National Strategic Plan to End TB 2017-2023

National Tuberculosis Control Programme
Department of Public Health
Ministry of Health
Bhutan

Second Edition : 2017

Foreword

Tuberculosis (TB) still remains one of the major public health problems across the globe including Bhutan. Millions of people are affected and cause mortality among the productive age groups. In 2015, Bhutan achieved the Millennium Development Goals (MDGs) in terms of reducing TB prevalence, incidence and mortality rates by halve as compared to the baseline of 1990. The total number of TB cases notified is over 1000 cases every year. The case detection and treatment success rate among all forms of TB has been achieved and sustained at more than 85% and 90% respectively against the global targets of 70% and 90%.

However, the challenges faced today are high rates of Extra-Pulmonary Tuberculosis, increasing trend in treatment failure resulting to emergence of Multi-Drug Resistance Tuberculosis, poor infection control measures in the hospital settings and increasing trend of non-communicable diseases like diabetes and immuno-suppressive conditions like cancer and HIV infections that are posing a threat to TB prevention and control efforts. These challenges are due to misclassification and over diagnosis of EPTB cases, inadequate case follow up and monitoring, failure in implementation of Directly Observed Treatment (DOT) and non-adherence to infection control guidelines.

This National Strategic Plan II for TB (2017-2023) with the goal to Eliminate TB in Bhutan by 2030 has been developed in line with the WHO End TB Strategy and is aligned to the 12th Five Year Plan of the Health Sector. It builds upon the achievements made so far and is expected to address the above listed programmatic gaps and challenges identified during the last Epi-data assessment and Joint Monitoring Mission report.

The goal of the NSP is to reduce TB and MDR-TB burden until it no longer poses a public health problem in Bhutan. The objectives are to increase case notification rate of 90% among estimated TB and MDR-TB cases, maintain treatment success rate of 90% among drug-susceptible TB and 75% among drug-resistant TB cases, to improve TB/HIV co-infection case detection and register 100% of estimated co-infected individuals from 2020 onwards and to strengthen programmatic management of Tuberculosis at all levels

This document is aimed to provide strategic directions in planning, programming and implementation of interventions and activities through multi-sectoral and collaborative approach both within and outside the health sector.

We hope that this document is useful for the national program as well as the districts and all relevant stakeholders striving towards achievement of the milestones and targets for End TB Strategy by 2030.

"TASHI-DELEK"

(Dr.Karma Lhazeen)
Director, DoPH

Director
Department of Public Health
Ministry of Health
Thimphu : Bhutan

Acknowledgement

The process for the development of this National Strategic Plan for TB II (2017-2023) was coordinated and led by the National Tuberculosis Control Programme under the Department of Public Health, Ministry of Health, Bhutan. This document has been developed through the Technical Assistance of WHO with several rounds of consultations with the Technical Working Group members of TB and other stakeholders to guide the program in implementation of TB and MDR-TB interventions. The program acknowledges the support of Dr.Vineet Bhatia (Consultant) and the Technical Working Group members of TB including other stakeholders for their valuable contributions into the development of this Strategic Plan. Without their involvement and expertise, the development of this document would not have been possible. We also acknowledge the support of WHO Country Office, Bhutan for fielding in Technical Assistance to develop this strategy document. We extend our gratitude to all the partners for their contributions and inputs with whom the programme has worked with to review and finalize the strategic plan. The financial support from the Global Fund has made it possible to produce and print this strategic document and we would like to convey our gratitude for their generous support.

National TB Control Program
Communicable Disease Division
DoPH, Ministry of Health

Contents

FOREWORD III

ACKNOWLEDGEMENT IV

ABBREVIATIONS VII

1. EXECUTIVE SUMMARY 1

2. COUNTRY PROFILE 3

2.1 Socio-Economic profile 4

3. POLICY FRAMEWORK - PRINCIPLES OF GROSS NATIONAL HAPPINESS (GNH), FIVE YEAR PLANS FOR HEALTH SECTOR 5

4. NATIONAL HEALTH SYSTEM AND HEALTH CARE SERVICES 7

4.1. Organogram of Health 8

4.2. Human Resource for Health 10

4.3. Health Indicators 11

5. NATIONAL TUBERCULOSIS CONTROL PROGRAMME 12

5.1. Tuberculosis- Epidemiological situation in Bhutan 14

5.2. Case notification and Case Detection 16

5.3. RR/MDR-TB cases notification 17

5.4. TB/HIV collaboration 18

5.5. Treatment outcomes 18

6. JOINT MONITORING MISSION OF THE TB CONTROL PROGRAMME, 2016 20

7. GUIDING PRINCIPLES FOR NSP- THE END TB STRATEGY 27

8. NATIONAL STRATEGIC PLAN II (2017-2023) 30

8.1. Vision 30

8.2. Goal 30

8.3. Objectives 30

9. STRATEGIC DIRECTIONS 31

10. FINANCING HEALTH SYSTEM IN BHUTAN 40

11. TECHNICAL ASSISTANCE 41

12. MONITORING AND EVALUATION (M &E) FRAMEWORK 42

REFERENCES 53

List of People and Stakeholders Consulted 54

Abbreviations

AFB	Acid-Fast Bacilli
AHB	Annual Health Bulletin
AIDS	Acquired Immunodeficiency Syndrome
ARTI	Annual Risk of Tuberculosis Infection
ART	Anti-retroviral Therapy
BHU	Basic Health Unit
CAG	Community Action Group
CPT	Cotrimoxazole Preventive Therapy
DHO	District Health Officer
DoMSHI	Department of Medical Supplies & Health Infrastructure
DOT	Directly Observed Treatment
DOTS	Directly Observed Treatment Short-course
DRS	Drug Resistance Survey
DST	Drug Susceptibility Testing
DVED	Drugs, Vaccines and Equipment Division
EMTD	Essential Medicines and Technology Division
EPTB	Extra-Pulmonary Tuberculosis
EQAS	External Quality Assurance Scheme
FDC	Fixed-Dose Combination
FYP	Five Year Plan
GDF	Global (TB) Drug Facility
GDP	Gross Domestic Product
GF	Global Fund
GNH	Gross National Happiness
GNM	General Nurse Midwifery
HCCD	Health Care and Diagnostic Division
HIV	Human Immunodeficiency Virus
HRD	Human Resource Development/Division
ICB	Information and Communication Bureau/ Health PromotionDivision
IEC	Information, Education and Communication
INH	Isoniazid
IPT	Isoniazid Preventive Therapy
ISTC	International Standards for Tuberculosis Care

JDWNRH	Jigme Dorji Wangchuk National Referral Hospital
KGMUS	Khesar Gyalpo University of Medical Sciences
LPA	Line Probe Assay
MCH	Mother and Child Health
MDG	Millennium Development Goal
MDR-TB	Multi-Drug-Resistant Tuberculosis
MO	Medical Officer
MOH	Ministry of Health
MSTF	Multi Sectoral Task Force
NACP	National AIDS Control Programme
NEQAS	National External Quality Assurance Scheme
NFE	Non-Formal Education
NGO	Non-Governmental Organization
NSB	National Statistical Bureau
NSP	New smear Positive Tuberculosis
NSP	National Strategic Plan
NTCP	National Tuberculosis Control Programme
NTRL	National TB Reference Laboratory
ORC	Out Reach Clinic
PHCB	Population and Housing Census of Bhutan
PHL	Public Health Laboratory
PLWHA	People living with HIV/AIDS
PMDT	Programmatic Management of Drug-Resistant Tuberculosis
PPD	Policy and Planning Division
PPE	Personal Protection Equipment
QASD	Quality Assurance and Standard Division
RCDC	Royal Centre for Disease Control
rGLC	regional Green Light Committee
RGOB	Royal Government of Bhutan
RRH	Regional Referral Hospital
RR	Rifampicin Resistant
SCC	Short-Course Chemotherapy
SL DST	Second Line Drug Susceptibility Test
SRL	Supranational Reference Laboratory

TB	Tuberculosis
TbISS	Tuberculosis Information and Surveillance System
TWG	Technical Working Group
VCT	Voluntary Counselling and Testing
VHW	Village Health Worker
WHO	World Health Organization
XDR-TB	Extensively Drug-Resistant Tuberculosis

1. EXECUTIVE SUMMARY

Tuberculosis is one of the major public health problems in Bhutan which existed more than three decades and is still prevalent today among the general population. Since the introduction of DOTS program in 1994 and 100% coverage by DOTS in 1997 the programme has performed well and established a strong network of diagnostic and treatment centres across the country. The Royal Government of Bhutan and the Ministry of Health is fully committed to TB control which is one of the priority diseases in the National Health Plan of the 11th five year plan (2013-18) where TB treatment success rate is among one of the 'key performance indicators'[1]. The government has endorsed the UN Sustainable Development Goals (SDGs) related to TB, as incorporated in the WHO End TB Strategy and reflected in the targets.For TB control, all staffs (TB In-charges) are fully or partially involved indelivery of TB care and services that are employed by the government. The diagnosis, management and treatment of TB patients are made in all the government run hospitals and BHUs and the entire salary of the staff is met from the government annual budget. The major challenge for the NationalTB Control Programme (NTCP) is to secure financial resources for programme related capital and recurrent expenditure for sustained and improved TB control activities.

The interventions described in this National TB Strategic Plan of 2017-2023 is built upon the achievements made by the NTCP in the past 5 years.The National Strategic Plan to end TB has been developed inline with the principles of the End TB Strategy and National Health Plan(2013-2018) that include government stewardship and accountability through intensive monitoring and evaluation; strong coalition with civil society organizations and communities; protection and promotion of human rights, ethics, and equity; and global collaboration.

The National Strategic Plan for NTCP is developed with technical support from WHO. Series of consultations were held with different units and reviewed by the TB technical working group of the Ministry of Health, Bhutan. The Plan takes into account the recommendations of the Joint Monitoring Mission (JMM) held in June 2016 and the

---

[1] *Eleventh Five Year Plan Document. Gross National Happiness Commission, Royal Government of Bhutan.2013. ISBN 978-99936-55-01-5*

needs for the strengthening delivery of services reaching towards the unreached populations with high quality service for a sustainable and equitable health care delivery in line with the 11th FiveYear Plan (FYP) document. At the end of the six year implementation of the National Strategic Plan by 2023, it is expected that Bhutan will be on target to achieve the End TB Strategy milestones of 35% reduction in absolute number of TB deaths, 20% reduction in TB incidence and zero catastrophic costs to TB patients. It is also expected that the proportion of drug-resistant (DR-TB) cases among bacteriologically confirmed TB patients will drastically be reduced.

A total budget of around US $ 4.5 million is envisaged for implementing the strategy. The Royal Government of Bhutan and the Global Fund (GF) have so far been the main contributors to the TB control programme. The NTCP is exploring various funding sources to address the gap.

2. COUNTRY PROFILE

Bhutan is a small mountainous landlocked (China in the north and India in the south) country with an estimated population of 757,042. With an area of approximately 38,394 sq.kms, Bhutan is administratively divided into three regions (Western, Central and Eastern), 20 Dzongkhags (districts) and 205 Gewogs (blocks). Each block is headed by an elected leader called 'Gup' and has a population of 2000-4000 people.

The country has one of the most formidable mountains, the Himalayas ranging from 100 meters above in the south to 7, 500 meters in the vastly uninhabited and dizzy heights of extreme cold of the north. About 72 % of the land area is covered by forests of temperate and sub-tropical species that form a natural habitat to a diversity of flora and fauna.

Bhutan is one of the ten global biodiversity 'hotspots' in the world having 3,281 plants species per 10,000 square kilometres.With almost 69 percent of the people living in rural areas, Bhutan is primarily an agricultural economy. More dynamic sectors such as electricity production, construction and tourism to a limited extent now contribute to Bhutan's healthy economic growth of more than 6 percent per year.

Modern economic development is largely limited to the public sector as Bhutan's private sector is relatively underdeveloped. However, with a rapidly growing educated workforce, private sector development is becoming a compelling necessity. Bhutan has developed high environmental protection standards and actively protects its rich culture and traditions. The kingdom became a Parliamentary Democracy in March 2008 upon the command of His Majesty the Fourth King.

2.1 Socio-economic profile

The Kingdom of Bhutan is a landlocked country that banks on the generation of hydropower to boost its economy. Hydropower contributes about a fifth of the gross domestic product. Bhutan has achieved exceptional economic growth over the past 3 decades. Significant achievements in social development have also been made in recent years, with the number of poor approximately halved between 2007 and 2012[2].

Despite notable socio-economic progress, the challenge remains for Bhutan to expand its economic base and make its growth more inclusive, especially for unemployed youth and women.

SL No.	INDICATOR	DATA VALUE	SOURCE	YEAR
1	Mean Monthly Household Consumption	Nu.18,367	Bhutan Living Standards Survey 2012	2012
2	Mean Monthly House Rent Paid by Households	Nu.3,313	Bhutan Living Standards Survey 2012	2012
3	Prevalence of Disability among Children 2-9 years	21.30%	Second Stage Disability Assessment 2011	2011
4	Population using Solid Fuel	28.60%	Bhutan Living Standards Survey 2012	2012
5	Population Access to Improved Sanitation	81.00%	Bhutan Living Standards Survey 2012	2012
6	Household with TV Connection	55.30%	Bhutan Living Standards Survey 2012	2012
7	Secondary School Completion Rate	74.20%	Bhutan Living Standards Survey 2012	2012
8	Youth Literacy Rate	86.10%	Bhutan Living Standards Survey 2012	2012
9	General Literacy Rate	63.00%	Bhutan Living Standards Survey 2012	2012
10	Population Poverty Rate	12.00%	Bhutan Living Standards Survey 2012	2012
11	GDP real Growth rate	6.49%	National Accounts Statistics	2015
12	GDP per Capita	US$ 2,719	National Accounts Statistics	2015

Table 1: Key socio-economic indicators[3]

2 *http://www.adb.org/countries/bhutan/main*
3 *http://www.nsb.gov.bt/nsbweb/main/indicator.php*

3. POLICY FRAMEWORK - PRINCIPLES OF GROSS NATIONAL HAPPINESS (GNH), FIVE YEAR PLANS FOR HEALTH SECTOR

The principle of Gross National Happiness (GNH) guides Bhutan's unique approach towards development and has four main pillars: good governance, preservation and promotion of cultural values, equitable and sustainable socio-economic development and conservation of the natural environment. The principle emphasizes the need to find an appropriate balance between material, spiritual, emotional and cultural well-being. The policies and programs that are developed in Bhutan are generally in line with the values of GNH, with number of screening tools to ensure the values are embedded in social policy.

Bhutan 2020: A Vision for Peace, Prosperity and Happiness translates the notion of GNH into a series of national objectives or precepts that guide policy-making and are central to all government programmes. The policy document is the basis for the formulation and implementation of successive Five Year Plans. Linkages between GHH, 2020, Health policy, MDG, SDG and END-TB (PPD input).

The eleventh FYP (2013-2018) titled "self reliance and inclusive green socio-economic development" is based on achieving the MDGs and the long term goals articulated in the Vision 2020 document including GNH, and it has adopted poverty reduction as the overarching theme under the National Key result area of "Poverty + reduced/MDG+ achieved". The Health sector strategies for the Programme emphasizes ensuring the quality of health services, development of human and institutional capacity, decentralization, sustainability and uniformity of health services.

To achieve Universal Health Coverage is one of the goals of the SDGs, which is critical for the achievement of all other targets. The overarching goal of the 11th Five Year Plan is to achieve "Universal health coverage by focusing on providing improved and equitable access to quality health care services." This goal is well supported by the primary health care approach practiced in Bhutan. In SDG, health is the focus of goal 3: Ensure healthy lives and promote well-being for all at all ages. However, there are other goals and targets related to health.

The broad objectives of the Health Sector in the eleventh Five Year Plan are to:

- Improve access to quality and equitable health services
- Strengthen preventive, promotive and rehabilitative health services
- Promote efficiency and effectiveness in financing and delivery of health services
- Achieve the Millennium Development Goals and Sustainable Development Goals beyond the set targets

HIV/AIDS and Tuberculosis have been identified as important interventions under communicable diseases framework and are being addressed through various strategic initiatives over the plan period. Accordingly, the programme outcome and output as outlined in the 11th FYP are as follows:

- **Outcome**: Morbidity & mortality due to communicable diseases reduced
- **Output:** Improved TB case detection and management;
- **Activities**: Various activities planned under communicable and non-communicable diseases which has direct or indirect affect for the control of Tuberculosis.

There has been remarkable progress towards achievement of MDGs, on the whole, including, poverty reduction, education improvements and increased access to safe drinking water.

Globally, the three health goals and targets have done considerably well. The HIV, tuberculosis and malaria epidemics were "turned around", child mortality and maternal mortality decreased significantly (53% and 44%, respectively, since 1990), despite falling short of the MDG targets. However, progress has been uneven, and substantial inequalities remain within and across countries.

4. NATIONAL HEALTH SYSTEM AND HEALTH CARE SERVICES

Health care services in Bhutan are provided free of cost throughout the country ensuring district-specific and regional balance in coverage in line with universal access principle. The Government is committed to implementation of pro-poor policies, which is supported by data on Primary Health Care coverage for more than 90% of the population, through Basic Health Units in distant areas and regular outreach clinics. The health services are provided through a four tiered network. The network constitutes the National Referral Hospital (also Regional for Western region), 2 Regional Referral Hospitals in Mongar and Gelephu, 27 district hospitals, 23 BHU I, 184 BHU II, 28 sub-post, 1 Indigenous hospital, 54 indigenous units and 562 Out Reach Clinics supported by BHU staffs and Village Health Workers at the community level. The management and delivery of TB control services are integrated into the general health system.

The national and regional referral hospital provides specialized tertiary care services. The next level consists of district level hospitals manned by medical officers with X-ray and laboratory facilities. The district hospitals are the health care service management units in the district and also for the TB care and control services. The next lower level consists of 207 Basic Health Units which are either graded as BHU I and II. All district level hospital and BHU I provide secondary level health care services. The BHUs are the primary level of health care facilities providing primary health care services and are manned by three health workers. At the community level, Village Health workers (VHWs) take care of around 20 households and they provide services entirely on voluntary basis. The BHU staffs provide monthly Out Reach Clinics (ORCs) to the most remote area providing preventive and minor curative services to the community at regular intervals. TB diagnostic and treatment services are provided through 27 hospitals including district and referral hospitals and 5 grade I BHUs. All BHU II are also involved in screening and referral of presumptive TB cases, follow up, default and contact tracing and provision of DOT. The private sector is limited to only few laboratory and diagnostic facilities in Thimphu, Phuentsholing and Samdrupjongkhar. There are no NGOs working for TB care and control in the country. The involvement of community systems and village health workers for TB care and services is inadequate.

4.1. Organogram of Health

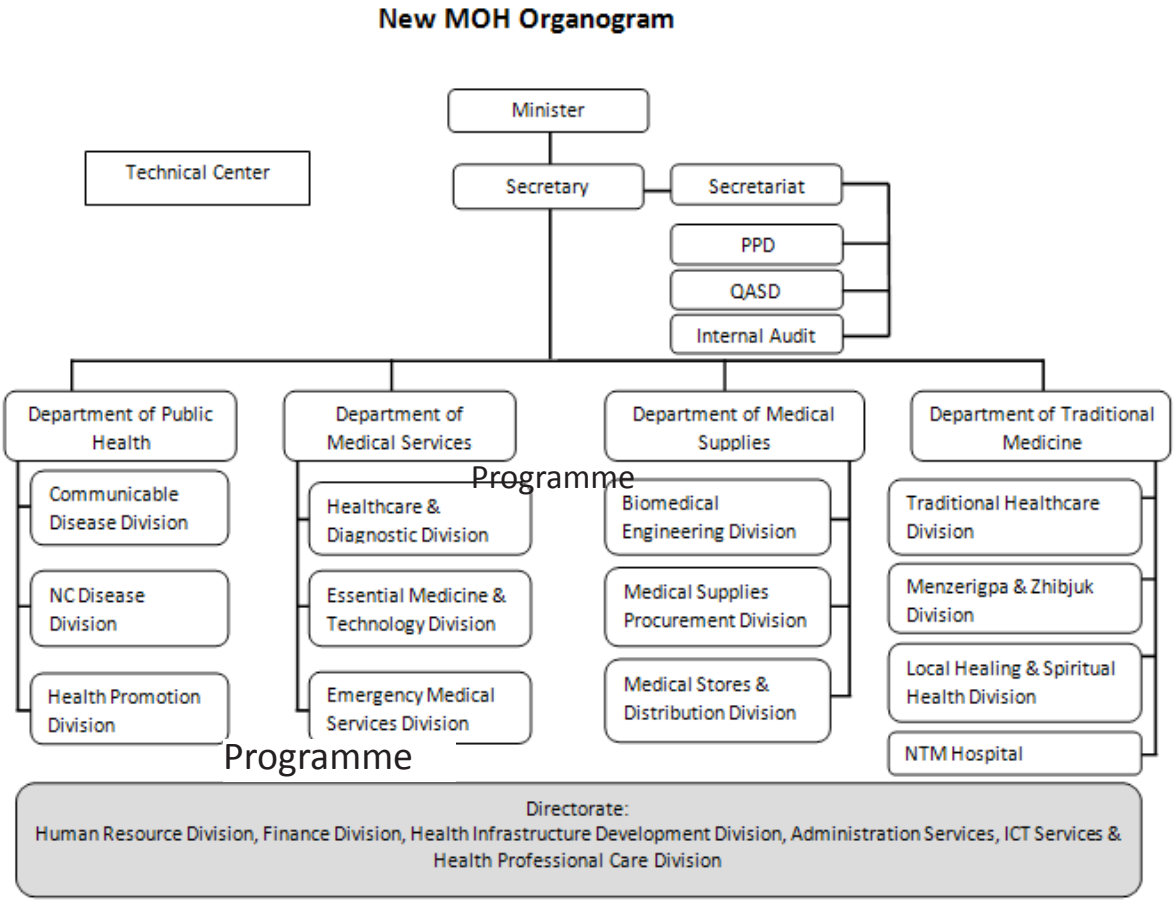

Figure 1: Organogram of Ministry of Health

Source: http://www.health.gov.bt/about/organogram/

Organogram of Department of Public Health-CDD

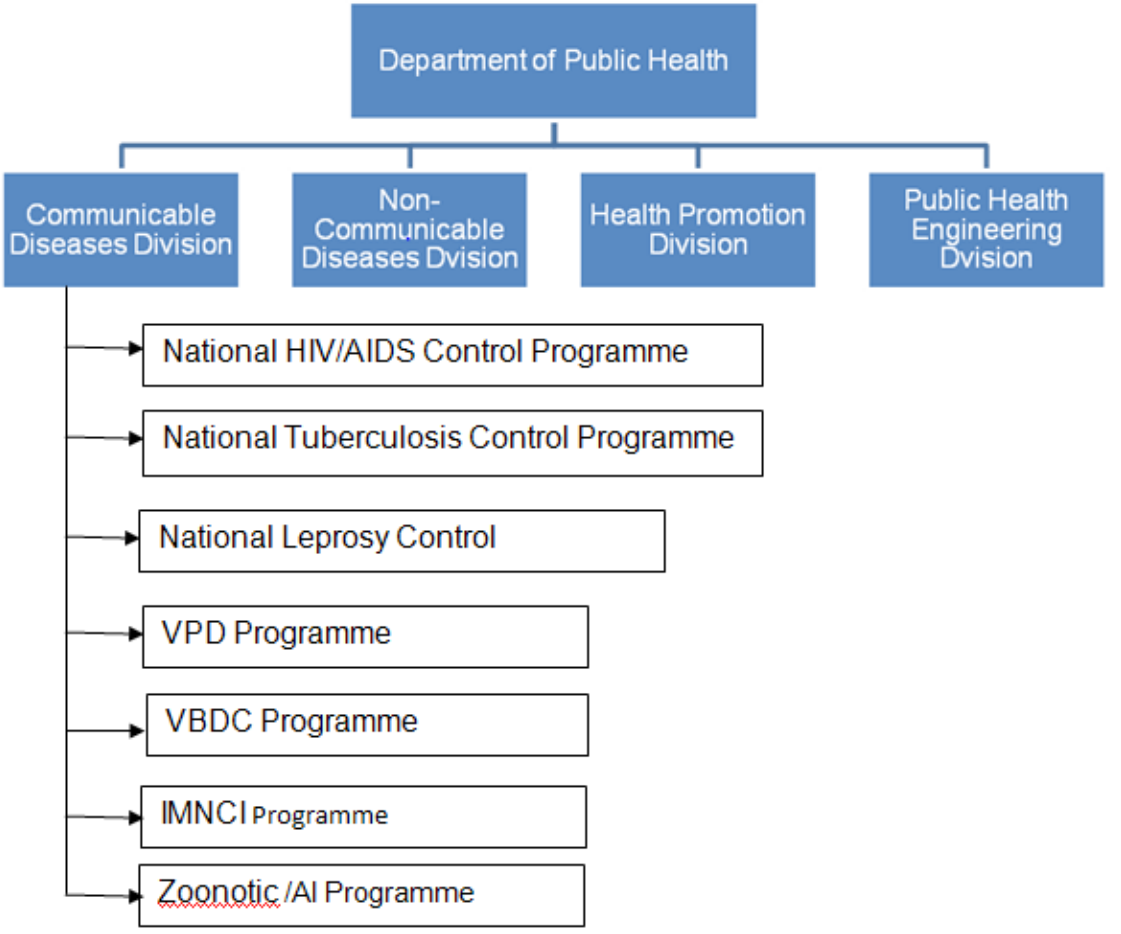

Figure 2: Organogram of Department of Public Health & CDD

4.2. Human Resource for Health

It is a known fact that health interventions cannot be carried out without health workers. Developing a competent, motivated, and supported health workforce is therefore essential for overcoming obstacles to achieving national and global health goals. The Human Resources Division in the Ministry of Health is responsible for human resource mapping, projection and planning. The Khesar Gyalpo University of Medical Sciences of Bhutan is primarily mandated for providing pre-service and in-service training programmes. Inadequate skills mixed, distributional imbalances, unfiled vacancies and poor working conditions compounds the problem of Human Resource for health. Total staff strength in the Ministry of Health is as given below:

Sl. #	Indicators	Year				
		2011	2012	2013	2014	2015
1	Number of Doctors and density (per 10,000 population)	181 **[2.6]**	194 **[2.7]**	203 **[2.8]**	244 **[3.3]**	251 **[3.3]**
2	Number of Nurses and density (per 10,000 population)	723 **[10.2]**	736 **[10.2]**	799 **[10.9]**	957 **[12.8]**	1070 **[14.1]**
3	Number of Pharmacists and density (per 10,000 population)	11 **[0.2]**	11 **[0.2]**	9 **[0.1]**	14 **[0.2]**	15 **[0.2]**
4	Number HA&BHW and density (per 10,000 population)	572 **[8.1]**	578 **[8.0]**	608 **[8.3]**	632 **[8.5]**	643 **[8.5]**
5	Number of Drungtshos (Indigenous Physicians) and density (per 10,000 population)	38 **[1.0]**	35 **[1.0]**	35 **[0.5]**	46 **[0.6]**	47 **[0.6]**
6	Number of sMenpas (Sowa Menpas) and density (per 10,000 population)	56 **[1.0]**	63 **[1.0]**	82 **[1.1]**	90 **[1.2]**	100 **[1.3]**
7	Number and distribution of health facilities (per 10,000 population)	215 **[3.0]**	222 **[3.1]**	236 **[3.2]**	262 **[3.5]**	266 **[3.5]**
8	Ratio of beds per Nurses	1.8	1.7	1.6	1.3	1.2
9	Ratio of Nurses per Doctor	4.0	3.8	3.9	3.9	4.3

Table 2: National Health workforce (2011-2015)

4.3. Health Indicators

Sl No	Indicators	Year -2015	Source
1	Crude birth rate (CBR) [births per 1000 population]	17.90	AHB, 2016
2	Total Fertility Rate (TFR) [children per woman]	2.30	AHB, 2016
3	General fertility rate (GFR) [births per 1000 women 15-49 years]	72.00	AHB, 2016
4	Crude death rate (CDR) [deaths per 1000 population]	6.20	AHB, 2016
5	Sex ratio of the population [males per 100 females]	96.00	AHB, 2016
6	Proportion of population using an improved drinking water source (%)	97.70	AHB, 2016
7	Proportion of population using an improved sanitation facility (%)	66.3+	AHB, 2016
8	Infant Mortality rate (per 1,000 live births)	30.00	AHB, 2016
9	Under 5 Mortality rate (per 1,000 live births)	37.03	AHB, 2016
10	Proportion of births attended by skilled health personnel (%)	74.60	AHB, 2016
11	Maternal mortality ratio (deaths per 100,000 live births)	86.00	AHB, 2016
12	HIV prevalence among population adult 15-19 years (%)	<0.1	AHB, 2016
13	Malaria incidence (per 10,000 population at risk)	2.00	AHB, 2016
14	TB Prevalence rate per 100000 population	190.00	Annual TB Report, 2016, SEAR
15	TB incidence rate per 100000 population	164.00	Annual TB Report, 2016, SEAR
16	Alcohol Liver Diseases incidence (per 10,000 population)	41.00	AHB, 2016
17	Diabetes incidence (per 10,000 population)	164.00	AHB, 2016
18	Pneumonia incidence (per 10,000 under 5 children)	905.00	AHB, 2016

Table 3: Selected Health Indicators

5. NATIONAL TUBERCULOSIS CONTROL PROGRAMME

The National TB Control Programme (NTCP) was initiated in 1976. After a pilot testing of short course chemotherapy (SCC) in 1988, SCC was implemented nationwide in 1994. This was followed by a nationwide introduction of DOTS in 1997. The DOTS Strategy evolved into the Stop TB Strategy and in 2016 WHO has transitioned to a more inclusive and comprehensive End TB strategy. Bhutan has adapted the End TB strategy which is reflected in the updated guidelines and the national strategic plan. The three pillars of the strategy include:

- Integrated, patient-centred care and prevention;
- Bold policies and supportive systems and
- Intensified research and innovation.

The strategy is based on principles of government stewardship and accountability, with monitoring and evaluation; strong coalition with civil society organizations and community; protection and promotion of human rights, ethics, and equity; and adaptation of the strategy and targets at the country level, with global collaboration.

The services for TB care and control are available free of cost for all the citizens of the country without any bias against gender, religion, groups or classes. As per the five year plan development guidelines, all sectors and agencies are required to mainstream gender into their plans, policies and programmes through sectoral gender analysis which is operationalized through the network of Gender Focal Persons who are responsible mainstreaming gender in their sectors and also carrying out awareness and sensitization programmes on gender in their respective sectors.

The services for diagnosis, treatment and care are made available and provided free of cost to migrants and other vulnerable groups as well. Regular awareness programs with health workers, communities, involvement of multi-sectoral task force, and religious groups has increased awareness and accessibility to TB care and services for all, and have helped in reducing associated stigma and discrimination.

The National TB Reference Laboratory **(NTRL)** under Royal Centre for Disease Control (RCDC) based in Serbithang, Thimphu is responsible for monitoring and maintaining quality diagnostic services. It is supervised and assessed by the Regional Supra National Reference Laboratory (SNRL) in Bangkok, Thailand, and provides facility for culture and Drug sensitivity testing services for diagnosis of Multi-Drug Resistant TB (MDR-TB) cases.

The **NTCP** at the central level is responsible for policy formulation, planning and budgeting, implementation and management of planned activities, coordination with partners within the ministry and other agencies; resource mobilization with funding/donor agencies, human resources development and capacity building for TB control, coordination with national and international agencies for improving the technical capacity in country to undertake TB related laboratory services including quality assurance; coordination with DoMSHI and HCDD for procurement of anti-TB drugs and other supplies; develop research agenda and coordination with academic institutes for undertaking operational research on priority areas of TB and MDR-TB; monitoring and supervising of TB care and control services and providing regular feedbacks to the reporting centers.

District Level: At the district level TB control activities are carried out by a team comprising of CMOs/Medical Superintendents/MOs/TB in-charges/Laboratory staffs and district health officers. Each district has a TB-in-charge coordinating all TB care and control services under the supervision of the Medical Officer and the District Health Officer. They are responsible for screening, case finding and diagnosis of TB, providing treatment to patients, contacting treatment interrupters, follow-up, reporting of outcomes, and compiling quarterly and annual TB reports for their districts. There are total of 32 reporting centers, 35 microscopy centers and four GeneXpert sites in Bhutan. MDR-TB patients are being managed in three referral hospitals.

BHU II level: The health workers at the Basic Health Units are responsible for identifying presumptive TB cases, referring those presumptive cases to the nearest microscopy and diagnostic center for confirmation of the case. In an event of decentralized treatment, they are responsible for providing DOTs during the continuation phase of treatment, follow-up and contact tracing of loss to follow up cases.

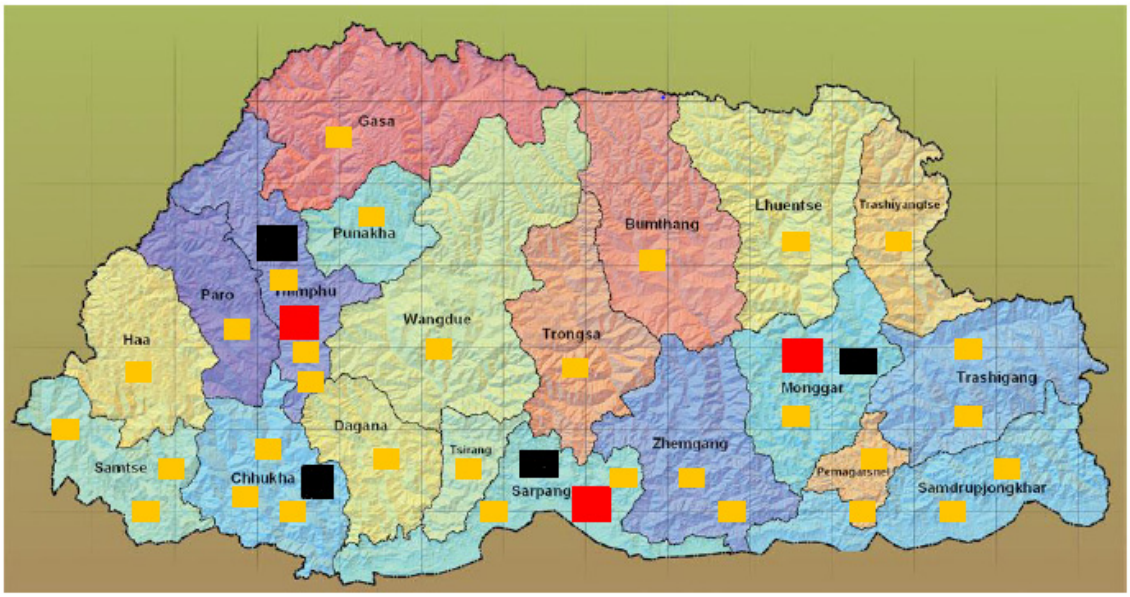

Figure 3: TB services in Bhutan

5.1. Tuberculosis- Epidemiological situation in Bhutan

Although statistically Bhutan is considered a relatively low TB burden country as compared to other countries, Tuberculosis (TB) remains a major health problem and the Government accords high priority to NTCP. It is estimated that in Bhutan, TB prevalence rate is 190/100,000 population while the TB Incidence rate is 164/100,000 population. The mortality rate due to TB is 9.5/100,000 population. The prevalence of HIV infection in general population is estimated at less than 0.1%[4]. According to the epi-data assessment report (2015), TB-HIV co-infection among the TB patients are relatively low.

4 *Health sector response to HIV in the South-East Asia Region, 2013. WHO SEARO*

The NTCP has made substantial progress after implementation of DOTS and subsequent Stop TB Strategy components with major budgetary support from the government and the Global Fund and technical support from WHO. The country has now adopted the WHO End TB Strategy. A consistently sustained case detection and high treatment success rate have resulted in preventing increasing trends Tuberculosis.

Given the current estimates of incidence and trends noted so far, Bhutan is a candidate country to enter the pre-elimination stage with further intensified efforts to reach the unreached populations. According to the annual TB report (SEAR,WHO,2016) the estimates of disease burden are as outlined in the table below.

Estimates of disease burden for 2014	
Incidence of all forms of TB	1 300 (1100–1400)
Incidence rate of all forms of TB (per 100 000 population per year)	164 (148–181)
Incidence rate HIV+TB only (per 100 000 population per year)	12 (9.4–15)
Prevalence of all forms of TB	1500 (570–2700)
Prevalence rate of all forms of TB (per 100 000 population)	190 (75–359)
TB death rate (of all forms of TB, excluding HIV per 100 000 population per year)	9.5 (5.1-15)

Table 4: Estimates of TB burden in Bhutan

(Source: Annual TB Report, SEAR, WHO, 2016)

MDR-TB situation

According to the Drug Resistance Surveillance (DRS, 2013) it was reported that the drug resistance pattern among the notified smear positive TB cases were as follows:

- New cases – 5%
- Retreatment cases – 35%

A high rate of MDR-TB among new cases is alarming and indicates that MDR-TB is being transmitted as primary infection in the general population. With the introduction of new diagnostic tools, Line Probe Assay in 2014 and GeneXpert in 2016, it is expected

that more cases of MDR-TB will be detected. TB affects men and women equally but markedly affects the younger age group (15-24), which carries 35% of the total burden of TB, and indicates active transmission of TB.

5.2. Case notification and Case Detection

The NTCP has performed well as evidenced by stable treatment success rate for smear positive TB above 90% since 2008 and very low loss to follow-up (1%). However, failure has increased from 2% to 5% in the past 6-7 years, possibly because of increase in primary drug resistance. Case notification rate of all forms of TB was 139/100,000 population in 2014 while case notification rate of bacteriologically confirmed new and relapse TB was 59/100,000 population. A total of 1082 all forms of TB cases notified in 2014. There are 6 high TB notification districts - Chukha, Mongar, Samtse, Sarpang, Thimphu and Wangdue that account for 80% of all notified TB cases.

Figure 4: District wise disease burden-size of the star indicates the relative burden of TB

Treatment success rate among new smear positive TB cases was 88% in 2014 (85% cured and 3% treatment completed) for the previous year cohort while the treatment success rate of all forms of TB was 90% (999 TB cases). It must be noted here that number of cases on treatment in Bhutan is small. Hence a small change in absolute numbers leads to significant changes to the percentages.

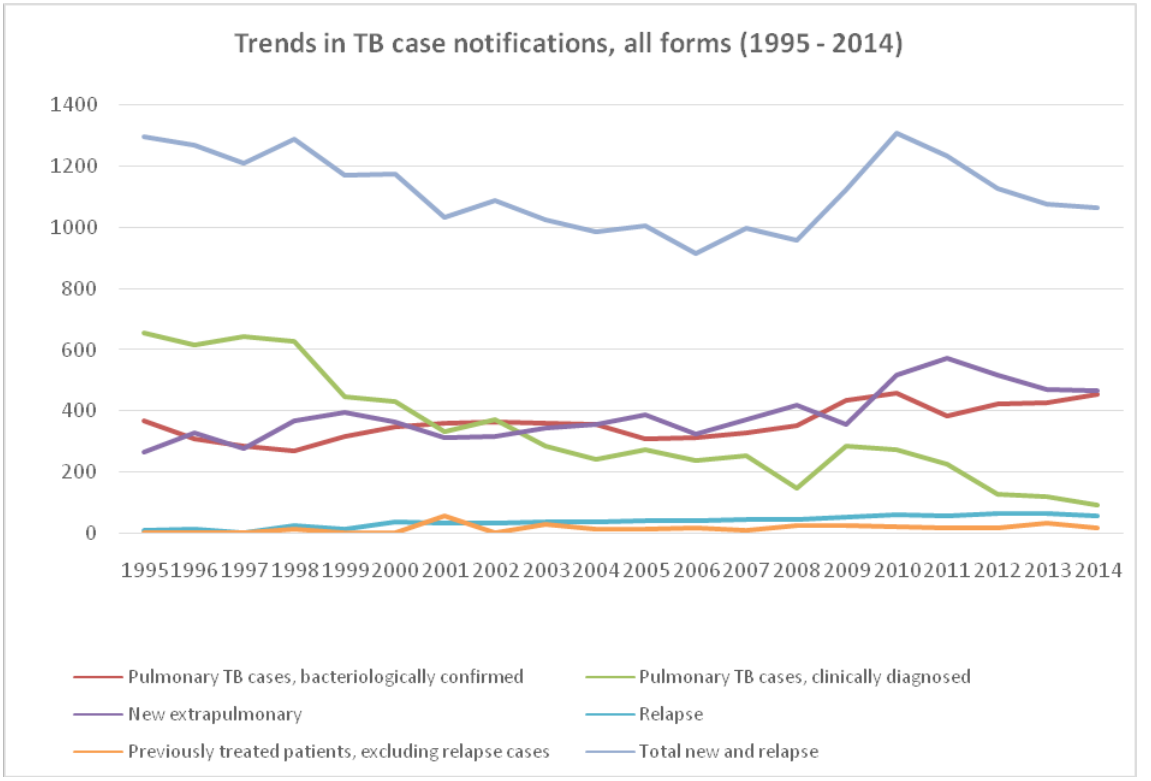

Figure 5: Case notification for various forms of TB

5.3. RR/MDR-TB cases notification

The following table shows programme performance in terms of detection and notification of rifampicin resistant (RR) and MDR-TB cases. There has been a substantial increase in number of RR/MDR-TB cases diagnosed in the year 2014. It can also be seen that all cases diagnosed with RR/MDR-TB were initiated on treatment within 2014.

	New	Retreatment	Total
Cases tested for RR/MDR-TB	53%	30%	504
Laboratory confirmed RR/MDR-TB cases			49 (9.7%)
Patients started on MDR-TB treatment*			49 (100%)

**Includes patients who were not laboratory confirmed and those diagnosed before 2014*

5.4. TB/HIV collaboration

Although HIV prevalence in the country is relatively low, the programme gives due priority to screening of HIV among TB cases and vice versa.

	Number (2015)	(%)
TB patients who are HIV positive	6	<1%
HIV-positive TB patients on anti-retroviral therapy (ART)	6	(100)

Table 5: TB-HIV collaborative activities

5.5. Treatment outcomes

The treatment success rate among new and relapse cases is sustained at >88% while for other previously treated cases, the success rate was 75%. Treatment success rate of RR/MDR-TB achieved at 93% (for cohort of 2013).

Treatment success rate and cohort size	(%)	Cohort
New and relapse cases registered in 2014	90%	1066
Previously treated cases, excluding relapse, registered in 2014	79%	71
RR-/MDR-TB cases started on second-line treatment in 2015	92%	37%
XDR-TB cases started on second-line treatment in 2012	0	0

Table 6: Treatment success rate for various categories of Tuberculosis

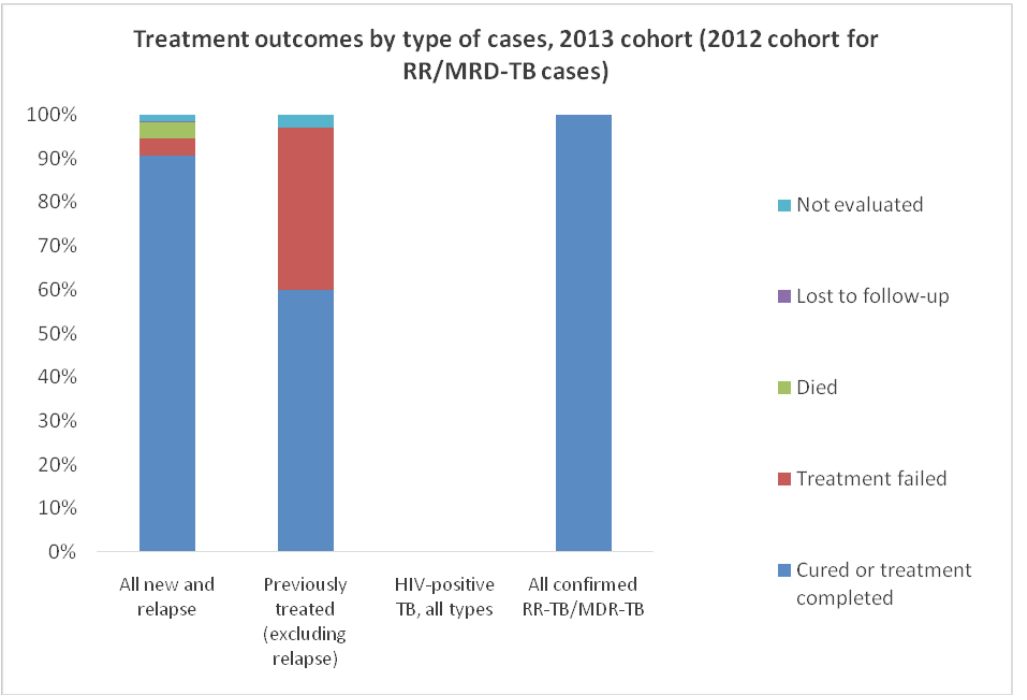

Figure 6: Treatment Success rate for RR/MDR-TB cases

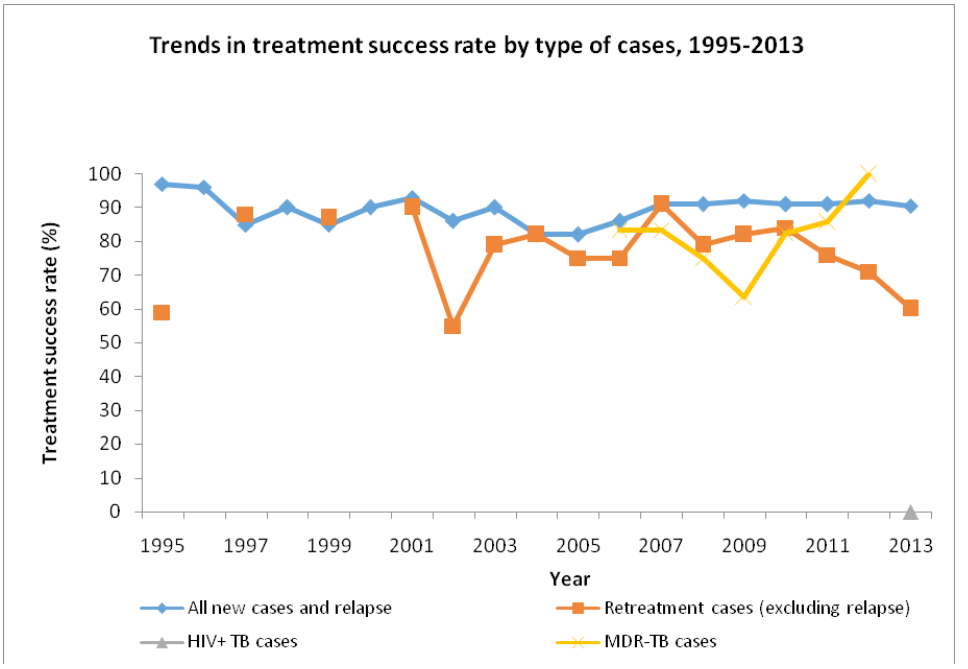

Figure 7: Trends in treatment Success rates

6. JOINT MONITORING MISSION OF THE TB CONTROL PROGRAMME, 2016

Prior to the exercise of updating national guidelines and strategic plans, a Joint Monitoring Mission (JMM) was held in Bhutan in May 2016. The mission team included international and national experts including representatives from CDC Atlanta, WHO Regional and Country Office. During the revision of the current NSP, several recommendations pertaining to policy are being already addressed through an update to the existing guidelines for TB control in Bhutan. Following are key observations and recommendations of the review.

Overall achievements of the programme as reported by the JMM

- Committed and motivated health staff at central and peripheral levels
- Awareness from clinicians and providers at health facilities about concerning epidemiologic trends (increased EPTB and MDR-TB)
- Excellent recording and reporting system through TbISS, reduces recording burden and paperwork
- Support from Royal Government of Bhutan to sustain health financing including procurement of anti-tuberculosis drugs.

TB Case Finding

- Severe delays in diagnosis (up to 1 year)
- Passive case finding
- Ad-hoc active case finding is limited
- No epidemiologic analysis of routinely collected data to guide public health action (targeting highly impacted communities)
- No SOP for active case finding activities
- Contact tracing is not consistent
- IPT is not consistent

Recommendations:

a. Revise the national guideline to include active case finding activities (e.g. algorithms, budgeting, SOP)
b. Engage community health workers for outreach
c. Develop and implement suspect register to complement active case finding
d. Improve implementation of IPT (children, HIV+, household contacts)
e. Broaden/strengthen cross-border screenings

Quality of TB Diagnosis

- Applying older version of TB case definitions
- Confusion about appropriate case classification in the field
- Lab EQA has not been conducted outside Thimphu since 2014 (system is in place, but no focal person)
- Even when EQA was done, there was no follow-up, nor quality improvement for corrective action
- Despite access to LPA, delays in diagnosis
- GeneXpert available and pending

Recommendations:

a. Training and clarification of revised in national guidelines to adopt 2013 WHO recommendations (including CXR)
b. Re-instate, strengthen EQA
c. Fast-track of use of LPA, consider concentrated sputum, and SL DST (with training and support from SNRL)
d. Consider cross-training and redistribution of HR and workload of laboratory personnel
e. Fast-track GeneXpert, consider special consultation for effective distribution of technology and resource allocation (rGLC)

Management of TB Cases

- DOTS is under-utilized
- 2-month compulsory inpatient care (poor infection control, inappropriate isolation and segregation, and limited beds)
- Despite inpatient care, DOT is still not occurring
- Poor follow-up and supervision in continuation phase (monitoring side-effects, follow-up sputum)
- Paediatric formulary not available for IPT

Recommendations:

a. Consider 2-week hospitalization for patient education, initiation of ATT, monitoring side effects, bacterial sterilization with appropriate transitioning to enhanced community-based DOT
b. Enhance patient education and counselling at CP initiation (consider VHW)
c. Strengthen IPT activities
d. Intensify planned supervision
e. Innovative mechanisms intensifying DOTS (consider incentives for DOT providers)

Management of DR-TB

- DOTS is under-utilized, strict implementation is needed to reduce development of DR
- 3 PMDT treatment initiation sites in country
- Poor follow-up and supervision (monitoring side-effects, follow-up sputum)
- Early diagnosis is needed
- Poor infection control (mixing of sensitive and DR patients)

Recommendations:

a. DOT
b. Implement appropriate IC, isolation and segregation of DR-TB patients during hospitalizations

c. Engage national MDR -TB committee for active review of all MDR-TB cases on treatment (pharmacovigilance, clinical monitoring, managing side-effects)
d. Consider decentralized MDR-TB management as per recent PMDT guidelines
e. Consider appropriate budget for social support

Infection Control

- Infection control guidelines and plans are in place
- N-95 mask not readily available
- No triaging of patients
- No cross-ventilation at outpatient settings
- No policy for healthcare screening

Recommendations:

a. Include TB-specific items in national checklist and guidelines (HAMT)
b. Develop policy and SOP of HCW screening (include laboratory)
c. Segregate MDR patients from non-MDR patients at all facilities

Recording and Reporting

- Overall recording and reporting is good
- District to sub-district level record transfer and feedback is not adequate
- TbISS is in place

Recommendations:

a. Current manual recording and reporting needs to be revised using the new case definitions
b. TbISS needs to be enhanced (improved connectivity, not all facilities are using it)
c. Recording and reporting data needs to be analyzed for public health action

TB/HIV

- HIV screening is excellent (HIV screening amongst TB cases and TB screening amongst HIV cases)
- Amongst HIV cases routine TB screening schedule is not regular
- IPT for HIV is not practiced

Recommendations:

a. All HIV patients should be screened for TB at every encounter (revised guidelines)
b. IPT should be implemented as per revised national guidelines
c. HIV patients should be prioritized for GeneXpert (revised in the national diagnostic algorithm and guideline)

ATT Medicines and Supply Management

- Paediatric IPT formulary not available in all areas
- Drug storage, maintenance is good
- No drug stock-outs nationally
- No electronic logistic management system in place
- Utility vans for supply chain management are old and needing replacement

Recommendations:

a. Ensure and forecast adequate reagents for LPA according to new policies for SLD and enhance MDR active case finding
b. Planning and budgeting for vehicles to avoid interruption in supply chain
c. Prioritize national distribution of paediatric IPT formulary

Paediatric TB

- Few TB cases identified (potential under-diagnosis)
- Mantoux not available in all places
- Paediatric IPT not implemented

Recommendations:

a. Update and revise paediatric treatment and management guidelines
b. Prioritize national distribution of paediatric IPT formulary
c. Implement national IPT policy
d. Consider integrating the global Roadmap for Childhood TB into local practice

Human Resource Development

- Shortage of human resources at central level
- Inadequate training/refresher training on program policies and guidelines at the district, sub-district level

Recommendations:

a. Designate additional staff for TB at central level
b. Intensify initial training and refresher training

ACSM and Community Engagement

- Limited community engagement and social mobilization
- Limited IEC materials available

Recommendations:

a. Strengthen the engagement of VHW for community education, case finding, contact tracing, DOT
b. Develop country-specific IEC materials for TB and disseminate broadly

Operational Research and Development

- Not using reporting data for public health action
- Operational research agenda developed, however, no priority for action and implementation

Recommendations:

a. Develop protocols from the prioritized research agenda
b. Engage external partners and mobilize resources
c. Consider conducting Operational Research training course with external partners (e.g., SORT-IT)

7. GUIDING PRINCIPLES FOR NSP- THE END TB STRATEGY

The revision and development of the National Strategic Plan on Tuberculosis Control is based on equity and sustainable socio-economic development as per the Gross National Happiness policy framework. Consequently the NSP has been aligned with 12th FYP of the Health Sector for the period 2017-2023. The strategic objectives of this plan, under the Department of Public Health are based on the strategic directions on WHO recommended End TB Strategy and Sustainable Development Goals (SDGs).

In May 2014, the World Health Assembly unilaterally endorsed the resolution WHA67.1 adopting the global strategy and targets for tuberculosis prevention, care and control after 2015. The strategy includes (1) bold vision of a world without tuberculosis, and its targets of ending the global tuberculosis epidemic by 2035 with a reduction in tuberculosis deaths by 95% and in tuberculosis incidence by 90% (or to fewer than 10 tuberculosis cases per 100, 000 population), and elimination of associated catastrophic costs for tuberculosis-affected households; (2) its associated milestones for 2020, 2025 and 2030; (3) its principles addressing: government stewardship and accountability; coalition-building with affected communities and civil society; equity, human rights and ethics; and adaptation to fit the needs of each epidemiological, socioeconomic and health system context; (4) its three pillars of: integrated, patient-centred care and prevention; bold policies and supportive systems; and intensified research and innovation (*Table 9)*.

The resolution also urges all Member States to:

1. Adapt the strategy in line with national priorities and specificities;
2. Implement, monitor and evaluate the strategy's proposed tuberculosis-specific health sector and multi-sectoral actions with high-level commitment and adequate financing, taking into account the local settings;
3. Seek, with the full engagement of a wide range of stakeholders, to prevent the persistence of high incidence rates of tuberculosis within specific communities or geographical settings.

While significant progress has been made towards the TB control targets (MDG achieved), several challenges persist in reducing the global burden of TB. These challenges vary according to country-contexts but addressing them effectively calls for a holistic approach in all contexts.

The targets and milestones for the End TB strategy are set for 2020, 2025, 2030 and 2035. The milestones for the End TB Strategy for 2030, the target year for the SDGs, are:

- **80%** reduction in TB incidence rate (compared with 2015)
- **90%** reduction in TB deaths (compared with 2015)
- **100%** families protected from facing catastrophic costs due to TB

Table 9: Milestones and targets for SDGs and End TB Strategy

VISION	**A WORLD FREE OF TUBERCULOSIS** – zero deaths, disease and suffering due to tuberculosis			
GOAL	**END THE GLOBAL TUBERCULOSIS EPIDEMIC**			
INDICATORS	**MILESTONES**		**TARGETS**	
	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% (<85/100,000)**	**50% (<55/100,000)**	**80% (<20/100, 000)**	**90% (<10/100, 000)**
TB-affected families facing catastrophic costs due to TB (%)	**0**	**0**	**0**	**0**

PRINCIPLES

1. Government stewardship and accountability, with monitoring and evaluation
2. Strong coalition with civil society organizations and communities
3. Protection and promotion of human rights, ethics and equity
4. Adaptation of the strategy and targets at country level, with global collaboration

PILLARS AND COMPONENTS

1. INTEGRATED, PATIENT-CENTRED CARE AND PREVENTION

A. Early diagnosis of tuberculosis including universal drug-susceptibility testing, and systematic screening of contacts and high-risk groups

B. Treatment of all people with tuberculosis including drug-resistant tuberculosis, and patient support

C. Collaborative TB/HIV activities, and management of co-morbidities

D. Preventive treatment of persons at high risk, and vaccination against tuberculosis

2. BOLD POLICIES AND SUPPORTIVE SYSTEMS

A. Political commitment with adequate resources for tuberculosis care and prevention

B. Engagement of communities, civil society organizations, and public and private care providers

C. Universal health coverage policy, and regulatory frameworks for case notification, vital registration, quality and rational use of medicines, and infection control

D. Social protection, poverty alleviation and actions on other determinants of tuberculosis

3. INTENSIFIED RESEARCH AND INNOVATION

A. Discovery, development and rapid uptake of new tools, interventions and strategies

B. Research to optimize implementation and impact, and promote innovations

* Targets for the United Nations "Sustainable Development Goals" under formulation

8. NATIONAL STRATEGIC PLAN II TO END TB IN BHUTAN (2017-2023)

Keeping in view the challenges to NTCP identified by the JMM 2016 and the principles of addressing the TB problem laid out in the WHO End TB Strategy, this NSP has been prepared for the period 2017-2023 so as to achieve the needed milestones within the given time frame.

8.1. Vision

A nation FREE OF TUBERCULOSIS
– zero deaths, disease and suffering due to tuberculosis

8.2. Goal

To reduce TB and DR-TB burden until it no longer poses a public health problem in Bhutan.

8.3. Objectives

1. To increase case notification rate of at least 90% among estimated TB and MDR-TB cases
2. To maintain treatment success rate of at least 90% among drug-susceptible TB and at least 75% among drug-resistant TB cases
3. To improve TB/HIV co-infection case detection and register at least 100% of estimated co-infected individuals from 2020 onwards
4. To strengthen programmatic management of Tuberculosis at all levels

9. STRATEGIES AND INTERVENTIONS

1. To detect at least 90% of all forms of TB including childhood TB by 2023.

1.1. Improve access to quality diagnostic services:

Currently, TB diagnosis is provided by sputum microscopy in 35 hospital/ Grade I BHU laboratories in 20 districts under the National External Quality Assessment Scheme (NEQAS) network conducted by NTRL at RCDC. As per the WHO guideline, country has adequate number of laboratories to provide sputum microscopy service for its population. However it is expected that with growing population and pockets of unreached area, additional microscopy centers may be needed in future. Further, provisions need to be made for replacement of microscopes while making sure that functional ones are maintained properly. All this will be supported and monitored through laboratory quality assurance (QA) system.

1.2. Intensifying diagnosis of childhood TB cases

There is an urgent need to improve the diagnosis and treatment of TB in children in the country by ensuring their inclusion in the NTP including the response to TB/HIV and MDR-TB in children. Reducing the burden of TB in children will require changing and improving many existing practices, such as those that relate to diagnosis and contact investigations. Paediatric TB guidelines as per the latest WHO recommendations have been included in the newly revised TB guideline.

1.3. Identifying TB among marginalised and vulnerable populations:

In country's context, migrant workers, monks and nuns, and other congregate settings (institutions/dormitories) have been identified as vulnerable population and priority has been given to detection and management of TB in these populations in the past. Since the number of migrant workers in districts bordering India and in road construction and hydropower projects are rapidly increasing, there is an urgent need of developing appropriate intervention based on risk assessment. Further, it is not always possible to establish a diagnostic centre in remote areas with small pockets of populations. Such populations will be screened using clinical methods and all presumptive cases will be

offered chest X-rays and rapid molecular test at the nearest center.

1.4. Improved active case finding and referral of TB symptomatic

To improve case notifications, it is important that all concerned should be able to identify chest symptomatic and be able to refer them to appropriate diagnostic centres. All close contacts with active TB/MDR-TB will be screened for TB through contact tracing SoP. This will include household and workplace contacts. Two mobile vans will be purchased for active screening of TB in remote area and pockets of vulnerable populations particularly where the expected transmission rates are high but case notifications have been low.

2. To ensure universal access to rapid diagnostics for all TB cases and DST for all bacteriology confirmed cases by 2020

In the recent DRS report, high proportions of drugs resistance have been reported in both new and retreatment cases. Hence it becomes imperative to offer drug susceptibility testing (DST) to all cases irrespective of the history of previous treatment of TB. Given the resource constraints, rapid DST is presently done in high risk categories only. However, it will be gradually expanded to cover all cases by 2023.

As per the existing programme policy, all sputum smear positive patients are screened for drug-resistance in addition to those who are at risk of drug resistance or those where there is a possibility of an unfavourable outcome because of co-morbidities and hence are at high risk of mortality due to drug-resistance. The GeneXpert MTB/RIF test is being used to screen the following categories:

Presumptive DR-TB cases – All the following categories of patients are high or moderate risk of drug-resistance and hence all the symptomatic will be screened directly with a GeneXpert MTB/RIF test:

- All retreatment cases
- All cases on first line drugs not converting at 2/3 months of treatment
- Symptomatic contacts of MDR-TB cases including health care workers, children, or those contacts who have suspicion of TB on physical examination by a physician

[6]http://www.phls.gov.bt/web/wp-content/uploads/2015/07/tbiss-Manual.pdf

Other risk and vulnerable groups

- Symptomatic HIV positive and those with known co-morbidity which may suppress immunity (e.g. diabetes, chronic kidney disease and cancer).
- Symptomatic children

The following categories will be included for GeneXpert MTB/RIF screening:

- Elderly
- Migrant workers specifically those in mining industry, cement industry and quarries
- Bridge population – Bhutanese citizens who have been to a neighbouring country for some time and come back with symptoms of TB
- Symptomatic from areas where transmission rates are high
- Prisons
- Other congregate settings – hostels/ dormitories.

The country will gear towards screening all presumptive TB cases with rapid diagnostic test by 2023. All bacteriologically confirmed cases will be subjected to conventional culture and DST.

2.1. Increase access to rapid diagnostics:

Based on the estimates of cases needing to undergo rapid diagnostic test, additional rapid diagnostic machines (like GeneXpert MTB/RIF) will be procured and deployed.

2.2. Improving efficiency in use of rapid diagnostics:

For proper usage of the available rapid diagnostic machines, staff will be trained on the new diagnostic algorithm and when to use the rapid diagnostics. To improve efficiencies, laboratories and treatment centres are planned to be linked with the electronic system - TB Information & Surveillance System (TbISS)[6] . TbISS is online software that was initially introduced to monitor the laboratory and diagnostics investigations for presumptive TB cases and their follow-up investigations. TbISS use is now being expanded to all aspects

of patient management and its access is being gradually expanded to all districts. Internet connectivity, however, is still an issue but is expected to be resolved in near future.

2.3. Improve efficiency in use of conventional culture and DST

With the establishment of NTRL, RCDC at Serbithang, the plan for gradual achievement of universal DST for all bacteriologically confirmed TB cases can be achieved. The HR capacity of National TB Reference Laboratory needs to be strengthened. The second line DST facility at the NTRL will be conducted using LPA.

It is emphasised here again that the NTP envisages provision of high quality diagnosis and treatment to all TB cases including drug-resistant cases. The country will soon be introducing shorter regimen for RR/MDR-TB cases and hence SL LPA will be quickly established by 2017.

3. To maintain treatment success rate of at least 90% among drug-susceptible TB and at least 75% among drug-resistant TB cases

The NTCP plans to achieve and sustain treatment success rate of at least 90% among drug-susceptible TB and 75% among drug-resistant TB. The NTCP had engaged government organizations such as the Council for Religious Affairs, Royal Bhutan Police, the Village Health Workers, and Health & Religion Programme within the ministry to improve and maximize access to quality treatment to some targeted vulnerable and hard-to-reach populations. Similarly, the NTCP in this strategic plan period intends to expand the participation of all key players, both governmental and non-governmental to further strengthen the interventions undertaken in the past through innovative approaches for better reach and improve the quality of TB services. In addition to improving case notifications, the programme will also focus on improving service provision to facilitate treatment adherence specifically in the low performing districts and vulnerable populations, strengthening community-based systems and fostering referral from other care providers.

3.1. Provide standardized treatment for all forms of TB

The programme will follow standardized treatment guidelines for all forms of TB being treated at all levels as per the accepted international standards and good practices. The updated guidelines will be disseminated and staff will accordingly be trained. For easy

remembrance and quick reference, desk reference materials will also be produced and disseminated.

3.2. Ensure uninterrupted supply of TB drugs

The anti-TB drugs should meet WHO-prequalification standards. The drugs are normally procured through Global Drug Facility under the STOP TB partnership. The consistent procurement and supply chain management will be maintained and monitored through early warning system and regular stock monitoring.

3.3. Improving the quality of DOT

Directly Observed Treatment (DOT) is the backbone of the programme. JMM 2016 found some deficiencies with implementation of DOT. The programme will ensure to strengthen DOTs at all levels. TB In-charge in close coordination with Medical Officer shall identify a DOT provider and educate him/her on administering DOTs and identifying the side effects and further management. DOT providers can be anyone residing near the patient. In some cases, it may be necessary to make a family member as DOT provider. In the communities, village health workers (VHW), health assistants (HA) will be trained in DOT. Comprehensive treatment literacy will be given to all the patients and the DOT providers.

3.4. Adopt recent WHO guidelines on management of DR-TB

The WHO has recently (in May 2016) approved the use of a shorter regimen for the treatment of RR and MDR-TB. Currently the country doesn`t have facilities for second line DST. The country plans for adopting shorter regimen at the earliest alongside with establishment of SL LPA in the country and active tuberculosis drug-safety monitoring and management (aDSM) system is in place. The process will include:

a. Development of a transition plan for adoption of shorter regimen after updating the PMDT guidelines, aDSM and developing necessary SoPs

b. Establishing SL LPA in 2017

c. Training of staff on shorter regimen for RR/MDR-TB. This will include both programmatic and clinical aspects

4. To cut the chain of TB transmission through adequate infection control in all treating facilities by 2020 and treat LTBI

4.1. Increased awareness and strengthen enforcement of Infection Control guidelines

Infection control is found sub-optimal in various internal and external reviews of the health facilities due to inadequate dissemination of guideline and mechanism to regularly monitor the implementation. This will be addressed through sensitisation meetings, training of staffs and monitoring of health facility level infection control practices. Program will coordinate with Infection Control Programme and Quality Assurance Standardization Division for the implementation of infection control measures by Hospital Administration and Management Transformation (HAMT) activities.

4.2. Diagnose and treat LTBI

Prevention of development of active disease in those considered vulnerable is an important step in cutting the chain of transmission of the disease. Hence treatment of LTBI is considered an important intervention. In Bhutan, LTBI detection will focus mainly on the HIV positives and child contacts of active TB. The Tuberculin skin test (TST) or the Mantoux test will be used to diagnose LTBI after ruling out active TB. All positive cases will be administered IPT for 6 months as per the guidelines. Mantoux test should be available in all hospitals; however, it will not be a limiting factor in deciding whether or not to start IPT. Treating physician can start IPT based on clinical history after ruling out active TB.

5. To detect and register 100% of TB-HIV co-infected individuals from 2020 onwards

The Human Immunodeficiency Virus (HIV) destroys the immune system of an individual. Someone who is HIV-positive and infected with TB bacilli is more likely to become sick with TB bacilli than those who are HIV-negative. HIV and TB form a lethal combination, each speeding the progress of the other. TB is a leading cause of death among people who are HIV-positive. HIV is the most potent factor known to increase the risk of

progressing from latent tuberculosis infection to tuberculosis disease. In an HIV negative patient infected with M. tuberculosis, the lifetime risk of developing tuberculosis is only 10%, whereas in person dually infected with TB and HIV is 50%. Hence it is important to diagnose all cases of TB with HIV infection and the other way round as well. The programme will ensure this cross referral through strengthening coordination between HIV and TB programme and ensuring proper referral system.

5.1. Strengthen collaboration between TB and HIV programme management

Have regular dialogues between the two programmes and exchange information through meetings and joint monitoring of programmes including formulation of TB-HIV collaborative guidelines. Also strengthen coordination and awareness level of all stakeholders including community-based organizations. This will involve sensitisation meetings as well as training of staffs.

5.2. Improved coordination between TB and HIV programme implementation

This part covers the implementation aspects of the programme. To achieve this coordination, sensitisation of medical officers will be organised. For coordination of recording and reporting, joint trainings of TB and VCT focal persons will be held. At the grassroots level, MSTF will be engaged in TB related activities.

6. Strengthen programmatic management of Tuberculosis at all levels

6.1. Strengthen partnership for prevention and control of TB at all levels.

In order to improve the efficiency and performance of the programme, it is important to have close collaboration and coordination with the relevant stakeholders. The NTCP will engage various government organizations such as the Council for Religious Affairs, Ministry of Education, Royal University of Bhutan and Armed Forces at the central level.

While keeping in mind for holistic engagement of all care providers, NTCP will coordinate and collaborate with Non-governmental Organizations like Youth Development Fund and other relevant partner. Similarly, at the Dzongkhag and community level, programme will involve Dzongkhag health sector, Local government institutions (Tshogdus and Tshogchhungs), Multi-sectorial Task Force, Community Action Groups and VHWs at the lowest level.

6.2 Enhance advocacy communication and social mobilisation among various partners

For the successful implementation of DOTs and control of TB, it is vital to invest on communication and education awareness programmes to general public through various stake holders and channels of communication. NTCP will have partnership with various governmental, non-governmental organizations including local government and community based institutions for creating awareness, support and implementation of TB control activities.

6.3 Ensure adequate human resource and capacity development.

Currently, there is shortage of human resources in the health system resulting into high workloads and turnovers. In order to achieve the outcomes of this strategic plan, adequate human resource and capacity development is imperative at all levels of health care system with relevant capacity and skills built.

6.4 Strengthening supervision and monitoring

The supervision and monitoring shall be undertaken as per the M& E framework. This is important for managing setbacks normally occurring during the implementation. It also provides an opportunity for corrective measures and feedbacks. The process will involve planning, recording, reporting and review (including JMM) of strategies, interventions and activities. As a follow-up to call for action that was jointly signed by all Member States of the WHO SEA Region at the Ministerial Meeting in Delhi on 15-16 March 2017, Bhutan will set up a high level committee to constantly review and monitor the progress of programme towards ending TB. Subject to approvals from the Hon'ble minster, the high level committee will be chaired by Health Minister, with members from health

sectors, finance, GNHC, NGO representation and civil society representation and other relevant agencies.

6.5 Improve strategic Information for evidence based programmatic interventions

To improve the quality services, evidence based planning has become critical. In order to achieve this, there is a need to strengthen operational research for making informed decision on public health action. In alignment with the End-TB Strategy, the programme will undertake operational research to assess barriers and develop more effective approaches to case finding, diagnosis and care, and minimise development of drug-resistance among TB patients. The programme will coordinate with international agencies and experts to undertake training of national TB experts on operational research and look for funding sources to support this research.

10. FINANCING HEALTH SYSTEM IN BHUTAN

All contributions either domestic/ external to the national TB programme are prioritized and allotted based on the Five Year Plan document. The national plan has been prepared using the result based planning approach to ensure that developmental plans are result-oriented. All budget requirements are hence determined on the basis of specific need of each programme which shall be guided by the FYP to achieve the desired outcomes. As per the policy of the government, all recurrent expenditures have to be met from the domestic budget. Only capital works and projects can be funded from the donor and grant funds. The government contributions are in the form of personnel salaries & emoluments, facilities maintenance and other logistic and administration costs. Since start of TB control programme, 1st line anti-TB drugs are procured through government funding and it will be sustained through Bhutan Health trust Fund which is mandated for funding of all vaccines and essential medicines. Such system has been put in place to ensure all time functioning and sustainability of the programmes even after a specific donor withdraws their support. Total indicative total capital outlay for health sector programme under 10th five Plan (2008 – 2013) is Nu. 4394.336 million, out of which TB programme outlay is Nu. 53.441 million. For TB control, all staffs (TB In charges) fully or partially involved in delivery of TB care and services are employed by the government and health centers diagnosing, managing and treating patients are owned by the government. They are responsible to carry out health education sessions and provide health care services in their catchment area on a regular basis. The services and activities they are engaged are monitored by the district health officers/district medical officers on a regular basis and periodically supervised by the central programmes. Any issues or achievements made by the districts are shared and deliberated during the annual TB review meetings/Annual Health Conference to seek direction for improvement. The monitoring and evaluation of the tenth plan aligned with the National Monitoring and Evaluation System is a very important component to ensure that the resources are used efficiently, transparently and equitably. All programme activities are directly linked to the web based computerized system, the Planning & Monitoring System (PLaMS) of The Gross National Happiness Commission. Through this system, a proper linkage of the operational plan with the strategic plan can be ascertained which would facilitate planning and monitoring the implementation of sector plans thereby ensuring effective and transparent use of resources. The Internal Audit unit under the MoH also performs auditing of the various programmes and projects through prioritization. Besides, annual audits are also being conducted by the

Royal Audit Authority for all programmes and projects to ensure integrity in use of public resources at all levels of public service delivery.

11. TECHNICAL ASSISTANCE

Considering limited technical capacity and limited manpower in Bhutan and absence of any International agencies working on tuberculosis in the country, WHO South Asia office and WHO country office plays an important role in providing Technical Assistance to NTCP in programmatic management in line with the WHO and international standards.

Along with WHO, The Global Fund and the Global Drug Facility has been technical advisor for NTCP and has assisted in different fields like development of TB and MDR-TB guideline, PMDT expansion plan, development of NSP, infection control plan, external review of TB program, GDF monitoring mission, rGLC mission, development of TB concept note for various rounds of GF grants.

Technical Assistance to the overall NTCP and to the various elements of TB control is needed to ensure and sustain the quality of TB control interventions. The NTCP shall continue to seek technical assistance support from WHO and other partners to improve the overall programmatic management. Important areas of Technical Assistance planned from 2017-2023

- JMM review
- Updating M & E framework/plan
- Revision of TB and MDR-TB guideline
- Developing Program Continuation request form/proposal for GF grant
- Transitioning to shorter regimen for RR/MDR-TB cases. TA will be needed within 2017 for
    - Update of PMDT guidelines including aDSM and relevant SoPs for implementing the guidelines
    - Preparation of transition plan
    - Training of programme personnel and clinicians

- Setting priority for Operational Research
- Annual Lab Assessment visit by SNRL
- Any other priority technical support required

12. MONITORING AND EVALUATION (M &E) FRAMEWORK

Through effective monitoring and evaluation, programme results at all levels (impact, outcome, output, process and input) can be measured to provide the basis for accountability and decision making at both programme and policy level. The monitoring and evaluation system also ensures accountability for the resources allocated for activities at the different levels of the programme. In order to materialize and achieve the set milestones and the targets in this NSP; monitoring, supervision, review and the evaluation of plan targets are essential to track the progress and the achievements at all levels.

One of the major strengths of the M & E is that all the indicators listed are clearly linked to the strategic objectives, and technically sound data sources have been established. There are indicators measuring disease trends in terms of TB incidence and mortality based on WHO estimates that have been applied to establish the baselines and will be used to measure trends during the NSP period. The baselines for the impact, outcome and most of the output indicators are available and targets have been set till 2023. The core indicators framework has been outlined in Table 8.

[7]In alignment with End TB Strategy milestones for 2020 and the SEA Regional Strategic Plan 2016-2020

Table 10: Core M & E framework indicators

	Indicator	Baseline	2017	2018	2019	2020	2021	2022	2023
Impact indicators	TB incidence per 100,000 population/year	155	147	139	131	124[7]	119	113	107
	TB mortality (in absolute numbers)	120	105	95	85	75[7]	65	55	45
Outcome indicators	Case notification rate: Number of new and relapse bacteriologically confirmed Pulmonary TB cases reported to the national TB programme per 100,000 population per year	59	65	70	75	80	80	80	70
	Treatment success rate: percentage of new and relapse bacteriologically confirmed Pulmonary TB cases successfully treated (cured plus completed treatment) among the new and relapse bacteriologically confirmed Pulmonary TB cases registered on treatment	88%	>90%	>90%	>90%	>90%	>90%	>90%	>90%
Output indication	Percentage (%) of laboratories showing adequate performance among those that receive external quality assurance (EQA)	90%	>90%	>90%	>90%	>95%	>95%	>95%	>95%
	Percentage (%) of Pulmonary TB patients tested for drug resistance using the WHO recommended rapid diagnostics (WRD)	NA	60%	70%	80%	>90%	>90%	>95%	100%
	Percentage (%) of treatment units reporting no stock out of first-line and second-line anti-TB drugs on the last day of each quarter out of all treatment units	100%	100%	100%	100%	100%	100%	100%	100%
	Number of districts supervised and feedback provided by the NTP for all reporting centers annually	32	32	32	32	32	32	32	32
	Proportion of all registered TB patients who are tested for HIV	73%	75%	80%	85%	90%	95%	100%	100%
	SL LPA established and functional	0	0	1	1	1	1	1	1
	Proportion of laboratory confirmed MDR-TB patients enrolled on second-line drugs	100%	100%	100%	100%	100%	100%	100%	100%
	Proportion of laboratory confirmed RR/ MDR-TB patients enrolled on shorter regimen for RR/MDR-TB patients	NA	0%	50%	60%	60%	80%	100%	100%

Table 11: Operational definition and measurement of the indicators

	Indicator	Indicator definition	Data collection method/ source	Frequency of data collection	Person/Agency responsible for collection and reporting
Impact indicators	TB incidence per 100,000 population/year	Number of new TB cases (all forms) per 100,000 population in a given year	• WHO estimates	• Annual	• WHO
	TB mortality per 100,000 population/year	Number of deaths due to TB (all forms) per 100,000 population in a given year	• WHO estimates • National TB mortality surveys	• Annual • Periodic	• WHO • NTP
Outcome indicators	Case notification rate: Number of new and relapse bacteriologically confirmed Pulmonary TB cases reported to the national TB programme per 100,000 population per year	Numerator: number of new and relapse bacteriologically confirmed Pulmonary TB cases recorded in TB registers between 1st January and 31st December of the reporting year Denominator: estimated mid-year population	District TB register; quarterly reports on TB case registration	Annual	NTP
	Treatment success rate: percentage of new and relapse bacteriologically confirmed Pulmonary TB cases successfully treated (cured plus completed treatment) among the new bacteriologically confirmed Pulmonary TB cases registered on treatment	Numerator: number of new and relapse bacteriologically confirmed Pulmonary TB cases registered between 1st January and 31st December of the year before the reporting year classified as "cured" or "treatment completed" at the end of the reporting year Denominator: number of new and relapse bacteriologically confirmed Pulmonary TB cases recorded in TB registers between 1st January and 31st December of the year being reported	Numerator: Patient treatment cards; District TB register; Quarterly reports on the results of TB patients registered 12-15 months earlier Denominator: District TB register; Quarterly reports on the results of TB patients registered 12-15 months earlier	Annual	NTP

Table 12: Operational Plan 2017-2023

Objectives	Strategic interventions	Activities	Sub-activity/ components	Unit Cost (in US $)	Annual Indicative Budget for NSP II (NSP Need)							
					2017	2018	2019	2020	2021	2022	2023	Grand total
1. To increase case notification rate of at least 90% among estimated TB and MDR-TB cases	1.1 Improve access to quality diagnostic services	Procure microscopes for expansion of diagnostic services and replacing the defective ones	Drafting specifications for requirement of microscopes (no budget needed)		0	0	0	0	0	0	0	0
			Payment for the microscopes	2,000	0	14,000	0	0	6,000	0	0	20,000
		Sputum/ biological specimen collection and transportation from BHUs to district hospitals and districts to RCDC S	Annual purchase of sputum transportation material (assuming 25% of samples will need transportation each year)*	5	1,250	1,300	1,350	1,400	1,450	1,500	1,550	9,800
			Courier/ transportation charges	20	5,000	5,200	5,400	5,600	5,800	6,000	6,200	39,200
		Establish 2 additional sub-national culture labs in two regional referral hospitals by 2019	Laboratory infrastructure upgrade	20,000	20,000	20,000	0	0	0	0	0	40,000
			Equipment purchase (as per WHO planning and budgeting tool)	146,350	146,350	146,350	0	0	0	0	0	292,700
			Training of laboratory technicians	500	0	2,000	0	1,000	0	1,000	0	4,000
		Bacteriological confirmation in all possible cases of EP-TB	Transportation of EP specimen	20	4,000	4,000	4,400	4,400	4,800	5,200	5,200	32,000
		Lab QA activities	Supervisory visits from national reference lab	100	800	800	800	800	800	800	800	5,600
			LQAS	20	800	800	800	800	800	800	800	5,600
			Refresher training of microscopists (5 per batch)	1,000	1,000	1,000	1,000	1,000	1,000	0	2,000	7,000
		Purchase of quality assured lab consumables, reagents and test kits for different methods of diagnostic tools	Sputum cups and slides (diagnosis and follow-up)	1	8,000	8,400	8,600	8,800	9,000	9,200	9,200	61,200
			Lab reagents for sputum microscopy	1	16,000	16,000	16,000	16,800	18,000	18,400	18,400	119,600
			Lab reagents for Solid culture and DST	3	2,700	3,000	3,300	3,450	3,750	4,800	5,400	26,400
			Lab reagents for liquid culture and DST	5	1,000	1,000	1,200	1,200	1,400	1,600	1,800	9,200
			Lab reagents for GeneXpert testing	12	28,800	36,000	48,000	57,600	67,200	72,000	76,800	386,400
			Lab reagents for FL LPA	20	16,000	20,000	20,000	24,000	24,000	26,000	28,000	158,000
			Lab reagents for SL LPA	35	0	3,500	4,200	4,900	4,900	5,600	5,600	28,700
		Laboratory equipment annual maintenance	Microscopes	200	7,000	7,000	7,000	7,400	7,400	7,400	7,800	51,000
			Solid culture lab	5,000	5,000	5,000	10,000	15,000	15,000	15,000	15,000	80,000
			Liquid culture lab	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	70,000
			GeneXpert	2,000	8,000	16,000	24,000	24,000	24,000	24,000	28,000	148,000
	1.2 Intensifying diagnosis of childhood TB cases	Develop and disseminate information material on algorithm for childhood TB diagnosis	Develop reference material	500	500	0	0	500	0	500	0	1,500
			Print reference material	2	1,000	1,000	1,000	1,000	1,000	1,000	1,000	7,000
			Distribute reference material to various sites	20	200	200	200	200	200	200	200	1,400
		Awareness generation on childhood TB	On-site meetings with heath staff	50	600	600	600	600	600	600	600	4,200
		Training of medical officers and paediatricians on management of paediatric TB (5 days)	Participant cost - group of 10	2,500	5,000	5,000	0	2,500	2,500	0	2,500	17,500
			Facilitators - 2 for each group	1,000	2,000	2,000	0	1,000	1,000	0	1,000	7,000
			Venue	100	200	200	0	100	100	0	100	700
												0
		Training of MCH staff on screening and referral of TB symptomatics (1 day)	Participant cost - group of 10	500	4,500	500	0	500	0	500	500	6,500
			Facilitators - 2 for each group	200	1,800	200	0	200	0	200	200	2,600
			Venue	50	450	50	0	50	0	50	50	650
			Stationery and miscellaneous	20	180	20	0	20	0	20	20	260
		Screening activities among schools	Sensitisation of school teachers - 1day	100	600	200	200	200	200	200	200	1,800
			Screening of school children - 1 day	100	600	200	200	200	200	200	200	1,800
			Travel and transportation - 2 health staff	100	600	200	200	200	200	200	200	1,800

1. To increase case notification rate of at least 90% among estimated TB and MDR-TB cases	1.3 Identifying TB among marginalised and vulnerable populations	Annual screening activities in monasteries and nunneries	Sensitisation meeting - 1 day	50	1,000	1,000	1,000	1,000	1,000	1,000	1,000	7,000
			Screening camp - 1 day	200	4,000	4,000	4,000	4,000	4,000	4,000	4,000	28,000
			Travel and transportation - 2 health staff	100	2,000	2,000	2,000	2,000	2,000	2,000	2,000	14,000
		Annual screening activities among prisons	Sensitisation meeting - 1 day	50	300	300	300	300	300	300	300	2,100
			Screening camp - 1 day	200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	8,400
			Travel and transportation - 2 health staff	100	600	600	600	600	600	600	600	4,200
											0	0
		Annual screening activities among migrant workers	Sensitisation meeting - 1 day	50	400	400	400	400	400	400	400	2,800
			Screening camp - 1 day	200	1,600	1,600	1,600	1,600	1,600	1,600	1,600	11,200
			Travel and transportation - 2 health staff	100	800	800	800	800	800	800	800	5,600
												0
		Regular screening of bridge population	Identification and household screening	50	1,000	1,000	1,000	1,000	1,000	1,000	1,000	7,000
			Travel and transportation - 2 health staff	100	2,000	2,000	2,000	2,000	2,000	2,000	2,000	14,000
	1.4 Improved active case finding and referral of TB symptomatics	Awareness generation activities among medical and paramedical staff	Sensitisation meeting - 1 day	200	2,000	1,000	1,000	1,000	1,000	1,000	1,000	8,000
		Awareness generation among BHU staff and VHWs	Sensitisation meeting - 1 day	100	1,000	500	500	500	500	500	500	4,000
		Awareness generation among community through mass-media and use of IEC materials	Development of IEC material	2,000	2,000	0	0	0	2,000	0	0	4,000
			Printing of IEC materials	1	2,500	0	2,500	0	2,500	2,500	2,500	12,500
			Development of mass-media clips	10,000	30,000	0	0	30,000	10,000	0	0	70,000
			Broadcasting clips	5,000	15,000	20,000	20,000	20,000	20,000	20,000	20,000	135,000
		Organise annual World TB Day activities	WTBD activities at national level	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	35,000
			WTBD activities at subnational level (25)	12,500	0	12,500	12,500	12,500	12,500	12,500	12,500	75,000
		Awareness generation among employers in factories, construction work and mining industry	Sensitisation meeting - 1 day	200	800	800	800	800	800	0	0	4,000
		Development and printing of posters, leaflets, brochures and other materials	Development of material	500	2,000	0	0	2,000	0	0	0	4,000
			Printing costs of materials	1	1,000	1,000	1,000	1,000	1,000	1,000	1,000	7,000
												0
		Purchase of 2 mobile vans for active screening activities	Developing the specifications for purchase (no budget required)		0	0	0	0	0	0	0	0
			Initiating the procurement process (no budget required)		0	0	0	0	0	0	0	0
			Purchase of mobile van retrofitted with digital CxR and a GeneXpert machine	65,000	0	65,000	65,000	0	0	0	0	130,000
			Running cost pf mobile van	500		1,000	3,000	4,000	4,000	4,000	4,000	20,000
												0
					0	0	0	0	0	0	0	0
	2.1 Increase access to rapid diagnostics	Procure additional rapid diagnostic machines	Additional GeneXpert machines (including accessories like UPS, printer, laptop and airconditioning of room)	25,000	100,000	100,000	0	50,000	0	0	50,000	300,000
					0	0	0	0		0	0	0
		Train staff on the use of rapid diagnostic machines	Staff training at national reference laboratory (5)	750	0	750	750	0	0	750	0	2,250
			Facilitator costs	200	0	200	200	0	0	200	0	600
					0	0	0	0	0	0	0	0

Objectives	Strategic interventions	Activities	Sub-activity/ components	Unit Cost (in US $)	Annual Indicative Budget for NSP II (NSP Need)							Grand total
					2017	2018	2019	2020	2021	2022	2023	
1. To increase case notification rate of at least 90% among estimated TB and MDR-TB cases	2.2 Improving efficiency in use of rapid diagnostics	Sensitisation of staff on algorithm and test preference	Particpant cost - 10 for 2 days	1,000	2,000	0	1,000	0	1,000	0	1,000	5,000
			Facilitator costs - 2 for 2 days	400	800	0	400	0	400	0	400	2,000
			Venue	100	200	0	100	0	100	0	100	500
			Stationery and miscellaneous	200	400	0	200	0	200	0	200	1,000
										0	0	0
		Linking of laboratories using TBISS	Software update and upgrade	3,000	3,000	0	0	0	0	0	0	3,000
			Computers	1,000	15,000	0	0	10,000	0	10,000	0	35,000
			Internet expenses - quarterly	75	6,000	6,000	6,000	6,000	6,000	6,000	6,000	42,000
		Refresher training of staff on TBISS										0
			Particpant cost - 10 for 2 days	1,000	2,000	1,000	1,000	1,000	1,000	1,000	1,000	8,000
			Facilitator costs - 2 for 2 days	400	800	400	400	400	400	400	400	3,200
			Venue	100	200	100	100	100	100	100	100	800
			Stationery and miscellaneous	200	400	200	200	200	200	200	200	1,600
2. Maintain treatment success rate of at least 90% among drug-susceptible TB and at least 75% among drug-resistant TB cases	3.1 Provide standardised treatment for all forms of TB	Disseminate standard guidelines for treatment of all forms	Printing of guidelines	10	5,000	0	5,000	0	5,000	0	0	15,000
										0	0	0
		Provide training to all staff on new TB guidelines (5 days)	Participant cost (20)	5,000	25,000	10,000	5,000	5,000	5,000	0	5,000	55,000
			Facilitators (3)	1,500	7,500	3,000	1,500	1,500	1,500	0	1,500	16,500
			Venue	500	2,500	1,000	500	500	500	0	500	5,500
			Stationery and miscellaneous	400	2,000	800	400	400	400	0	400	4,400
					0	0	0	0			0	0
		Develop and disseminate desk reference materials	Printing of desk reference materials (2)	2	1,000	1,000	0	1,000	0	1,000	0	4,000
	3.2 Ensure uninterrupted supply of drugs	Procure quality assured first line drugs for all adult cases	Quantification (no budget needed)		0	0	0	0	0	0	0	0
			Begin procurement process (no budget needed)		0	0	0	0	0	0	0	0
			Cost of FLD per patient	25	30,000	32,000	33,000	35,000	36,000	36,000	38,000	240,000
		Procure quality assured child-friendly paediatric formulations	Quantification (no budget needed)		0	0	0	0	0	0	0	0
			Begin procurement process (no budget needed)		0	0	0	0	0	0	0	0
			Cost of FLD per patient (10% of adults)	25	3,000	3,200	3,300	3,500	3,600	3,600	3,800	24,000
		Procure quality assured second-line drugs for all cases	Quantification (no budget needed)		0	0	0	0	0	0	0	0
			Begin procurement process (no budget needed)		0	0	0	0	0	0	0	0
			Cost of SLD per patient - coventional regimen	2,500	190,000	100,000	80,000	90,000	50,000	0	0	510,000
			Cost of SLD per patient - shorter regimen	800		32,000	38,400	44,800	64,000	96,000	112,000	387,200
	3.3 Improving the quality of DOT	Training VHW and BHU staff on DOT	Participant cost	1,000	3,000	1,000	1,000	1,000	1,000	1,000	1,000	9,000
			Facilitators	100	300	100	100	100	100	100	100	900
			Venue	100	300	100	100	100	100	100	100	900
			Stationery and miscellaneous	200	600	200	200	200	200	200	200	1,800
		Incentives to VHWs and DOT provider (cash or kind)	At the initiation of treatment	5	3,500	3,720	3,840	4,080	4,220	4,260	4,540	28,160
			After 3 months	10	7,000	7,440	7,680	8,160	8,440	8,520	9,080	56,320
			After 6 months/ completion of treatment for DS-TB	10	7,000	7,440	7,680	8,160	8,440	8,520	9,080	56,320
			After 9 months (in case of DR-TB)	10	400	400	400	480	520	600	720	3,520
			After 12 months (in case of DR-TB)	10	400	400	400	480	520	600	720	3,520
			After 15 months (in case of DR-TB)	10	400	400	400	480	520	600	720	3,520
			After 18 months (in case of DR-TB)	10	400	400	400	480	520	600	720	3,520
			After completion of treatment (in case of DR-TB)	10	400	400	400	480	520	600	720	3,520

Objectives	Strategic interventions	Activities	Sub-activity/ components	Unit Cost (in US $)	Annual Indicative Budget for NSP II (NSP Need)							Grand total
					2017	2018	2019	2020	2021	2022	2023	
2. Maintain treatment success rate of at least 90% among drug-susceptible TB and at least 75% among drug-resistant TB cases		Contact tracing by BHU staff and VHWs	Home visits - twice for each case	10	13,960	14,880	15,320	16,320	16,840	17,040	18,120	112,480
		Using IT tools for contacting treatment interrupters	Text messages by DOT provider - average 3 per case	0	279	298	306	326	337	341	362	2,250
			Software update for system alert on treatment interruption	5,000	5,000	0	0	10,000	0	0	5,000	20,000
	3.4 Adopt recent WHO guidelines on management of DR-TB	Phase-in shorter regimen gradually from 2018	International TA to develop phase-in startegy	9,500	0	9,500	0	0	9,500	0	0	19,000
					0	0	0	0	0	0	0	0
		Establish SL LPA facility in 2017	Infrastructure	40,000	40,000	0	0	0	0	0	0	40,000
			Equipment - available LPA machine will be used	0	0	0	0	0	0	0	0	0
			International training of laboratory technicians (2)	4,000	0	4,000	0	4,000	0	0	4,000	12,000
										0	0	0
		Training of Medical Officers on shorter regimen	Participant cost	1,500	4,500	1,500	1,500	3,000	1,500	1,500	1,500	15,000
			Facilitators	600	1,800	600	600	1,200	600	600	600	6,000
			Venue	300	900	300	300	600	300	300	300	3,000
			Stationery and miscellaneous	60	180	60	60	120	60	60	60	600
	4.1 Increased awareness and strengthen enforcement of infection control guidelines	Dissemination of Infection control guidelines	Development of guidelines - international TA	9,500	9,500	0	0	0	0	0	0	9,500
			Printing of guidelines	25	5,000	0	5,000	0	0	5,000	0	15,000
					0	0	0	0	0	0	0	0
		Sensitisation of all health facilities and training of focal persons (2 days)	Participants cost (10)	1,000	2,000	1,000	0	1,000	0	1,000	0	5,000
			Facilitators (2)	400	800	400	0	400	0	400	0	2,000
			Venue	200	400	200	0	200	0	200	0	1,000
			Stationery and miscellaneous	100	200	100	0	100	0	100	0	500
										0	0	0
		Regular meeting of infection control committee	Quarterly meeting at district level	200	16,000	16,000	16,000	16,000	16,000	16,000	16,000	112,000
		Renovation for infection control	Building renovation for wards with in-patient facilities	10,000	40,000	20,000	0	0	0	10,000	0	70,000
			Use of suitable exhausts/ ventilation	250	5,000	2,500	0	2,500	0	0	2,500	12,500
			UVGI fixtures at selected places/ labs	1,200	4,800	2,400	0	2,400	0	0	2,400	12,000
		Purchase of PPE	N95 respirators (per staff per week)	5	10,400	10,400	11,700	11,700	11,700	11,700	11,700	79,300
			Gloves and gowns (per staff per week)	10	0	20,800	23,400	23,400	23,400	23,400	23,400	137,800
					0	0	0	0	0	0	0	0
		Screening for TB among health care workers	Organising screening activities annually at each centre catering to TB patients (no budget)	0	0	0	0	0	0	0	0	0
					0	0	0	0	0	0	0	0
		Risk communication	Printing of infection control leaflets	1	500	500	500	500	500	500	500	3,500
			Short films on cough hygiene and infection control at home - shown in waiting areas	1,000	2,000	0	0	2,000	0	0	0	4,000
			Posters with TB messages at health facilities	5	2,500	2,500	1,000	1,000	1,000	1,000	1,000	10,000
										0	0	0
		Inclusion of TB specific check-list in Health Administration Management Transformation	Advocacy meeting - 1 day, 5 particpants	200	200	0	0	0	0	0	0	200
2. Maintain treatment success rate of at least 90% among drug-susceptible TB and at least 75% among drug-resistant TB cases	4.2 Diagnose and treat LTBI	Screen all HIV positive patients	transportation of patients/ specimen	20	1,600	2,000	2,400	2,800	3,200	3,600	4,000	19,600
					0	0	0	0	0	0	0	0
		Screen all under 5 contacts of active TB	Health care workers home visit for screening	20	24,000	25,600	26,400	28,000	28,800	28,800	30,400	192,000
			Purchase of TST	10	1,000	1,250	1,300	1,400	1,500	1,600	1,700	9,750
		IPT administration as per guidelines	Purchase of INH 100 (for 2000 HIV and child contacts for 6 months)	2	3,000	3,000	3,300	3,300	3,600	3,600	3,900	23,700

Objectives	Strategic interventions	Activities	Sub-activity/ components	Unit Cost (in US $)	Annual Indicative Budget for NSP II (NSP Need)							
					2017	2018	2019	2020	2021	2022	2023	Grand total
3. Detect and register 100% of TB-HIV coinfected individuals by 2020	5.1 Strengthen collaboration between TB and HIV	Biannual meeting of the TB/HIV coordinating body (1 day)	Participant cost	500	1,000	1,000	1,000	1,000	1,000	1,000	1,000	7,000
			Venue	100	200	200	200	200	200	200	200	1,400
		Joint monitoring of TB and HIV programme from central level	As part of the supervisiory activities, HIV programme will also be invited - no separate budget	0	0	0	0	0	0	0	0	0
	5.2 Improved coordination between TB and HIV programme implementation	Sensitisation/training of medical officers and other relevant staff (1 day)	Particpant cost (20)	1,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	14,000
			Facilitators (1)	100	200	200	200	200	200	200	200	1,400
			Venue	100	200	200	200	200	200	200	200	1,400
		Joint training of TB and VCT focal persons (3 days)	Participant cost (10)	1,500	1,500	0	1,500	0	1,500	0	1,500	6,000
			Facilitators (2)	600	600	0	600	0	600	0	600	2,400
			Venue	300	300	0	300	0	300	0	300	1,200
			Stationery and miscellaneous	60	60	0	60	0	60	0	60	240
		Involve MSTF in TB related activities	Incentive for referral and follow-up of symptomatics (quarterly in each of the district)	6,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	168,000
4. Strengthen programmatic management of Tuberculosis at all levels	6.1 Strengthen partnership for prevention and control of TB at all levels	Sensitization of local government members at the district and geog levels		60,000	0	0	60,000	0	0	60,000	0	120,000
	6.2 Enhance advocacy communication and social mobilisation among various	Support for High level advocacy		20,000				20,000			20,000	40,000
	6.3 Ensure adequate HR and capacity development.	Master course for one NTCP staff on MPH/Epidemiology		75,000		75,000						75,000
		Participation of 3 staff each year (1 central, 1 hospital and 1 district/BHU	Travel cost and Per Diem	2,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	42,000
			Registration costs	2,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	52,500
					0	0	0	0	0	0	0	0
		Organise international training in the country - one in two years (5 days)	International facilitators (2)	19,000	0	19,000	0	19,000	0	19,000	0	57,000
			National facilitators (2)	2,000	0	2,000	0	2,000	0	2,000	0	6,000
			Particpants (20)	5,000		5,000	0	5,000	0	5,000	0	15,000
			Venue	500	0	500	0	500	0	500	0	1,500
			Stationery and miscellaneous	400	0	400	0	400	0	400	0	1,200
					0	0	0	0	0	0	0	0
		Training of nurses on programmatic aspects (2 days)	Participants cost (20)	2,000	4,000	2,000	2,000	2,000	2,000	2,000	2,000	16,000
			Facilitators (2)	400	800	400	400	400	400	400	400	3,200
			Venue	200	400	200	200	200	200	200	200	1,600
			Stationery and miscellaneous	200	400	200	200	200	200	200	200	1,600
												0

Objectives	Strategic interventions	Activities	Sub-activity/ components	Unit Cost (in US $)	Annual Indicative Budget for NSP II (NSP Need)							Grand total
					2017	2018	2019	2020	2021	2022	2023	
4. Strengthen programmatic management of Tuberculosis at all levels	6.4 Strengthening supervision and monitoring	High level committee monitoring progress in TB control chaired by H.E. Minister of Health - once in six months	Participant cost (10)	1,000	1,000	2,000	2,000	2,000	2,000	2,000	2,000	13,000
			Venue	500	500	1,000	1,000	1,000	1,000	1,000	1,000	6,500
			Stationery and miscellaneous	1,000	1,000	2,000	2,000	2,000	2,000	2,000	2,000	13,000
												0
		Prepare annual action plan at central and sub-national level (2 days)	Participants cost (35)	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	24,500
			Venue	100	100	100	100	100	100	100	100	700
			Stationery and miscellaneous	350	350	350	350	350	350	350	350	2,450
		Quarterly supervision from central level to district level each quarter	Travel cost	200	800	800	800	800	800	800	800	5,600
			Per Diem (4)	600	2,400	2,400	2,400	2,400	2,400	2,400	2,400	16,800
		Quarterly supervision from regions to the districts	Travel cost	100	400	400	400	400	400	400	400	2,800
			Per Diem	600	2,400	2,400	2,400	2,400	2,400	2,400	2,400	16,800
		Monthly supervision from districts to health facilities	Travel cost	20	240	240	240	240	240	240	240	1,680
					0	0	0	0	0	0	0	0
		Bi annual review meeting (1 day)	Participants cost (30)	6,000	12,000	12,000	18,000	12,000	12,000	12,000	12,000	90,000
			Venue	200	400	400	600	400	400	400	400	3,000
					0	0	0	0	0	0	0	0
		One JMM in 2018/2019 (5 days)	International staff - consultancy, travel and per diem (2)	19,000	0	0	19,000	0	0	0	0	19,000
			International staff - travel and per diem	1,250	0	0	1,250	0	0	0	0	1,250
			National staff - travel and per diem	500	0	0	500	0	0	0	0	500
			local travel of teams (3) - vehicle hiring and fuel	3,000	0	0	3,000	0	0	0	0	3,000
			Stationery and miscellaneous	1,000	0	0	1,000	0	0	0	0	1,000
		Training of staff on recording and reporting (3 days)	Participants cost (10)	1,500	3,000	1,500	0	1,500	0	1,500	0	7,500
			Facilitators (2)	600	1,200	600	0	600	0	600	0	3,000
			Venue	300	600	300	0	300	0	300	0	1,500
			Stationery and miscellaneous	200	400	200	0	200	0	200	0	1,000
	6.5 Improve strategic Information for evidence based	Operational research - training and protocol development	International facilitator	9,500	9,500	0	0	0	9,500	0	0	19,000
			National facilitators	2,000	2,000	0	0	0	2,000	0	0	4,000
			Participants cost	3,750	3,750	0	0	0	3,750	0	0	7,500
			Venue	1,000	1,000	0	0	0	1,000	0	0	2,000
			Stationery and miscellaneous	100	100	0	0	0	100	0	0	200
		Funding operation research	Funding needs per OR undertaken	5,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	70,000
			Grand Total		**1,097,949**	**1,092,848**	**778,686**	**823,976**	**705,137**	**753,051**	**770,412**	**6,022,060**
*This is only transportation material. Sputum cups and slides are budgeted along with laboratory consumables												
** International TA based on assumptions - consultancy fee USD 700/day for 10 days												
		Per Diem - USD 125/day for 6 days										
		Travel - USD 1500										
		Other costs - USD 250										
***IPT	Assuming 1100 paediatric contacts <3 yrs		Total 2,000 in first year, gradually increasing to 2400 in 5th year									
	800 paediatric contacts 3-5 yrs											

REFERENCES

1. *Annual Health Bulletin (2016).Health Management & Information System, Policy & Planning Division, Ministry of Health, Royal Government of Bhutan, Thimphu*
2. *Bhutan and ADB (2016), Retrieved from: http://www.adb.org/countries/bhutan/main*
3. *Constitution of Bhutan, 2008*
4. *Eleventh Five Year Plan Document. Gross National Happiness Commission, Royal Government of Bhutan.2013.*
5. *Ending TB in the South-East Asia Region: Regional Strategic Plan (2016-2020)*
6. *Global TB Report, WHO, 2015 (20th Ed.).*
7. *GNH Index at a Glance, (2015). Retrieved from: http://www.grossnationalhappiness.com/*
8. *Guidelines for the Management of Multi-Drug Resistant Tuberculosis, 2011, (1st Ed.) National TB Control Programme, Department of Public Health, Ministry of Health*
9. *Guidelines for the Management of Tuberculosis, 2010, (5th Ed.) National TB Control Programme, Department of Public Health, Ministry of Health*
10. *Health sector response to HIV in the South-East Asia Region, 2013. WHO SEARO*
11. *Joint Monitoring Mission Report (2016): National TB control Programme of Bhutan Kingdom of Bhutan*
12. *Key Socioeconomic Indicators, National Statistical Bureau (2016). Retrieved from: http://www.nsb.gov.bt/nsbweb/main/indicator.php*
13. *National Guidelines for Management of Drug Resistant Tuberculosis, 2016 (2nd Ed.), National TB Control Programme, Department of Public Health, Ministry of Health.*
14. *National Guidelines for Management of Tuberculosis, 2016,(6th Ed.) National TB Control Programme, Department of Public Health, Ministry of Health.*
15. *National Guidelines on TB-HIV Collaboration, 2013 (1st Ed.) Department of Public Health, Ministry of Health*
16. *National Health Policy, Ministry of Health, 2011*
17. *National Strategic Plan for Tuberculosis Control, 2012(1st Ed.)2012-2016*
18. *New MoH Organogram, Royal Government of Bhutan. Retrieved from: http://www.health.gov.bt/about/organogram/*
19. *The Story of GNH, GNH Center Bhutan. Retrieved from: http://www.gnhcentrebhutan.org/what-is-gnh/the-story-of-gnh/*
20. *Tuberculosis Control In the South East Asia Region: Annual Report, (2016) WHO, SEA Region*

21. *Tuberculosis Information and Surveillance User Manual, Version 1.0 (2015. Public Helath Laboratory, Department of Public Health. Retrieved from: http://www.phls.gov.bt/web/wp-content/uploads/2015/07/tbiss-Manual.pdf*

22. *Wallengren, K (2016). TB Epidemiological and Impact Analysis and Standards and Benchmarks Report*

23. *WHO treatment guidelines for drug-resistant tuberculosis. 2016 update*

List of People and Stakeholders Consulted

Sl.No.	Name	Designation	Organization
1	Dr. Karma Lhazeen	Director	DoPH, MoH
2	Dr. Gosar Pemba	Medical Superintendent	JDWNRH
3	Dr. Pema Tenzin	Chest Physician	RBA Hospital, Lungtenphu
3	Dr. H.P. Chhetri	Pediatrician	JDWNRH
4	Dr. Kuenley Pedon	Pediatrician	JDWNRH
5	Dr. Gaki Nima	Chest Physician	JDWNRH
6	Mr. Namgay Wangchuk	Chief HRO	HRD, MoH
7	Mr. Namgay Tshering	Offtg. CPO	CDD, DoPH
8	Mr. Sherab Gyeltshen	Sr. Planning Officer	GNHC
9	Mr. Gembo Dorji	Sr. Budget Officer	Ministry of Finance
10	Ms. Lila Maya Adhikari	Laboratory Officer	RCDC
11	Mr. Tshering Dorji	Laboratory Officer	RCDC
12	Mr. Gembo Dorji	DHO	Thimphu Dzongkhag
13	Mr. Tshering Wangdi	Planning Officer	PPD, MoH
14	Mr. Dechen Choiphel	CPO	EMTD, MoH
15	Mr. Yeshi Wangdi	Dy. CPO	NCDD, DoPH
16	Mr. Lobzang Tshering	Program Officer	RMNHP, NCDD, DoPH
17	Mr. Loday Zangpo	Program Officer	NCDD, DoPH
18	Mr. Dorji Khandu	Program Officer	CDD, DoPH
19	Mr. Lungten Jamtsho	Dy. CPO	QASD, MoH
20	Mr. Mindu Dorji	Dy. CPO	NCDD, DoPH
21	Ms. Chening Peldon	DCAO	Directorate of Services, MoH
22	Mr. Kencho Wangdi	Program Officer	CDD, DoPH
23	Ms. Sonam Yangchen	Planning Officer	PPD, MoH
24	Ms. Yangchen Dolkar	Asstt. Program Officer	NACP, DoPH, MoH
25	Ms. Jamyang Pema	Asstt. M & E Officer	NTCP, DoPH, MoH
26	Mr. Phurpa Tenzin	Asstt. Program Officer	NTCP, DoPH, MoH
27	Mr. Chewang Rinzin	Dy. Chief Program Officer	NTCP, CDD, DoPH