it.

v. Priority recommendations of the mission:

Recommendation	Responsible persons/agency	Timeline	Support required to fulfil the recommendation
1. **Case finding**: Country should urgently move towards universal DST for all TB cases and symptomatics from high risk groups.	BTB, DDC, NHSO	Complete coverage by 1st quarter 2019 (This is part of the 2018 guidelines under publication and needs to be implemented)	Planning support may be needed to estimate financial and resource needs
2. **Guidelines for shorter regimen and implementation**: a. The WHO guidelines for shorter MDR-TB treatment regimen should be adhered without deviations outside permitted flexibilities.	BTB, CET	2nd quarter 2018	

Recommendation	Responsible persons/agency	Timeline	Support required to fulfil the recommendation
b. The programme needs to take into consideration results from existing sites implementing shorter regimen and aim to be more ambitious in enrolment with its targets for treatment initiation on shorter regimen based on the experience			
3. **Guidelines for XDR-TB** a. Careful monitoring of implementation of guidelines for pre and XDR-TB cases under guidance of CET specifically use of new drugs b. Injectables may need to be given for upto 12 months (or even more) in XDR-TB - to be discussed within the CET	BTB, CET, PHO (latter for monitoring)	2nd quarter 2018	
4. **Use of new drugs**: a. Wider use of bedaquiline in various situations to strengthen drug regimen may be included in the country guidelines. 'WHO best practice on expanded indications' can be taken into consideration when needed b. use of delamanid specifically in cases where a strong enough regimen is not possible using available drugs should be included as an option in the country guidelines	BTB, CET	2nd quarter 2018	Roll-out of new drugs as per national guidelines
5. **Patient support**: Financial and socio-economic support for all MDR-TB patients should be uniformly available across the country	MoH, DDC, BTB, NHSO	By 4th quarter quarter 2018	For strengthening community engagement in treatment delivery to all MDR-TB cases across country
6. **Infection control** and specifically use of personal protective equipment by health staff should	MoH, BTB	2nd quarter 2018 (As part of campaign 'Zero	

Recommendation	Responsible persons/agency	Timeline	Support required to fulfil the recommendation
be encouraged.		TB in Health Care Workers')	
7. **aDSM –** Intensive training of peripheral staff in recording and reporting of the adverse events based on the updated guidelines	BTB	Ongoing	Additional budget and technical support may be needed

Lab

- There is an urgent need for dissemination of in-country data and evidence on the reliability of molecular diagnostics available at global level to the treating physicians across the country
- Since the country has been performing DRS every few years and the current is the 5th in this series and the findings of this survey and a time trend analysis of all the surveys need to be published in a peer reviewed journal
- There is a proposal for acquiring a next generation sequencer in the NTRL which would be ideal to support the surveillance system in the country to inform on drug resistance, mycobacterial strains and molecular epidemiology of TB in the country.
- The country should use the data from the current survey as baseline and initiate activities to build capacity for continuous surveillance for getting information on the drug resistance levels and patterns that would guide the country for management of DR TB and regimens that could be used.

vi. Status of priority recommendations of previous mission:

Recommendations	Responsible agency/person	Status
1. Early and complete detection of drug-resistance among notified pulmonary TB cases • As a first, immediate step, use wider criteria for screening drug resistance among TB patients using rapid molecular tests specifically among populations considered vulnerable to have contracted the infection because of close contact and those who may be at risk of mortality due to co-morbidities or age. This would need revision of the national programme guidelines along with HR capacity building • As a next step for next 1 year the aim should be to achieve universal DST so that all cases initiated on TB treatment should have undergone a testing for resistance using at least one of the WHO approved molecular tests. Those found resistant to first line drugs should also undergo testing for resistance to second-line drugs. • Intensify case finding among contacts of DR-TB cases even when asymptomatic because of a high risk of having been infected with the resistant bacillus along with use of MDR-TB contact register. Contacts would include household contacts, workplace contacts and inmates in close, congregate settings like prisons		• Revised criteria for rapid molecular tests into two groups - high risk and key populations like HIV, DM/COPD/Silicosis, Prisoners, Elderly and Health Care Workers • The upcoming guidelines in 2018 will have an emphasis on universal DST
2. Ensure quality treatment for all RR/ MDR-TB cases to improve treatment success rates • Patient centred DOT as a package of counselling, psychosocial support, treatment observation and patient involvement. Self-administered treatment is unacceptable and family DOT may not be effective in several cases and should be the last resort. • Update MDR-TB treatment guidelines by mid-2017 to include recent recommendations o Offer second line treatment to all RR cases (in addition to MDR-		• In the new guidelines to be published in 2018, case management has been introduced to ensure quality of treatment. • DOT, multi-disciplinary team and patient support are highlighted. • Shorter regimen has been introduced at 7 sites, 12 more in preparation.

TB cases) ○ Regrouping of second line drugs and specifically PAS; this is now classified as an 'add-on' drug. This has a major impact on the current regimen in the country that uses PAS as one of the mainstay drugs ○ Wider use of bedaquiline (or delamanid) in all RR/MDR-TB cases where an effective regimen cannot be constituted with core second line drugs (as per new classification) ○ Register all drugs required for RR/MDR-TB treatment as per the new grouping of drugs in the 2016 updates to WHO guidelines for management of drug-resistant TB • Prepare transition plan for introduction of shorter regimen guided by SL-LPA and supported by aDSM. Start with two provinces in the beginning of 2017, expanding to five by end of the year and complete country coverage in subsequent year. Reducing treatment duration as per the new recommendations will improve chances of treatment adherence and hence the outcomes.		
3. Mainstream support for patients on second-line treatment to improve treatment adherence • Adequate budgetary provisions should be made at Regional and Provincial level to support patients on second-line drugs • Devise mechanisms for patient rehabilitation – psychosocial and specifically vocational after patient is fit to return to work – during or after treatment.		• Ministry of Social Development and Human Security - 2,000 baht/patient/3 times/year • Thai patient foundation – 70 baht/day/3 months • Social Welfare Programmes at the hospitals - 500 baht/visit.
4. **CSO and CBO should be involved extensively in PMDT to plug the gaps in delivery of care. For doing this** • Define the roles that NGOs and CBOs can play as partners in supporting care for Thai population as well as migrants and actively involve them in: ○ Advocacy ○ Counselling		• Within the Global Fund Project, World Vision and Raks Thai Foundation provide DOT and advocate for TB in target communities • World Vision, Raks Thai Foundation, IOM are committee members of the National Development

○ Patient support including DOT and patient retrieval in case of missed doses ○ Palliative care		Committee of the National Strategic Plan
5. Ensure uniform standards of care in private sector • Increasing awareness of private sector regarding national guidelines specifically screening and use of new diagnostics for DR-TB and monitoring them through appropriate national/ sub-national administrative bodies • Ensuring DOT and retrieval of lost patients in private sector through • Coordination with MoPH (BMA in Bangkok) • Coordination with NGOs for support where government support is not feasible		• Referral system between private sector and government hospitals. • Coordination with BMA to support private hospitals in terms of training, supervision and DST when applicable
6. Sort out NHSO reimbursement issues to clear any potential impediments to scale-up of PMDT • The following areas may need to be discussed with NHSO for reimbursement after their inclusion in national guidelines • Sputum transportation for screening as well as follow-up when patients cannot visit the hospital • Use of molecular tests for expanded screening criteria • Treatment of RR-TB with second line drugs (and not waiting for confirmation of MDR-TB). This is already part of the existing PMDT guidelines • Use of newer and repurposed drugs for MDR-TB treatment (like Cfz, Lzd, Bdq and Dlm) as per the national guidelines		• A committee is appointed with members from both MOPH and NHSO to sort out issues or reimbursement. • Regular meetings of the committee members are held. • Reimbursement issues are discussed for the conclusion. • Newer and re-purposed drugs are now being included in national guidelines and regimen will get reimbursed

Achieved	
Some progress/ ongoing	
No change	

Detailed report

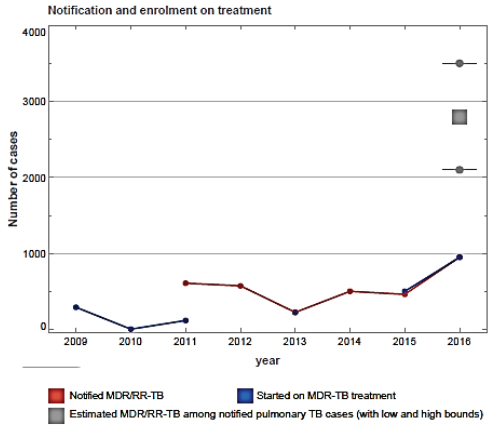
A. Introduction/Background

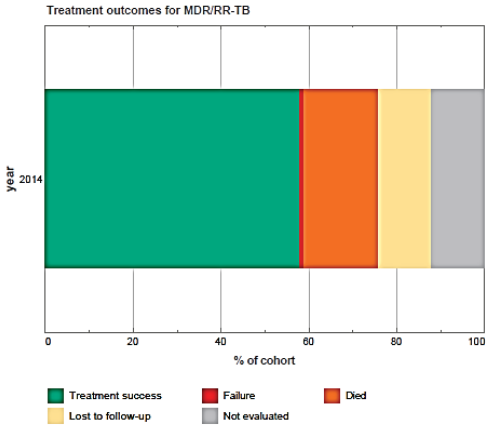
Thailand is one of the 30 high TB burden countries in the world. The estimated incidence of TB in 2016 was 172 per 100,000 (same as 2015) and estimated mortality, including those dying of TB as a result of HIV infection, was approx. 19 per 100,000. The estimated proportion of rifampicin resistant (RR) and multi-drug-resistant (MDR) TB cases among notified pulmonary TB cases was 2800. In 2016, a total of 74,190 all forms of TB cases were notified. Thailand has achieved full coverage of TB services through national programme although there are challenges with notification of TB cases from sectors outside the programme.

An important recent development is the announcement of High Level Meeting on TB along with the United Nations General Assembly (UNGA) in 2018. Thailand has been a co-sponsor of call for such a meeting along with other countries. This meeting will address countries' commitment to implement the WHO's End TB Strategy. One of the key issues in making this meeting happen was the recent realization that MDR-TB is responsible for nearly 30% of the deaths caused by anti-microbial resistance, globally[1].

B. Overall DR-TB programme performance

Overall the programme has shown progress in enrolment of RR/MDR-TB cases nearly doubling between 2015 and 2016. Treatment success rate of 58% among RR/MDR-TB cases for the 2014 cohort is better that the Regional and Global average for the same cohort





[1] J O'Neill. Tackling drug resistant infections globally: final report and recommendations. UK Government and the Wellcome Trust, 2016 https://amr-review.org/sites/default/files/160518_Final%20paper_with%20cover.pdf. Accessed 29 January, 2016.

Drug-resistant TB care, 2016	New cases	Previously treated cases	Total number***
Estimated MDR/RR-TB cases among notified pulmonary TB cases			2 800 (2 100–3 500)
Estimated % of TB cases with MDR/RR-TB	2.2% (1.5–2.9)	24% (16–32)	
% notified tested for rifampicin resistance	8%	17%	6 889
MDR/RR-TB cases tested for resistance to second-line drugs			499
Laboratory-confirmed cases		MDR/RR-TB: 955, XDR-TB: 13	
Patients started on treatment ****		MDR/RR-TB: 952, XDR-TB: 8	

However, there are some discrepancies noticed in the numbers being reported by the programme. In the Global Fund funding request application, it is stated that as per the laboratory data, 1070 RR/MDR-TB cases were confirmed in 2016 and 955 started on treatment. In TBCM numbers recorded were 654 and 582 respectively. During discussions on the issue, BTB confirmed that numbers reported to WHO were final and correct. Discrepancies in numbers within national records are being corrected.

C. Role of partners in delivery of TB and MDR-TB care

Thailand is one of the countries that was covered under the USAID CAP-TB project (ending in December 2017). Specifically in the area of drug-resistant TB, CAP-TB worked with sub-national level government bodies in Kanchanaburi and Rayong Province to build capacity of the TB networks in MDR-TB management.

- In Kanchanaburi, CAP-TB organized regular case conference for the TB Network to update on MDR-TB patient cohort, patients on treatment, treatment outcome, including discussion and follow up on challenging cases (mostly patients with poor treatment adherence) and how the network could work together to address the challenges the patients face. CAP-TB also conducted short teaching/information giving session. Topics covered included TB/MDR-TB, TB/MDR-TB and diabetes mellitus, TB/HIV, WHO new anti-TB drug groups, shorter MDR-TB treatment regimens. TB Clinic at Makarak Hospital coordinated with the nutritionists at the hospital to share with the participants about nutrition for TB/MDR-TB patients. Makarak Hospital has now started to monitor side effects systematically and regularly.
- In Rayong, CAP-TB also organized training on motivational interviewing for healthcare providers in the province. This particular technique highlights patient's autonomy and rights to make decision about their health and helps elicit behaviour change of the patients. CAP-TB assisted Rayong to develop TB IC guide that is specific to Rayong Context. TB IC principles and concepts are based on US CDC, WHO and Thailand IC guidelines. The agency also the province to implement community-based patient-centered care model in Ta Pong Sub-district/ The model involves multi-sectorial partners (municipality, village health volunteers, healthcare providers and Rayong PHO). The model was well received in Ta Pong and has been introduced to two other sub-districts in Rayong.
- At national level, CAP-TB supported the BTB's effort to decentralize MDR-TB expertise to regional and provincial-level physicians by introducing an online helpdesk that allows physicians countrywide to send their request for consultations to the national DR-TB expert group through the system. CAP-TB supported the BTB on the application for Bedaquiline Donation Program; helped review the protocol to initiate patients on a treatment regimen containing BDQ (the green book); supported a site visit of the BTB

and Thai FDA to Khon Kaen Hospital to learn problems in online reporting of patient and drug-safety information; invited the BTB and Thai FDA to attend USAID regional PV workshop conducted in April 2017 and supported the BTB and Thai FDA to conduct online aDSM reporting training for BDQ and STR sites in Thailand in November 2017.

The other main Civil Society Organisations (CSOs) supporting TB and MDR-TB programme include Raks Thai, World Vision Foundation and the Thailand MoPH US CDC collaboration (TUC). Raks Thai is a principal recipient of GFATM support which has some "grass roots" engagement; it is focused primarily on migrant health issues. World Vision Foundation is another Civil Society Organisation which is a major sub-recipient for GFATM support, including in the NFM. World Vision has been involved in supporting community health volunteers, whose network could be a crucial resource in the future expansion of PMDT. TUC is a partnership with dual goals both relevant to PMDT: (i) to develop the evidence base for control policies and (ii) improve quality of surveillance, prevention and treatment through technical assistance.

D. Case finding strategy

The current case finding strategy for diagnosis of RR/MDR-TB is restricted to specific risk groups as elaborated in the national policy which includes relapse, failures of treatment, treatment after LFU, patients on a re-treatment regimen, sputum non- converters, PLHIV, chronic TB, elderly with uncontrolled Diabetes Mellitus, contacts of MDR, Prisoners and migrants.

The algorithm though efficient is constrained by information gaps in the understanding of reliability and accuracy of the newer molecular tests resulting in inordinate delay in communication of results of rapid molecular tests pending the culture positivity to be reported for the results to be accepted for initiating a course of MDR TB treatment. In addition the rifampicin resistance obtained from GeneXpert is being reconfirmed by LPA before declaring the results as per the algorithm currently in use.

There is a sustained effort to identify TB among key populations as per the national guidelines which includes prisons, elderly with uncontrolled diabetes, PLHIV and migrants.

In addition GeneXpert is being offered for diagnosis of extra-pulmonary TB, however children and other occupational risk groups may also be considered to be included in the group that could be offered upfront GeneXpert testing for early and improved diagnosis of TB/MDR TB.

X-ray screening is being used to gate the use of GeneXpert and rightly so as this improves the positive predictive value and is cost efficient, however it should be noted that when this is not available for the risk group in a timely manner, direct GeneXpert testing may be offered.

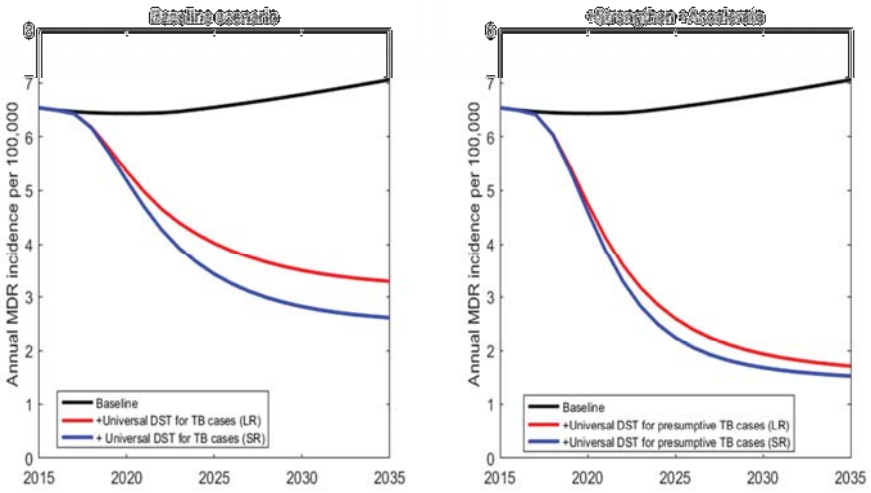
A model algorithm for detection of TB in children has been suggested to be considered after discussion and adaptation to country specific needs for incorporation in the paediatric TB guidelines that is expected to be available in Jan –Feb 2018.

Universal DST at least to Rifampicin should be the 'Standard of Care' in line with the updated WHO targets for ending TB by 2030. Acknowledging that provision of Universal DST will need a considerable quantum of funds for procurement of cartridges for GeneXpert, the country needs to invest in identifying resources from both government and donor partners to meet the needs.

A cost benefit analysis and the modelling exercise clearly shows that use of a highly sensitive TB diagnostic tool especially with the added advantage of Rifampicin resistance detection along with use of shorter regimen will rapidly lead to reduction in the burden of TB and MDR TB and assist in the country reaching the goal of ending TB by 2030.

WHO SEARO is undertaking modelling exercises to provide evidence for potential gains of achieving universal DST. The graphs below show potential reduction in MDR-TB incidence and mortality if universal DST is achieved

Fig: Modelling exercise on potential impact of universal DST on MDR-TB incidence (work in progress)



It is anticipated that by reaching the targets of universal DST for all TB cases, will lead to 50% reduction in incidence by 2035 if longer regimen is used and 60% reduction if shorter regimen is used.

However ifs Universal DST for symptomatics is achieved then a 74% reduction is possible by 2035 using longer regimen and a 77% reduction if shorter regimen is used

Similarly a 50% reduction in mortality is possible by 2035 using longer regimen while a 68% reduction by using shorter regimen over and above what can be achieved with current efforts

(Disclaimer: The modelling exercise is work in progress and the potential results are illustrative examples only. For longer regimen, the current average of treatment success being achieved is considered while for shorter regimen, the available information from ongoing studies has been used)

Table: Cost estimates for use of GeneXpert machines for reaching universal DST

DST for all TB cases	Number per year	Cost per cartridge	Total cost
Testing all TB cases	107,000	USD 15	USD 1,605,000
Testing high risk symptomatics	40,000	USD 15	USD 600,000
Total	147,000 tests		**USD 2,205,000**
DST for all symptomatics			
Testing all symptomatics	642,000	USD 15	USD 9,630,000
Additional screening for indeterminate and errors, non-converters	10,000	USD 15	USD 150,000
Total	652,000 tests		**USD 9,780,000**

Assumptions:

i) The programme reaches 90% of current estimates of TB incidence (119,000)

ii) High risk symptomatics numbers are based on the current activity pattern of the programme (70,000 screened between October 2015-2017). In second scenario, it is assumed that a substantial proportions will be screened as symptomatic in previous row

iii) Cost of cartridge is estimated at USD 15 but can be brought down

Recommendation:

- Country should urgently start undertaking universal DST for all TB cases and symptomatics from high risk groups slowly moving towards upfront DST of presumptive cases to achieve the end TB targets

E. Laboratory services and expansion plan

The country has a well-established network of tiered laboratories with smear microscopy services at the most peripheral level, provincial labs with molecular facilities (GeneXpert & LPA) and conventional culture & DST (both solid & liquid) and a TB containment facility. Beyond these is the National TB Reference Laboratory located in Bangkok which also serves as one of the WHO designated Supra-National Reference Laboratories for the South Asia Region (supports Bhutan, Myanmar and its own country).

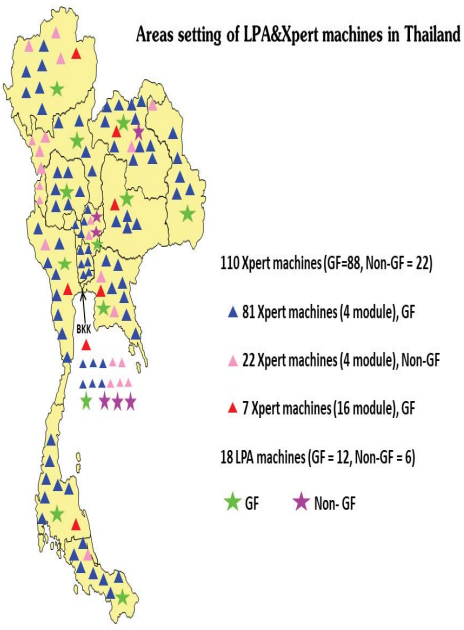
In addition to the NTPs labs there are TB labs in Universities and private hospitals. There are 77 provinces, 1305 hospitals, 13 ODPCs and 12 Universities in the country.

Smear Microscopy services are provided throughout the country 1191 bright field and 84 LED FM microscopy sites available. The EQA for the smear microscopy is administered from the ODPCs and also from the national level. The country follows the LQAS methodology for RBRC as per the WHO EQA guidelines and is well established. Staff assigned the duties of EQA are well trained and are implementing the EQA programme as per National guidelines.

However there are obvious constraints in completing the EQA cycles within the given timelines due to extremely high workload for rechecking slides and limited human resources for this work. This may rationalized by reworking the annual volume for rechecking slides while still having acceptable limits for sensitivity for error detection.

The Molecular facilities both GeneXpert (100) and LPA (18 for first line and 3 for second line) are currently functional. There are 10 additional GeneXpert and 15 second line LPA services planned for 2018. Though both the facilities are available in most ODPCs and a diagnostic algorithm that mainstreams use of GeneXpert for rapid identification of Rifampicin Resistance is available, the TATs for the results range from 8-10 days for GeneXpert and 15-20 days for LPA. In addition GeneXpert Rifampicin resistant results are being reconfirmed routinely for all groups of patients irrespective of risk groups and likely PPVs. The country should consider transitioning to using GeneXpert results for TB patients who are at higher risk of rifampicin resistance like relapse, failures, return after LFU, retreatment category, contacts of MDR etc and reconfirmation of rifampicin resistance using repeat Xpert or LPA be restricted to groups who are least risk of MDR like new patients with no history of TB treatment, and when GeneXpert is being used as a TB diagnostic tool for screening key populations who are not TB patients but are presumptive TB cases .

In addition some GeneXpert sites are not optimally used mainly attributed to suboptimal referral mechanism, restrictive criteria for testing and an apparent lack of trust molecular platforms for diagnosis of MDR TB.



LPA facilities are well established and staffs are proficient in using the technology. However again there is limited use of these tools with an over reliance on growth based (phenotypic tests) by the physicians which impacts TATs of the labs who are then forced to wait for cultures to become positive to report molecular test results. Currently first line LPA is available in 18 sites and 3 of them also perform Second line LPA. There is a plan for expanding SL-LPA to all the 18 sites in 2018.

EQA for the molecular tests are being undertaken by the NTRL as per GLI norms and standards and is acceptable.

The National TB Reference Laboratory is well established and adequately staffed. The Head of the Lab is also supported by an experienced senior emeritus professor well versed in TB bacteriology and is also driving the research agenda for the laboratory.

The National reference laboratory performs all the WHO-endorsed technologies and participates in the annual EQAS PT programme organized by the coordinating lab of the WHO SRLs (Antwerp Belgium). In addition to the functions of the NTRL, it also provides diagnostic services to some parts of Bangkok region.

The main functions of the NTRL are training, EQA for all technologies, supervision and monitoring, providing media and reagents to lower level labs, SRL functions and contributing to research agenda of the TB control programme. Currently the NTRL is conducting the 5th round of national drug resistance surveillance with a sample size of 1700. Around 1000 samples have been collected till date and likely to be completed by March 2018. The analysis and report of this survey is expected to be available by June 2018.

The sub national TB laboratory facility that the author visited in ODPC 7 had been refurbished in the recent past and is conforming to the WHO standards on biosafety and is well equipped. All infection control measures are in place. It is an integrated public health lab with 3 medical technologists being assigned to TB. However considering the work load for this facility which also includes active case finding campaigns in the prison population in addition to catering to 2 ODPCs for routine molecular and culture activities, the staff numbers appear inadequate. There is a standalone laboratory data base which is providing the staff with data on laboratory work but is not linked to the main Data base of the programme. Acknowledging that a clear plan for the linkage of the lab data with the TB data is ongoing, there is urgency for this activity to be completed at the earliest.

Recommendations

- There is an urgent need for dissemination of in-country data and evidence on the reliability of molecular diagnostics available at global level to the treating physicians across the country
- Since the country has been performing DRS every few years and the current is the 5th in this series and the findings of this survey and a time trend analysis of all the surveys need to be published in a peer reviewed journal
- There is a proposal for acquiring a next generation sequencer in the NTRL which would be ideal to support the surveillance system in the country to inform on drug resistance, mycobacterial strains and molecular epidemiology of TB in the country.
- The country should use the data from the current survey as baseline and initiate activities to build capacity for continuous surveillance for getting information on the drug resistance levels and patterns that would guide the country for management of DR TB and regimens that could be used.
- LPA need not be used for reconfirming all RR -TB cases diagnosed using GeneXpert test. However in certain low risk cases found to have RR-TB, a repeat GeneXpert or LPA on a new sample may be performed depending on assessed need.

F. Treatment strategy

The country has been using standardized longer regimen for treatment of RR/MDR-TB cases. The treatment dosage and regimen in national guidelines is aligned with WHO recommendations. It was also observed during the review that shorter regimen guidelines have been developed and started in 7 sites. The use of this regimen is being expanded to 12 more sites and there is now an increasing demand in the country for use of this regimen.

The Clinical Expert Team (CET) plays an active role in treatment decision of complicated cases, specifically pre-XDR, XDR-TB, co-morbidities and other complications. However the role of CET is advisory only and not regulatory.

Although treatment initiation is quick in most cases, one hospital visited by the team reported that they need to wait for upto two months for start of SL treatment. This was because of two reasons mainly – longer than usual turnaround time for getting the results and assumption that NHSO does not permit start of second-line treatment based on GeneXpert results alone (i.e. if only RR is detected).

In one instance, FQ had been added to first line regimen for a patient on retreatment without confirmation of drug-resistance.

Instances of deviation from country guidelines in treating pre-XDR cases was also noted with use of D3 group drugs where group C and group D2 drugs could potentially have been used.

On discussions with the health care providers in periphery it was observed that some of them are not fully aware of follow-up monitoring specifically adverse events monitoring. This will become even more important when use of shorter regimen and new drugs is decentrailsed.

Treatment delivery (DOT), adherence and social support

Most patients receive counselling support through health facilities. It was informed that patient groups have been formed at some hospitals for peer-group discussions and psychological support for MDR-TB patients.

Socio-economic support received by patients in various parts of the country are variable with a potential to receive support from

- Global Fund (GF) mechanism (if within the GF implementing area)
- Ministry of Social Development and Human Security for low-income patients
- Thai relief foundation
- Social welfare programme of the hospital
- Local administration

However even where the support is supposed to be provided, its actual availability for patients is variable. Different knowledge levels among health care workers and patients receiving treatment were observed regarding the economic support even when the counselling support had been received

During visits it was informed that in most cases patients were handed over drugs (duration varies). The patients then visit health facility for injectables and to take oral drugs at health facility under observation of health worker. DOT for MDR-TB during continuation phase is either health facility based or family based – little engagement of community volunteers

Recommendations

- BTB should clarify that health care facilities can start SLDs after RR results are available without waiting for full confirmation of MDR-TB specifically in high-risk cases
- Desk reference/ charts for follow-up monitoring of patients on SLDs could be made available at health care facilities

- PAS should no longer be counted as core drug in longer regimen although this may be used when it is not possible to use other core second line drugs
- No random use of FQs in first line regimen. Retreatment patients should undergo DST and use of subsequent regimen should be guided by DST

Guidelines for shorter regimen:

- Some of the clinicians seem to be in opinion of use of different drugs/ dosage for shorter regimen. It needs to be clarified that shorter regimen are fairly standardized and flexibilities in use of certain drugs is already described in WHO guidelines. Any further deviations should be referred to ethics committee and administered only under research mode but not under programmatic conditions.
- Shorter regimen should be avoided in patients with known or potential hypersensitivity to any of the drugs in shorter regimen. It was observed that in one case the patient had history of Lfx hypersensitivity and hence potential hypersensitivity to other FQs as well. This patient could have been considered equivalent of pre-XDR and treated under guidance of CET
- Dose ramping is not part of the current WHO guidelines and should be avoided in patients to be administered shorter regimen. In cases this has already been done, the days with lower dosage should not be counted as part of the regimen duration

Guidelines for XDR-TB regimen:

- Careful monitoring of implementation of guidelines for pre and XDR-TB cases under guidance of CET
- It is observed that a category of 'Difficult to treat' cases has been created in the guidelines. However some cases in this category may qualify as treatment failure as per WHO guidelines specifically when changes to regimen are required.
- The guidelines should clearly state that injectables may need to be given for upto 12 months (or even more) in XDR-TB patients.
- Clofazimine needs to be given twice daily for 2 months and then once a day afterwards when used in longer regimen
- Role of surgery needs to included in the XDR-TB guidliens

Use of new drugs

- Wider use of bedaquiline in various situations to strengthen drug regimen may be included in the country guidelines. While interim guidelines for bedaquiline and delamanid use are clear for conditions under which the drug can be used or not used, the exclusion criteria are not 'absolute'. 'WHO best practice on expanded indications' can be taken into consideration when a suitable regimen cannot be constructed for patients
- Further, the use of delamanid specifically in cases where a strong enough regimen is not possible using available drugs should be included as an option in the country guidelines

Patient support

- The country should adopt a uniform patient support policy across country which is not limited to GF implementing areas
- There is need to ease access to available support programmes. All patients should be made aware of the available economic support at the time of counselling. Patient education should include information on support opportunities available
- Social Welfare department may include TB (at least MDR-TB) in 'social difficulty' disease category. This will widen the scope of available support
- Income generation activities for patients through CSOs and CBOs will help in rehabilitation of those on treatment as well as those who have been cured as many of them loose jobs because of the disease.
- Such activities could be extended to all TB patients to reduce the catastrophic costs and achieve one of the key End TB strategy milestones.

G. Pharmacovigilance/ aDSM

There has been progress in implementation of pharmacovigilance/ aDSM. Guidelines are available and health staff being trained with partner collaborations. A website developed to collect available data (www.thaihpvc.fda.moph.go.th). As per the prescribed policy, pharmacists need to provide monthly report via online system. However the main focus of aDSM for now is shorter regimen and new drugs

During field visits, it was observed that patient baseline tests and monitoring test reports were not readily available in patient files, although they were being done in most cases. It was also seen that ECG and audiometry are not being routinely performed

Recommendations

- All health workers should pro-actively monitor adverse events (AEs), using checklist
- AE monitoring should slowly be evolved as practice for all MDR-TB patients
- Each patient file should include charts and tables for clinical and lab monitoring schedule as well as trend of results
- ECG and audiometry testing should be undertaken for all patients

H. Drug management

No stock-outs of second-line drugs were reported at any of the places visited. Medicines were found to be well stored and organized. During discussions with counterparts, it was observed that some of the drugs to be used in shorter regimen are not in country essential medicine list (EML). No challenges are foreseen with their import in immediate future as most of them are registered, but the purpose so far has been other diseases. However, it would be good to have them included in the EML to ensure proper usage as per country regulations. It appears that application for specifically bedaquiline inclusion has been pending for long with FDA

Recommendations

- EML issues for bedaquiline and delamanid need to be discussed and sorted out with FDA urgently.

I. Recording and reporting, and data management

There has been a good progress with TB Case Management (TBCM) online reporting system over last one one year and has nice dashboard visualization of various programme related statistics. The team was informed that this is now being used by 920 MoPH hospitals and further expanding. Usability of the system for NHSO is also being worked out and there has been an in-principle agreement to use it for NHSO purpose has been reached, which will sort out duplicate reporting needs by the hospitals. Interconnectivity with other systems is also being worked out. For procurement purposes, the TBCM is now linked with Vendor Management Inventory (VMI) system. However link with Laboratory Information Management System (LIMS) is still not clear. It has been emphasized in earlier reports as well that the two systems need to be linked so that patients diagnosed can be correlated with those put on treatment. Initial loss to follow-up can easily be traced with this linking up allowing for timely action.

Some discrepancies in reporting of 2016 data were observed with different systems reporting different number of MDR-TB cases diagnosed and those put on treatment. However with wider use of TBCM from 2017, these discrepancies are expected to be minimized, if not eliminated.

Recommendations

- It is reiterated to link LIMS with TBCM to be able to correlate diagnosed cases with those on treatment. This will also reduce discrepancies currently being observed in laboratory reports and programme reports.
- Online aDSM system will also need to be linked with TBCM to improve clinical management of MDR-TB cases as well as capturing essential information on adverse events with use of second-line drugs for the programme and FDA

J. Infection control

Some good practices in infection control were observed at the visited hospitals. There was a reported triage of patients with cough so that possibility of infection is minimized. It was also seen that patients in waiting areas were using masks for personal protection and preventing spread of infection. Most hospitals have good infrastructure and functioning negative pressure room for isolation.

However, it was also seen that there were common clinics for HIV, TB and paediatric TB cases (though the days were different) with minimum use of natural ventilation or other means to minimize airborne infection. Further the health workers at this clinic were hardly using any personal protection measure like the N-95 respirator putting them at risk of contracting infection from patients.

On the other hand data on health TB notification among health care worker from previous year did not corroborate with fear of high TB transmission. Only one health care worker - patient transporter had been diagnosed with TB during annual screening

Recommendations

- Infection control should be strictly followed in all health facilities to cut the chain of transmission.
- Patient crowding in waiting areas should be avoided
- Maximise use of natural ventilation wherever possible

K. Human resource, training and technical support strategy

This aspect was not thoroughly reviewed during the mission. However training on various aspects of patients management, programmatic management with use of shorter regimen, aDSM and other aspects of recording and reporting are definitely needed and should be planned. Any additional resources for organising such training should be mobilised.

L. Supervision of the programme

Overall supervision of TB programme is suboptimal because of several constraints including human resource issues at various levels and specifically sub-national level. As per the National Strategic Plan 2017-21, supervision shall be conducted as follows:

- From the BTB to each region and selected provinces, annually
- From the region to the provinces, quarterly
- From the province to the district and selected health facilities, quarterly
- From the district to the health facilities and community activities – quarterly

However, supervision is generally conducted only in combination with other activities as per the need – mostly adhoc. At sub-national level it may not be TB specific.

Recommendations

- Supervision for TB in general and specifically MDR-TB needs to be enhanced. There is a greater need for supervision to sites that have started implementing shorter regimen. Similarly, use of new drugs and treatment of complicated cases needs intensive monitoring and supervision

M. MDR-TB among key populations

There are specific vulnerable populations, notably migrants, displaced and stateless individuals, subsections of the prison population and those in detention centres. There are an estimated 1.1 million registered migrants, and another 2–3 million are unregistered. In August 2013, the MOPH announced plans to extend health insurance coverage to all migrants, regardless of age or registration status, but with increased premium cost to the

migrants. Registered migrants have access to the Thai public health-care system through either the compulsory migrant health insurance scheme, which annually costs THB 1300 plus 600 THB for enrolment and medical checks, or through the social security scheme for those employed in the formal sector. However, less than half of those eligible have enrolled in either scheme.

There are strong efforts to address TB in prisons by the NTP, with many prisoners covered by health insurance. Thailand's prisons, however, are built to house only 105 748 prisoners. As per reports these are generally occupied more than double the capacity in recent times, with more than 3 quarters of them for drug offences. There is thus huge overcrowding and, unsurprisingly, substance use and a high HIV prevalence.

Intensified case-finding for TB among newly detected HIV-positive patients, uninsured migrants, the elderly and prisoners has been initiated. This intensified case finding is using Xpert MTB/RIF. The yield from this activity, and which other groups may benefit from it, needs assessment.

Table: Results of GeneXpert screening among high risk groups

KPs	Suspected	Xpert result (Oct15–Oct17)					
		MTB detected	%	MTB detected with No RIF-resistance	MTB detected with RIF resistance indeterminated	MTB detected with RIF-resistance	%
1.HIV	4,214	886	21%	781	12	93	10%
2.DM	3,150	786	25%	739	7	40	5%
3.HHC- M+	8,948	1516	17%	1411	35	70	5%
4.HHC- MDR-TB	1319	308	23%	262	5	41	13%
5.Prison	15,358	1983	13%	1832	64	87	4%
6.Migrant	4,203	683	16%	621	15	47	7%
7.EP suspected	1269	177	14%	166	1	10	6%
8.Chronic Disease (CXR abnormal)	10,467	1501	14%	1392	21	88	6%
9.CXR abnormal & smear negative	9,123	1677	18%	1565	33	79	5%
10.Unknown	12,015	3,407	28%	3,069	49	289	8%
11.Relapse	57	22	39%	17	0	5	23%
12.TAL	14	11	79%	11	0	0	0%
13.Failure	37	18	49%	14	0	4	22%
Total	70,174	12,975	18%	11,880	242	853	7%

The proportion of drug resistance among risk groups is seen higher than general population

Recommendation

- Intensive case finding among high risk groups needs to continue.
- Reaching out to migrant populations specifically those not enrolled under insurance schemes and unregistered migrants will be tricky. To achieve this
    - Civil society organsiations could play a crucial role in reaching out to all migrant populations and providing them appropriate care or linking them to care system
    - An estimate of resources required for the purpose need to be calculated
    - Inter-country monitoring mechanisms need to be established to track cases who may cross borders. However care should be taken as to not penalize or stigmatize such patients as that will be detrimental to reach-out activities.

N. PMDT plan including funding source

Table: Global Fund funding request by the country specific for MDR-TB

Intervention	Year 1	Year 2	Year 3	Total
Case detection and diagnosis: MDR-TB	138,228	74,183	92,352	304,763
Key populations (MDR-TB) - Others	253,347	318,547	191,514	763,407
Treatment: MDR-TB	836,155	1,080,272	679,014	2,595,440
Community MDR-TB care delivery	166,478	171,265	176,196	513,940
Grand Total	**1,394,208**	**1,644,266**	**1,139,076**	**4,177,550**

National programme budget for 2017 as submitted to WHO

	Budget line item	Budget required [d]	Expected funding [e]	Gap
4.4	**Laboratory infrastructure, equipment and supplies** *Building, maintaining, and renovating TB laboratories, laboratory equipment purchase and maintenance, consummables for all tests (including TB screening for people living with HIV/AIDS), quality assurance, retooling and the transportation of specimens.*	1 375 214	1 258 233	116 981
4.5	**National TB Programme staff (central unit staff and subnational TB staff)** *Salaries and incentives of those working only on TB activities at central and peripheral levels (for example provincial TB coordinators, district TB coordinators, etc.). Do not include primary health care personnel working on other diseases in addition to TB.*	1 610 824	1 610 824	0
4.6	**Drug-susceptible TB: drugs** *Drugs for patients being treated for drug-susceptible TB. Include children, re-treatment cases and buffer stock.*	376 657	376 657	0
4.7	**Drug-susceptible TB: programme costs** *The management and supervision of the TB control programme, training, policy development, meetings, visits for supervision, purchase of office equipment/vehicles, construction of buildings for use by programme staff, routine surveillance, advocacy and communication, public-private mix activities, community engagement, active case-finding, infection control, and management of TB drug procurement and distribution.*	1 198 022	506 981	691 041
4.8	**Drug-resistant TB: drugs** *Drugs to treat drug-resistant TB (RR-TB, MDR-TB or XDR-TB). Include drugs to deal with adverse events for RR-/MDR-/XDR-TB patients.*	74 764	74 764	0
4.9	**Drug-resistant TB: programme costs** *Management of drug-resistant TB services, excluding drugs. Examples are renovation of MDR-TB wards, support for the Green Light Committee, conducting an MDR situation assessment, default and contact tracing, palliative care.*	88 889	48 498	40 391
4.10	**Collaborative TB/HIV activities** *Collaboration between TB and HIV programmes aimed at reducing the impact of HIV-related TB. Activities include TB/HIV coordinating bodies, joint TB/HIV training and planning, HIV testing for TB patients, HIV surveillance among TB patients, isoniazid preventive therapy (IPT), co-trimoxazole preventive therapy (CPT), joint TB/HIV education/ communication, and antiretroviral treatment for TB patients. TB screening for people living with HIV/AIDS is included under (Lab infrastructure, equipment, and supplies).*	48 777	20 327	28 450
4.11	**Patient support** *Cash transfers, food packages, transportation vouchers, educational and emotional support to patient or other in-kind benefits given to TB patients.*	245 118	245 118	0
4.12	**Operational research and surveys** *Periodic surveys (prevalence, drug resistance, patient catastrophic cost); routine surveillance (epidemiology review, inventory studies, pharmacovigilance, systematic assessment of the surveillance system); operational research.*	746 503	726 974	19 529
4.13	**All other budget lines** *Please explain this amount in the "Remarks" box below.*	13 835 228	13 616 740	218 488
4.14	**Total**	**19 599 996**	**18 485 116**	**1 114 880**

	Funding source	Expected funding
4.15	Domestic (including loans)	15 053 071
4.16	Global Fund	3 432 045
4.17	USAID	
4.18	Other sources	
4.19	**Total expected funding**	**18 485 116**

It was also reported that there are differences in 4.6 and 4.7 between the expected number of patients and the budget for the FLD & SLD because the National Health Security Office (NHSO), a major funding organization has procured the FLD and SLD. However, the budget by category from 4.44.13 is not provided by NHSO. Only lumpsum budget of 12,409,392 USD from NHSO is provided, thus, this figure is include into 4.13.

Recommendations

- Domestic funding allocation in consultation with NHSO may need to be enhanced for increasing programme needs for expansion of services.

Annexure 1: Agenda

Monday 18 December 2017

09.00-09.30 hr. Opening remarks and Welcome address at Department of Disease Control (DDC), Ministry of Public Health, Nonthaburi
Dr. Suwannachai Wattanayingcharoenchai
Director General, Department of Disease Control

09.30-10.00 hr. Purpose and description of the Mission
Dr. Vineet Bhatia, WHO SEARO
Dr. Ranjani Ramachandran, Laboratory expert, WHO India

09.30-11.00 hr. Progress made on recommendations of the last mission (6-16 December 2016).
Policy: Criteria for screening drug resistance, update MDR-TB treatment guidelines, the role of CSO in supporting care, standards of care in private sector, NHSO reimbursement issues
Dr. Phalin Kamolwat, Director of TB Bureau

Laboratory: Training for lab staff, time bound EQA, efforts for utilizing molecular diagnostic methods
Saijai Smithikarn, Chief, National TB Reference Laboratory, TB Bureau

Introduction of shorter regimen: Expansion plan and current status
Dr. Thidaporn Jirawattanapisal (PhD), a focal point of shorter regimen

Use of newer and repurposed drugs for MDR-TB treatment: Registration, criteria, and current patient enrolment status
Piriya Rienttrirat, Chief of Pharmacy Unit, TB Bureau

Quality treatment for all RR/MDR-TB patients: DOT & patient support (budgetary provisions, patient rehabilitation- psychosocial & vocational programme)
Sonjit Pongpanich, focal point of PMDT

11.00-12.00 hr. Contribution of partner organizations to PMDT implementation (10-minute presentation of each organization)
National Health Insurance Office (NHSO)
Bangkok Metropolitan Administration (BMA)
Department of Corrections, Ministry of Justice
Ministry of Social Development and Human Security (MSDHS)
Food and Drug Administration (FDA)-Health Product Vigilance Center (HPVC)
Family Health International (FHI)
Principal Recipient-DDC, The Global Fund

13.30-16.00 hr. Visit PR-DDC for briefing on the status of the new GFATM proposal and procurement related to shorter regimen.

18.30-19.30 hr. Travel from Bangkok Suvarnabhumi Airport to Khon Kaen Airport

Tuesday 19 December 2017

Team A: Dr. Vineet Bhatia

09.00-12.00 hr.	Visit Khon Kaen Hospital i. A pilot site of shorter treatment regimen(STR) as expected 2 patients starting the STR on 1 December 2017 ii. A laboratory center performing culture, FLD DST & Xpert
13.00-15.00 hr.	Visit a health promotion hospital (as a health center) providing DOT for the patien
15.00-16.00 hr.	Visit a patient's home
16.00-18.00 hr.	Travel to Kalasin Province by a van

Team B: Dr. Ranjani Ramachandran

09.00-12.00 hr.	Visit Khon Kaen Hospital i. A pilot site of shorter treatment regimen(STR) as expected 2 patients starting the STR on 1 December 2017 ii. A laboratory center performing culture, FLD DST & Xpert
13.00-16.00 hr.	Visit the regional laboratory center of Office of Prevention and Control 7 Khon Ka The laboratory performing culture, FLD DST, FLD LPA & Xpert covering 5 province
17.40-18.40 hrs.	Travel from Khon Kaen Airport to Bangkok Suvarnabhumi Airport (Thai Smile, WE

Wednesday 20 December 2017

Team A: Dr. Vineet Bhatia

09.00-12.00 hr.	Visit Kalasin Provincial Hospital i. An MDR-TB center with current 10-12 MDR-TB patients ii. A laboratory center performing Xpert
13.00-14.30 hr.	Visit Namon District Hospital where case finding and auxiliary care are implement
15.00-17.00 hr.	Travel from Kalasin to Khon Kaen by a van
17.40-18.40 hrs.	Travel from Khon Kaen Airport to Bangkok Suvarnabhumi Airport (Thai Smile, WE

Team B: Dr. Ranjani Ramachandran

09.00-16.30 hrs.	Visit National TB Reference Laboratory, TB Bureau

Thursday 21 December 2017

Team A & Team B

09.00-12.00 hrs.	Visit TB Bureau Laboratory Pharmacy & aDSM Guidelines algorithms for diagnosis of drug-resistant TB Recording & reporting
13.30-16.00 hr.	Discussion with experts on shorter regimen and newer drugs use: terminologies used in aDSM and management of adverse events.
16.00-18.00 hr.	Review GLC Mission Report with the team

Friday 22 December 2017

09.30-10.00 hr. Welcome address

Dr. Suwannachai Wattanayingcharoenchai
Director General, Department of Disease Control

10.00-12.00 hr. Debrief key findings and recommendations at Department of Disease Contro

Dr. Vineet Bhatia, WHO SEARO
Dr Ranjani Ramachandran, Laboratory expert, WHO India

TB Bureau invites representatives from:

Expert Committee of the Shorter regimen
13 Regional Offices of Disease Prevention and Control
Hospitals where the GLC consultants visit
National Health Insurance Office (NHSO)
Bangkok Metropolitan Administration (BMA)
Department of Corrections, Ministry of Justice
Ministry of Social Development and Human Security (MSDHS)
FDA-HPVC
Family Health International (FHI)

Annexure 2: Classification of second-line drugs

GROUP A Fluoroquinolones	Levofloxacin Moxifloxacin Gatifloxacin	
GROUP B Second-line injectable agents	Amikacin Capreomycin Kanamycin (Streptomycin)	
GROUP C Other Core Second-line Agents	Ethionamide / Prothionamide Cycloserine / Terizidone ***Linezolid*** ***Clofazimine***	
GROUP D Add-on agents *(not core MDR-TB regimen components)*	**D1**	Pyrazinamide Ethambutol High-dose isoniazid
	D2	Bedaquiline Delamanid
	D3	*p*-aminosalicylic acid Imipenem-Cilastatin Meropenem Amoxicillin-Clavulanate (Thioacetazone)

Annexure 3: Drug dosage for shorter regimen

Drug	Weight group		
	Less than 30 kg	30 kg to 50 kg	More than 50 kg
Gatifloxacin	400 mg	600 mg	600 mg
Moxifloxacin	400 mg	600 mg	800 mg
Clofazimine	50 mg	100 mg	100 mg
Ethambutol	800 mg	1200 mg	1200 mg
Pyrazinamide	1000 mg	1500 mg	2000 mg
Isoniazid	300 mg	450 mg	600 mg
Prothionamide	250 mg	500 mg	750 mg
Kanamycin†	15 mg per kilogram body weight (maximum 1 g)		

†For adults over 59 years of age, the dose will be reduced to 10 mg/kg (max dose 750 mg).