Thailand Operational Plan

to End Tuberculosis 2017-2021

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Executive Summary

Background

Tuberculosis (TB) continues to be an important public health problem in Thailand. In 2016, Thailand is classified by the World Health Organization (WHO) as one of the 22 countries in the world with the highest TB burden whereby it is expected that there are 120 000 TB incidences per year, 12 000 cases of which would result in mortality. In 2015, 66 179 TB cases were reported. Moreover, multidrug-resistant TB (MDR-TB) has been increasing over the past 10 years at the rate of approximately 2200 cases per year.

Despite continual efforts on prevention, structural shifts in the population structure, namely the aging society and increased labour mobility, have resulted in a high prevalence of 171/100 000 population as reported in the national TB survey in 2012. The survey also suggests that more than half of TB cases do not exhibit any symptoms or do so only minimally. Moreover, TB is more prevalent in male and female, and present higher risk to the elderlies.

At the global level, TB remains the number one cause of death amongst infectious diseases in 2014 – more prominent than AIDS. The United Nations (UN) and the World Health Organization (WHO), through ratification by members, have identified TB prevention and control as part of the Sustainable Development Goals (SDGs) and the End TB Strategy, with the aim to reduce TB incidence to 20 and 10/100 000 population in 2020 and 2025, respectively.

TB incidence in Thailand is 1.3 times the global rate. Reported diagnosis stands at only 59% of the expected total number of cases. This reflects partly a delay in or lack of access to treatment that leads to spreads in the communities. As a result, projections of TB cases only reduce slowly. To achieve the SDGs and the End TB Plan, Thailand must delve in a new direction that can end TB once and for all before the situation worsens to a point that standard treatment renders ineffective.

Assessment of Past Strategic Plans

The report from the 5th Joint International Monitoring Mission for TB Control (JIMM), conducted in 2013, confirms that compared to other countries in the region, Thailand is currently facing a number of challenges, namely:

(1) High mortality from TB

(2) Late diagnosis

(3) Duplications in the monitoring and evaluation (M&E) system

(4) Under-reporting from non-MoPH settings

(5) Insufficient coverage of MDR-TB detection (In 2012, detection rate was only 28%)

(6) Difficulties in accessing TB care for migrant workers, including challenges related to freedom of movement of people within the Association of South-East Asian Nations (ASEAN) Economic Community (AEC), which came into effect on 31 December 2015 and led to an increase in the number of migrants from neighbouring countries with significantly higher rates of TB than Thai nationals.

Moreover, findings from a gap assessment conducted as part of a SWOT analysis suggest that there is a problem of unequal benefits in terms of access to TB diagnosis and treatment between the three health insurance schemes, namely, the Universal Coverage Scheme (UCS) under the National Health Security Office (NHSO), the Civil Servants Medical Benefits Scheme (CSMBS) and the Social Security Scheme (SSS).

Thailand Operational Plan to End Tuberculosis 2017 – 2021

This Thailand Operational Plan to End Tuberculosis 2017 – 2021 has as goal "to reduce the incidence of TB by 12.5% per year, from 171/100 000 population in 2014 to 88/100 000 by the end of 2021". To ensure that the Operational Plan is fully consistent with the Global End TB Plan, as recommended by WHO, the Plan consists of five strategies and their associated strategic objectives and interventions as follows.

Strategy 1: Expedite TB case finding to ensure full coverage through TB screening in risk populations

Objectives: To ensure that all (100%) presumptive TB cases have access to TB screening and early TB diagnosis via molecular diagnostics, as well as standardadised TB treatment and care, and to ascertain an effective TB spread control. Strategic interventions include:

1.1 Increase access to early TB diagnosis via molecular diagnostics for all presumptive TB cases, namely, elderlies, prisoners, HIV-infected persons and migrant workers and ensure national access to molecular diagnostics capacity.

1.2 Conduct TB case finding in key target populations, namely children under 5 years of age living with TB patients, and HIV-infected persons to ensure treatment of latent TB infection.

1.3 Increase coverage of TB control in healthcare facilities and the communities

1.4 Support the private sector and civil society to garner their participation in TB diagnosis, treatment and care, as well as patient referral.

Strategy 2: To reduce TB mortality

Objectives: To halve the TB mortality by 2021 compared to 2015. Strategic interventions include:

2.1 Ensure that all TB cases – adult and child – receive full treatment regimen with standardised and high quality medicine

2.2 Expedite efforts to address HIV-associated TB, including joint planning, timely case finding, TB preventive treatment, and anti-retroviral treatment for all HIV-associated TB cases

2.3 Improve the quality of Programmatic Management of Drug-resistant TB (PMDT) and ensure national coverage

Strategy 3: Enhance human resource capacity on TB prevention, treatment and control

Objectives: To strengthen the leadership and strategic management capacity for TB prevention, treatment and control. Strategic interventions include:

3.1 Develop an internet-based data system to keep individual patient records, ensuring data linkages to facilitate consolidation and utilisation by service providers, funding agencies, M&E agencies and policy-making bodies

3.2 Enhance TB human resource quality to ensure capability and incentive

Strategy 4: Create a system to support a sustainable strategic management

Objectives: To sustain political commitment by mobilising resources to support the system for TB prevention, care and control. Strategic interventions include:

4.1 Appoint the National TB Prevention and Control Committee to assemble institutional expertise and skills on TB prevention, treatment and control from all sectors involved

4.2 Coordinate with the AIDS and Malaria Plans to establish a special fund for AIDS, TB and Malaria (ATM) to ensure continual funding post Global Fund support and develop a system to provide financial support for MDR-TB patients from various sources – government, private and civil society

4.3 Promote appropriate enforcement of TB related laws

Strategy 5: Promote research and innovation on TB prevention, treatment and control

Objectives: To intensify research to direct and optimise implementation and impact, including innovation to improve programme performance that is consistent with the local situation. Strategic interventions include:

5.1 Develop the National Tuberculosis Research Roadmap with participation from funding agencies, research institutions and research supporting institutions

5.2 Promote innovation to facilitate systematic TB interventions

The aforementioned objectives and strategic interventions will be used as guidelines to plan programme activities. In this connection, the target for first-line drug treatment is 108 000 persons by 2021, equivalent to 90% of the projected number of cases, and increasing from 61 200 persons in 2012.

Projections over the duration of the Operational Plan take into consideration both the declining trend in TB due to higher standards of living and the increasing trend in TB due to early diagnosis in children, elderlies and populations at risk of which migrant workers form the largest proportion. In this regard, it is expected that 7200 migrant workers will be diagnosed per year by 2012. This number already takes into consideration the increase in number of migrant workers after the AEC.

It is projected that 90% of reported MDR-TB cases, equivalent to 1900 persons, will receive treatment by 2021. Meanwhile, 2711 children under 15 years of age are expected to receive treatment during the duration of the NSP.

Budget

The budget will be prepared in parallel to the operational plan for implementation during 2017 – 2020. The budget from the existing health service system and the additional budget will be considered to enable a significant progress on TB control as envisaged in the Operational Plan, for instance, increased coverage of screening and diagnosis, laboratory improvement, treatment of MDR-TB, patient support to ensure treatment collaboration, monitoring of TB contacts, human resource development and research. In this connection, a multi-sectoral collaboration is key in ensuring successful outcomes. The budget framework will be used in developing the NSP operational plan and calculating costs of activities by relevant parties, including the National Health Security Office (TB medicine fund and laboratory test), the Ministry of Social Development and Human Security (financial support for TB and MDR-TB patients), Ministry of Justice in coordination with the Ministry of Public Health (TB screening and care for prisoners), and local administration offices (community care).

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Introduction

This document represents Thailand's comprehensive plan to control TB in the period 2017 to 2021. It should, therefore, guide the actions not only of the Ministry of Public Health (MoPH), but also all decision-makers and implementers within the government, and in the nongovernmental sector, both national and international, whose duties or mandates are related to TB control. It should also serve as principal guide for funding agencies considering investment for TB control in Thailand during the same period.

Key principles and foundations on which the Plan is built

Global strategy and targets for tuberculosis prevention, care and control after 2015

In May 2014, The World Health Assembly, convened annually by WHO at the UN Palais des Nations in Geneva, passed a resolution approving with full support the new post-2015 Global TB Strategy named "The End TB Strategy." The Strategy has a vision for a world free of TB and a goal for ending the global TB epidemic. Its ambitious targets are to reduce TB deaths by 95% and to cut new cases by 90% between 2015 and 2035, and to ensure that no family is burdened with catastrophic expenses due to TB. It sets interim milestones for 2020 (Table 1).

Table 1. Targets of the End TB Strategy

Description	Targets			
	Milestones		SDG	End TB
	2020	2025	2030	2035
Reduction in number of TB deaths, compared with 2015 (%)	35	75	90	95
Reduction in TB incidence rate, compared with 2015 (%)	20	50	80	90
TB-affected families facing catastrophic costs due to TB (%)	0	0	0	0

To reach the targets, the Strategy builds on three strategic pillars underpinned by four key principles. Pillars include a greater emphasis on prevention, patient-centred care, role for the civil society in working collaboratively with the government, and bolder policies including commitment to universal health coverage and social protection (Table 2).

Table 2. Pillars of the End TB Strategy

Pillar	Key component
1. Integrated, patient-centred care and prevention	A. Early diagnosis of TB including universal drug susceptibility testing, and systematic screening of contacts and high-risk groups. B. Treatment of all people with TB, including drug-resistant, and patient support. C. Collaborative TB/HIV activities; and management of co-morbidities. D. Preventive treatment of persons at high risk; and vaccination against TB.
2. Bold policies and supportive system	A. Political commitment with adequate resources for TB care and prevention. B. Engagement of communities, civil society organizations, and all public and private care providers. C. Universal health coverage policy and regulatory frameworks for case notification, quality and rational use of medicines, and infection control. D. Social protection, poverty alleviation and intervention to address social determinants of TB
3. Intensified research and innovation	A. Discovery, development and rapid uptake of new tools, intervention and strategies. B. Research to optimize implementation and impact; and promote innovations.

Four key principles are used to increase access to TB treatment and care and limit the burden on the overall economy (Table 3).

Table 3 Principles of the End TB Strategy

Principles	Key component
1	Government stewardship and accountability, with monitoring and evaluation
2	Building a strong coalition with civil society and communities
3	Protecting and promoting human rights, ethics and equity
4	Adaptation of the strategy and targets at country level, with global collaboration

The End TB Strategy calls national stakeholders to use it as a framework to guide their undertakings and requires adequate financing. It reinforces a focus within the strategy on serving populations highly vulnerable to infection and poor health care access, such as migrants. The strategy also highlights the need for multi-sectoral participation and the importance of tackling the problem of MDR-TB.

The national development and health context

The 11th National Economic and Social Development Plan, 2012-2016[1] , provides the background to the health context of the country and has four main objectives:

1) To promote a fair and peaceful society;

2) To increase the potential of all Thais based on a holistic approach with physical, mental, intellectual, emotional, ethical and moral development through social institutions;

3) To develop an efficient and sustainable economy by upgrading production and services based on technology, innovation and creativity with effective regional linkages, improving food and energy security, upgrading eco-friendly production and consumption toward a low-carbon-society; and

4) To preserve natural resources and the environment for maintaining the ecology and a secure foundation of development.

The 11th National Health Development Plan, 2012-2016[2] takes into account the shift in disease burden in Thailand and, hence, in priorities, away from communicable diseases to non-communicable or life-style diseases. It, therefore, aims to strengthen individuals' and communities' contributions to health, in collaboration with the public sector, and to foster self-reliance in the promotion of health and the provision of health services. Disaster preparedness is included, especially in the management of floods and their aftermath. The Plan seeks for more pro-active health systems, including in the field of disease prevention and control. It wants to strengthen health systems with quality standards and with adequate health personnel and appropriate technology at all levels. The Plan foresees the establishment of the National Health Service Delivery Board to balance the needs of purchasers and providers and to reduce the differences between the three major insurance schemes. Health care for migrants is included, as well as an improved health information system and greater emphasis on public-private partnerships. Research is expected to be carried out on major national health issues.

After the launch of the 11th National Health Development Plan, a health system reform was announcement with the goal to decentralise health system management and administration by distributing administrative powers to the districts.

Key components of the National Operational Plan

The Operational Plan is comprised of the following sections:

Introduction

This section provides the purpose and underlying principles of the Plan. It outlines its structure and the collaborative process through which it was developed. It briefly describes the societal and health context for the Plan.

1 Summary of the 11th National Economic and Social Development Plan (2012-2016). http://www.nesdb.go.th/Portals/0/news/annual_meet/54/book/Executive%20Summary%20of%2011th%20Plan.pdf Accessed on 14 December 2013

2 Bureau of Policy and Strategy. The 11th National Health Development Plan, 2012-2016

Core Plan

This section is the heart of the Operational Plan, giving the national background in which TB control operates, summarizing recent achievements of the NTP and assessing its strengths, weaknesses, opportunities and threats. It lays out the goal, objectives and strategic interventions for the new planning period.

M&E Plan

This section provides details on how the Operational Plan will be monitored and evaluated, with indicators and performance targets and how the M&E system itself will be revitalized.

The process of assembling the Operational Plan

For many years the Operational Plan has benefited from the support provided by external and local partners. Inputs were also provided by periodic programme reviews. The most recent 5th JIMM took place in August 2013. It was organized by the BTB (the central unit of the NTP and part of the DDC of the MoPH). Other Thai organizations that took part of this review were the Bangkok Metropolitan Administration (BMA), Khon Kaen University, Mahidol University, Walailuk University, Siriraj Hospital and the Raks-Thai Foundation, National Health Security Office (NHSO). Overall coordination was facilitated by the WHO Country Office for Thailand. International experts from the International Union Against Tuberculosis and Lung Disease (the Union), Family Health International (FHI360), USAID, CDC (Thai MoPH-US CDC Collaboration as well as CDC-Atlanta), Global Infectious Diseases Consulting Ltd. (London), and the Global Fund; as well as staff from WHO Headquarters and the Regional Office for South-East Asia.

Following this 5th JIMM, the next step would be the preparation of the Operational Plan for the next programme period. A broad consultation took place in October 2013 involving many of the organizations included in the 5th JIMM; people affected by TB (including former TB patients and people living with HIV or their representatives); civil society organizations (CSOs) and NGOs; and the national Stop TB Partnership. Follow-up consultations took place in January and March 2014 at which, in addition to the participants of previous consultation, the Principal Recipient (PR-DDC) and more representatives of KAPs attended. In 2014 and 2015, further consultations were undertaken at the provincial level (3 consultations), and the Operational Plan was costed and revised during this period to ensure alignment with the Global End TB Strategy.

The first draft of the Operational Plan was developed by Dr Paul Nunn of Global Infectious Diseases Consulting Ltd., Head of the 5th HIMM. The Department of Disease Control (DDC) then invited experts and stakeholders to revise the draft. In 2016, DDC issued an order to appoint the Thailand Operational Plan to End Tuberculosis 2017 – 20201 Committee to consider the draft Operational Plan for accuracy and completeness before submitting it to the Minister and the Cabinet for approval.

Core Plan

Background

Demographic, geographic and socio-economic features

Demography

With a population of approximately 67 million, Thailand is one of the most developed countries of South-East Asia (Table 4). The country has a rapidly ageing population, a high and rising life expectancy and a need for young labour. The median age is increasing rapidly as fertility declines while the infant mortality rate (IMR) is approaching levels of countries in Western Europe. A growing economy and a fertility rate below replacement level is creating demand for migrant labour which is readily available from poorer neighbouring countries. In 2013, 36% of the population lived in urban areas[3]. About a sixth of the entire population resides in Bangkok.

According to the Institute of Population and Social Research, Mahidol University, there are an estimated 4.5 million migrants, mostly from ASEAN countries (in particular Myanmar, Cambodia and Laos). Out of the estimation, 1.2 million migrants are registered through the Ministry of Labour. Unregistered migrants have generally faced poor access to health care. There are also about 150 000 refugees living in camps near the Thai-Myanmar border and approximately 100 000 stateless people from ethnic minority groups in the north and north-eastern parts of the country.

Table 4. Basic economic, health economic and health indicators[4]

Indicator	Value	Unit	Latest data	Annual change	5 years ago
Gross national income per capita	8190	PPP int. $	2010	+7.62%	6890
Total health spending as a percentage of Gross domestic product (GDP)	3.9	%	2010	-0.30%	3.5
Per capita health spending	179	USD	2010	11.88%	108
Government health expenditure as a percentage of total health expenditure	75	%	2010	0.40%	72.7

[3] Thailand-all health indicators. Available at: http://www.quandl.com/health/thailand-all-health-indicators (accessed on 11 September 2013).

[4] Thailand-all health indicators. Available at: http://www.quandl.com/health/thailand-all-health-indicators (accessed on 11 September 2013).

Table 4. Basic economic, health economic and health indicators[4]

Indicator	Value	Unit	Latest data	Annual change	5 years ago
Private health expenditure as a percentage of total health expenditure	25	%	2010	-0.4%	27.3
Out-of-pocket expenditure as a percentage of total private health expenditure	55.8	%	2010	-3.8%	63.7
IMR	11	per 1000 live births	2010	n.a.	26
Adult mortality rate	205	per 1000 population	2009	n.a.	-
Number of physicians	2.98	per 10 000 population	2004	n.a.	-
Number of nurses and midwives	15.2	per 10 000 population	2004	n.a.	-

Economics and health

Thailand is an upper middle income country with a GDP per capita of USD 9430 in 2013, adjusted for purchasing power parity to reflect changes in prices of goods and services, inflation and comparative purchasing powers. The GDP per capita has been increasing since the country's rapid recovery from the 1997-1999 Asian economic crisis. With a 1% unemployment rate, the economy is short of labour.

Life expectancy is on the rise[5] . The Government covers three quarters of total health expenditure, while private expenditure on health is only 25%, of which just over half is out-of-pocket. Almost all births are attended by skilled health personnel. Mortality is dominated by non-communicable diseases, while AIDS deaths account for over a quarter of all communicable diseases deaths. Physician, nurse and midwife numbers are relatively low compared to other upper middle income countries.

[4] Thailand-all health indicators. Available at: http://www.quandl.com/health/thailand-all-health-indicators (accessed on 11 September 2013).

[5] Health care spending. Available at: http://ucatlas.ucsc.edu/spend.php (accessed 12 September 2013)

Overview of the national health situation

Although there has been considerable improvement in the health status of Thais over the past several decades, there is still significant inequity with the burden of ill-health concentrated particularly among the rural poor in the northern and north-eastern provinces, and to some extent in the southern provinces.

Total spending on health as a proportion of GDP was 3.9% in 2010. The major share of expenditure is on account of non-communicable diseases which form the bulk of the disease burden in Thailand (and have done so for some years). HIV/AIDS is the only communicable disease in the top ten causes of combined death and disability[6]. Within the MoPH the focus on communicable diseases is rather limited, with resources being mostly directed towards emerging diseases (e.g. new strains of influenza), dengue and HIV. The HIV burden is fairly large: nearly 450 000 people are living with the virus; and HIV-associated TB accounts for 13% of all TB cases in 2015. The case fatality rate in HIV-associated TB has been particularly high, especially in the north of the country[7] .

There are multiple health care providers. The private sector is large and not fully regulated. Migrants and prisoners are challenging groups when it comes to providing health services. Both these groups are particularly vulnerable to TB.

The rapid ageing of the population also presents significant problems both in the range of diseases elderly people are prone to, and in the provision of suitable health services. With respect to TB disease, the incidence is higher in the elderlies compared to other age groups. As such, the shifting population structure towards an aging society may result in higher TB incidences in Thailand.

Structure and organization of the health services

Administratively, Thailand is divided into 13 Offices of Regional Health Inspectors which are further divided into provinces, districts, sub-districts and villages. Each region has a Department of Disease Prevention and Control and a health region. At the provincial level, there is a Provincial Health Office or PHO in each province while Bangkok has the Bangkok Metropolitan Administration which is independent and has its own governance structure. Provinces outside Bangkok are divided into 878 districts.

There is a three-tier (province, district and sub-district) public health delivery system with a good health infrastructure down to the village level. Provincial hospitals have 400 to 2000 beds;

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6 WHO. World Health Organization Country Office: Thailand's country cooperation strategy.

7 Causes of mortality among tuberculosis and HIV co-infected patients in Chiang Rai, Northern Thailand.Kantipong P, Murakami K, Moolphate S, Aung MN, Yamada N. in HIV AIDS (Auckl). 2012;4:159-68. doi: 10.2147/HIV.S33535. Epub4 Oct 2012

district hospitals have 30 to 120 beds and 2 to 9 doctors, and health promotion hospitals at the village sub-district level have 3 to 6 nurses and other health workers. Within the MoPH, about 10 departments touch on TB, with 22 separate agencies.

A major feature of the health system in Thailand is the link with three insurance schemes, which cover 99% of the Thai population[8]. Most important is the Universal Coverage Scheme (UCS), established in 2001 and run through the National Health Security Office (NHSO). The others are the Civil Servants Medical Benefits Scheme (CSMBS) and the Social Security Scheme (SSS), which go back to the 1980s and 1990s, respectively. However, these insurance packages are not harmonized, leading to some inequity – a problem that is recognized and being addressed. The CSMBS and UCS are financed by general taxation whereas the SSS is financed by a payroll tax with a tripartite contribution shared by employer, employee and the government, with 1.5 % of the salary as premium. These schemes cover the costs of basic care for almost all the population, and have nearly eliminated the risk of catastrophic health expenditure for families.

In a decentralized health system, where more and more decision-making is devolved to the provinces, the role of national agencies is being redirected to norm-setting, policy guidance and advocacy. Management at the central level has limited authority to issue instructions to provincial and district management in other departments and relies on negotiations. Meanwhile, health insurance agencies pay the providers directly using a service-based approach, therefore, hospitals focus on reporting to the agencies for reimbursement.

The emphasis of reporting to NHSO is on reimbursement for agreed performance indicators rather than clinical issues and outcomes. There is no system to ensure the collection and maintenance of accurate and complete data on clinical issues and treatment outcomes that can be utilised by DDC.

[8] New research shows success of Thailand's universal healthcare scheme. Available at: http://asiancorrespondent.com/106809/new-research-continues-to-demonstrate-the-success-of-thailands-universal-coverage-healthcare-scheme (accessed 02 October 2013)

Gap Analysis

SWOT analysis of the major programme components, unit of analysis is NTP

Area of TB care and prevention	Strengths	Weaknesses	Opportunities	Threats
Case finding	1. Proven impact on the epidemic of TB with declines in estimated incidence, prevalence and mortality. 2. Establishment of a forum for all stakeholders from the public, private, academic and military/ police hospitals to discuss TB issues and agree on ways forward 3. Comprehensive policies of TB control agreed and enforced and new guidelines for adult TB care and prevention in place.	1. Slower than expected fall in new case findings 2. Only some providers are actively engaged in TB control. 3. Public-private and public-public sector coordination is limited. Most teaching, private and military hospitals do not report cases. 4. High number of TB inpatients.	1. Health insurance with state financed health insurance schemes covering almost the entire population 2. Presence of private and public hospitals of international standard. Hospital accreditation by independent agency. 3. Mapping of collaboration and support for NGOs and CSOs to provide community support and follow up services	1. Decentralisation and health reform may result in a loss of focus on TB. Local health authorities may or may not prioritise TB. 2. Disease outbreaks such as SARS and dengue can lead to lack of focus on TB as the same staff are involved.

Area of TB care and prevention	Strengths	Weaknesses	Opportunities	Threats
Treatment	1. Assessment of standards for TB service delivery 2. Community health volunteers have shown effectiveness in providing DOT for TB cases. 3. Automated, centralized procurement of pharmaceuticals through the Government Pharmaceutical Organization. 4. No stock-outs of drugs during the past decade.	1. Urban TB control, particularly in Bangkok. There is limited engagement of civil society. 2. Delays in updating the new guidelines while DOT is not well accepted and not routinely practised. DOT by family member or community health volunteer practised in many settings with limited or no involvement of health care staff. 3. Treatment success for the 2013 cohort below the global target of 85%. 4. Inadequate staff capacity at the BTB to supervise clinical and public health performance of provincial and regional staff. A formal human resource development plan for all levels is needed.	1. Focus on non-communicable diseases opens opportunities to address co-morbidities (e.g. TB and diabetes mellitus or cancer). 2. Progress in BMA in case finding and treatment. 3. The context of universal access provides an opportunity to revise TB aims and operations, making it more efficient.	1. Focus on non-communicable diseases may lead to a loss of interest and focus on TB. 2. Increased non-communicable diseases (such as diabetes mellitus) may lead to increased TB incidence and case fatality.

Area of TB care and prevention	Strengths	Weaknesses	Opportunities	Threats
MDR-TB	1. The 2012 drug-resistance survey did not show evidence of a significant increase of MDR-TB over time. 2. Five-year plan for managing MDR-TB drafted. 3. Management of MDR-TB treatment rolled out to 100 sites from 2009 onwards. 4. No stock-out of drugs at NHSO. 5. Drugs to treat adverse effects are available and covered by NHSO.	1. Capacity for diagnosing drug resistance is under-utilized. 2. Only <30% of estimated MDR-TB cases among the notified cases (TB07) are identified, and approx. 10% are treated and reported. 3. Management of extensively drug-resistant tuberculosis (XDR-TB) is insufficient. In addition, standards of procedure for each level to respond to XDR-TB are not available. 4. Confusion about rights of non-citizens in receiving MDR-TB treatment.	1. Private hospitals are involved in the diagnosis MDR-TB and could collaborate with the public sector. 2. The current debate around health care for migrants could help make MDR-TB treatment available for migrants. 3. Increasing availability of Xpert MTB/RIF machines should facilitate early and rapid diagnosis of MDR-TB.	1. If treatment of MDR-TB cases remains at low levels, XDR-TB will likely increase.

Area of TB care and prevention	Strengths	Weaknesses	Opportunities	Threats
TB/HIV	1. TB/HIV collaboration is progressing: a high proportion (72% in 2012) of TB patients is tested for HIV; the majority of co-infected patients are under dual treatment (62% on ART and 77% on CPT). 2. Infection control in healthcare facilities well managed.	1. Increase in numbers of patients not receiving or experience delays in receiving ART and CPT, and increase in mortality 2. IPT not routinely provided to people living with HIV (PLWA). 3. Challenges in coordination between NTP and NACP at central and regional levels with limited joint planning. 4. TB and HIV plans not well aligned.	1. Early identification of HIV and early addition of ART and CPT to anti-TB treatment would help reduce mortality 2. Operations under the support of Global Fund lead to increased coordination of TB and AIDS plans 3. Strong evidence of positive impact of IPT for PLWA (including those on ART) is available. 4. Capacity to conduct research on IPT effectiveness under the new HIV guidelines for PLWA with CD4 < 500 cells/mm^3	1. Contentment with success on HIV/AIDS control 2. Areas of increased MDR-HIV also reflect MDR-TB

Area of TB care and prevention	Strengths	Weaknesses	Opportunities	Threats
Vulnerable populations (elderly, prisoners, migrants and children)	1. Good linkages established with Ministry of Justice for increasing efforts to control TB among prisoners. 2. Excellent quality of paediatric care available. Paediatric Infectious Disease Society interested in increased collaboration to address childhood TB. 3. Significant amounts of care already provided to migrants. 4. Ample evidence that TB rates are very high in people above 65 years	1. Incidence of TB among prisoners is significantly higher than in the general population. 2. Only a minor fraction of TB cases are reported in children, suggesting significant under-reporting. Management of childhood TB, including contact tracing is often inadequate. Paediatric drug formulations generally unavailable. 3. Limited information about TB in the elderly.	1. Current debate about provision of health services for migrants, and policy movement towards establishing care, at least for migrant workers and their families. 2. Several NGOs and international partners working on migrant and cross-border issues have strong relationships with communities in border areas and migrant communities. 3. The ASEAN free economic area will provide an opportunity to advocate for good access to care and support to migrants.	1. If TB in the elderly is unaddressed it will seriously undermine efforts to reduce the TB burden in the country. 2. TB in prisons is likely acting as a major amplification system for TB in the whole population. 3. Unaddressed TB in migrants will likely increase transmission among citizens.

Area of TB care and prevention	Strengths	Weaknesses	Opportunities	Threats
			4. Thai universities are well positioned to carry out operational research to elucidate and resolve barriers to care for vulnerable populations. 5. Collaboration with Maternal and Child Health and the Expanded Programme on Immunization could catalyse TB diagnosis in children.	
Laboratory strengthening	1. The National reference laboratory (NRL) and Supra-national Reference Laboratory under the BTB allow opportunities for frequent interaction and cooperation.	1. Laboratory supervision is insufficient and staff are uncertain about their roles and responsibilities 2. The process of external quality assessment needs revision 3. Laboratory capacity for molecular diagnostics for timely diagnosis needs to be improved. 4. The role of Xpert MTB/RIF is not clear, resulting in under-use of machines.	1. Significant opportunities are offered by the new diagnostic technologies. 2. Accreditation of laboratories for TB offers possibility of increasing quality.	1. Failure to invest in adequate equipment and training will have negative consequences on the TB epidemic. 2. Excessive customs duties on new molecular diagnostic tests.

Area of TB care and prevention	Strengths	Weaknesses	Opportunities	Threats
Surveillance, Monitoring and Evaluation	1. World class data systems (including NHSO) and excellent information technology infrastructure.	1. Fragmented, inefficient and parallel reporting systems. Paper-based system providing aggregated data only to the central level are still in place in most areas. 2. Vital registration is not yet adequate for accurate TB death reporting.	1. A major opportunity exists to remove duplication in the TB M&E system and make it much more efficient by creation of a web-based, case-based system. 2. A web-based system would facilitate the involvement of the private sector in TB case reporting. 3. Focused training could increase the reporting of under-reported groups such as children and hospital staff	1. If BTB's analytical capacity to handle the increased amounts of data is not increased, it will create a bottleneck.

The 5th Joint International Monitoring Mission

The 5th JIMM took place in August 2013, bringing together external experts and national staff to review the performance of TB care and prevention activities in different settings. The review team prioritised their main concerns into the following conclusions:

1. **Low case notifications**

Private, university, military and some MoPH hospitals rarely report TB cases. In Bangkok, for example, only 21 of 97 hospitals report all their cases to the BTB. The extent of this national underreporting is unknown but likely to be significant. This is especially the case in children, the elderly and those with MDR-TB, where reported rates are well below estimated rates. Among the reasons for this low reporting are that the private sector is passively engaged in partnership with the NTP. Though case notification for certain diseases (including TB), is mandatory by law, this law is neither observed nor enforced for TB. The priority for complying with recording and reporting nationwide is to satisfy the insurance schemes rather than the disease control bureaus. For Bangkok specifically, the majority of hospitals are private hospitals and those that do not come under the BMA; thus, TB notification is low.

2. **Inefficient reporting and surveillance systems**

Current systems for registering and following cases are time consuming and do not exploit the existing opportunities offered by the information technology infrastructure in Thailand. Potential synergies of sharing data with the NHSO have also not been exploited. Thailand is, therefore, currently addressing TB without a clear understanding of the size of the problem or the impact of its policies. The country is at risk of failing to recognize rapid changes in the TB epidemic, e.g. outbreaks of MDR- or XDR-TB while there is capacity to manage both.

3. **Urgent need for improvement of treatment outcomes**

Nationally, the treatment success rate was 82% in 2012 among the notified new Thai smear-positive cases, which is below the global target of 85%. It is largely due to the lack of follow up by private hospitals. A wider range of support approaches is needed for patient-centred care. This should be provided by expanding existing public services to include outreach services for difficult-to-reach patients, through collaboration with other care providers, such as nongovernmental agencies.

4. **Provision of suitable care for all migrants in need**

The majority of migrants are undocumented. They are concentrated in border areas as well as in and around Bangkok. They are reluctant to seek care at the hospital. For those with access to care, they are less likely to complete the treatment. When the AEC comes into force, the free movement of people will likely increase immigration. Demand for healthy labour, respect for human rights and protecting public health all suggest that access to treatment should be facilitated for all migrants, regardless of documentation status.

In summary, underreporting does not necessarily mean that cases go untreated, especially since the advent of near-universal health coverage. Similarly, while case notification data in many provinces should not be regarded as accurate or reliable, it does not mean that the underlying epidemiology of TB is worsening. In fact, detailed analysis of the data available suggests that the burden of TB is falling. Meanwhile, incomplete reporting and irregular availability surveillance data generally reflects inadequacy of the data system to efficiently cater for TB control.

Nonetheless, the 5th JIMM attributed the decline in TB burden to widespread and effective coverage of health insurance, which covers the cost of diagnosis, treatment and much of the care for all forms of TB. Catastrophic expenditures as a result of illness has been significantly reduced. This situation has important implications for the future management of TB in Thailand, and for Thailand's partners in TB control.

Main recommendations of the 5th JIMM

1. The MoPH should address the gaps in notification with the goal of finding all TB cases. Greater priority should be accorded to TB control. The Ministry should take the lead in strengthening/establishing a PPM approach through a high-level conference early in 2014. This event should include staff from the MoPH and BMA, leaders of private, military and teaching hospitals, international and bilateral partners (such as WHO and USAID). The notification system needs to be strengthened in order to achieve mandatory reporting to the BTB of all cases from all institutions that treat TB. The quality of diagnosis needs to be improved by using the new rapid diagnostic tests as the first-line test throughout the country by 2016. Investments should be made in quality assurance. All TB laboratories should be accredited. The MoPH and BMA should also discuss (re-)establishing clear regulatory control over non-BMA facilities with respect to TB reporting and case management.

2. A unified, nationwide case-based, web-based electronic recording and reporting system should be set up that capture all cases in all facilities. Such a system should be linked with the data collection system of the NHSO. A careful transition from the current system should be planned.

3. To ensure maximum treatment success, a campaign targeting both patients and health staff should be organized to improve treatment outcomes based on DOT. Care needs to be more patient-centred, with provision of enablers to poor patients, proper management of co-morbidities and a clearer notion of the roles and responsibilities of patients and providers. Resources for DOT should in particular focus on higher-risk patients (HIV, the elderly, uninsured, marginalized, etc.). Quality of care should be monitored. In Bangkok, the BMA should take responsibility for setting up a monitoring unit and outreach service that follows up cases using DOT providers/peer educators and supports private practitioners to follow their patients.

4. To provide suitable care for all migrants in need, the MoPH should promote the principle that to safeguard the health of all people in Thailand, TB care should also be offered to migrants,

regardless of their status. Access to care should be extended among non-Thais by promoting active TB case-finding, migrant-sensitive TB health service delivery and coordinated approaches with international and local NGOs and CBOs. Local initiatives should be expanded to establish cross-border referral mechanisms, e.g. between Mae Sot and Myawaddy (Myanmar). The MoPH should further explore innovative financing approaches to ensure migrants' universal health coverage, including the removal of financial barriers to TB care.

5. As Thailand is undergoing a transition to an industrialized economy with universal health coverage, the BTB should keep pace with these changes to avoid becoming cost-ineffective in an environment where TB diagnosis, treatment and care are increasingly undertaken in hospital and reimbursed by the health insurance agencies. A debate should be started on the future strategy of NTP. The MoPH needs to expand the BTB's analytical, financial and management capacity, while also strengthening its technical capacity.

Key affected populations

There are specific vulnerable populations, notably migrants, displaced and stateless people, prisoners, people residing in detention centres and PLWA. There are about 1.1 million registered migrants while it is estimated that 2 to 3 million migrants are unregistered. Registered migrants have access to the Thai public health-care system through either the (compulsory) migrant health insurance scheme, with an annual premium of THB 1300 plus THB 600 for enrolment and medical checks; or through the SSS for those employed in the formal sector. However, less than half of those eligible have enrolled in either scheme. During the second half of 2013, health insurance coverage was extended to all migrants, regardless of age or registration status, but with increased premium cost to the migrants.

The uninsured, of whom migrants are the great majority, have limited access to TB care. This problem is likely to expand with the creation of the AEC. While economically beneficial, the expected influx of migrants may potential lead to aggravation of communicable disease control. Migrants coming into contact with health services struggle with financial, language, cultural and legal issues. Consequently, they find it difficult to adhere to treatment for the full duration of the course. Fear of losing employment also negatively affects treatment completion. Additional demands for TB services are generated by those who cross the border, primarily from Myanmar, specifically to seek health care in Thailand where the health infrastructure is well developed.

Thailand has a large prison population. While many Thai prisoners have access to health insurance, some are reluctant to reveal their 13 digit identification code. Prisons house a large number of current and former drug-addicted people with disproportionate HIV and TB prevalences. There are strong efforts to address TB in prisons by the NTP. Thailand's prisons, however, are built to house

about 105 000 prisoners; while on 1 December 2015 they housed close to 300000 inmates. There is thus huge overcrowding favouring TB transmission. Over 4% of prisoners with TB have MDR-TB, which is twice the national rate.

HIV infection is concentrated, with an estimated prevalence in excess of 1% of the 15-49 year old population, in other words there are about 450 000 PLWA. National record indicates that 13% of TB cases are infected with HIV, which is a cause of immunity impairment and leads to increased risk of TB. In Thailand, there is evidence to suggest that TB incidence rises with age with a notable increase in people over 65 years of age compared to other age groups. A survey of national TB prevalence in 2012 – 2013 with sample size of 67 000 people finds that 44% of 142 smear-positive cases represents people over 60 years of age, reflecting the increase in elder population in Thailand during the last decade (Figure 2). This implies that TB in the elderlies has become a major component of TB infection.

The abovementioned survey also finds that TB is twice more common in male than female and 57% of TB cases are concentrated in the north-eastern region. Another key finding is that 60% of TB cases do not exhibit symptoms or do so below the criteria for TB suspects. Hence, the criteria must be revised to become more sensitive/responsiveness so that diagnosis can be performed for this group. Alternatively, a chest x-Ray may be used as the main screening method.

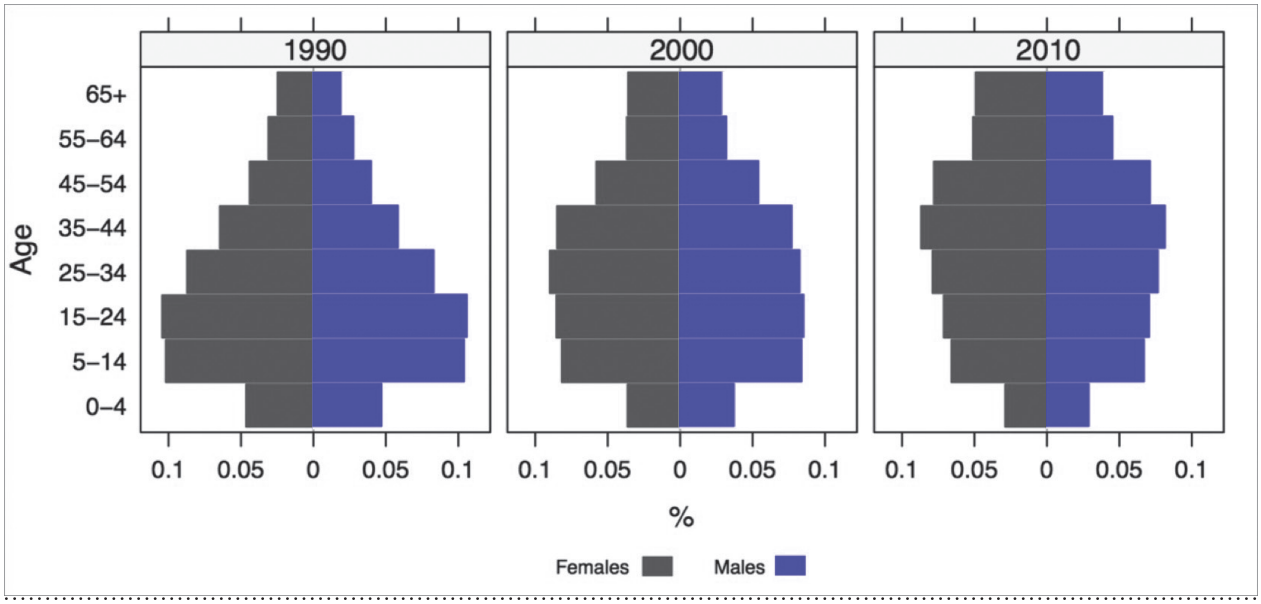

Figure 2. Rapid demographic changes over two decades in Thailand. Each pyramid represents the distribution of the population by age and sex (Source: UN Population Division 2013)

Data from the national registry indicates that there is high prevalence in the north-eastern region of Thailand. However, per 100 000 population, all provinces with high prevalence can be found in all regions (Figure 3). Thus, operational plan should take into consideration socio-geographical differences between areas to ensure appropriateness for local contexts.

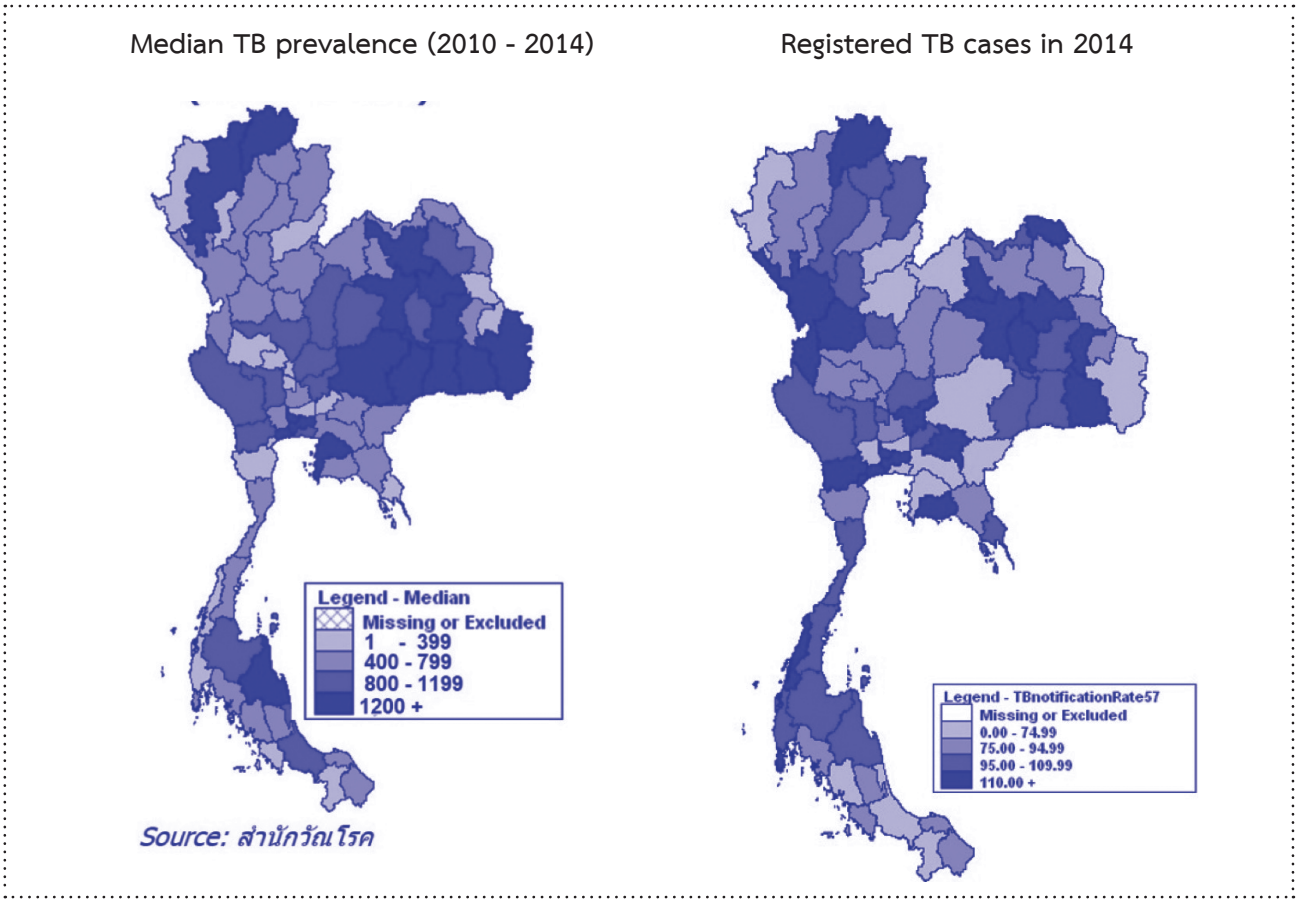

Figure 3. Map of TB prevalence (median) / 100 000 population, by province

It is well known that smoking is a risk factor of TB. Smoking is more common among men (46%) than women (3%)[9] . Tobacco smoking is a known risk factor for TB. Consideration should, therefore, be given to collaboration of TB control and anti-smoking efforts.

The percentage of childhood cases out of all cases reported is less than expected for a middle-income country (5%-15% of all TB cases are expected based on observations from countries with well-functioning TB surveillance systems). This indicates a problem of under-diagnosis, under-reporting of diagnosed cases or both. As per the 5th JIMM report under-reporting of diagnosed cases is likely to be the main problem, since Thailand's health system shows a high performance in a context of

[9] Benjakul S, Termsirikulchai L, Hsia J, Kengganpanich M, Puckcharern H, Touchchai C, Lohtongmongkol A, Andes L, Asma S. Current manufactured cigarette smokingand roll-your-own cigarette smoking in Thailand: findings from the 2009 Global Adult Tobacco Survey. BMC Public Health. 2013 Mar 27;13:277. doi: 10.1186/1471-2458-13-277.

universal access to health care and a low under-5 mortality while under-reporting was observed in several institutions, including the BMA. The extent of the under-reporting is difficult to determine; it was estimated to be at least 33% but could be over 45%.

In the absence of adequate infection control procedures, health care workers are at higher risk of TB. Trends in TB incidence among health care workers in Saraburi hospital (Region 2) show an average TB incidence of 206 per 100 000 person-years over 2003/2010 compared to an estimated TB incidence of 145 per 100 000 person-years in the general adult population. Similar results were observed in hospitals in Bangkok and elsewhere.

Diabetics are reported to comprise 6.9% of the population over 15 years of age[10]. The risk of TB is about two to three times greater among diabetics[11]. This area requires more operational research and policy development towards collaborative activities.

Key new directions for Thailand Operational Plan to End Tuberculosis 2017-2021

1. The rapid and more sensitive diagnosis technologies will be focused to reduce diagnostic delays and provide a chance for starting treatment earlier and may thus prevent deaths. These new tests are especially useful for diagnosing MDR-TB as well as diagnosing TB in PLWA and other high-risk groups for TB and other groups with difficulty in diagnosis such as children, presumptive TB patients with smear negative and elderly.

2. Patient-centred approach will be promoted to improve the treatment outcome. Mechanism to provide psycho-social support and financial support will be strengthened. TB case manager will be introduced to tailor care to the patients. In addition, causes of poor outcomes will require specific investigation, and remedial actions will need to be taken in a timely fashion. Outreach service models that provide DOT especially for those at higher risk of non-compliance (particularly in Bangkok and other capital districts) will be deployed.

3. Leadership and management capacity of program staff and clinical staff at all levels will be highlighted. The major strength of NTP structure is that TB officers are officially appointed and they actively perform their role. However, high turn-over rates of TB staff limit the effective implementation. Human resource development, therefore, becomes key. The types of staff will also need to be tailored in order to boost staff's capacity for analytical work on epidemiological program data and policy development. Staff development will also need to focus on liaising more closely with other programmes such as commodity procurement and management, HIV/AIDS program, policy development for migrant health care, the Hospital Accreditation Agency, and human resource development as well

[10] 11th National Health Development Plan.

[11] WHO. Collaborative framework for care and control of tuberculosis and diabetes (WHO/HTM/TB/2011.15)

as with the health insurance schemes. In addition, capacity building for TB staff and motivation are necessary to improving staff's performance.

4. A renewed effort to engage all providers in TB care will be started through an expanded set of public-private and public-public approaches in order to address the challenges of fragmentation of TB control and standard care as well as TB surveillance. This is especially important for the large private, military and teaching hospitals that treat significant numbers of patients without notifying them. The MoPH will engage with NGOs and local administration organizations that provide social and health services, especially those that work with the migrants living in Thailand through local practice standards or cross-border migrants through International Health Regulations 2005.

5. Information technology will be used to improve TB surveillance system. Different options are available. These include the linkage of TB surveillance with existing health data of hospital administration as well as a unified web-based, case-based TB electronic recording and reporting system. Linkage with laboratory and pharmaceutical data systems will help keep records up to date, reduce data entry burden and duplication of efforts.

6. Sustained political commitment with adequate resources and effective management for TB prevention care and control will be strengthened. This includes social protection by providing financial support to patients with M/XDR –TB to alleviate economic and social problems for patients in all health insurance schemes. Moreover, as a country with a regional role, policies to address TB problem along the border are needed. Key considerations include treatment and care, follow up and treatment continuity and information sharing between border-healthcare facilities.

7. A national TB research plan will be developed to respond to the country's needs through collaboration with research institutions to ensure that all research-related activities will be beneficial and impactful. Innovations for improving program performance will be promoted in ways that are consistent with local situations.

The 2017-2021 Plan

Vision

The vision of the Operational Plan is a "Thailand free of TB"

Overall goal using new incidence version

The overall goal is to reduce TB incidence by 12.5% per year, from 171 per 100 000 to 88 per 100 000, between 2017 and 2021

Overall Goal	Indicator	Target	Means of measurement
Reduction in Incidence	Incidence in the general population	88 /100 000 by 2021	Incidence assessment using modelling and surveillance system as a proxy measurement, etc.

Operational objectives and strategic interventions[12]

Strategy 1: Expedite TB case finding to ensure full coverage through TB screening in risk populations

Objectives : To ensure that all (100%) presumptive TB cases have access to TB screening and early TB diagnosis via molecular diagnostics, as well as standardadised TB treatment and care, and to ascertain an effective TB spread control. Strategic interventions include:

1.1 Increase access to early TB diagnosis via molecular diagnostics for all presumptive TB cases, namely, elderlies, prisoners, PLWA and migrant workers and ensure national access to molecular diagnostics capacity.

While supporting routine diagnosis by sputum smear, the Operational Plan calls for increased throughput of culture by both solid and liquid medium in existing laboratories, with an additional investment in molecular diagnostics as approved by the WHO.

1.2 Conduct TB case finding in key target populations, namely children under 5 years of age living with TB patients, and HIV-infected persons to ensure treatment of latent TB infection.

1.3 Increase coverage of TB control in healthcare facilities and the communities, and promote assessment of healthcare facilities together with programmatic measures (sputum booths, surgical masks for patients to reduce the spread of infectious droplets and personal protection tools for

[12] A brief description of the activities in each strategic intervention is given here. In the Budget section these are divided into numbered specific activities and sub-activities

hospital staff). Promote TB prevention activities to prevent infection in families and communities, for example, knowledge sharing with patients and family members to raise awareness on the importance of infection prevention in residences, community areas, public transports, schools and workplaces. Accountability will be devolved to community-based facilities.

1.4 Support the private sector and civil society to garner their participation in TB diagnosis, treatment and care, as well as patient referral.

1.4.1 Increase private sector and civil society participation by developing operational guidelines to strengthen joint roles and responsibilities

1.4.2 Provide training and communication to ensure understanding and confidence of all healthcare providers

1.4.3 Strengthen TB operations in large cities by forging collaboration between local stakeholders

Strategy 2: To reduce TB mortality

Objectives: To halve the TB mortality by 2021 compared to 2015. Strategic interventions include:

2.1 Ensure that all TB cases – adult and child – receive full treatment regimen with standardised and high quality medicine

2.1.1 Support patients and provide treatment and care using a patient-centred approach

2.1.2 Appoint TB case managers to provide or coordinate support that aligns with the patient's needs to facilitate treatment completion

2.1.3 Provide consulting service to TB patients that is tailored for each specific case to foster treatment collaboration. The service will help identify issues relating to treatment adherence, treatment side effects, TB infection control and moral and social support.

2.1.4 Promote DOT by public health officers, civil society organisation staff, village volunteers or migrant worker volunteers, and use mobile phones as communication devices for patients and trainers. VDO observation is another method to observe medication intake.

2.1.5 Promote capacity building on DOT for patients to ensure adherence.

2.1.6 Develop a coordination mechanism with the Ministry of Labour on law enforcement to enable patients – Thai and non-Thai – to take sick leave or be compensated in case of dismissal

2.1.7 Promote social and human rights measures to prevent stigmatisation and discrimination

2.1.8 Strengthen TB operations in children by stepping up the monitoring of contacts in order to increase case findings, utilising standard diagnosis, providing fixed dose and palatable formulation for children, and prescribing TB preventive medicine to children under 5 years of age according to the country's guidelines.

2.1.9 Conduct death case conference to identify causes of death and collect information that will serve as reference in developing knowledge on treatment and care for severe cases, thereby preventing death

2.2 Expedite efforts to address HIV-associated TB, including joint planning, timely case finding, TB preventive treatment, and anti-retroviral treatment for all HIV-associated TB cases

2.2.1 Develop and utilise a coordination mechanism at the national and sub-national levels e.g. regional and provincial, to integrate efforts from planning to monitoring

2.2.2 Reduce TB burden in PLWA by strengthening case findings, infection control, and providing Isoniazid Preventive Therapy (IPT) for 6 – 36 months

2.2.3 Reduce HIV burden in TB patients by providing diagnosis, Co-trimoxazole Preventive Therapy (CPT) and ART to all regardless of CD4 levels

2.2.4 Ensure treatment of latent TB infection according to the guidelines developed by the National TB and AIDS plans, including those from NHSO

2.3 Improve the quality of Programmatic Management of Drug-resistant TB (PMDT) and ensure national coverage

2.3.1 Conduct screening in MDR-TB risk populations, including re-treatment cases from treatment failure, re-treatment cases from discontinued dosage, repeated infection or irresponsiveness of sputum smear result after two months of treatment, MDR-TB contacts, PLWA, prisoners and the elderlies – all of whom should be diagnosed with molecular diagnostics

2.3.2 Provide universal access to DST among risk groups to ensure that MDR-TB patients are diagnosed for both first- and second-line drug resistances, using molecular diagnostics

2.3.3 Provide second-line drugs for all identified MDR-TB cases, along with counselling and patient support assessment. Treatment will be ambulatory with community-based DOT and care as well as case management support through a multi-disciplinary team. In particular, MDR-TB patients' injection and medication must be under the observation of a public health officer at least once a day. Hospitalization will remain an option for a minority of patients with complications

2.3.4 Improve the IT system and counselling service channels (from national TB experts) for patients with complications

2.3.5 Improve the laboratory information system to enable real-time reporting so that treatment can begin promptly

2.3.6 Support outbreak detection and mitigation

2.3.7 Support supervision for patients to strengthen treatment collaboration and reduce side effects

2.3.8 Ensure that practise in PMDT adheres to the recommended principles reflected in international and national guidelines

2.3.9 Introduce new drugs and shorter MDR-TB regimens under operational research settings and establish a system for active pharmacovigilance

2.3.10 Ensure coordination between the Ministry of Public Health and the Ministry of Social Development and Human Security in developing policies and budget on financial assistance

for MDR-TB patients due to long treatment duration (at least 20 months), severe symptoms, inability to work and loss of income. Thus, financial assistance would help encourage treatment adherence.

2.3.11 Promote palliative and end-of-life cares for all TB patients whom cannot be treated with TB drugs. Arrange for treatment of respiratory and other symptoms such as diet and psychological wellbeing, as well as infection prevention.

Strategy 3: Enhance human resource capacity on TB prevention, treatment and control

Objectives: To strengthen the leadership and strategic management capacity for TB prevention, treatment and control. Strategic interventions include:

3.1 Develop an internet-based data system to keep individual patient records, ensuring data linkages to facilitate consolidation and utilisation by service providers, funding agencies, M&E agencies and policy-making bodies

3.1.1 Conduct monitoring and evaluation, using a case-based data system that provides linkage between TB and AIDS records of hospitals, NHSO and DDC, as well as linkage with death certificate data system to improve the accuracy death notifications

3.1.2 Support case investigation by genetic sequencing to determine cluster of infections

3.1.3 Manage and supervise programme by organising regular staff meetings at all levels (e.g. quarterly programme review meetings) and formulating production of guidelines (e.g. for the new electronic recording and reporting system). It also includes supervisory visits (from the national to the regional level, from the regional to the provincial level, from the provincial to the district level and from the district health office to the health facilities) and information/education/communication (IEC) activities.

3.2 Enhance TB human resource quality to ensure capability and incentive

3.2.1 Formulate strategic plans for human resources and develop a staff information database which can be used to calculate job requirements, training needs and TB personnel budget needs.

3.2.2 Prepare manual and curriculum on TB staff training for all multi-disciplines and levels

3.2.3 Develop an E-learning system to equip TB staff with up-to-date knowledge and conduct trainings that promote continuous learning (continuing education credit) by collaborating with accrediting institutions

3.2.4 Develop an incentive system for TB staff

Strategy 4: Create a system to support a sustainable strategic management

Objectives: To sustain political commitment by mobilising resources to support the system for TB prevention, care and control. Strategic interventions include:

4.1 Appoint the National TB Prevention and Control Committee to assemble institutional expertise and skills on TB prevention, treatment and control from all sectors involved

4.2 Coordinate with the AIDS and Malaria Plans to establish a special fund for AIDS, TB and Malaria (ATM) to ensure continual funding post Global Fund support and develop a system to provide financial support for MDR-TB patients from various sources – government, private and civil society

4.2.1 Formulate guidelines on the establishment of a special fund through sharing of experiences and lessons learned from success cases

4.2.2 Reduce catastrophic costs for TB patients and their families as a result of various expenditures incurred, including direct costs of treatment, particularly for uninsured or inadequately insured persons (mismatch of rights and types of facilities) and other costs not covered by the insurance policy, and indirect costs e.g. transport, food, loss of income and debt accumulation. A financial support programme will be established, for instance, with support from NHSO or other sources, to compensate for loss of income. A catastrophic cost survey to understand the current situation will be implemented and utilised for policy development.

4.2.3 Coordinate with concerned agencies e.g. Ministry of Social Development and Human Security and local administration offices to create a network to provide social and economic support for TB patients, MDR-TB patients and their families. Coordinate policies to initiate a welfare programme to care for TB patients and their families to ensure good quality of life.

4.3 Promote appropriate enforcement of TB related laws

4.3.1 Create a mechanism to enforce laws and regulations, particularly on TB case reporting

4.3.2 Utilise the Communicable Disease Act B.E. 2015 in areas with TB or MDR-TB infection

Strategy 5: Promote research and innovation on TB prevention, treatment and control

Objectives: To intensify research to direct and optimise implementation and impact, including innovation to improve programme performance that is consistent with the local situation. Strategic interventions include:

5.1 Develop the National Tuberculosis Research Roadmap with participation from funding agencies, research institutions and research supporting institutions

5.2 Promote innovation to facilitate systematic TB interventions

Strategies, objectives, measures and accountabilities

Strategies	Objectives Measures	Accountabilities
Strategy 1	**Expedite TB case finding to ensure full coverage through TB screening in risk populations**	Ministry of Public Health National Health Security Office Ministry of Education (university hospitals) Ministry of Defense (Royal Thai Army Medical Department, Royal Thai Navy Medical Department, Royal Thai Air Force Medical Department) Royal Thai Police (Police Hospital) Bangkok Metropolitan Administration (hospitals under BMA) Private hospitals/clinics Local administration offices and the civil society
Objectives	To ensure that all (100%) presumptive TB cases have access to TB screening and early TB diagnosis via molecular diagnostics, as well as standardadised TB treatment and care.	
1.1	Increase access to early TB diagnosis via molecular diagnostics for all presumptive TB cases, namely, elderlies, prisoners, HIV-infected persons and migrant workers and ensure national access to molecular diagnostics capacity.	
1.2	Conduct TB case finding in key target populations, namely children under 5 years of age living with TB patients, and HIV-infected persons to ensure treatment of latent TB infection.	
1.3	Increase coverage of TB control in healthcare facilities and the communities	
1.4	Support the private sector and civil society to garner their participation in TB diagnosis, treatment and care, as well as patient referral.	

Strategies	Objectives Measures	Accountabilities
Strategy 2	**To reduce TB mortality**	Ministry of Public Health
Objectives	To halve the TB mortality by 2021 compared to 2015	National Health Security Office
2.1	Ensure that all TB cases – adult and child – receive full treatment regimen with standardised and high quality medicine	Ministry of Education (university hospitals)
2.2	Expedite efforts to address HIV-associated TB, including joint planning, timely case finding, TB preventive treatment, and anti-retroviral treatment for all HIV-associated TB cases	Ministry of Defense (Royal Thai Army Medical Department, Royal Thai Navy Medical Department, Royal Thai Air Force Medical Department)
2.3	Improve the quality of Programmatic Management of Drug-resistant TB (PMDT) and ensure national coverage	Royal Thai Police (Police Hospital)
		Bangkok Metropolitan Administration (hospitals under BMA)
		Private hospitals/clinics
Strategy 3	**Enhance human resource capacity on TB prevention, treatment and control**	Ministry of Public Health Ministry of Education
Objectives	To strengthen the leadership and strategic management capacity for TB prevention, treatment and control. Strategic interventions include:	
3.1	Develop an internet-based data system to keep individual patient records, ensuring data linkages to facilitate consolidation and utilisation by service providers, funding agencies, M&E agencies and policy-making bodies	
3.2	Enhance TB human resource quality to ensure capability and incentive	

Strategies	Objectives Measures	Accountabilities
Strategy 4	**Create a system to support a sustainable strategic management**	Ministry of Public Health National Health Security Office Ministry of Defense Ministry of Foreign Affairs Ministry of Social Development and Human Security Ministry of Interior Ministry of Education Ministry of Labour Ministry of Justice Thai Red Cross National Health Commission Office Social Security Office National Economic and Social Development Board Bureau of Budget WHO Thailand Country Office Tuberculosis Eradication Association Lungs Disease Civil Society
Objectives	To sustain political commitment by mobilising resources to support the system for TB prevention, care and control. Strategic interventions include:	
4.1	Appoint the National TB Prevention and Control Committee to assemble institutional expertise and skills on TB prevention, treatment and control from all sectors involved	
4.2	Coordinate with the AIDS and Malaria Plans to establish a special fund for AIDS, TB and Malaria (ATM) to ensure continual funding post Global Fund support and develop a system to provide financial support for MDR-TB patients from various sources – government, private and civil society	
4.3	Promote appropriate enforcement of TB related laws	

Strategies	Objectives Measures	Accountabilities
Strategy 5	**Promote research and innovation on TB prevention, treatment and control**	Ministry of Public Health Ministry of Education National Research Council of Thailand Private sector Funding agencies Research supporting institutions National Innovation Agency
Objectives	To intensify research to direct and optimise implementation and impact, including innovation to improve programme performance that is consistent with the local situation. Strategic interventions include:	
5.1	Develop the National Tuberculosis Research Roadmap with participation from funding agencies, research institutions and research supporting institutions	
5.2	Promote innovation to facilitate systematic TB interventions	

Monitoring and Evaluation Plan

Purpose of M&E Plan

The Core Plan of the Operational Plan lays out the overall goal for 2017-2021 – to reduce the prevalence of TB from 171/100 000 population in 2014 to 88/100 000 by the end of 2021 – and describes five objectives, together with the strategic interventions which are designed to achieve the overall goal. The activities and sub-activities are set out in the operational plan and budget.

This M&E Plan has two main parts. The purpose of the first part is to describe how, using the M&E system, impact on addressing the TB epidemic in Thailand will be charted up until 2021. It will also monitor progress in achieving planned outcomes, outputs, processes and inputs. Relevant indicators are described and annual targets given. In the second part, the M&E Plan will address the strengths and weaknesses of the current M&E system. The plan should enable the National TB Prevention and Control Committee to check progress of TB works in a regular fashion, decide whether milestones are met or corrective action needs to be taken.

Overview of the current M&E system

Although, there are a number of data sources collecting TB information, current M&E system in Thailand mainly depends on the routine reporting system responsible by TB Bureau.

Data collection, data sources and coordination between systems

TB data for monitoring and evaluation are available from the following sources:

1. Routine case notifications to the BTB compiled in a national database of quarterly aggregated counts (BTB in in charge of data compilation and management);
2. Routine TB case registrations to the NHSO for financial purpose – data are available in a national database of aggregated case counts. For parts of the country, a case-based database is available;
3. Hospital Information Systems e.g. Hos XP or Hos OS are able to use for TB case finding reports;
4. TB deaths (HIV-negative) from death certificates (Bureau of Policy and Strategy or BPS) – data are case-based and submitted by the Ministry of Interior (MoI);
5. National surveys of TB prevalence were conducted in 1962, 1977, 1991, and 2012. National surveys of MDR-TB were also implemented in 1997 – 1998, 2001 – 2002, 2006 – 2007 and 2012 – 2013.
6. In 2016, a web-based TB Clinic Management (TBCM) will be launched, and it is projected to cover a countrywide within three years.

1. Routine recording and reporting managed by BTB

TB surveillance managed by the BTB is based on electronic. BTB developed an on-line web application at www.tbthailand.org/data for TB clinic staff of all treatment units to enter the summary data into the standard forms available on the website. Registration for username and password is required for TB clinic staff and TB coordinators of all levels to access to the database. To reduce the duplication in data entry and any errors, all levels can see the figures, when TB clinic staff enters the data. TB coordinators of the Provincial Health Office and the Office of Disease Prevention and Control are able to do the data quality check. A programmer at TB Bureau is responsible for website management.

Although all treatment units are available for the data entry, private hospitals or university hospitals barely participate in this system. Please note that throughout the country there are 999 public and 316 private hospitals[13] .

2. Routine case registration to NHSO for financial purpose

The NHSO developed a comprehensive case-based disease management information system for TB. Anti-TB drugs and reimbursement to service providers concerning patients under the UCS, which covers about 70% of the population, is the main objective of the information system. Its TB information system, however, provides much more information than needed to monitor UCS-related financial flows. It allows the monitoring of treatment outcomes and active case finding, for example, in addition to details of medical services provided to each patient.

The NHSO TB database also includes data on patients not on UCS (UCS status is confirmed by record linkage with a master database of UCS-affiliated people, using the 13-digit national ID number as a single identifier). In 2012, 53 000 TB cases were registered and 42 000 (79%) were on the UCS. The choice is left to the service provider to enter data for non-UCS cases. A payment of THB 10 is provided for each entered record, regardless of whether the record refers to a patient on UCS or not.

Data on culture, DST and MDR-TB are entered directly online from laboratories or hospitals using an on-line web application called DMIS-TB which is linked to the NHSO TB database.

There is a desire to put in place an automatic procedure to extract the TB data right from each Hospital Information Systems (HIS) in order to minimize data entry requirements.

The NHSO requires reporting of treatment outcomes by hospitals, thus, it is able to prepare reports on national treatment outcomes. This system is not shared with the BTB.

The NHSO maintains a similar parallel information system for a few other diseases, including HIV/AIDS, renal deficiency requiring haemodialysis, or chronic obstructive pulmonary disease.

[13] http://en.wikipedia.org/wiki/List_of_hospitals_in_Thailand

3. Hospital information systems

Each hospital maintains a HIS, and these are not standardized across hospitals. They partly allow the monitoring and supervision of TB cases. However, data is not used for generating provincial or national reports. This limitation is the underlying reason for reliance on BTB database.

An important advantage of HISs is that TB cases are reported as witnessed by hospital staff and can be readily used by relevant personnel. IT staff are available to assist with system usage and data exports.

4. Death certificates

Vital statistics are collected by the MoI through death certificates, which are forwarded to the BPS of the MoPH. A team of five staff routinely checks data quality and one staff encodes causes of death for well over 400 000 death certificates per year. The data can be queried through a password-protected web interface to generate reports. Different strategies have been used to improve data quality, involving hospital doctors, then health centres and lastly officers from the MoI, trained by the BPS. This has led to a variable state of implementation across provinces.

Hospital data are automatically extracted from HISs. Community deaths are investigated by MoI officers, who interview relatives and fill in death certificates. The MoI will cover all provinces in 2014.

By law, death certificates must be completed before a body is cremated or buried, but this law is not always enforced.

Data quality issues include incomplete coverage of causes of death and a large number of ill-defined causes. Miscoding between HIV and TB causes of death is also a recognized problem but the frequency is not well quantified. The last large scale data quality audit on causes of death was conducted in 1999 in 16 provinces and showed that only 29% of causes were correctly attributed. Random sampling now takes place every year in about ten hospitals, covering around 2000 deaths. There is currently no mechanism for auditing causes of death reported at community level.

5. Surveys

A national prevalence survey meeting international standards was conducted in 2012-2013, sampling separately the population in the 76 provinces and in Bangkok. The third and fourth national drug resistance surveys were conducted in 2006 and 2012, respectively.

The fifth national survey revealed useful insights on changes in TB epidemiology. For instance, smear-positive TB cases with unclear symptoms made up almost 1/3 of all cases and TB prevalence was higher among the elderlies. However, survey limitation included low participation rate of Bangkok residents, availability of quantitative (size of disease burden) rather than qualitative data (quality of care), lack of data on the proportions of HIV infections – information that is already present in existing reporting system.

6. The web-based TB-CM

It is expected that in 2016, this web-based TB-CM will become a single national online web-based and case-based real-time reporting system for TB. The data entry is performed at hospital level. Then the data checks can be done by coordinators at the Provincial Health Office and the Office of Disease Prevention and Control. The data-interchange mechanism to link with the NHSO will be established so that no record needs to be entered twice at the hospital level.

M&E Plan to monitor progress of the TB epidemic and implementation of the Operational Plan

Indicators

The Monitoring Framework follows the logical approach of monitoring inputs, processes and outputs, through to assessing the coverage of TB services and the impact they provide (Figure 7).

The major indicators for monitoring the plan and its impact are listed in the M&E Framework (Table 5). The indicators closely follow the objectives and strategic interventions from the Core Plan, using the same numbering system.

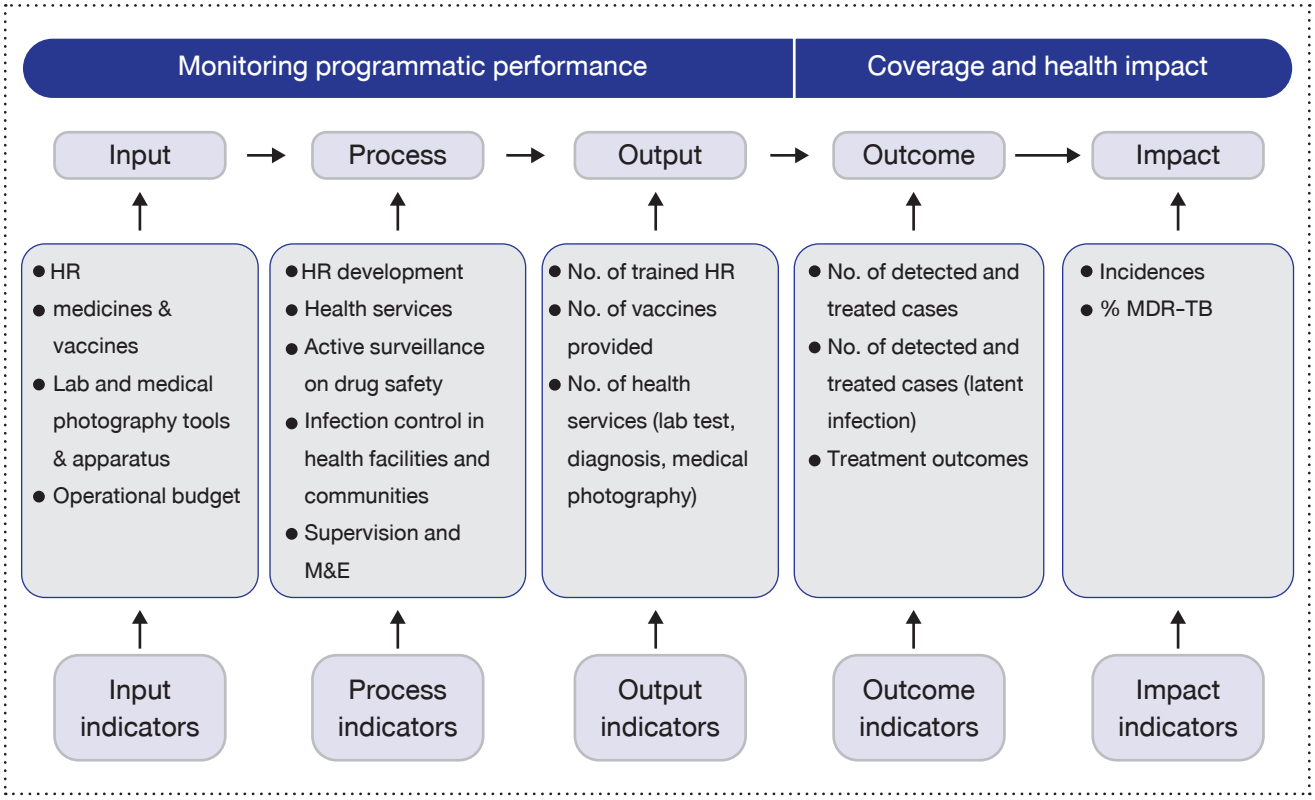

Figure 7. Logical indicator sequence

Table 5: National M&E Framework

No.	Indicator	Basline		Performance target					Data source & frequency	Indicator type
		Year	Value	2017	2018	2019	2020	2021		
Overall goal – Reduction in TB incidence										
	TB incidence rate (per 100 000 population)	2014	171	150	131	115	100	88	Global TB report, surveillance system	Impact
Strategy 1: Expedite TB case finding to ensure full coverage through TB screening in risk populations										
To ensure that all (100%) presumptive TB cases have access to TB screening and early TB diagnosis via molecular diagnostics, as well as standardadised TB treatment and care.										
	% TB case finding (all types)	2014	59	80	82.5	85	87.5	90	Global TB report, surveillance system	Outcome
1.1 Increase access to early TB diagnosis via molecular diagnostics for all presumptive TB cases, namely, elderlies, prisoners, HIV-infected persons and migrant workers and ensure national access to molecular diagnostics capacity.										
1.1.1	Proportion of contacts in confirmed TB patient's household receiving x-Ray screening (%)	2014	NA	30	40	50	60	70	TB surveillance system (Web-based TBCM)	Output
1.1.2	Proportion of sputum smears laboratories achieving acceptable performance on external quality assessment (EQA-LQAS) (%) (Only smear) (False positive/False negative)	2014	67	90	90	90	90	90	NRL (BTB) performance report	Output
1.1.3	Proportion of existing laboratory routinely performing DST and achieving acceptable performance on external quality assessment (at least 95%[14]) agreement for Rifampicin and Isoniazid with the results of NRL) (%)	2014	35 (7/20)	85 (20/23)	90 (21/23)	95	100	100	NRL (BTB) performance report	Output

[14] จะพิจารณาต่อไปโดยระดับนโยบายแห่งชาติ

No.	Indicator	Basline		Performance target					Data source & frequency	Indicator type
		Year	Value	2017	2018	2019	2020	2021		
1.2 Conduct TB case finding in key target populations, namely children under 5 years of age living with TB patients, and HIV-infected persons to ensure treatment of latent TB infection.										
1.2.1	Proportion of children (under five years) who are contacts of bacteriologically-confirmed TB patients and receiving treatment according to the TB Treatment Guidelines for Children (%)	2014	NA	50	60	70	80	90	TB surveillance system (Web-based TBCM)	Output
1.2.2	Proportion of PLWA who are presumptive latent TB cases according to the HIV Treatment and Prevention Guidelines, receiving treatment for latent TB (%)		NA	10	20	30	40	50	TB surveillance system (Web-based TBCM)	Output
1.3 Increase coverage of TB control in healthcare facilities and the communities										
1.3.1	Proportion of target hospitals meets the criteria of TB infection control and staff use personal protection tools (%)	2014	NA	90	90	90	90	90	Survey	Output
1.3.2	Number of TB in health care workers / general population	2014	1.2	-	-	1		1	Survey	Output
Support the private sector and civil society to garner their participation in TB diagnosis, treatment and care, as well as patient referral.										
1.4.1	Proportion of TB cases reported to the BTB by Non–MoPH care providers (%)	2014	NA	20	40	60	80	100	TB surveillance system (Web-based TBCM)	Output

No.	Indicator	Basline		Performance target					Data source & frequency	Indicator type
		Year	Value	2017	2018	2019	2020	2021		
Strategy 2: To reduce TB mortality										
To halve the TB mortality by 2021 compared to 2015.										
	TB mortality in the general population (per 100 000 population)	2014	10	9	8	7	6	5	Annual Global TB Report and national TB surveillance system	Impact
2.1 Ensure that all TB cases – adult and child – receive full treatment regimen with standardised and high quality medicine										
2.1.1	Treatment success rate for new and re-infected TB cases using first-line drug treatment	2013	81	85	86	87	88	90	TB surveillance system (Web-based TBCM)	Outcome
2.1.2	Proportion of TB cases receiving complete treatment regimen (including DOT) under the care of case managers (%)	2556	NA	50	60	70	80	90	Research and assessment	Output
2.2 Expedite efforts to address HIV-associated TB, including joint planning, timely case finding, TB preventive treatment, and anti-retroviral treatment for all HIV-associated TB cases										
2.2.1	Proportion of all TB cases with HIV test result recorded in TB register (%)	2014	71	75	80	85	90	95	TB surveillance system (Web-based TBCM)	Output
2.2.2	Proportion of HIV-associated TB cases receiving CPT (%)	2014	64	75	80	85	90	90	TB surveillance system (Web-based TBCM)	Output
2.2.3	Proportion of HIV-associated TB cases receiving ART (%)	2014	69	75	80	85	90	90	TB surveillance system (Web-based TBCM)	Output

No.	Indicator	Basline		Performance target					Data source & frequency	Indicator type
		Year	Value	2017	2018	2019	2020	2021		
2.3 Improve the quality of Programmatic Management of Drug-resistant TB (PMDT) and ensure national coverage										
2.3.1	Proportion of bacteriologically confirmed & previously treated cases, receiving DST results conducted by molecular diagnostics or conventional phenotypic method (%)	2014	38	50	60	70	80	90	TB surveillance system (Web-based TBCM)	Output
2.3.2	Proportion of new cases, receiving DST results conducted by molecular diagnostics or conventional phenotypic method (%)	2014	24	30	40	50	60	70	TB surveillance system (Web-based TBCM)	Output
2.3.3	Case detection rate of MDR-TB (%)	2014	23 (506/ 2,200)	50	60	70	80	90	TB surveillance system (Web-based TBCM)	Output
2.3.4	Proportion of MDR-TB cases undergoing treatment (%)	2014	71 (303/ 428)	95	95	95	95	95	TB surveillance system (Web-based TBCM)	Output
2.3.5	Coverage of new drug provision in presumptive MDR-TB cases (%)	2014	NA	90	90	90	90	90	Minutes of the meetings of the national expert committee on MDR-TB	Output

No.	Indicator	Basline		Performance target					Data source & frequency	Indicator type
		Year	Value	2017	2018	2019	2020	2021		
Strategy 3: Enhance human resource capacity on TB prevention, treatment and control										
To strengthen the leadership and strategic management capacity for TB prevention, treatment and control										
3.1 Develop an internet-based data system to keep individual patient records, ensuring data linkages to facilitate consolidation and utilisation by service providers, funding agencies, M&E agencies and policy-making bodies										
3.1.1	Proportion of TB treatment units reporting for MoPH settings, not including specialised health units (%)	2014	90	90	95	95	100	100	TB surveillance system (Web-based TBCM)	Output
3.1.2	Proportion of TB treatment units reporting for non-MoPH settings, not including specialised health units (%)	2014	21 (138/652)	40	50	60	70	80	TB surveillance system (Web-based TBCM)	Output
3.1.3	M&E and surveillance system assessed following the WHO checklist	2013	Yes	Yes	Yes	Yes	Yes	Yes	Survey and self-assessment, technically supported by WHO	Process
3.2 Enhance TB human resource quality to ensure capability and incentive										
3.2.1	Availability of a comprehensive strategic plan for HRD	2015	NA	No	Yes	Yes	Yes	Yes	TB staff database	Process
3.2.2	Number of trained staff on TB standard courses	2015	NA	800	800	800	800	800	TB staff training report	Process

No.	Indicator	Basline		Performance target					Data source & frequency	Indicator type
		Year	Value	2017	2018	2019	2020	2021		
Strategy 4: Create a system to support a sustainable strategic management										
To sustain political commitment by mobilising resources to support the system for TB prevention, care and control.										
4.1 Appoint the National TB Prevention and Control Committee to assemble institutional expertise and skills on TB prevention, treatment and control from all sectors involved										
4.1.1	Number of minutes of the meetings of the National TB Prevention and Control Committee	2015	NA	2	2	2	2	2	Minutes of the meetings (BTB)	Process
4.2 Coordinate with the AIDS and Malaria Plans to establish a special fund for AIDS, TB and Malaria (ATM) to ensure continual funding post Global Fund support and develop a system to provide financial support for MDR-TB patients from various sources – government, private and civil society										
4.2.1	Availability of a special fund for ATM	2015	No	No	Yes	Yes	Yes	Yes	Global Fund progress report	Process
4.2.2	A system to provide financial support for MDR-TB patients from various sources – government, private and civil society	2015	No	Yes	Yes	Yes	Yes	Yes	Ministry of Social Development and Human Security	Process
4.2.3	Number of TB patients receiving monthly allowance	2015	NA	40	50	75	100	125	Social welfare progress report (BTB)	Output
4.2.4	Proportion households facing catastrophic costs as a result of TB treatment	2015	NA	-	-	0	-	0	Research report	Output
4.3 Promote appropriate enforcement of TB related laws										
4.3.1	Number of provinces that utilise the Communicable Disease Act B.E. 2015 for TB operations	2015	NA	5	10	15	20	25	Survey	Output

No.	Indicator	Basline		Performance target					Data source & frequency	Indicator type
		Year	Value	2017	2018	2019	2020	2021		
Strategy 5: Promote research and innovation on TB prevention, treatment and control										
To intensify research to direct and optimise implementation and impact, including innovation to improve programme performance that is consistent with the local situation.										
5.1 Develop the National Tuberculosis Research Roadmap with participation from funding agencies, research institutions and research supporting institutions										
5.1.1	Development of the National Tuberculosis Research Roadmap with participation from funding agencies, research institutions and research supporting institutions	2015	No	Yes	Yes	Yes	Yes	Yes	DDC	Output
5.2 Promote innovation to facilitate systematic TB interventions										
5.2.1	Proportion of budget for research studies (%)	2014	3 (604,908/ 19,694,609)	4	4	6	8	10	Global TB report	Input
5.2.2	Number of TB innovations (IT & management)	2015	NA	2	4	6	8	10	Survey	Output

Data verification and quality assurance

Data verification and quality assurance will be carried out through various processes:

1. Routine Data Quality Assessment (RDQA) tools will be used to measure periodic data quality of the M&E and the routine supervision by the NTP and partners. TB supervisors can also conduct RDQA procedures in another site than their usual supervision area. M&E staff will be trained in conducting RDQA to strengthen data management and reporting in order to produce quality data.

2. In addition, follow-up verifications will be conducted at intermediate levels (provinces) and at the BTB, where data entries will be "cross-checked" for accuracy and reliability.

3. On-site data verification processes in randomly selected provinces will be carried out to assess the quality of data and the reporting systems at different levels.

Supervision

Supervision is an integral part of support to the key elements of TB control, and is a high priority among the core activities to be carried out during the life span of the M&E Plan: to monitor NTP activities, check the data collection methodology, assess quality of data, build capacity and provide feedback to the peripheral units. 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, annually
- From the district to the health facilities and community activities – ongoing

Capacity building

Strengthening the Operational Plan to allow it to address the expected demands in the near future, especially in terms of design and installation of the web-based surveillance system, increased data analysis, policy development, etc. requires consideration of the staffing needs.

On-going training will be required of staff at all levels – both working exclusively or partly on TB –on the routine current activities as well as the new activities to be conducted over the planned period.

In addition, relevant staff may participate in study tours, conferences and training workshops overseas (based on needs).