

**2023 Sri Lanka TB Program Review**

**September 4-15, 2023**

Review report

Learning from Yesterday and Today, to Shape the Future of the TB Response in Sri Lanka.

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# List of abbreviations/acronyms

ADRs Adverse drug reactions

aDSM adverse drug safety monitoring & management

AI Artificial Intelligence

Bdq Bedaquiline

BSL Bio-Safety Level

CAD Computer Aided Diagnostics

CBC Community based care

CBOs Community Based Organizations

CDS

C&DST Culture and drug susceptibility testing

Cfz Clofazimine

CHE Current Health Expenditure

CNAPT Ceylon National Association for the Prevention of Tuberculosis

CRP Consultant Respiratory physician

CXR Chest X-Ray

DCC District Chest Clinic

DCCL District chest clinic laboratory

DDG-PHS Deputy Director General of Public Health Services

DGHS Director General of Health Services

DOT Directly Observed Treatment

DRM Domestic Resource Mobilization

DRTB Dug Resistant TB

DSTB Drug Susceptible TB

DST Drug Susceptibility Testing

DTCO District TB coordination officer

DOT Directly observed treatment

DR TB Drug-resistant tuberculosis

DST Drug susceptibility testing

ENRS

EQA External Quality Assurance

ePIMS electronic Patient Information Management System

FEFO First Expiry, First Out

FLDs First Line (anti-TB) drugs

FQ Fluoroquinolone

GDP Gross Domestic Product

GF Global Fund

GLI Global Laboratory Initiative

GNI Gross National Income

GOSL Government of Sri Lanka

GPs General Practitioners

HDU High Dependency Unit

Hr Isoniazid resistant

IDs Infectious Diseases

IGRA Interferon Gamma Release Assay

IHME Institute for Health Metrics and Evaluation

INH Isoniazid

IPC Infection (transmission) Prevention and Control

ITLC Intermediate TB Laboratory Centres

KPI Key Performance Indicators

LIMS Laboratory Information Management System

LPA Line Probe Assay

LJ Lowenstein Jensen

Lzd Linezolid

MCs Microscopy Centres

MDR-TB Multidrug-resistant tuberculosis

MGIT Mycobacterium Growth Indicator Tubes

MLTs Medical Laboratory Technicians

MOH Ministry of Health

MPI Multi-dimensional Poverty Index

M.tb Mycobacterium tuberculosis

NCDs Non communicable diseases

NEQA National External Quality Assurance

NGOs Non-Governmental Organization

NHRD National Hospital for Respiratory Diseases

NSP National Strategic Plan

NPTCCD National Program for Tuberculosis Control and Chest Diseases

NTRL National TB Reference Laboratory

OPD Outpatient Department

OSSTR Oral Standard Short Treatment Regimen

PHI Public Health Inspector

PHLTs Public Health Laboratory Technicians

PIMS Patient Information System

PMCU Primary Medical Care Units

PMDT Programmatic Management of Drug Resistant TB

PLHIV People Living with HIV

PMTPT Programmatic Management of Tuberculosis Preventive Treatment

.

PPA Patient Pathway Analysis

PPM Public Private Mix ( for TB care and prevention)

QA Quality Assurance

QC Quality Control

SAEs Serious adverse drug events

SDGs Sustainable Development Goals

SLDs Second-line anti-tuberculosis drugs

SOPs Standard operating procedures

SORTIT Structured Operations Research and Training IniaTive.

SNRL Supranational tuberculosis reference laboratory

SSM Sputum Smear Microscopy

TB Tuberculosis

TPT Tuberculosis Preventive Treatment

TSH Thyroid Stimulating Hormone

TST Tuberculin Skin Test

rGLC Regional Green Light Committee

RR Rifampicin resistance

UHC Universal Health Coverage

V-DOT Video Directly Observed Treatment

VOT Video Observed Treatment

WHO World Health Organization

WRD WHO recommended rapid diagnostic test

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# Acknowledgements

The review team would like to sincerely thank the leadership of the Ministry of Health (MoH) and the National Program for TB Control and Chest Diseases (NPTCCD) for providing the team with the opportunity to contribute, albeit in a small way, to the TB response in Sri Lanka. The MoH and the NPTCCD created a conducive environment for this review, including providing unhindered access to documents, offices, health facilities, health care providers and patients. In the districts that the review teams visited, they were received warmly by health authorities and health care workers. Discussions with provincial and district health officers and health facility staff were cordial, with all people met , in both the public and private sector, enthusiastically engaging with the review team to provide perspectives and information that was key to understanding the state of the TB response in Sri Lanka.

This review was keenly and carefully steered by the World Health Organization, with excellent technical and logistical support by WHO, Sri Lanka, and technical support from the regional office for the Southeast Asia region and WHO HQ.

The TB response in Sri Lanka is receiving significant financial support from the Global Fund. This funding is helping Sri Lanka to push forward towards the achievement of the End TB Strategy/SDG targets. This review benefited from the presence of technical staff from the Global Fund Secretariat in Geneva.

While there are many challenges, Sri Lanka remains committed to get on course to end TB as a public health threat in the country. The review team applauds the efforts of the team at the NPTCCD and all the national stakeholders who are relentlessly pushing forward to have the vision of ending TB in Sri Lanka realized.

# Executive summary

Sri Lanka, a country in South Asia with a population of about 22 million people, is classified by the World Bank as a low middle income country. Its Gross Domestic Product (GDP) is US$ 74.4 billion and the GDP per capita, current, is US$ is 3,348. The country has a robust public health care service delivery system that has been offering free health services to all its citizens since independence in 1948. Impressive public health gains have been made that has placed Sri Lanka at par with high income countries in health indicators, such as maternal mortality, neonatal mortality and under five mortality. Even though the country has been facing an economic crisis since 2019, that has affected the health care sector, provision of free health services has continued unabated.

Sri Lanka has a low burden of TB. In 2021 WHO estimated that 14,000 (4,900 - 18, 000) or 63 (46 -83) /100,000 population, developed TB and 760 (680-830) or 3.5(3.1-3.8) /100,000 died of the disease. Among the five factors that are tracked by WHO for their role in driving the burden of TB around the world, undernutrition, alcohol use disorder, smoking and diabetes mellitus appear to be the most relevant in Sri Lanka (WHO Global TB Report, 2022). In 2022 the country identified and notified a total of 8, 343 people with TB among whom were 5, 767 (69%) people who had pulmonary TB and of whom 4, 211 (73%) were bacteriologically confirmed. The treatment coverage in 2021 was estimated by WHO to be only 48% (36-66) implying that over half of the people developing TB each year in Sri Lanka are missed. There were 16 people who were identified and notified with multi – drug resistant TB out of an estimated 48. Of all cases of TB notified, children and adolescents, under the age of 14 have consistently been under 5% with the highest proportion of 3.9% achieved in 2010. In 2022, this proportion was 2.2%. HIV testing coverage among people with TB was at 100% with HIV prevalence among tested TB patients at 0.73%. Of the 48 people with TB who were identified to be living with HIV, 23 (48%) were placed on ART. Two populations groups are currently targeted for TB preventive treatment (TPT): people living with HIV and children under 5 who are contacts of people with bacteriologically confirmed TB. Coverage of TPT in child contacts of people with TB has been climbing from 44% in 2019 to over 80% by quarter 2 of 2023. Treatment success rate (TSR) for new and relapse cases of TB has been below 85% since 2012 with the lowest TSR being in the 2021 cohort at 79.4%. Treatment success rate has been even lower for people with drug resistant TB: for the cohort of 2020, TSR was only 44%.

The TB response is currently guided by a TB National Strategic Plan that covers the period 2021- 2025. The goal of the TB-NSP is to achieve universal access to TB diagnosis and treatment and get on track to achieve the End TB Targets by 2035. There are six objectives which include: 1) Find and successfully treat about 10,000 people (including 600 children) with TB annually; 2) Successfully treat about 11, 600 people for (Latent) TB infection annually; 3) Engage the private sector so that by 2025, this sector contributes at least 30% of all TB notifications; 4) Strengthen monitoring and evaluation ; 5)Increase quantity and quality of TB operations research and 6) Improve organization and management of the TB program.

The 2023 TB program review, which was undertaken at the mid-term of the TB-NSP was carried out to a) assess the present status of the TB response; b) assess the implementation status of the current TB-NSP and to identify progress towards achieving the NSP objectives and targets; c) identify strengths, weaknesses and gaps/barriers in the implementation of the TB-NSP in relation to each objective to understand drivers of positive change or lack of progress; and to d) formulate feasible, context appropriate and evidence-based recommendations to support an enhanced TB response.

The review used desk review of key documents including the TB-NSP, the health sector plan, technical guidance, publications in peer reviewed journals; review of available program data; field visits to (a)observe practices and how these conform to program guidance and (b) obtain perceptions and opinions of various stakeholders. Information from the multiple sources was triangulated and discussed among the review team members to obtain consensus on key findings and to formulate recommendations.

The key findings of the review of the TB program data include the following:

* Annual TB notifications demonstrated minimum change for over a decade, including in the 2 years covered by the current TB- NSP.
* The estimated TB incidence has also remained the same over the decade, implying that Sri Lanka remains off track to achieve the End TB Strategy targets.
* There is geo-spatial clustering of TB, with TB notification (not necessarily burden) highest in urban districts.
* Tuberculosis notification is increasingly higher in older people with the highest notification being in males who are 60 years or older.
* The proportion of missing people with TB, is higher in children and in those with multi – drug resistant TB.
* Good /desirable TB treatment outcomes are not obtained in up to 15% of people placed on TB treatment for drug susceptible TB and in over 50% of people placed on TB treatment for multi- drug resistant TB.
* Up to 9% of people placed on treatment for drug susceptible TB die and another 4-5% are lost to follow up. Elderly males with co-morbid states are contributing most deaths.

With these observations, the review team sought to understand the drivers of the geospatial distribution of TB in Sri Lanka, factors constraining finding people with TB and drivers of the sub-optimal treatment success rate for both drug susceptible and drug resistant TB.

The following were identified to be among the program strengths:

* + Program organization and capacity to manage the TB response is reasonable with a knowledgeable and skilled team at the central level and also at the district level.
  + There are reasonable efforts being made to find people with TB at the community and health facility level through contact tracing and van-based TB screening and screening and testing of OPD attendees, respectively.
  + There are good efforts to support people on treatment for TB which includes financial, transport, food and adherence support.
  + A WHO recommended rapid TB diagnostic test (WRD), which in the case of Sri Lanka is one of the GeneXpert MTB assays (Xpert MTB/Rif, Xpert MTB/Rif ultra and Xpert MTB/XDR) is increasingly being used.
  + There are good efforts to provide health care services of good quality equitably, providing an opportunity to rapidly ramp up finding people with TB and providing them with appropriate care.
  + Domestic financing covers at least 50% of program financing needs.

Despite these strengths there are many gaps, which include:

* + Policy and managerial bottlenecks such as medical officers not empowered to request for a chest x-ray in some hospitals, which is likely to be limiting efforts to finding people with TB at health service delivery points.
  + At the community level, public health inspectors visit homes of people with TB to carry out field investigations. This includes screening people for symptoms of TB and referring symptomatics to health facilities for further evaluation. There are no community health care workers and volunteers to screen targeted vulnerable populations for TB including obtaining samples from such people at the community level and bringing them over to the health facility for TB bacteriological testing. This may be a missed opportunity to rapidly identify people with TB.
  + Community health care workers and volunteers are only available for specific health programs such as the Field Health Assistants for Mosquito control who are dedicated to the Dengue response.
  + Community screening for non-communicable diseases carried out by health care staff of Primary Medical Care Units (PMCUs) is not integrated with screening for TB. Thus, opportunities for delivering integrated multi – disease screening interventions at the community level are not being used to support finding people with TB.
  + The tools and algorithms (symptom enquiry and sputum smear microscopy (SSM)) being used to screen and test people for TB at the outpatient setting of health care facilities, have poor sensitivity for that purpose.

* + Care and treatment for TB is not fully patient centric with referrals from diagnostic sites to district chest clinics for registration and treatment initiation in the visited districts.
  + Most if not all patients with MDRTB are hospitalized until after culture conversion.
  + A shortfall of nearly 25% of the NSP budget is projected yet there are no clear plans on how this budget gap will be filled. It is also not clear where the largest budget deficits among key interventions are. The perception by national TB stakeholders is that TB is receiving inadequate political attention.

**Key recommendations of the 2023 TB program review**

**Recommendation 1**: Institute (through policy and practice review and revision) measures to screen and triage all OPD attendees for TB at all health service delivery points.

This approach should include symptoms enquiry at the registration desk , which is a good practice also for airborne infection transmission prevention as part of pandemic preparedness, rapid review by a medical officer(MO), request for a CXR for identified TB presumptives, with the x-ray capacity preferably made available at the OPD and artificial intelligence enabled to reduce the need for radiologist interpretation and thus reduce the work burden of the radiologists, and testing of people with radiological shadows compatible with TB for TB using a WRD.

**Resource requirements for this recommendation**: There will be a need to expand chest radiography including recruiting and deploying radiographers and x-ray machines. This increased cost may be counterbalanced by an improved cost efficiency of Xpert ( the WRD currently in use) which may reduce the overall costs of TB testing.

**Primary duty bearer**s: the Ministry of Health, Regional Health Authorities, Health facility managers and the NPTCCD.

**Timeline**s: begin the policy dialogue immediately.

**Recommendation 2**: Develop and implement a plan with milestones and targets to phase out smear microscopy as a TB diagnostic test and replace it with a WRD.

The rationale for this recommendation includes the fact that SSM has a low and variable sensitivity, is not specific for *Mycobacterium tuberculosis* and does not provide drug susceptibility information. An algorithm based on upfront use of CXR and WRD offers opportunities for effective and efficient use of the mWRD.

**Resource requirements for this recommendation**: There will probably be no change in human resource for health requirements and it is expected that there will be improved cost efficiency of Xpert if CXR screening is used to triage those who need to be tested with the WRD, however, costs for the Xpert test are likely to increase. The cost of the Xpert is expected to come down as recently announced and other WRDs such Truenat, which are cheaper could be explored. An Xpert or other WRD for all, will require the development and implementation of robust specimen transportation system.

**Primary duty bearer**s: the Ministry of Health, Regional Health Authorities, Health facility managers and the NPTCCD.

**Timeline**s: begin the policy dialogue immediately.

**Recommendation 3**: Increase capacity for CXR with or without Computer Aided Diagnostics/Artificial Intelligence (CAD/AI) including use of mobile chest radiography.

The rationale for this recommendation includes the fact that the use of the CXR has clinical and public health benefits beyond TB and will improve the cost-efficient use of the WRD.

**Resource requirements**: Sri Lanka is currently experiencing a shortage of human resources for health including radiographers with the staff available confronted by a heavy workload. This constraint will need to be addressed for CXR to be made more widely available. There may be additional costs for chest x-ray machines, however, it is important to assess and determine existing x-ray capacity within the health care system before new machines are bought. If AI enabled CXR is introduced, there may be no need for additional radiologists. Existing radiologists will be critical to ensure that the AI enabled CXR service is quality controlled. There may be a need for increased financial resources but probably marginally with an overall reduction in the number needed to test to detect one person with TB.

**Primary duty bearer**s: the Ministry of Health, Regional Health Authorities, Health facility managers and the NPTCCD.

**Timeline**s: begin the policy dialogue immediately.

**Recommendation 4**: Determine which populations will benefit from community level screening and for these populations plan to achieve high coverage (ideally at least 90%) of screening using the most sensitive tool/algorithm.

**The rationale for this recommendation** is based on the opinion of the review group that in Sri Lanka , where there appear to be no major financial or geographic barriers to accessing health/TB services, community screening should be limited to a few targeted populations that for some reason, remain unreachable through routine health care services.

**Resource requirements**: There is only one van available at the moment that is equipped with mobile CXR and has Xpert testing available on board. There may be no need for more vans if the populations targeted for van-based community screening are few. The number of vans that are needed for community screening will depend on the number of populations groups that need to be screened for TB in this way and their geographical locations. Alternatively ultra-portable digital x-ray machines may be used where van-based screening services are inappropriate. Community screening, including van-based screening will need to be sustained which may be best achieved by developing dedicated teams of people to provide this service( to gain experience in all phases of community screening such as planning and preparation and community mobilization to gain community acceptance and to allay stigma). The screening for TB should be integrated with screening for other diseases of public health concern and should include an appropriate data system for monitoring and evaluating the approach.

**Primary duty bearer**s: The NPTCCD and national stakeholders.

**Timelines:** Begin the policy dialogue immediately.

**Recommendation 5:** Transform TB care and treatment to be truly patient centric for all people on treatment for TB including those on treatment for MDRTB.

**The rationale for this recommendation** includes the following considerations: Patient centered care should includereducing the burden of referral and transport costs for patients, linkage to appropriate services for those with co-morbid states such as alcohol use disorder and other substance abuse, enhanced financial, transport, food and adherence support and ambulatory care for drug resistant TB.

**Resource requirements for this recommendation**: It would be expected that the resources needed to fully support people on treatment for TB will increase as patient centric approaches are adopted, however, overall being people centric and socialistic is at the core of the development policy and architecture of Sri Lanka.

**Primary duty bearer**s: the Ministry of Health, Regional Health Authorities, Health facility managers and the NPTCCD.

**Timelines**: begin the policy dialogue immediately and begin implementing the new policies as soon as possible.

**Recommendation 6:** Re-estimate financing needs of the TB program and mobilize the additional resources required from all potential sources.

**Rationale for this recommendation**: The TB-NSP currently has an estimated funding gap of 25%. It is to be expected that adoption of new approaches to aggressively pursue measures that would lead to faster declines in the burden of TB will require additional resources. Therefore, the cost of implementing the TB-NSP is expected to increase. Both external and domestic resource mobilization should be pursued to narrow the TB-NSP funding gap. Domestic resource mobilization (DRM) should include pursuing opportunities presented by the corporate sector through corporate social responsibility and engagement with local philanthropists and philanthropies. Revamping the Ceylon National Association for TB Prevention (CNAPT) may be helpful so that this organization can support DRM efforts.

**Resource requirements**: minimal.

**Primary duty bearer**s: the NPTCCD and national stakeholders.

**Timeline**: begin the revision of the TB-NSP as soon as possible and thereafter re-estimate the financial needs and draw up a resource mobilization plan that includes DRM.

**Recommendation 7**: Strongly consider the creation of a presidential task force on poverty associated diseases including TB.

**Rationale for this recommendation**: Tuberculosis is primarily driven by poverty as are other diseases. To comprehensively address poverty related diseases multi –sectoral approaches are needed in addition to anchorage of responses on the Universal Health Coverage (UHC) platform. A presidential task force on poverty related diseases would promote cross program efficiencies.

**Resource requirements**: no major financial resource needs.

**Primary duty bearers:** the Ministry of Health, the NPTCCD, national stakeholders including the World Health Organization and other providers of technical support.

**Timeline**: begin the national dialogue as soon as possible.

**Recommendation 8: Optimize the TB diagnostic network.**

**Rationale for this recommendation**: The TB laboratory network is the backbone of the TB program; however, it is not currently optimized (many Xpert machines are either underutilized or have module failures, the specimen transport system is suboptimal, quality management systems are not in place etc.). To optimize this network, it is advised that WRD network machine/module failures be urgently addressed, managerial capacity of the network be enhanced, a laboratory total quality management system (Standard Operating Procedures (SOPs), competency assessment, safety, Quality Control (QC) etc.) be implemented and the laboratory management information system be enhanced.

**Resource requirements for this recommendation**: it should be expected that additional resources (financial, human) will be required to optimize the TB laboratory diagnostic network.

**Primary duty bearers**: **:** the Ministry of Health, the NPTCCD, national stakeholders and providers of technical support.

**Timelines:** to begin the national dialogue as soon as possible

**Recommendation 9:** Seek to enhance technical assistance and support provided by technical agencies such as the World Health Organization while also increasing technical supervision and support to the regions and districts.

**Rationale for this recommendation**: The ambition to end TB in Sri Lanka requires a marked shift in approaches. While the NPTCCD has a reasonable technical capacity, there is a need to significantly increase this capacity to effectively plan, execute, monitor, and track new approaches for TB care and prevention. Global providers of technical assistance such as WHO can be particularly useful in this front. The NPTCCD will also need to provide better technical support to the regions and districts and for this to happen, technical capacity at the NPTCCD will need to be enhanced.

**Resource requirements for this recommendation**: it should be expected that to be able to boost technical capacity at the NPTCCD and to obtain technical assistance and support from global providers of technical assistance such WHO, additional resources (financial, human) will be required.

**Primary duty bearers**: **:** the Ministry of Health, the NPTCCD, national stakeholders and providers of technical support, especially WHO.

**Timelines:** to begin the national dialogue to identify technical assistance (TA) needs as soon as possible and begin to mobilize resources for the required TA .

# 1. Introduction

## 1.1 Geography of Sri Lanka

The Democratic Socialist Republic of Sri Lanka (henceforth referred to as Sri Lanka ) is located in South Asia. This island country has a total area of 65, 610 km2 and shares maritime borders with India and Maldives. Sri Lanka’s topography consists of the central highlands, the plains and the coastal belt. The country can broadly be divided into wet and dry areas based on the amount of rainfall that these areas receive. The most common natural disasters that have occurred in Sri Lanka include droughts, floods, landslides , cyclones, and coastal erosion( figure 1) . With climate change the frequency and severity of these events may increase posing a significant risk to the Sri Lankan economy and human health[[1]](#footnote-1).

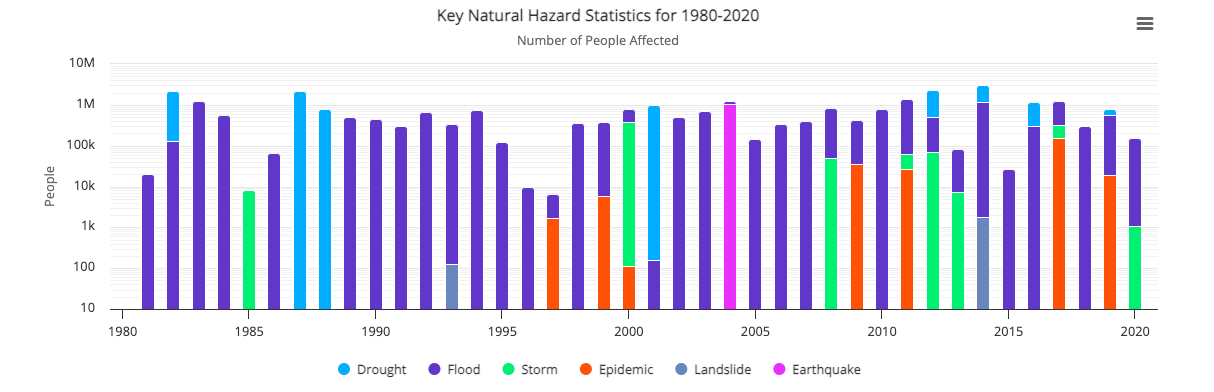


Figure 1: Natural disasters that have occurred in Sri Lanka, 1980-2020

From a health service access perspective, the Sri Lankan population largely does not have geographic barriers to health services.

## 1.2 Demography

The population of Sri Lanka is currently estimated at over 22 million people of whom 22% are children in the age group of 0-14 years, 24% are young people aged 10-24 years and 66% are people aged 15-64 years. Elderly people over the age of 65 years comprise about 12% of the population ( see figure 2 below) . The annual rate of population change has ranged from 0.47% in 2017 to 0.24% in 2022. Life expectancy at birth is 73 years for males and 80 years for females with an overall life expectancy of 75.96 years[[2]](#footnote-2). Sri Lanka has been experiencing a demographic transition, with a decreasing dependency ratio and increasing proportion of the population in the productive age of 15-64, however, in the coming years the proportion of the elderly population is expected to grow and could constrain social protection programs for the poor and increase the proportion of the population that is vulnerable to TB[[3]](#footnote-3). Of the nearly 22 million people who live in Sri Lanka, only 19% are officially living in urban areas, which places Sri Lanka among the least urbanized countries in the world[[4]](#footnote-4), however, there have been arguments that the rapid urban expansion in peripheral areas is not being captured in the computation of urban populations [[5]](#footnote-5)

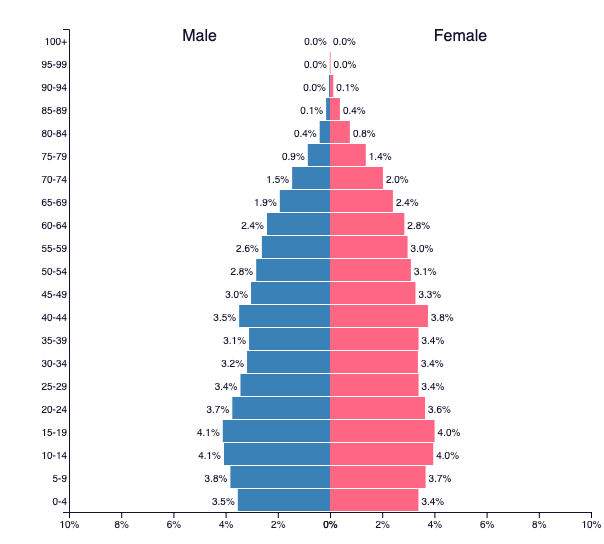


Figure 2: Sri Lanka’s population pyramid ( sourced from http://population pryramid.net/sri-lanka/2023/

## 1.3 Economy

Sri Lanka is currently classified by the World Bank as a lower middle-income country. Its Gross Domestic Product (GDP) at current US$, is 74.4 billion and the GDP per capita is US$ is 3,348. The Gross National Income (GNI) per capita was estimated at US$ 3,610 in 2022. While Sri Lanka’s economy grew steadily since independence in 1948, for multiple reasons including but not limited to tax cuts, a policy to switch to organic or biological farming and the COVID-19 pandemic, Sri Lanka has, since 2019, been experiencing its worst economic crisis since independence. The economic crisis has affected the health sector including out migration of health care workers and constraints in the procurement of medical equipment and supplies[[6]](#footnote-6).

Sri Lanka has been doing exemplary well in lifting people out of poverty (Figure 3). Currently it is estimated that only 3 % of the Sri Lankan population lives below the international poverty line of US$ 2.15 per day, however, rates of poverty are higher, at 12% and 49.3% when the lower middle income poverty line of US$3.65 and the upper middle income poverty line of US$ 6.85 are used, respectively. While on monetary terms Sri Lanka has done well in reducing poverty rates in the population, results of the Sri Lankan multi-dimensional poverty index (MPI) 2019[[7]](#footnote-7) , which includes multiple parameters such as access to education and health services and living standards, reveal worrying figures. According to the MPI, 16% of Sri Lankans are multi-dimensionally poor with rates of poverty highest in estates areas where 51.3% of the population was multi-dimensionally poor. Over 80% of those who are multi-dimensionally poor live in rural areas and the elderly , over the age of 65, are among the poorest, with a poverty head count ratio of 17.9%. Worryingly, children also suffer high rates of multi-dimensional poverty with 16.4 % of children aged 0-4 years being poor. In addition to poverty, Sri Lanka’s development pathway has not effectively dealt with population inequality with the GINI co-efficient remaining unchanged between 1985, when it was 0.46 and 2016 , when it was 0.45[[8]](#footnote-8). These observations are critical to the TB response in Sri Lanka and need to be considered when designing targeted approaches to reach TB vulnerable populations.

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Figure 3: Poverty headcount ratio in Sri Lanka at USD 2.15/ day, 2010 -2023; 2017 PPP, % (source: SDG dashboard: <https://dashboards.sdgindex.org/profiles/sri-lanka>)

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Figure 4: **Poverty head count ratio in Sri Lanka at USD 3.65 per day, 2010-2020, 2017 PPP, % (Source SDG dashboard:** [**https://dashboards.sdgindex.org/profiles/sri-lanka**](https://dashboards.sdgindex.org/profiles/sri-lanka)**)**

## 1.4. Health and disease in Sri Lanka

Sri Lanka has made tremendous progress in the delivery of preventive and curative health services that has led to the achievement of population health outcomes that are at par with those in in high income countries. Table 1 below shows some of the health indicators that are tracked and monitored as part of the effort to monitor progress towards the achievement of Sustainable Development Goals (SDGs) goal 3 (Health and Wellbeing).

|  |  |  |
| --- | --- | --- |
| **Indicator** | **2000 (Baseline Year)** | **2020 or year when most recent data is available** |
| Maternal Mortality Rate per 100,000 live births | 61.08 | 28.84 |
| Neonatal Mortality Rate per 1000 live births | 9.76 | 3.99 |
| Under 5 Mortality per 1000 live births | 16.52 | 7 |
| Birth attended by skilled health personnel (%) | 96 | 99.5 (2016) |
| UHC index of service coverage | 45 | 67 |

Table 1: Selected health indicators tracked to monitor progress of SDG goal 3

The figure below is a screen shot of the most common causes of death in Sri Lanka and the changes that have occurred between 1990 and 2020 as provided by the Institute of Health Metrics and Evaluation (IHME).

A screenshot of a graph

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Figure 5: Screen shot of the top ten causes of death in Sri- Lanka, 2009-2019 including the direction of change (source IHME: <https://www.healthdata.org/research-analysis/health-by-location/profiles/sri-lanka>)

It will be noted that non-communicable diseases (NCDs) are the most common causes of deaths in Sri Lanka, however, lower respiratory tract infections have shown an upward trajectory in the ten-year period covered by these data which is a significant cause of concern. It may be that TB deaths , especially among the very young are hidden within the group of lower respiratory tract infections.

The curative health care delivery system in Sri Lanka is organized in a hierarchical fashion as shown in the table 2 below.

|  |  |
| --- | --- |
| **Type of Health Facility** | **Number ( 2023)** |
| National Hospital | 2 |
| Teaching Hospital | 9 |
| Specialized Teaching Hospital | 6 |
| Other Specialized Hospital | 10 |
| Provincial General Hospital | 2 |
| District General Hospital | 20 |
| Base Hospital Type A | 28 |
| Base Hospital Type B | 52 |
| Divisional Hospital Type A | 76 |
| Divisional Hospital Type B | 139 |
| Divisional Hospital Type C | 259 |
| Primary Medical Care Units | 499 |
| Total | 1,102 |

Table 2: public health care delivery system in Sri Lanka

Health care services of whatever nature have been provided to the Sri Lankan population free of charge since independence, effectively removing financial barriers to access to these services. On average households are 2.5 km away from a maternity clinic, 4 kilometers from a government dispensary and 6.5 kilometers from a hospital. In terms of human resources for health there is a doctor for every 1,054 persons and 16 nurses for every 10,000 people. The private health care sector is a significant player in the provision of health services, however, while there are regional differences, it is more likely to be used by the richer population and people with chronic diseases[[9]](#footnote-9). Currently there are 250 private hospitals, nursing homes and maternity units and 500 general practitioners many of whom are government employees working part time in the private sector[[10]](#footnote-10).

# 2: Review rationale, objectives and methodology

## 2.1 Review rationale

Sri Lanka has committed to achieve the target of ending TB by 2030 in keeping with the global End TB Strategy and the United Nations’ SDGs. The road map for achieving the target to end TB by 2030 is contained in the National TB Strategic Plan (TB-NSP) covering the period 2021 -2025 that was prepared by the National Programme for TB Control and Chest Diseases (NPTCCD) in collaboration with national stakeholders. The goal of the TB-NSP is to achieve universal access to TB diagnosis and treatment by 2025. The TB-NSP has set a target of 54, 790 people with TB to be successfully treated between 2021 and 2025, including over 3,000 children under 15 years , which translates to at least 10,000 people being notified and treated for TB in a year. The TB-NSP also targets to provide TB preventive treatment to 11, 600 people eligible for this intervention between 2021 and 2025.The TB-NSP is currently in its mid-term and therefore the NPTCCD considered it important to review the program to determine if its objectives and targets are being achieved. Of particular interest was the need to understand drivers of change if it was happening or lack of progress if there has been no change.

**Objectives of the Mid Term review.**

* To assess the present status of the TB response and progress in the implementation of recommendations of previous missions and reviews.
* To assess the implementation status of the current TB-NSP, 2021-2025, to identify progress being made towards achieving its objectives and targets.
* To identify strengths, weaknesses, and gaps/barriers for implementation of the TB-NSP in relation to each objective so as to understand drivers of positive change or lack of progress.
* To analyze achievements and constraints of the TB diagnostic network in its mandate to deliver quality, effective and efficient TB diagnostic services. This included assessment of the quality of smear microscopy, solid and liquid culture and drug susceptibility testing, WRD tests, especially the Xpert MTB/Rif, ultra and XDR tests and line probe assays. The availability and use of chest radiography with or without CAD/AI was included in the assessment of the TB screening and diagnostic network.
* To assess the current status of implementation of Programmatic Management of Drug-resistant TB (PMDT).
* To assess the implementation of TB case finding, prevention and treatment interventions in all population groups including children and TB key and vulnerable populations.
* To assess the status of multi – stakeholder engagement in the TB response in Sri Lanka.
* To assess progress with the integration of TB with other health services at all levels of the health care system, including at the community level.
* To make necessary changes (if any) in the objectives of the TB-NSP and further recommendations for the improvement of the national TB response.

**Methodology of the mid-term review**

**The TB NSP mid-term review was conducted in three stages.**

* Stage one included document review which was undertaken before the in-country phase of the review. Among the documents reviewed were the NSP itself, program guidelines and policy documents, reports of previous reviews and assessments, national health sector policy documents, scientific publications touching on the TB response in Sri Lanka among other documents.
* Stage two involved an in-country mission where the external experts worked with national experts, program staff and national stakeholders to conduct field visits in 4 districts: Colombo, Gampaha, Kandy and Galle. The review team visited all levels of the health care system in the 4 districts and had the opportunity to engage with the leadership of the Ministry of Health, the NPTCCD, provincial and district health authorities, partners of the NPTCCD, health care workers, people undergoing evaluation and or treatment for TB and community leaders. This phase of the review was carried out from 4th to September 15th , 2023.
* The third phase of the review involved preparation, review and endorsement of the TB-NSP review report.

The review team, using structured review guides, examined program policies, guidelines, strategies, SOPs and performance data and reports. Information obtained, both quantitative and qualitative, was triangulated to identify major achievements and gaps and constraints in all technical areas of TB programming. Based on the findings of the review, recommendations were formulated and presented to national stakeholders at a debrief meeting that was held on Friday September 15, 2023 in Colombo City.

During the early phases of the review, the following issues were identified to be of particular relevance for the TB program review:

1. Measures in place to find people with TB at the community and health facility level.
2. Robustness of the TB care cascade for drug susceptible and drug resistant TB (DS and DR-TB) including its person centeredness.
3. Measures in place to enhance finding children with TB.
4. The robustness of the TB laboratory network.
5. Engagement of all providers through public-private mix approaches for TB care and prevention.
6. Integration of TB care and prevention with other health services.
7. Measures in place to prevent TB: TB preventive treatment and infection transmission prevention and control.
8. TB response governance, stewardship, partnerships, and coordination.
9. Financing of the TB response.
10. Ethics, Equity, gender and human rights in the TB response.
11. Multi- sectoral approaches to TB care and prevention.

3: Review findings

## 3.1 Burden of TB in Sri Lanka

The TB program review was preceded by a TB epidemiological review whose objectives included examining level and trends of the burden of TB in Sri Lanka. Sri Lanka has a low burden of TB. In 2021, WHO estimated that 14,000 people (95% credible interval 4,900 - 18, 000) or 63 people (46 -83) per 100,000 population, developed TB and 760 people (680-830) or 3.5 people ( 3.1-3.8) per 100,000 died of the disease. As shown in figure 6 below estimated incidence has minimally changed in the last two decades while TB notifications have been declining implying, proportionately more people with TB have not been identified and placed on treatment in recent years. These represent the missing people with TB: in 2021, **it was estimated that up to 4,000 people who developed TB in Sri Lanka were either not identified at all or if identified were not notified.**

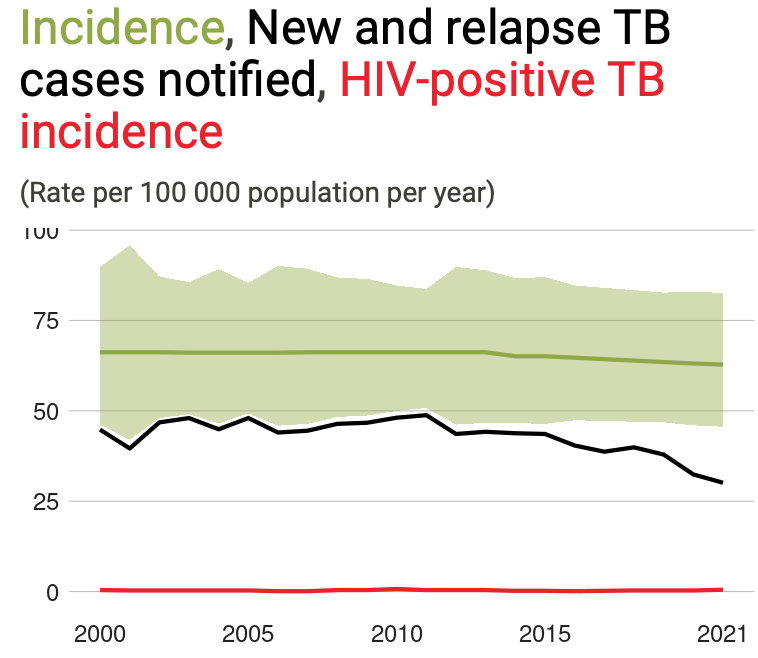


Figure 6: Estimated TB incidence and TB notification in Sri Lanka, 2000-2021 (source: 2022 WHO Global TB Report)

**Drivers of TB in Sri Lanka**

The World Health Organization estimates the number of people with TB that is attributable to five risk factors in each country that reports TB data to it: undernutrition, diabetes, tobacco smoking, alcohol use disorder and HIV. Outlined in the following sections is a summary of what is known about each of these risk factors in Sri Lanka.

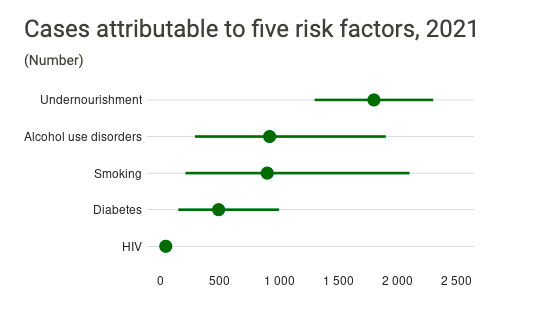


Figure 7: Tuberculosis cases attributable to five risk factors in Sri Lanka, 2021 (source: WHO Global TB report 2021)

**Undernutrition**

In Sri Lanka, the biggest driver of TB, as in other countries where TB remains endemic, is undernutrition (figure 7 above) with about 2, 000 cases attributable to it. That undernutrition remains the major driver of TB in Sri Lanka is supported by the results of the MPI which revealed that, by 2019, up to a third of children 0-4 years in age were multi-dimensionally poor and were either underweight or stunted. These findings may on the surface appear to contradict what has been observed in the trajectory of the prevalence of undernutrition in the general population as shown in the figure 8 below, however, when examined carefully , it is noted that even though the prevalence of undernutrition was only about 3.4% of the Sri Lankan population in 2020, it implies that about 750,000 people were food insecure in Sri Lanka that year.

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Figure 8: Prevalence of undernourishment in Sri Lanka, 2000-2020 (**Source SDG dashboard:** [**https://dashboards.sdgindex.org/profiles/sri-lanka**](https://dashboards.sdgindex.org/profiles/sri-lanka) **)**

**Alcohol Use Disorder in Sri Lanka**

The weekly epidemiological report of the Ministry of Health, Nutrition and Indigenous Medicine, covering February 5-11, 2022[[11]](#footnote-11), highlight alcohol consumption in Sri Lanka as a male dominated activity. The report indicates that a study published in 2014 had observed a current alcohol use rate of 23.7% among adults, with marked differences between males (48.1%) and females (1.2%). It is not clear however what proportion of those who were categorized as current users of alcohol had an alcohol use disorder. **In 2021 , WHO estimated that about 1,000 cases of TB were attributable to alcohol use disorder, however, the TB-NSP 2021-25 does not highlight any specific measures targeting this population, reflecting, maybe, awareness about the contribution of this disorder to the burden of TB and the challenge of identifying people with this state.**

**Diabetes Mellitus in Sri Lanka**

Diabetes mellitus has emerged as a major public health challenge in Sri Lanka. The Sri Lankan Health and Ageing Survey 2018/2019 which has recently been published [[12]](#footnote-12) revealed a crude prevalence of 23% (95% 21.2-24.7) with rates of diabetes increasing with age, and being higher in females compared to males, urban areas compared to rural areas and among the affluent. In 2021, WHO estimated that only about 500 cases of TB were attributable to diabetes. While screening people with TB for diabetes has been found to lead to the identification of a significant number of people with diabetes or pre-diabetes[[13]](#footnote-13), screening people with diabetes for tuberculosis has not been found to be effective. For example, in one tertiary health care facility, 4,548 diabetics were screened for TB and only 6 (0.1%) of them had bacteriologically confirmed TB. Older males with poor diabetic control, however had higher rates of TB (0.4%)[[14]](#footnote-14).

**Tobacco Smoking in Sri Lanka**

There has been a significant reduction in the prevalence of tobacco smoking in Sri Lanka. Among people aged 15 years and above, the prevalence of tobacco smoking declined from 28.5% in 2000 to 22% in 2020[[15]](#footnote-15). In 2021, WHO estimated that about 1,000 cases of TB in Sri Lanka were attributable to tobacco smoking, a figure that is significant and which implies that the TB control program in the country needs to work with the tobacco control unit in the Ministry of Heath to support efforts to further reduce tobacco smoking in this country.

**HIV infection**

Sri Lanka is a low HIV prevalence setting. The incidence of HIV infection is less than 0.01 per 1,000 population for all ages and the prevalence of HIV infection among the population aged 15-49 years is less 0.1%. It is not surprising therefore that the number of cases of TB attributable to HIV infection is near zero.

**Populations at risk of or vulnerable to TB in Sri Lanka**

The TB-NSP, 2021 -2025 has listed the following populations as the TB high risk groups to be targeted for TB screening: contacts of people with TB including household and other close contacts, people living with HIV (PLHIV), the elderly over the age of 60years, people living with diabetes mellitus, immune - compromised individuals (those with chronic kidney disease, people on long term steroids and other immune - suppressive drugs, cancer patients on anti - cancer treatment and patients undergoing transplant surgery); people living in high risk environments for TB transmission (urban slums, tea estates, internally displaced, migrants etc.), prisoners and those who are institutionalized, health care workers and people who work in mines and are exposed to silica dust. In the ensuing section of this review report, a summary of what is known about some of these groups is provided, excluding groups that have already been highlighted above, with an emphasis on describing population size estimates.

**The elderly**

As indicated in section 1.2 of this report, about 12% of the 22 million people who live in Sri Lanka is made up of people aged 65 and above. Thus, about 2.6 million people in Sri Lanka are vulnerable to TB as a result of being elderly. The NPTCCD has observed higher case notification with increasing age as shown in figure 9 below with a male preponderance that begins in the early adulthood and continues to the elderly age.

**Figure 9: Tuberculosis case notification by age and gender in Sri Lanka, 2022.**

**Estate workers.**

With the establishment of the tea plantations in Sri Lanka in the 19th and early 20th  century a large need for people to work in these plantations was recognized and consequently large numbers of people were brought to Sri Lanka from India to provide the labor that was needed in the tea plantations. The people brought to Sri Lanka from India were poor as a result of many factors. At the Sri Lankan tea plantations their poor status did not change and relative to the rest of the Sri Lankan population, tea estate workers have largely remained on the lower end of the socio-economic ladder and thus vulnerable to TB[[16]](#footnote-16). It is estimated that this group of TB at risk population is made up of over 1 million people.

**Urban slum dwellers**

Sri Lanka is relatively under urbanized with only 19% of the population officially living in urban areas. The proportion of the urban population that lives in slums in Sri Lanka is not clear, however, as in other countries in the region (see table below) it is to be expected that the number of people living in urban slums Sri Lanka is increasing. Highly urbanized districts such as Colombo Municipal Council(CMC) are likely to have the largest proportion of urban slum dwellers and consequently bear the larger burden of TB (see next section on TB case finding).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Region | 2000 | 2014 | 2016 | 2018 |
| World | 803.126 | 897.651 | 1003.08 | 1035.546 |
| Sub- Saharan Africa | 131.76 | 202.042 | 228.936 | 237.840 |
| Northern Africa and Western Asia | 6.335 | 63.814 | 71.720 | 82.123 |
| Central and Southern Asia | 205.661 | 206.704 | 223.643 | 221.092 |
| Eastern and Southeastern Asia | 317.123 | 349.409 | 364.684 | 368.898 |
| Latin America and the Caribbean | 115.148 | 104.652 | 112.602 | 109.946 |
| Oceania (excluding Australia and New Zealand | 0.234 | 0.602 | 0.648 | 0.643 |
| Australia and New Zealand | 0.03 | 0.03 | 0.01 | 0.01 |
| Europe and Northern America | 0.764 | 0.833 | 0.842 | 1.022 |

**Table 3: Number of people living in urban slums by regions ( source UN Habitat Global Indicators, 2020).**

**Prisoners**

There are 60 establishments/facilities, including prisons, remand centres, correctional centres and others, where people who have fallen foul of the law are held. The official capacity of these institutions is 11, 768 , however, it is estimated that these institutions are currently holding 27, 063 people for an occupancy rate of 220.7%. Of the people that are being held in these institutions, 65.3% are pre-trial detainees, 3.9% are female, 0.1% are juveniles and 1.4% are non-Sri Lankan[[17]](#footnote-17).

**Refugees**

Sri Lanka has only small number of refugees, estimated at about 500[[18]](#footnote-18) currently, which means as a TB vulnerable population, this group appears not to be that important for Sri Lanka. The NPTCCD, however, has been undertaking active TB screening activities in this population.

**Contacts of people with TB.**

In 2022, Sri Lanka notified a total of 8, 342 people with TB which included, 5, 767 people with pulmonary TB and 4, 211 people with bacteriologically confirmed TB. With a national average household size of 3.7[[19]](#footnote-19) , it means there were at least 17,000 people who were contacts of a person who had TB that is transmissible to others. These people are at risk of acquiring Mycobacterium tuberculosis infection and a proportion of them would then progress to develop TB disease.

**Sub-national estimates of TB disease burden**

The NPTCCD has used TB notification rates or applied national level estimates to come up with TB notification targets at the sub-national level. The appropriateness of those sub-national case notification targets however is unclear in the absence of estimates of prevalence or incidence of TB. Countries like India have been using district surveys that combine notification and a structured way to determine prevalence of TB to obtain estimates of TB incidence at the district level[[20]](#footnote-20) . There are therefore no estimates of the burden of TB disease (incidence and mortality) at the sub-national level. Tuberculosis notification with case notification rates, dealt with in the next section, are available for each of the 26 Sri Lankan health districts.

## 3.2. Tuberculosis Case Finding

**Context**

The current paradigm for TB care and prevention is based on the following key steps or cascade: screening/testing- treatment- prevention (STP). The NPTCCD in the 2021-2025 TB-NSP, targeted to identify and notify 10,000 people with TB each year through active TB case finding at the community level and enhanced patient-initiated pathway for TB case finding at facility level. Active case finding at the community level was to be undertaken through screening of TB key and vulnerable populations. The trend of TB case finding, and notification is shown in figure 10 below. It will be noted that TB notification has been in the range of 8 to 10 thousands each year for over 15 years. The highest notification was achieved in 2011 when 10, 329 people with TB were notified while the lowest notification was in 2021 when only 6, 771 people with TB were notified. The dip in case notification that occurred in 2020 and 2021 is attributed to the COVID-19 pandemic.

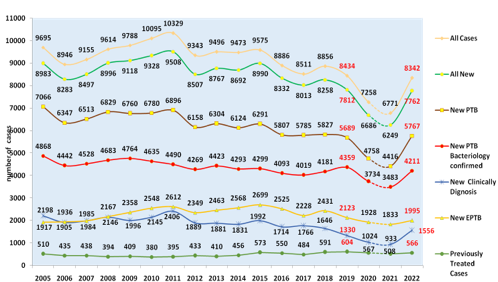


Figure 10: Tuberculosis case finding in Sri Lanka, by disease category; 2005-2022.

Tuberculosis notification is variable across Sri Lanka. Colombo, the commercial capital, which carries about 11% of the Sri Lankan population (2, 324, 349 of the total population of 20, 359, 439 in the 2012 national population census) contributed 26% of TB notifications in 2022 while several districts, as seen in figure 11 below contributed very little to the national tally of notified people with TB. This observation may be driven by several factors including size of vulnerable populations and diagnostic capacity.

Figure 11: Tuberculosis case notification in Sri Lanka by district, 2022.

The TB-NSP 2021 -2025 targeted to detect 90% of an estimated 12, 000 incident cases of TB each year (this estimate was based on a national consultative process that down scaled the TB incidence estimate by WHO) which comes to an average of 10,000 cases including 600 children for each NSP year and to screen populations that have an estimated prevalence of TB of 1% or more in addition to screening elderly people for TB. As noted above , this target has so far not been achieved.

**Case Finding: key achievements.**

Highlighted below are the key TB case finding achievements that have been made since the period of implementation of the current TB – NSP began:

* The NPTCCD has developed guidance on patient initiated ( formerly passive ) and active case finding that includes an algorithm to be followed for screening and testing of vulnerable people for TB.
* TB diagnostic services have been decentralized to more than 160 diagnostic centres across the country.
* The NPTCCD has initiated van-based TB screening that includes use of mobile chest x-ray that is targeted at key and vulnerable populations.
* There is on-going screening of prisoners. In quarter 1 of 2023 a total of 23 prisoners with TB were identified through active TB screening activities within prisons.
* Contact tracing and management using symptom screening and CXR, is ongoing.
* In a few facilities there is a structured approach to screening of OPD attendees.
* The NPTCCD is engaging private providers and Ayurvedic practitioners for TB care and prevention.
* There is ongoing collaboration with the HIV Programme   to support TB screening among PLHIV.
* The NPTCCD is carrying out TB awareness creation activities among TB key and vulnerable populations, schools, and armed forces.
* Community empowerment, and engagement activities in estate and urban sectors through establishment of peer groups.
* NPTCCD is engaging multi-stakeholders at national and sub national levels which also include engagement of NGOs and CBOs at community level.

**Case Finding: key gaps.**

While the NPTCCD is carrying out active TB case finding activities, the scope and scale of these activities appear to be too small and insufficient to achieve the goal of identifying most prevalent cases of TB and therefore influence transmission of TB. The Stop TB Partnership has been advocating for the 90-90-90 targets for TB care and prevention since 2016[[21]](#footnote-21). These targets include reaching 90% of people at risk of TB with screening and testing services and then successfully treating at least 90% of those identified to have TB. The Sri Lankan TB response is at the moment not close to achieving these targets. The key gaps include:

* Lack of systematic screening of OPD attendees for TB. The lessons learnt during the COVID-19 pandemic when cough triaging was the norm are not being used to continue the good practice of rapidly identifying people with symptoms of respiratory disease that could be TB. As a consequence of this, health system delays for TB diagnosis probably remain high. In one study at the Colombo South teaching hospital, among 106 people with TB, 16.3% and 28.6% of them were diagnosed two and four weeks after the onset of symptoms respectively and 25% remained undiagnosed 8 weeks after seeking medical attention at the primary health care setting[[22]](#footnote-22).
* At the OPDs of health facilities, the TB screening algorithm and the tools being used for TB screening and testing (symptom screening to identify those with a cough of greater than 2 weeks, then chest x-ray after review by a chest physician and mostly sputum smear microscopy) have sub-optimal sensitivity for TB diagnosis.
* The coverage rates for all the key populations listed in the TB-NSP with TB screening services are unclear and likely are very low.
* There is limited coverage of engagement of private providers especially General Practitioners (GPs).
* Opportunities for integrated disease (prioritized NCDs and Infectious Diseases (IDs) screening at the community level have not been fully utilized.
* Even though there have been efforts to engage communities, create awareness and develop peer leaders and groups, those efforts have been small in scale and the impact on TB case finding is unclear.
* TB screening cascade data is incomplete.

**Case Finding: key recommendations.**

To enhance finding people with TB and therefore narrow the TB prevalence – notification gap, the NPTCCD, in partnership with national stakeholders should undertake the following actions:

1. Reprioritize TB high risk groups and target implementation of active TB case finding/ TB screening activities to the groups that are most at risk. In the prioritized TB at risk groups target to achieve a high population coverage (at least 90%) and sustain the effort over time (repeated screening) to maximize impact of the screening intervention.
2. Consider a strategy in which community screening is targeted to geographic areas in districts with the highest prevalence of TB and risk factors and where there are challenges to access to routine health services.
3. Plan to implement in a phased manner a TB screening approach that uses algorithms and tools that have a high sensitivity, such cough of any duration if using symptom screening, use of digital chest x-ray with CAD/AI when screening populations that have a high prevalence of TB and use of the Xpert/MTB ultra-assay or other WHO recommended rapid molecular TB diagnostic test.
4. Re-establish cough triaging at the OPD level of all health facilities with rapid progression of persons identified as TB presumptives to chest radiography with or without CAD/AI.
5. Revise the current national guidelines for screening and diagnosis to enhance sequential use of CXR and Xpert testing after symptom screening and move away from diagnostic testing with SSM.
6. Improve quality, consistency, and scalability of CXR, including portable CXR,  using CAD/AI to assist with radiological interpretation.
7. Ensure data is collected for the entire screening cascade and that data collection is integrated into routine program implementation. Digital tools (ePIMS) should be used to record, analyze, report data electronically.
8. Support the use of TB screening data for learning and course correction at all levels including at the local level to ensure the highest quality of TB screening services. Ensure adequate human resources capacity and financing for implementation of TB screening services.
9. Determine staff needs for targeted screening of at-risk populations and mobilize resources to recruit needed staff  at  each level. Consider task sharing/shifting of  certain cadres of health  care workers such as Public Health Inspectors (PHIs) to support community TB screening.

## 3.3. Childhood and adolescent TB

**Context**

Children are highly vulnerable to TB with the younger the child the higher the vulnerability and the greater the risk of experiencing a severe form of TB such as TB meningitis and miliary TB. In most TB endemic settings children and adolescents in the age group 0-14 years comprise about 10% of all TB notifications with a range from 5-15%[[23]](#footnote-23). Globally there is a wide gap between estimated number of children who develop TB each year and the number that is diagnosed and placed on treatment by national TB programmes. This gap is widest among children with multi-drug/ rifampicin resistant (MDR/RR) TB and those who are very young[[24]](#footnote-24). While underdiagnosis is the commoner situation, over diagnosis also occurs and is associated with clinical practices of individual clinicians. The occurrence of TB in a child usually reflects recent transmission of TB and demands that health authorities undertake measures to identify the source of transmission.

In 2022 , the WHO updated global recommendations for the prevention, care, and treatment of TB in children. These updates include recommendations to use a wider range of samples for molecular rapid diagnostic testing, use of shorter regimens for non-severe TB disease, regimens for TB meningitis as well as all-oral regimens for MDR/RR TB for all ages and newer shorter regimens for the prevention of TB using TB preventive treatment.

In Sri Lanka, the proportion of children and adolescents among all notified people with TB has remained low at below 5% for over a decade. The highest proportion that was ever achieved is 3.9% in 2010 ( see figure 12 below). This suggests that there is underdiagnosis of child and adolescent TB in Sri Lanka. This has been recognized by the NPTCCD as a programmatic challenge and consequently the TB-NSP includes proposed interventions to increase the proportion of children among notified people with TB from 3% to 6%.

Figure 12: Number and proportion of TB among all notified TB cases in Sri Lanka, 2010-2022.

**Child and adolescent TB: key achievements.**

The review noted the following key achievements in childhood and adolescent TB care and prevention:

* The NPTCCD has recognized under-notification of TB among children as a program challenge and has included specific case finding targets in the TB-NSP.
* A national steering committee for childhood TB is in place.
* Contact tracing and management, which is an important intervention for reaching children who have TB is ongoing.
* Provision and coverage of Tuberculosis Preventive Treatment (TPT) for children under 5 who are household contacts of people with bacteriologically confirmed TB has been increasing. It  increased from 44% in 2019 to about 83% in quarter 2 of 2023.
* Child friendly, paediatric formulations of anti-TB medicines are available and in use.

**Child and adolescent TB: key gaps.**

There are major gaps in the prevention, diagnosis and treatment of childhood and adolescent TB. These include:

* Inadequate human resources to steer and champion child and adolescent TB. Currently the number of consultant paediatric respiratory physicians is much lower than that of consultant respiratory physicians which is a major hurdle for TB in Sri Lanka where the provision of clinical services for people with TB is overly dependent on the inputs of the consultant respiratory physician. The review group was informed that where there is a consultant paediatric respiratory physician, it has been observed that often there is a significant increase in the number of children diagnosed with TB. This information was not verified.
* There is limited engagement of child specific services or services frequented by children such as Maternal and Child Health services to support early detection of children with TB.
* The TB program has not yet adopted the use of alternative samples to sputum, such as stool, for the diagnosis of TB in children, partly as a result of erroneous advise from the local agents of Cepheid who have advised that stool samples would adversely affect module functionality .

**Child and adolescent TB: key recommendations**.

To enhance prevention, identification and treatment of children with TB it is recommended that the NPTCCD, national stakeholders and providers of technical assistance to the NPTCCD undertake the following actions:

1. Strengthen the child and adolescent TB steering committee by ensuring a) its membership includes organizations and people with relevant professional qualifications, experience and interest in this technical area; b) reviewing and revising its terms of reference and objectives to make it effective in responding to the observed programmatic challenge of childhood TB under diagnosis and under notification; c) provide the steering committee with an effective secretariat that includes people, equipment and communication capacity and d) empower the steering committee to set up key programmatic milestones and deliveries to which itself and specific stakeholders will be held accountable.
2. Revise the 2018 childhood TB national guidelines to align them with the 2022 WHO guidance on childhood TB prevention, care and treatment.
3. Develop the human resource capacity for prevention, diagnosis and treatment of childhood TB to include but not limited to consultant pediatric pulmonologists, other pediatricians, medical officers, staff of the Medical Officer of Health (MoH), nurses and laboratory staff through both long and short training and educational programmes.
4. Procure, deploy and use newer tools and approaches including algorithms likely to have a higher sensitivity for the diagnosis of childhood TB such as digital radiography and Xpert MTB/ultra for use with non-traditional specimens such as stool.
5. Enhance contact management including reverse contact tracing with linkage to the provision of TPT to eligible children.

## 3.4. Engagement of all care providers (Public – Private mix for TB care and prevention).

**Context**

Sri Lanka has a robust public sector health delivery system which is geographically accessible and is completely free. This notwithstanding, Sri Lanka has a thriving private health sector that is heterogenous and includes many players. The range of private health care services providers includes hospitals, maternity homes, nursing homes, GPs (both full time and part time), pharmacies and practitioners of Ayurvedic medicine. To date only a small number of private providers have been linked with the public sector TB services. The private health sector is currently perceived not to be treating people for TB with the public sector being the sole provider of anti-TB medicines, even for the few patients with TB who may be non-poor or wealthy. Most people with TB tend to have a sub-acute onset of symptoms and therefore the finding that people with chronic disease tend to use the private sector mentioned in the introduction section of this report9 is relevant. Use of private providers in the course of an episode of TB may lead to delayed diagnosis and increases costs incurred by the affected person. The results of a **patient pathway analysis (PPA) conducted in 2020 are compatible with this perception. Among 743 people with TB who completed the PPA survey, 288 (38.8%) had initially sought care in the private sector and diagnostic delays were longer in these individuals (14 (IQR 23days) than in those who had sought care in the public sector (7(IQR 9). A**n analysis of patient referrals carried out by the NPTCCD revealed that of the total 4, 964 patients, 717 (14%) were referred by either private hospitals or general practitioners. The TB-NSP 2021-2025 set a target of 30% of all notified TB cases to come from the private health sector by 2025.

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| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Referred by | | | | | | |
| **Government facility** | | **Private providers** | | **Other** | | |
| District | **Hospitals** | **Other** | **Hospital** | **GPs** | **NGO** | **CHW** | **Self-referral** |
| Colombo | 992 | 28 | 91 | 159 | 0 | 0 | 365 |
| Gampaha | 992 | 8 | 43 | 18 | 0 | 0 | 26 |
| Kalutara | 377 | 5 | 24 | 29 | 0 | 0 | 11 |
| Kandy | 418 | 12 | 17 | 0 | 0 | 0 | 57 |
| Matale | 41 | 0 | 0 | 0 | 0 | 0 | 0 |
| Nuwara Eliya | 199 | 0 | 0 | 7 | 0 | 0 | 1 |
| Galle | 258 | 5 | 35 | 7 | 0 | 0 | 14 |
| Matara | 51 | 47 | 0 | 39 | 0 | 0 | 3 |
| Hambantota | 80 | 13 | 0 | 2 | 0 | 0 | 2 |
| Jaffna | 157 | 0 | 20 | 0 | 0 | 0 | 43 |
| Vavuniya | 31 | 5 | 4 | 1 | 0 | 0 | 12 |
| Batticaloa | 88 | 2 | 11 | 2 | 0 | 0 | 1 |
| Ampara | 10 | 19 | 0 | 0 | 0 | 0 | 1 |
| Kalmunai | 21 | 13 | 0 | 3 | 0 | 0 | 0 |
| Trincomalee | 73 | 0 | 1 | 2 | 0 | 0 | 0 |
| Kurunegala | 114 | 5 | 20 | 39 | 0 | 0 | 83 |
| Puttalam | 117 | 10 | 0 | 5 | 0 | 1 | 15 |
| Anuradhapura | 196 | 48 | 0 | 2 | 0 | 0 | 5 |
| Polonnaruwa | 102 | 12 | 1 | 9 | 0 | 0 | 2 |
| Badulla | 134 | 48 | 0 | 28 | 0 | 0 | 2 |
| Monaragala | 62 | 18 | 16 | 10 | 0 | 0 | 5 |
| Ratnapura | 166 | 6 | 3 | 30 | 0 | 0 | 11 |
| Kegalle | 229 | 0 | 0 | 31 | 0 | 0 | 20 |
| Mannar | 15 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mullaitivu | 26 | 0 | 0 | 0 | 0 | 0 | 0 |
| Kilinochchi | 15 | 0 | 8 | 0 | 0 | 0 | 21 |
| Sri Lanka | 4964 | 304 | 294 | 423 | 0 | 1 | 700 |

Table 4. Source of referrals for people with TB in Sri Lanka, 2022

**Public-private mix for TB care and prevention: key achievements**.

The NTCCD recognizes the private health care sector as a critical partner in the TB response in Sri Lanka. Consequently, the NPTCCD has:

* A target for the proportion of all TB cases that are to be notified by the private sector.
* Developed a set of practice standards for private providers including GPs.
* Developed and distributed information, education, and communication materials for the private sector.
* A PPM working group has been established and a biannual PPM meeting has been conducted.
* Director-Private Health Sector Regulatory Council and the College of General Practitioners are included as the membership of multi-  stakeholder committee chaired by the Additional Secretary, Public Health Services.
* WHO recommended rapid diagnostic test (WRDs) has been made available free of charge to the private health sector.

**Public-private mix for TB care and prevention: gaps, constraints and weaknesses**

Overall, structured engagement of private providers in TB care and prevention remains sub-optimal in Sri Lanka. The major gaps and weaknesses include the following:

* While there is some engagement of private hospitals and GPs, there was hardly any evidence that pharmacies were engaged.
* The scope/coverage of hospitals and GPs was also unclear and is likely to be small.
* While the TB-NSP set up a target of 30% of all notified TB cases to come from the private sector, there is no clear pathway on how this target was to be achieved.
* The engagement of the private health sector in the development of PPM policies and practice recommendations was not evident.
* Training programs targeting private providers are poorly attended.

**Public-private mix for TB care and prevention: key recommendations**

The NPTCCD is encouraged to work towards enhancing private provider engagement in TB care and prevention for many reasons including but not limited to reducing costs associated with TB and reducing TB diagnostic delays. To enhance PPM the NPTCCD and national stakeholders are urged to undertake the following actions:

1. Develop a PPM strategy and action plan that includes key interventions and activities, milestones and targets including coverage targets for each cadre of private provider and a monitoring and evaluation plan.
2. Engage private providers at the national and district level through their umbrella organizations to co-create interventions and activities and to dialogue and agree on appropriate incentive and enabler schemes.
3. Develop and implement a private provider training and technical support program that fits the work schedules of targeted providers. This should include the use of digital platforms. Training of private providers should be fitted to the tasks they are expected to perform in the TB response.
4. Work with the private sector to enhance access to diagnostic tools including WHO recommended rapid diagnostics (WRDs) by patients accessing care in the private health care sector. This may include machine placement in the private sector and or inclusion of the private sector in the specimen transport system.
5. Use the results of the PPA and those of the ongoing patient cost survey to better understand use of the private providers by people with TB and to design interventions that reduce diagnostic delays and protect people with TB and their families from incurring catastrophic costs on account of the disease.

## 3.5. Engaging communities in TB care and prevention

**Context**

The experience of an episode of TB does not just affect the individual but has an influence on families and the community at large. Robust responses to TB care and prevention therefore need to involve communities. The World Health Organization (WHO) defines community engagement as a process for developing relationships that enable stakeholders to work together to address health-related issues and promote well-being to achieve positive health impact and outcomes[[25]](#footnote-25). In Sri Lanka, it is debatable if a formal /structured link between communities and the formal health care system exists. Engagement of the communities is carried out by the preventive arm of the Ministry of Health, mainly through PHIs. This cadre of health care workers has the responsibility of carrying out “field investigation” of people who are contacts of persons with notifiable infectious disease at the community level. These diseases include TB. Each PHI is responsible for 10,000 people. The current procedure is to list all contacts of a person with infectious TB and to refer them to a health facility for a chest x-ray and sputum examination as needed. Community health care workers and volunteers in Sri Lanka are only available except for specific programs such as dengue and plantation and urban health sector. There are no dedicated community health care workers and volunteers for TB. It is worth noting that a community approach to TB care and prevention is deemed to have failed in the past[[26]](#footnote-26). To date there is little engagement of communities which is reflected in the zero number of people with TB referred by non-governmental organizations/community-based organizations (NGOs/CBOs) and community health care workers as shown in table 4 above. The lack of community engagement is acknowledged by TB national stakeholders. The Ceylon National Association for the Prevention of TB (CNAPT) has been trying to fill this void, however, it has a limited presence, with its activities limited to one or two districts in the country at the moment.

**Community engagement: Key recommendation.**

* The lack of community engagement in the TB response in Sri Lanka is a systemic issue. The NPTCCD and national TB stakeholders are urged to engage in policy dialogue at the national level to stimulate development of appropriate policies for engagement of communities, NGOs and CBOs in the TB response.
* The NPTCCD and national TB stakeholders should explore strategic use of organizations such as the CNAPT to advocate for the development of appropriate policies for community engagement in the TB response.

## 3.6. The TB laboratory Network

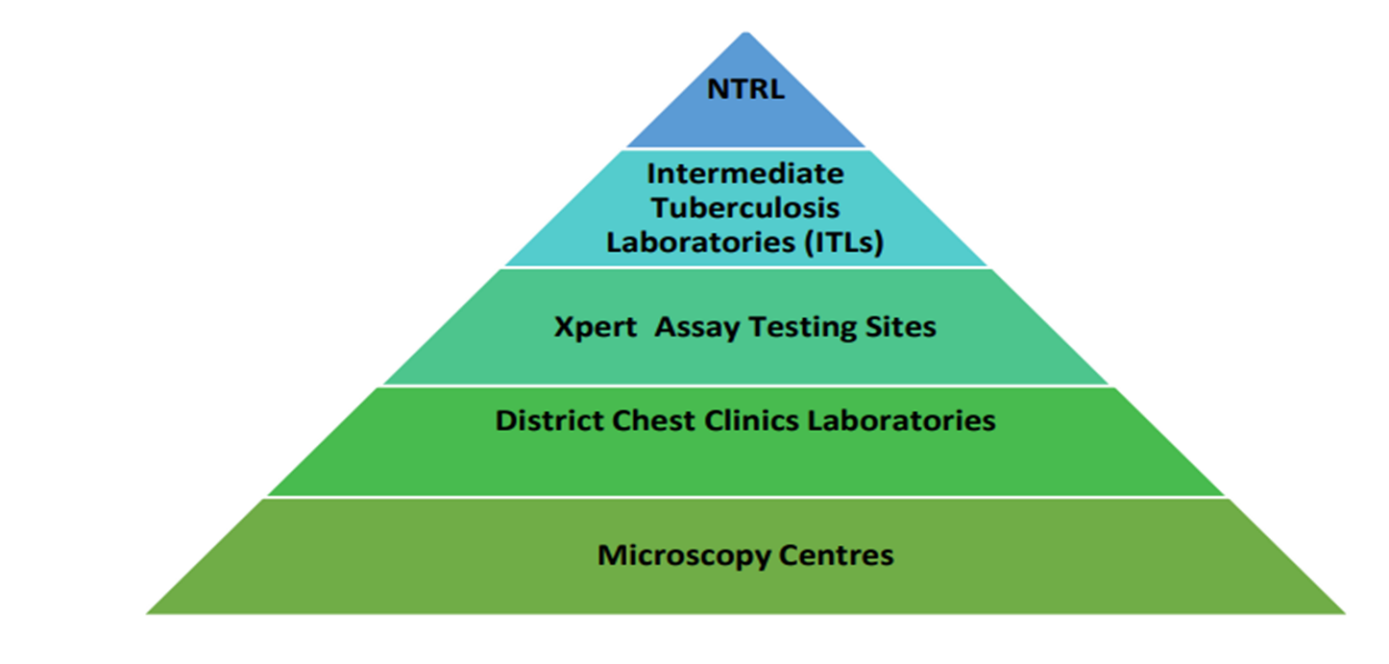
1. **Introduction and Background**

National TB control efforts are directed by the National Program for Tuberculosis Control and Chest Diseases (NPTCCD), which is a directorate under the Ministry of Health, Sri Lanka. The Central Unit, National Tuberculosis Reference Laboratory (NTRL), Central Drug Stores of the NPTCCD, and Central Chest Clinic (CCC) Colombo and District Chest Clinics (DCC) Gampaha are under the direct administrative purview of the NPTCCD. The NPTCCD implements its activities through a network of District Tuberculosis Control Officers (DTCOs) and DCCs which carry out TB control functions at the district level, as well as the follow up of other chest conditions.

TB diagnostic services are offered by both government and private sector laboratories and are easily accessible to patients. Mycobacterium tuberculosis (M.tb) diagnostics services offered by government health sector are free of charge. National TB Reference Laboratory (NTRL) under the guidance of National TB Program, is the apex laboratory of the National TB Laboratory Network which consists of 4 intermediate TB culture laboratories (ITL), 29 GeneXpert testing sites, 26 district chest clinic laboratories and 160 microscopy centers (MC) across the country. The NTRL is also supported by a supranational reference laboratory (SRL) which is currently the Queensland Mycobacterium Reference Laboratory (QMRL), in Brisbane, Australia. Please refer to diagram 13 below.



**National TB Program**



**4**

**29**

**160**

**26**

**Supranational Reference Laboratory (SRL)**

**Private sector performing M.tb diagnostic services including Smear Microscopy, GeneXpert, Culture and IGRA.**

**Figure 13: National TB Laboratory Network in Sri Lanka**

**National Tuberculosis Reference Laboratory (NTRL)**

The NTRL is the reference laboratory of Sri Lanka. It is the apex laboratory of the national TB laboratory network with a Biological Safety Level 3 (BSL 3) containment facility and the expertise to perform M.tb culture and drug susceptibility testing (DST). Services provided by NTRL includes diagnostic tests such as Acid-Fast Bacilli (AFB) smear microscopy, mycobacterial culture using both solid (Lowenstein Jensen (LJ) ) and liquid (Mycobacterium Growth Indicator Tube (MGIT)) media and phenotypic DST to Streptomycin (S) , Isoniazid (H), Rifampicin (R) and Ethambutol (E) using solid media. Direct detection of TB and genotypic DST is performed by Line Probe Assay (LPA) using the MTBDRplus, GeneXpert Ultra and GeneXpert MTB/XDR Assays. The NTRL is also involved in; capacity building by providing training to Public Health Laboratory Technicians (PHLTs,), Medical Laboratory Technicians (MLTs), Nurses, Medical officers and DTCOs, supervision and monitoring of all the laboratories in the TB laboratory network, providing National External Quality Assurance (NEQA) program and laboratory data management as per NPTCCD guidelines.

**Intermediate TB Laboratories (ITLs)**

There are four ITLs in Sri Lanka under the supervision of a Consultant Microbiologist. These include: *District Chest Clinic (DCC) Jaffna* that can performs smear microscopy, GeneXpert assay and solid culture, *District Chest Clinic (DCC) Kandy* that can performs Smear Microscopy, Xpert assay and solid culture, *Teaching Hospital Karapitiya* and *Teaching Hospital Ratnapura* that can perform smear microscopy, GeneXpert assay and solid culture. Each ITL has a catchment area of its own for receiving clinical specimens for TB cultures and Xpert MTB/RIF assay. All positive cultures are transported to NTRL for DST.

**GeneXpert sites**

Currently, there are 33 GeneXpert machines in Sri Lanka. Thirty-two (31 x 4 modules and 1 x 16 module) machines are in public sector and 1 (4 module) is in private sector. GeneXpert has been rolled out in 25 of the 26 districts (Mullaitivu currently does not have a machine) and are mainly available in major hospitals in the districts. The assay is performed by MLTs working in the microbiology laboratories where the GeneXpert machines are installed and under the supervision of respective Consultant Microbiologists. The country is in the process of rolling out GeneXpert MTB Ultra assay. Please refer to Annex 1 for GeneXpert sites.

**District Chest Clinic (DCC) laboratories**

There are 26 DCC laboratories in Sri Lanka that have facilities for sputum collection and smear microscopy for TB diagnosis. Specimens collected at DCC laboratories and hospitals in the district, that require further TB testing such as TB culture are sent to NTRL or ITLs and those for GeneXpert assays are sent to the nearest GeneXpert sites.

**Microscopy Centers**

There are approximately 160 MCs that are located country wide mainly at base hospitals in the periphery, which are primary level facilities. These MCs are linked to district laboratories. Microscopy centers have basic facilities for sputum collection and smear microscopy. Smear microscopy is performed by PHLTs under the supervision of the DTCO in the relevant district. DTCOs are responsible for carrying out EQA for smear microscopy for peripheral microscopy laboratories in the district.

**Other Laboratories Involved in M.tb diagnosis**

In addition to the laboratories in the ministry of health, there are TB diagnostic laboratories in other ministries and private sector which includes:

1. Ministry of Higher Education - Faculty of Medicine, University of Colombo – which performs smear microscopy, GeneXpert MTB/RIF assay, M.tb culture (solid media) and latent M.tb infection detection using Interferon Gamma Release Assay (IGRA).
2. Ministry of Public Security - Prison and Rehabilitation- which performs smear microscopy and GeneXpert MTB/RIF assay.
3. Ministry of Defense - Military Hospital and Kotelawala Defense University Hospital- performs smear microscopy only.
4. Private sector laboratories are also involved in the diagnosis of M.tb. These include:

* Hemas Hospital **-** Smear Microscopy, GeneXpert MTB Ultra assay.
* Lanka Hospital – Smear Microscopy, Liquid Culture, Latent TB (IGRA).
* Asiri Hospital – Smear Microscopy, Liquid Culture, Latent TB (IGRA).
* Durdans Hospital – Smear Microscopy, Liquid Culture, Latent TB (IGRA).
* Nawaloka Hospital – Smear Microscopy, Latent TB (IGRA).

1. **Key Achievements of the TB Laboratory Network.**

Some of the key achievements are:

* 1. Presence of an established TB Laboratory Network structure including engagement with the SRL.
  2. Support of senior management at the NPTCCD to strengthen TB laboratory diagnosis and drug susceptibility testing.
  3. Highly qualified staff. Majority of the Medical Officers have undergone training in an international well established laboratory environment.
  4. Availability of culture facilities in Public and Private sectors.
  5. Equipment to perform both phenotypic and genotypic DST.
  6. Availability of WHO recommended rapid molecular technologies such as GeneXpert and LPA.
  7. Reagents and consumables are readily available, currently the country is not facing any stock outs.
  8. Funds are available through Government of Sri Lanka (GOSL) or Global Fund to support the laboratory network.

1. **Mid-Term Achievements as per National Strategic Plan.**

Review of the laboratory operational plans set in the TB-NSP 2021-2025 to achieve the NSP target showed that only 12.8% of the laboratory goals were fully achieved, 46.8% were partially achieved and 40.4% is currently not achieved. Refer to Annex 2 for detailed laboratory operational plans as per the NSP that were either achieved, partially achieved or not achieved.

1. **Key gaps/weakness and recommendations.**

Sri Lanka has a well-established laboratory network with WHO recommended tools to provide optimum M.tb diagnosis. However, few major gaps/weakness have been identified within the laboratory network that could have a negative impact on reaching the objectives of the NSP. These include:

1. **Key Findings – M.tb diagnosis using SSM**

Sri Lanka is heavily reliant on smear microscopy (instead of a WRD -GeneXpert MTB/RIF or Ultra) as the primary method for M.tb diagnosis in presumptive M.tb cases. With more than 180 microscopy sites, the country has performed on average 384,145 AFB smears over past five years (refer to Annex 3). Smear microscopy is considered to be a technique that is less sensitive in comparison to other WHO recommend tools such as GeneXpert. It does not have the ability to differentiate between M.tb complex and other non-tuberculosis mycobacteria which could lead to false diagnosis and over-treatment. It was noted that there is a perception among laboratory staff members that BSC is required to perform AFB microscopy or GeneXpert. BSCs is not required to perform GeneXpert or SSM provided adequate ventilation is assured as per Global Laboratory Initiative (GLI) TB Laboratory Safety Handbook (https://www.stoptb.org/gli-guidance-and-tools/gli-tb-laboratory-safety-handbook).

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| **Recommendation** | **Responsible persons/agency** | **Timeline** | **Support required to fulfil the recommendation** |
| Phase out smear microscopy and utilize a WRD - GeneXpert Ultra as the primary laboratory diagnostic tool for M.tb and Rif resistance detection.  Note: Bio Safety Cabinets (BSC) are not required to perform GeneXpert or Smear Microscopy provided adequate ventilation is assured. | NPTCCD/  NTRL | December 2024 | Engage clinicians to request GeneXpert instead of smear microscopy on regular basis.  Training of PHLTs to perform GeneXpert to cater for the shift in workload from microscopy to GeneXpert testing. |

**Table 5: Laboratory recommendations on M.tb diagnosis using smear microscopy**

1. **Key Findings- Underutilization of WHO Recommend Tools for M.tb Detection and DST.**

**GeneXpert**

The country has 32 GeneXpert machines for M.tb and Rif resistance detection. Each Xpert (4 module or 16 module) can do 3,680 or 14,720 tests per working days per year. Therefore with 31 Xpert (4 module) and one Xpert (16 module), Sri Lanka can do a total of 128,800 test during working days per year. However, a total of only 19,047 Xpert (including Xpert MTB/RIF and Ultra) assays was performed from 1st January - 31st August, 2023. Some areas for example GH Matale, whose Xpert machine was out of order for 7 months and became functional again recently, only performed 30 tests during this period. Hence, currently GeneXpert is underutilized at majority of the sites. Of the 32 GeneXpert machines available, 16 machines have at least one module that is currently not functional. In total, there are 26 modules that are not functional and need replacement. Refer to Annex 1 for further details on number of modules that are not functional. There is only one GeneXpert machine (4 module) that has 10 color channel modules to perform Xpert XDR assay. This is the only machine that has a warranty extension that ends in December 2024. For the other machines, there are no current service contracts or extended warranty available. A verbal confirmation was given by NPTCCD that extension of the extended warranty of 12 machines for a period of one year has been approved which would include module replacements. However, it was not clear how the other modules would be fixed. The service contract that the country had in the past did not include module replacement but only covered general maintenance. GeneXpert MTB Ultra is not fully rolled out within the country. Its only performed at limited sites mostly in Colombo and Kandy. Currently, there are approximately 27,300 GeneXpert MTB Ultra cartridges with an expiry date of 25/08/2024 stored at NTRL that are waiting for distribution. Majority, of the GeneXpert machines are yet to have a software upgrade to perform GeneXpert MTB Ultra assay. High error rates are seen in some laboratories which raises concerns about staff performance and the condition of the machine. Only MLTs are trained to perform GeneXpert which could pose a risk when the country moves to using GeneXpert Ultra as a primary method for M.tb diagnosis. There is also a perception that samples such as stool might damage the GeneXpert machine, hence the laboratories are reluctant to perform GeneXpert assay on stool samples from pediatric cases.

**Liquid Culture/Drug susceptibility testing (DST)**

Sri Lanka has two MGIT 960 machines at the NTRL that are fully functional to perform liquid culture. However, in 2022 majority of the mycobacterial culture from respiratory samples (16,402 ) were performed on solid media. Only 9,730 non-respiratory samples were cultured using the MGIT machine. Drug susceptibility testing is also done on solid media. In 2022, a total 2,422 were subjected to first line DST (S,H,R,E). DST of 2nd line drugs and group A drugs (Bedaquiline (Bdq), Linezolid (Lzd) and Clofazimine (Cfz) are not performed.

**Line Probe Assay (LPA)**

Sri Lanka has one GT-48 Blot machine and a PCR machine (Hain CTQ-Cycler 96) at NTRL that is fully functional. However, LPA for both 1st and 2nd line drugs are not currently performed.

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| **Recommendation** | **Responsible persons/agency** | **Timeline** | **Support required to fulfil the recommendation** |
| Increase utilizing WHO recommended techniques such as:  GeneXpert  Strengthen the GeneXpert Network (in both private and public sector) and utilize GeneXpert to its full capacity country wide.   * Advocate GeneXpert usage by clinicians. * Install Cephid 360 at all GeneXpert sites for automated data collation. * Install GxAlert to obtain diagnostic results in real time. * Replace modules that are not functional as soon as possible (preferably to a 10 colour module). * Obtain an extend warranty or service maintenance agreement that include replacement of broken modules at no cost to the program. This will require discussion with Cepheid. * Upload GeneXpert Ultra software at all sites as soon as possible. * Distribute GeneXpert Ultra cartridges to all GeneXpert sites at least six months before the expiry date of the available GeneXpert Ultra stock of 25/08/2024. * Start performing GeneXpert MTB ultra on stool samples from paediatric cases (<10 year of age). | MOH,  NPTCCD,  NTRL  &  Cephid Agent  (Analytical Instruments)  SRL | March 2024 | Educate clinician to request GeneXpert test as a primary M.tb diagnostic tool.  Contract with Cepheid that includes replacement of faulty modules with 10 colour modules and timely installation of Cepheid 360, and GxAlert.  SOPs and training of MLTs to upload software to run GeneXpert Ultra.  SOPs to perform GeneXpert on stool samples from Paediatric cases (<10 yrs of age) |
| **Liquid Culture/Drug susceptibility testing (DST**)   * Liquid culture should be preferred over solid culture on all samples that have a culture request. * Implement DST for 1st/2nd line drugs, that include Group A drugs (Bdq, Lzd) and Cfz using MGIT960. | NPTCCD/  NTRL | Dec 2024 | Training of MLTs to perform DST using liquid media either by a SRL or an external consultant. |
| **Line Probe Assay**  LPA to be performed on regular basis. However, the country can choose to perform GeneXpert MTB Ultra and GeneXpert XDR assay instead to get a similar outcome as that of LPA. Should the country choose to perform LPA then a regular participation in EQA for LPA will be required. | NPTCCD/  NTRL | Dec 2023 | Decision to be made by NPTCCD & NTRL on whether to continue using LPA. |

**Table 6: Laboratory recommendations for molecular testing and culture &DST**

1. **Key Findings - Human Resource Management**

There has been no communication with the SRL for the past few years. There is high staff turnover at all levels where staff are rotated every 4 years based on seniority as per ministerial policy. There is no role description or clear handover mechanism in place. Staff meetings are not conducted in the majority of the laboratories visited and there seems to be no clear means of sharing essential information to staff members at all levels. Some laboratories including the ITL visited did not have SOPs for some essential assays such as M.tb culture and GeneXpert. This raises concerns about the integrity of results generated.

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| **Recommendation** | **Responsible persons/agency** | **Timeline** | **Support required to fulfil the recommendation** |
| Strengthen human resource management:   * Strengthen communication at all levels. * NPTCCD to provide clear direction on what the expectation of NRTL is. * NTRL should participate in meeting with NPTCCD on regular basis. * Meetings should be conducted on regular basis at all levels. Important information should be disseminated during this process. * NTRL should strengthen its relationship with the SRL. * Appoint a permanent Microbiology Consultant at NTRL. * Ensure staff rotation is based on the area of expertise. * Provide required training on regular basis (including managerial and leadership training). * Have a clear mechanism of handover at all levels. * Provide a clear role/job description at all levels. | NPTCCD/  NTRL | June 2024 | Clear communication between NPTCCD and NTRL.  Training of staff at all levels needs to be conducted. |

Table 7: Recommendations for HRH management for the TB diagnostic network.

1. **Key Findings - Equipment Maintenance and IT support**

There is a mechanism for servicing equipment either through internal process or via external service provides such as Analytical Instrument (for GeneXpert). However, servicing is not done in a timely manner. The BSL3 facility at NTRL has been out of action for the past few months that is hindering the DST process. The back-up generator at NTRL is not functioning. There are insufficient or lack of UPS at all levels. There is deficiency in IT support. There is also either lack of or intermittent internet services available. There are insufficient computers or presence of non-functional computers within the network.

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| **Recommendation** | **Responsible persons/agency** | **Timeline** | **Support required to fulfil the recommendation** |
| Strengthen equipment maintenance support.   * All laboratory equipment are to be serviced on a regular basis (at least once a year). * UPS are to be upgraded or installed as required | NPTCCD/  NTRL | December 2023 | Clear communication between NPTCCD and NTRL. |
| Strengthen IT support at all levels.   * Internet services should be proved at all sites in order to roll out LIMS and to implement Cepheid 360 and GxAlert system. * Hardware including computers are to be provided as required. * Efficient IT services is to be provided at all levels | IT Support  Cepheid | December  2024 | Engage Cepheid and IT support to roll out internet, Cepheid 360 and GxAlert  Purchase/ fix required hardware. |

Table 8: Recommendations for laboratory equipment maintenance and IT support

1. **Key Findings - Sputum Transportation Mechanism**

It was noted that most of the specimens are not transported to the laboratory in an adequate time frame. Specimens are not stored at 02-08°C until transportation to the laboratory in some places. On arrival at the testing laboratory, most specimens are not refrigerated until they are processed. There is no dedicated mechanism for sputum transportation. Sputum and other samples are transported to respective laboratories by ambulance, bystanders, medical students, and patients.

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| **Recommendation** | **Responsible persons/agency** | **Timeline** | **Support required to fulfil the recommendation** |
| Strengthen Sputum transportation mechanism.   * Have a dedicated mechanism for efficient sputum transportation (this might require sourcing out sputum/sample transportation). * Engage “Primary Health Care System Strengthening Project (PHCSSP)” group if required to assist in the process. | NPTCCD/  NTRL  &  PHCSSP | December 2023 | Clear communication between NPTCCD/NTRL and PHCSSP regarding implementation of preferred sputum transportation mechanism. |

Table 9: Recommendations for specimen transportation system.

1. **Key Findings - Quality Assurance (QA)**

Lack of participation in QA was observed at all levels. Sri Lanka does not participate in External Quality Assurance (EQA) for GeneXpert MTB/RIF or Ultra (including required verification checks). There is no EQA program for culture laboratories. Quality assurance for data recording or reporting is also not performed. There is no consistent use of internal quality control at all levels.

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| **Recommendation** | **Responsible persons/agency** | **Timeline** | **Support required to fulfil the recommendation** |
| Strengthen Quality Assurance at all levels.   * Participate in GeneXpert EQA program for all the GeneXpert assays implemented (GeneXpert Ultra, MTB/RIF and XDR assays). * All culture labs (in both private and public) should be participating in an EQA program. * Strengthen EQA program for DST and LPA. * Implement and strengthen internal quality assurance for all the assays. * Implement and strengthen QA for data recording and reporting. | NTRL | June 2024 | Enroll and participate in required EQA programs.  NTRL to provide training and also required EQA panels to other laboratories. |

Table 10: Recommendations for laboratory quality assurance

1. **Key Findings - Recording/ reporting of results and data sharing**

There is a complex manual mechanism of result entry where results are entered in various forms which are prone to transcriptional errors. An electronic Patient Information Management System (ePIMS) is available for recording patient data at some sites, however, the laboratory module is not implemented in most of the sites. Culture, GeneXpert and Smear Microscopy are not or partially shared with NTRL from other laboratories.

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| **Recommendation** | **Responsible persons/agency** | **Timeline** | **Support required to fulfil the recommendation** |
| Strengthen data recording and reporting at all levels.   * Laboratory data should be collated and analyzed as per NPTCCD key point indicators on a regular basis. | NPTCCD/  NTRL | December 2023 | Clear communication between NPTCCD and NTRL on NPTCCD KPI. |
| * Implement electronic lab information system (LIMS) preferably integrated with ePIMS at all laboratories. The LIMS should have a function to easily access the required data from all sites as per NPTCCD’s KPI from NTRL or NPTCCD. | NPTCCD/  NTRL  & IT support | Dec 2024 | Clear LIMS requirement to be provided IT Support. Engage external IT consultants as required. |

Table 11: Recommendations for laboratory recording and reporting system including data sharing

1. **Key Findings - Private sector engagement.**

There is lack of engagement between the private sector and NTRL/NPTCCD. Though there are laboratories in the private sector that perform AFB microscopy, GeneXpert and mycobacterial culture, the sharing of the data with NTRL or NPTCCD is limited. This could result in miss-management of presumptive and confirmed M.tb cases.

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| **Recommendation** | **Responsible persons/agency** | **Timeline** | **Support required to fulfil the recommendation** |
| Strengthen relationship with the private sector laboratories.   * Data from the private sector should be shared with NTRL/NPTCCD. * Private sector should also engage in QC and training mechanism as per NPTCCD guidelines. * Private sector are to follow NPTCCD approved SOPs and guidelines for recording and reporting of data. | MOH  NPTCCD/  NTRL | June 2024 | Directive from MOH to private sector regarding data sharing.  Clear communication between NPTCCD and NTRL and private sector laboratories in terms of data requirement. |

Table 12: Recommendations for engagement of the private sector in the TB diagnostic network

1. **Key Findings – Health and Safety**

Lack of Health and Safety practices were observed at various levels within the laboratory network. Inadequate clinical waste disposal at some district sites were observed. Storage and disposal of cultures in culture labs is inadequate. Laboratory assistants who are handling biological wastes or active mycobacterial cultures are not properly trained or had not received refresher training in recent years. Annual staff health check is not performed at all levels. Sputum collection containers that are currently used are not suitable for sample collection – they do not have a proper screw top lid and is very soft, thus posing a risk leakages. In some cases, patients are provided with glass culture bottles and washed penicillin vials to collect sputum samples. This poses an increased risk of sample leakage. Sample collection booths are not adequately built at some sites.

|  |  |  |  |
| --- | --- | --- | --- |
| **Recommendation** | **Responsible persons/agency** | **Timeline** | **Support required to fulfil the recommendation** |
| Strengthen Health and Safety measures:   * Provide required SOPs and training to strengthen biosafety and infection control measures for the laboratory network. * Proper sample collection containers with screw top lids and hard surfaces should be provided. The sample container that is provided for sputum collection for GeneXpert is very suitable and should be used instead. * Proper waste disposal bins, SOPs and guidelines should be provided. * Staff health check should be done on a regular basis (at least once a year). Health check can be done by Medical Officers and the staff to be referred to the Chest Clinic should there be any concerns. * Proper cough booths that are well ventilated with water facilities and instruction on how to collect sputum are to be provided for sample collection. | NPTCCD/  NTRL | December 2023 | NTRL.to provide Health and Safety training at all levels.  NPTCCD to purchase more containers ( like the current GeneXpert sample collection containers in use) as the primary sputum sample collection container for all assays. |

Table 13: Recommendations on laboratory health safety practices

## 3.7. Programmatic Management of Drug Resistant TB (PMDT)

**Context**

A regional Green Light Committee (rGLC) mission was conducted as an integral component of the 2023 Sri Lanka TB Program review. The specific technical areas that this mission examined include: review of the national guidelines for the treatment of DR-TB, and identify areas that need to be updated to be in line with the recent WHO recommendations; tuberculosis case detection including detection of DR-TB patients; progress of the country towards universal DST; treatment regimens and modalities including patient support for DR-TB; monitoring & evaluation including supervision at the central, provincial and district level; recording and reporting including e-PIMS; DR-TB detection and management in children; detection and management of drug safety (aDSM) and management of DR-TB and comorbidities. Table 5 below shows the PMDT achievements that have been made so far in the implementation of the TB-NSP2021-25.

|  |  |  |  |
| --- | --- | --- | --- |
| **Indicator** | **NSP targets** | **Achievement** | **Comments** |
| DR TB treated 2022 and 2Qs of 2023 | GF targets = 90% of 54 | 16/48(33%) 2022  30/48(62%) estimated for 2023 based on 2Qs |  |
| 1.2 : DR TB TSR | 80% | 2020 Cohort 44% |  |
| 1.2.1.1: Continuous supply of SLDs | Uninterrupted supply of SLDs | Remains uninterrupted at all levels | From CDS to DCCs to DOT providers in line with protocols |
| 1.2.2.1 c: Development of SMS notification  component in ePIMS and integrate with  the SMS platform | Developed and functional at all levels | Not integrated with DR TB patients | Still in development phase |
| 1.2.3.2 a Monitoring of Adverse Drug Reactions (ADR) through a  checklist at each visit and mandatory  reporting of major side effects. | Monthly at DCCs | ADRs recorded but not reported(major ADRs and Serious Adverse Events (SAEs) | aDSM not implemented |
| 1.2.3.3.b Establishment of chest wards  with High Dependency Unit (HDU) | One per District | Not achieved | Inadequate Funds |
| 1.2.4.1 Provision of Directly Observed  treatment (DOT provision) for all patients  who are on 2nd line Treatment | Provision of daily supervised  treatment by a reliable and accountable  DOT provider to all patents on 2nd line  Treatment. | At all Districts not available and not systemized | Somehow family DOT is there which may not be as reliable /accountable |
| 1.2.4.1.b Regular supervision of DOT providers of MDRTB/  RR-TB patients by PHI | At least once a week | No checklist for standardized practice, no reports |  |
| 1.2.4.4.c Home visits to selected MDR/ RR  TB patients by PMDT coordinator | As needed to visit patient home | Yes, but now not happening due to lack of funds. |  |
| 1.6 Detection of childhood TB/DR TB  cases | Chest Xray, GeneXpert on available samples | GeneXpert testing on gastric lavage samples among children | One child 13 years old detected to have RR TB in 2022. |
| 4.4.1.3 Timely submission of accurate &  complete PMDT case finding & PMDT  treatment outcome returns by PMDT  Coordinator | Monthly submission to PMDT coordinator | Yes |  |
| 5.1 Enhance research activities,  through establishing research  consortium and conduct regular research committee meetings | 5.1.1.1.b Identification of priority research  areas and regular update - Research  committee meetings | No research took place for DR TB, Not from the program in the last 3 years |  |

Table 14: Key achievements in the implementation of PMDT.

**Programmatic Management of Drug Resistant TB: Key achievements**

1. Currently there is a well-functioning PMDT program that includes a committed DR TB team at the central NPTCCD PMDT unit who are Government staff which implies PMDT is poised for sustainability.
2. PMDT sites have been expanded to all districts under DCCs.
3. The injectables have been phased out for DR TB treatment since 2019 with a complete shift to all oral regimens including adaptation of Oral Standard Short Term Regimen (OSSTR) in 2021
4. A significant increase in RR/MDR TB case notification in 1st 2 Qs of 2023 (15 patients) as compared to total notified in 2022(16 patients).
5. Ongoing efforts to scale up DST to achieve universal DST coverage including starting testing of RR TB patients at NTRL using the Xpert MTB-XDR platform.
6. Efficient contact screening of all close contacts of DR TB using CXR regardless of symptoms.
7. Pretomanid has been procured and is now available in the country for selected patients.
8. There are regular meetings of the PMDT committee at the central level and at care and treatment sites.
9. Commencement of ePMIS data platform, however, there are limitation with report generation.

**PMDT: gaps, constraints and challenges**

**Drug resistant TB diagnosis.**

Though the burden of RR/MDR TB is very low, the current figure (54) being used for the burden of RR/MDRTB is an underestimate of the DRTB numbers as per the TB-NSP which estimated that there will be 76-86 RR/MDRTB cases from the estimated 14,000 people who had TB in 2022 . In 2022, the NPTCCD, re-estimated that there were 48 people with RR/MDRTB, however, only 16 (33%) were identified. The TB-NSP budget and the Global Fund grant performance target was to detect 54 people with RR/MDRTB of whom 90% would be treated. There is thus a significant gap in RR/MDRTB detection. The pattern of detection and treatment shows that historically the country was not able achieve targets of RR/MDR TB detection. Moreover, 3 districts in the country, namely Colombo, Gampaha and Ratnapura are contributing 64% of the detected RR/MDR TB burden. In the last 2 years, only 2 patients have been detected from Kandy district, which is the 2nd largest city in Sri Lanka. In addition, some districts are reporting “zero” RR/MDR TB cases, which raises questions about accessibility to screening programs, testing and diagnosis strategy. There are indeed RR TB cases being missed in the communities and one of the reasons could be the low TB detection overall, the sub-optimal DST coverage and not using GeneXpert MTB Rif as upfront test. It is noted that smear microscopy is still the mainstay of TB diagnosis in Sri Lanka. Significantly suboptimal DST coverage (30% in 2022) leads to low RR/MDR TB detection. DST to fluoroquinolones (FQ) has now been started by using Xpert MTB-XDR test but is limited to Colombo and generally most diagnosed RR TB patients have an unknown FQ susceptibility status at baseline.

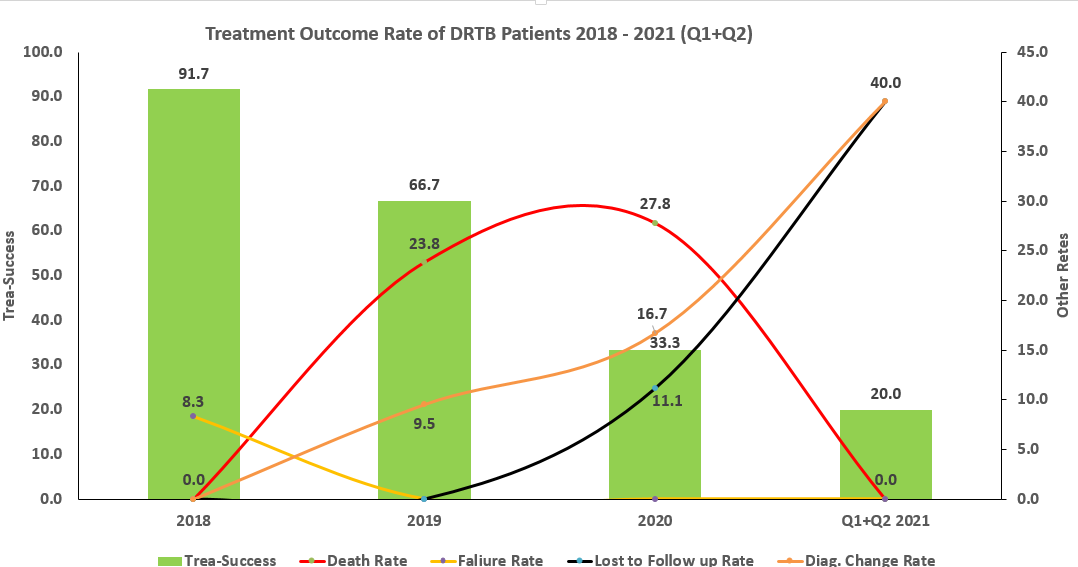
**Fig 14: Number of RR/MDR TB cases detected and treated in Sri Lanka from 2008 to mid of August 2023** (Source NPTCCD PMDT PPT Sep 2023)



**Treatment and care**

The DR TB management guidelines were updated in 2021. There is a fairly well-established TB and RR/MDRTB care and treatment infrastructure at each district level through the DCCs which are managed by DTCOs and supervised by consultant respiratory physicians (CRPs). There are a total of 26 PMDT sites with each district having a DCC . However, it has been observed that there are highly centralized practices for DR TB management and a clinically oriented DR TB program. All patients diagnosed with RR/MDRTB are hospitalized at the National Hospital for Respiratory Diseases (NHRD) for 4-5 months on average (until culture conversion) and are then sent back home for ambulatory care. In some settings, it was observed that RR/MDRTB care practices were not adherent to the latest (2021) NPTCCD DR TB guidelines and WHO recommendations. For example, routinely 6 drugs are being prescribed to each RR/MDR TB patient (evidence and recommendation does not support this), there is an unnecessary enrolment on Oral Long-Term Regimen (OLTR) instead of OSSTR and all patients enrolled on OSSTR are being treated for a fixed term of 11 months. Treatment success rate was only 33 % for the 2020 cohort, which is much below the global average, or the target set by the TB-NSP 2021-2025 (80%). There is a high death rate (26%) and significant levels of lost to follow up (11 %). The time lapse between RR TB detection and enrolment is crossing 2 weeks in 34% of patients (10/29) and crossing 4 weeks in 10% of patients (3/29). Only 38%(11/29) are enrolled within one week of RRTB detection.

**Fig 15: Treatment outcome of DRTB Patients in Sri Lanka from 2018 - Q1+Q2 2021(Source NPTCCD outcome data PPT)**



**Community based care for DRTB**

There is a well decentralized structure of care for TB and DR TB patients up to district and peripheral level which includes the DDCs and the Medical officer for Health (MOH). PHIs (Public health Inspectors) visit households for NCDs screening and investigation of infectious diseases including Dengue. There is a systematic program of TB screening of close contacts of people with TB and DR TB using CXR for all close contacts. Despite these positive elements in community level TB prevention and care , there are multiple gaps. These include variable involvement of PHIs in TB/DR TB patients care and variable community-based care & psycho-social support for DR TB patients. There are also capacity limitations of health staff at field/community level for the provision of appropriate DOT and adverse events detection. Currently the practice is to provide Second Line Drugs (SLDs) for 2 weeks without a buffer of at least one week which poses a high risk of stock outs and treatment interruption at peripheral health facility levels.

**Adverse drug effects detection and management**

At all DCCs, minor to major adverse effects are being managed but without having a reasonable standardized way of recording and reporting nationwide. There is non availability of audiometry, electro cardiography (ECG), tuning fork, monofilament, Ishihara color test/charts at all PMDT sites and non-implementation of aDSM component though this is part of DR TB 2021 guidelines. There is an unnecessary referrals to cardiologists for cardiac assessment at baseline for all diagnosed RR/MDR TB patients and to secondary or tertiary care hospitals for peripheral neuropathy and other ADRs if these develop during treatment. At peripheral sites where patients receive daily DOT the DOT provider in the majority of visited facilities is not aware of common adverse events of RR/MDRTB drugs. There are no documents/ job aids available at these facilities to help health staff managing people with RR/MDRTB to learn about common drug adverse effects of the medicines they are using to treat patients.

**Monitoring and evaluations**

The ePMIS has been adopted for DR TB data entry but the system is still not able to generate reports as is common with electronic server-based systems. The cohort enumeration of RR TB detected shows that 73 % were new and 27% were previously treated, which is an incorrect proportion as the definition of classification at registration based on history is misunderstood. Moreover, in the 2020 RR/MDR TB cohort, out of 16 patients registered some were later not confirmed as RR/MDR TB but continued to be included/enumerated in the 2020 cohort, which leads to incorrect cohort evaluation. Recording and reporting tools for DR TB are not updated.

**Case report:**

This was a great opportunity to visit one of the MDR TB patient home at Kandy District. This was a team visit including NPTCCD PMDT lead, DTCO, PHI. The following are the major findings:

The patient is a 37 years old construction worker who was previously treated for TB in 2019. He resides in a sub-urban area of Kandy city. He is currently in the 5th month of an OSSTR and is feeling better but experiencing joint pain as his major complaint. He was initially hospitalized at NHRD but had requested to be discharged after 5 weeks to manage his family and domestic matters. Him and his family were not aware of TB, what it is , its symptoms and how it transmits to others. It took 2 months to get his TB diagnosed. initially he consulted a GP and visited several hospitals until he reached the respiratory ward after his CXR was done at a medical ward. During diagnosis of TB and MDR TB, he did not experience any out-of-pocket expenses, but since he is suffering from TB and MDR , he lost his work and is currently facing financial problems. His wife is working and earning about 100 LKR ( in a month). He is receiving financial support from GOSL and one NGO, however, both sources of support are irregular. He is taking daily DOT from a local health facility about a kilometer from his residence. It has been observed that his chief complaint of joint pain has not been addressed and he also has a high thyroid stimulating hormone (TSH) level which has also not been addressed**. The patient suggested that the TB Program should provide sufficient social support/financial support to all TB/DR TB patients, and he did not wish to be hospitalized, instead, he was happier to be treated from his home.**

**Drug Management**

The NPTCCD central store is well maintained and has an accurately recorded and maintained temperature. There was no history of drug stock outs in recent times and the First Expiry, First Out (FEFO) principle is practiced. There were, however, a few medicine boxes that were directly laid on the ground. All First Line Drugs (FLDs) and SLDs were available in the appropriate quantities. The Pretomanid tablets have been procured and in store for about 6 patient courses. The medicine supplies to peripheral health facilities is for 2 weeks. While visiting peripheral health facilities where DR TB patients are meant to take daily DOT, it was noted that the medicine supply of 2 weeks poses a risk of stock out in case the patient after 2 weeks is not able to visit the DCC. Therefore, it is recommended to add one week buffer to avoid potential stock out.

**PMDT: Recommendations - diagnosis including targets.**

**Diagnosis**

|  |  |  |  |
| --- | --- | --- | --- |
| **Recommendation** | **Responsible persons/agency** | **Timeline** | **Support required to fulfil the recommendation** |
| 1.1: Follow the set targets of RR/MDR TB in the country as there is a significant gap in targets and detection. Detect early all missing TB/ DR TB cases by adopting a revised screening and diagnostic algorithm that brings up CXR and GeneXpert Ultra as upfront tests for presumptive TB. This intervention will also bring high death rate down.  1.2:Perform geospatial analysis of DRTB patients:   * To understand distribution of diagnosis of RR TB and why it is high in some districts and so low in other districts. Is there an issue with accessibility to RR/MDRTB testing? The NPTCCD is encouraged to conduct an appropriately designed operations research study on this issue. * Invest appropriate level of resources and focus on Colombo, Gampaha and Ratnapura districts that collectively contribute 64 % of all notified RR/MDRTB. * Analyze case-based data from these 3 districts to evaluate drivers of the high RR/DRTB case load.   1.3: Scale up use of Xpert/MTB XDR test at baseline for all RR TB patients and build capacity of the NTRL to perform DST to Group A drugs(Bdq, Lzd) and Cfz so as to ensure patients are offered the most appropriate regimens.  1.4: Prioritize isoniazid resistant (Hr) TB detection by testing high risk groups using Xpert/ MTBXDR for isoniazid (INH) resistance once RR TB has been excluded. The program should consider conducting a study on the burden of INH resistance by testing using Xpert/ MTBXDR on a reasonable sample of new DS TB patients (after excluding RR TB). | NPTCCD/NTRL/DCCs    NPTCCD  NPTCCD/NTRL | October 2023  November 2023  November 2023 | Ensure all GeneXpert modules are functional, software upgraded to Ultra and enough machines in place to cater for the need, TB screeners at OPDs ,increased referrals of TB presumptives, R&R of TB presumptive and cascade of care.  The NPTCCD may need to seek an implementing partner to perform such accelerated and active case finding to meet NSP targets  Upgrade from 6 color machines to 10 color machines. Seek support from the SNRL to develop  SOPs and training for the NTRL to perform DST to Bdq, Lzd and Cfz. Consider sending staff to the Chennai laboratory in India to receive on the bench training. |

Table 15: Recommendations on RR/MDRT targets and diagnosis.

**Treatment.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Recommendation** | **Responsible persons/agency** | **Timeline** | **Support required to fulfil the recommendation** |
| 2.1:Revise and update DR TB guidelines to align with the WHO 2022 recommendations and encourage and support clinicians to be adherent to the 2021 NPTCCD DR TB guidelines for diagnosis and treatment of TB/DR TB.   * As per the guidelines use at least 4-5 likely effective drugs instead of 6 drugs as is routinely done currently in OLTR. * Follow inclusion/exclusion criteria for OSSTR to prioritize OSSTR over OLTR among eligible patients. * Plan to adopt and roll-out BPaLM as a priority regimen for FQ susceptible patients or in whom FQ susceptibility is unknown and BPaL as a priority regimen for documented FQ resistant patients. | MOH, NPTCCD | By November 2023 | Regular central DR TB committee meetings to continue.  Support of International Consultant may be needed.  Embark on appropriate medicine forecasting for 2024. |
| * 1. Decentralize treatment initiation to the DCC level instead of hospitalizing everyone, with hospitalization limited to those with specific indications for admission: * Regular capacity building and strengthening the role of DTCOs at DCCs for DR TB management and orientation on DR TB care and treatment for CRPs. * Providing periodic trainings to relevant staff at district and peripheral levels. * Develop online modules for self-reading and assessment on major DR TB components. * Assess and determine reasons for high death rate (26%) and high lost to follow up rate (11%) and address them accordingly to improve treatment outcomes. * Evaluate and record post treatment outcome follow up as routine practice. | NPTCCD/NHRD /DTCOs | As early as possible based on Central DR TB committee decision. | Central Training of Trainers (ToT) on DR TB followed by cascade training at district level by Master trainers.  NPTTCD to send central PMDT focal officers including consultants abroad for 2 weeks on job training on MDR TB.  Retrospective case-based data review and evaluation. |
| * 1. Develop and strengthen linkages between GeneXpert sites, PMDT sites and NTRL including private hospitals diagnosing RR TB with PMDT sites to optimize DR TB patient management. This will help to reduce time lapse between RRTB diagnosis and treatment initiation. Preferably develop an online result availability platform. | NPTCCD/NTRL/DTCOs | As early as possible | Online platform for results availability of diagnosis of RR TB, C/DST results.  Mapping of GeneXpert sites, PMDT sites and linkages including contact details of care providers. |

**Table 16: Recommendations on RR/MDRTB care and treatment**

**Community care**

|  |  |  |  |
| --- | --- | --- | --- |
| **Recommendation** | **Responsible persons/agency** | **Timeline** | **Support required to fulfil the recommendation** |
| 3.1: Strengthen community-based DR TB care at field level by;   * Providing appropriate counselling &education (pre-treatment initiation and at each follow up monthly visit). * Standardize enablers monthly support for RR/MDRTB patients at all districts based on Global Fund (GF) or State standards of social support (either from the State budget or with GF support) * Develop appropriate capacity of health staff at field level by training provision and refresher trainings –develop online modules for self-reading and assessment. * Provide one week buffer of medicines at peripheral health facilities to mitigate risk of stock outs. * Use virtual/ video observed treatment (VOT) to supplement community administered physically provided DOT(please see references for V-DOT)\*\* | MOH ,NPTCCD  DTCOs/DCCc | In 3months’ time | Funds for monthly support either from GF support or from Public funds.  V-DOT protocols and SOPs |

**Table 17: Recommendations on community care for RR/MDRTB.**

**Adverse drug effect detection and management**

|  |  |  |  |
| --- | --- | --- | --- |
| **Recommendation** | **Responsible persons/agency** | **Timeline** | **Support required to fulfil the recommendation** |
| 4.1 Implement and strengthen practices of aDSM nationwide:   * Recording and reporting of serious adverse events(SAEs) as per guidelines. * Provide ECG machines, tuning fork, monofilament, Ishihara color test- Snellen charts at all PMDT sites including job aids at peripheral DOT sites for enhance knowledge of medicines adverse effects. This can be supported by GF given the country’s current budgetary constraints. * Develop capacity of all DTCOs on aDSM practices nationwide including assessment of visual acuity and peripheral neuropathy assessment and grading it appropriately | MOH ,NPTCCD  DTCOs, | As early as possible | Assessment of availability of ECGs at DCCs.  Procurement of ECGs, 128 hrtz Tuning forks, 10 gm monofilaments, , Ishihara color test-Snellen charts for all PMDT sites.  aDSM is already part of DR TB 2021 guidelines. |

**Table 18: Recommendations for RR/MDRTB adverse drug effect detection and management.**

**Monitoring and evaluation**

|  |  |  |  |
| --- | --- | --- | --- |
| **Recommendation** | **Responsible persons/agency** | **Timeline** | **Support required to fulfil the recommendation** |
| 5.1 Adopt the definitions of new and previously treated/retreatment as per guidelines and make the corrections in the recording and reporting system.  5.2 Non -confirmed RR/MDRTB should not be part of yearly cohorts and should be excluded.  5.3 Update the R&R tools per new guidelines (diagnostic tests, treatment regimens etc.)  5.4 Update and customize ePMIS per new regimens and optimize use of ePMIS for report generating. Use excel based ENRS/sheet for data collection from districts which will also support data analysis | NPTCCD  DTCOs | Review the 2021 cohort.  Update of R&R tools at the time of updating DR TB guidelines. |  |

**Table 19: Recommendation for RR/MDRTB Monitoring and Evaluation.**

## 3.8.Prevention of TB (Infection transmission prevention and programmatic management of TB preventive treatment )

**Context**

Prevention of TB disease includes addressing upstream social determinants of TB mostly related to poverty and its consequences, preventing transmission of TB and prevention of progression of TB infection to active TB. This section will focus on the latter two interventions: infection transmission prevention and TB preventive treatment (TPT).

**Infection Prevention and Control (IPC).**

A hierarchy of interventions is recommended for TB -IPC. These include administrative and environmental controls and use of personal protective equipment. These measures have been included in the national manual for TB control, 2021 update. Ideally TB -IPC measures should be an integral component of broader IPC at health facilities which are guided by national guidance documents.

**TB- IPC: Key achievements**

* Most visited health facilities indicated that they have an IPC focal person and an IPC plan .
* In one facility triaging of people presenting with cough was being practiced, with those presenting with cough separated from the other patients.
* New TB patients were observed to have been separated from those who have been on treatment for a while in the visited DCCs.
* A significant proportion of health care workers were observed to be wearing “surgical masks” in the visited health facilities.
* Guidelines on TB-IPC have been developed and disseminated.

**TB-IPC: gaps, constraints and weaknesses**

Overall, there was limited implementation of airborne infection transmission prevention and control with limited application of administrative and environmental controls in the visited facilities.

Most of the visited, high volume health facilities, except one, did not have a structured system for identifying people presenting with cough and separating them from other patients. The risk of transmission of airborne infections is thus high in these facilities.

Most health care workers had not recently been screened for TB nor provided with TB preventive treatment if eligible.

**TB-IPC: Recommendations**

* The next infectious disease pandemic, if there is going to be one, is likely to involve a pathogen that is transmitted through the airborne route and therefore the NPTCCD and national stakeholders are urged to ensure that application of simple airborne infection prevention measures become the culture or the norm in all health facilities.
* The NPTCCD and national stakeholders are advised to engage in a national dialogue to identify the key barriers to implementation of airborne infection transmission prevention measures and thereafter develop an action plan to promote the implementation of these measures across the health care system.

**Tuberculosis preventive treatment (TPT)**

**Key achievements**

* The TB-NSP has prioritized TPT and has set a target to successfully treat 11,600 people for (Latent) TB infection annually.
* An increasing proportion of eligible children under 5 who are contacts of people with bacteriologically confirmed TB are receiving TPT. This proportion had reached 83.2% by quarter 2 of 2023.

**Key gaps, constraints and challenges**

* + Short TPT regimens are generally not in use.
  + The programmatic management of TPT is based on TB screening and TB infection tests that in some visited facilities include tests of doubtful value such as the erythrocyte sedimentation rate (ESR) or are not recommended as mandatory tests before TPT initiation (the TST/ IGRA assay)   in some at risk populations including child contacts under the age of 5 and PLHIV.
  + Elderly males with co-morbid states, who have been noted to be at an increased risk of deaths when they get TB are not receiving TPT.
  + Outcomes of TPT, though recorded in LTBI registers are not routinely reported and monitored.
  + Health care workers, including those who may have additional risk factors for active TB are not routinely screened for TB or targeted to receive TPT.

**Tuberculosis preventive treatment (TPT): Recommendations**

A greater push for implementation of TPT at the programmatic level was made at the second TB -UNHLM. To enhance TPT implementation, it is recommended that the NPTCCD and national stakeholders undertake the following actions:

* Link active case finding targeting elderly males who have comorbidities including diabetes with provision of TPT.
* Initiate provision of shorter regimens such as 3HR, 1HP, and 3HP which are already included in the Sri Lanka TB Infection Guidance but are not yet being provided to people being treated for TBI.
* For populations at a high risk of progression of TBI to active TB, such household contacts below the age of 5 and PLHIV, provide TPT with or without TBI testing as recommended by WHO.
* Consider adopting use of antigen-based skin tests (recently recommended by WHO[[27]](#footnote-27)) for TB infection testing.
* Determine level of patient and or health care worker TPT hesitancy and address it appropriately.

## 3.9. Program Management.

**Context**

National TB control programs are essential for designing, delivering and monitoring interventions for TB care and prevention[[28]](#footnote-28). The Sri Lankan TB program is a standalone entity within the Ministry of Health under the Directorate of General Health Services (DGHS). Among its mandate is prevention, care and treatment of other chest diseases.

**Program Structure and Organization**

Figure 15, below, shows the organization structure of the National Program for TB Control and Chest Diseases (NPTCCD) at the central and regional levels.

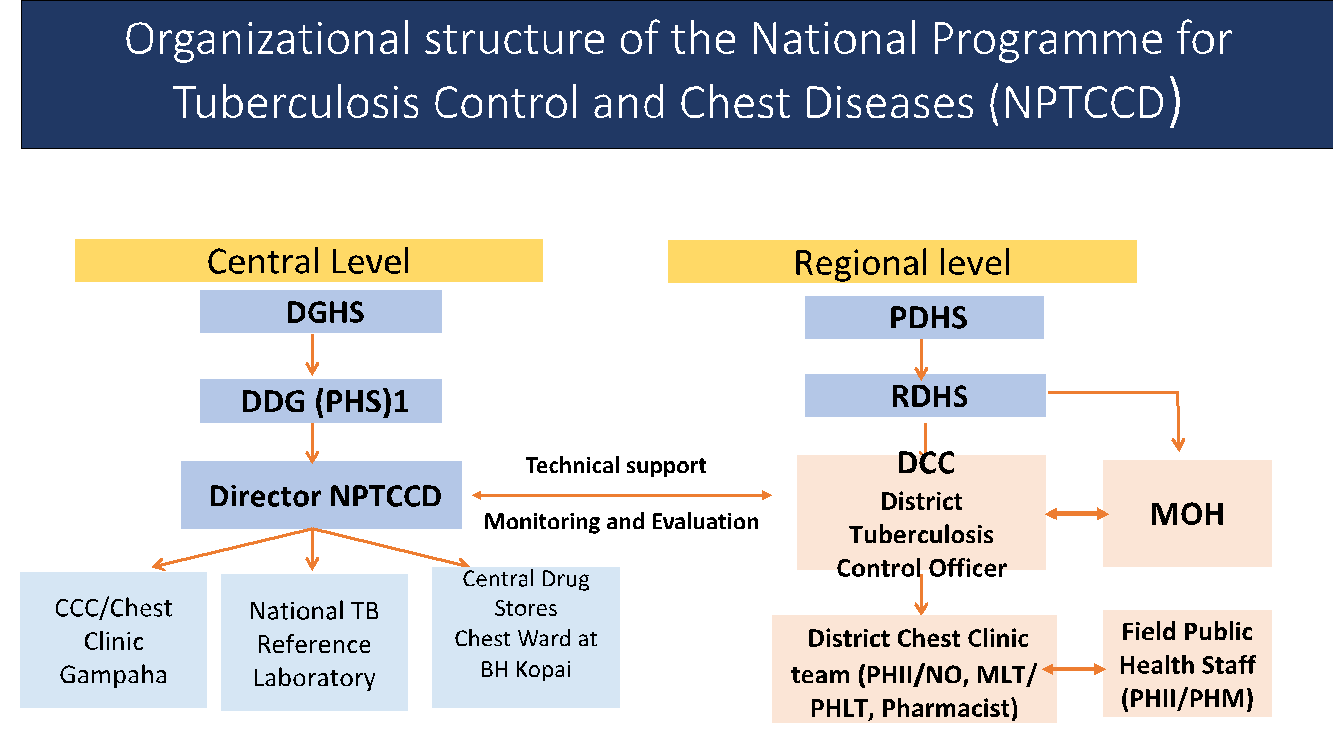


Figure 16: Organizational structure of the NPTCCD, Sri Lanka, 2023

The NPTCCD pursues standard program management cycles which including **Planning** to set goals and objectives, **Implement** and **Monitor** to track progress and **Review** to evaluate processes and results.

Objective 6 of the TB-NSP 2021-2025 is focused on programme management and includes interventions to ensure the program has adequate staff at all levels, and interventions for improving technical capacity of the staff working in various capacities within the program. As a component of objective 6, the TB-NSP aimed to establish a national TB commission to be chaired by the Minister for Health, a TB advisory committee and a TB technical support group. Other than for the national TB commission, all the other entities have been established. The national manual for TB control highlights roles and responsibilities for various entities within the MoH including roles and responsibilities of various cadres of health care workers such as the consultant respiratory physician, the district TB officers, the medical laboratory technologists and technicians, the DOT officers etc.

**Program management: Key strengths/achievements**

Highlighted below were the perceptions of the review team on the strengths of programme management:

* **Program coordination**: The MoH through the NPTCCD has established coordination platforms at the central level that includes multiple stakeholders within and outside the MoH. These stakeholders are involved in the development of policies, strategies, interventions and program guidelines.
* The **TB program structure** conforms with the internationally recommended norms.
* There are **TB focal points** at the district level (District TB control officers) in all the districts who have been given clear roles and responsibilities.
* Even through additional training will be required for some program staff, a large proportion of central level have the most relevant knowledge and skills.
* There are program guidelines and practice manuals in most technical areas of TB care and prevention.
* There is a **multi-year TB strategic plan from which annual operational plans** are developed.
* **Target setting**: Targets for TB case finding, and other TB outcomes have been set at the national level and in some of the visited districts.
* **Technical support/supervision**: Supervisory visits to each district occur at least once a year.

**Program management: Weaknesses and Gaps**

* At facility level (except at DCCs) there are no TB focal persons.
* There is a systemic requirement not to retain medical staff in one position for longer than 4 or so years, which implies staff are always moving which places a lot of pressure on the NPTCCD to continually train staff, however, existing training programs reach only a small proportion of those who need to be trained, especially in view of the frequent staff changes.
* Supervisory visits to districts by central level staff is on annual basis and may not be meeting the technical support needs of those districts.
* There is limited engagement of regional technical staff in TB supervisory activities.
* Participation of medical practitioners in residential training programs is unpopular for several reasons including the fact that it takes people away from their clinical practices, including part time private practice.
* There is limited integration of TB activities among other programmes, especially non-communicable diseases.

**Program Management: Recommendations:**

To enhance program quality and meet the TB-NSP program management objectives it is recommended that the NPTCCD undertake the following actions:

* Increase the frequency of supervision to priority districts and facilities, while ensuring that supervisory activities are standardized, recorded, and include a feedback mechanism.
* To promote ownership and accountability at the regional and district level, include regional and district technical staff in monitoring and supervisory activities.
* To enhance technical capacity of staff working in health facilities and those providing technical assistance to them, develop and implement a system for in-service and continuous on-site training, including using supervisory visits as platforms for providing on-site training. Training to enhance technical capacity at all levels (central and at the peripheral levels) may be undertaken within the country or outside the country as may be appropriate.
* To increase interest and participation of program and health facility staff in TB training programs, consider spearheading a national dialogue to aimed at linking training and certification to a performance evaluation scheme (MoH).
* Make deliberate efforts to enhance collaboration and integration of other health services with the TB programme.
* Continue and expand collaborations and partnership with other ministries whose work has a direct impact on the burden of TB in Sri Lanka such urban development, housing and agriculture and food security.

## 3.10. Program Financing

**Context**

According to the 2017/2018 Sri Lanka National Health Accounts[[29]](#footnote-29) published in 2022, in 2017 and 2018, Sri Lanka’s Current Health Expenditure (CHE) was Sri Lankan rupees (LKR) 479, 232 million and 559, 100 million respectively. This translates to 3.6% of the GDP at current prices in 2017 and 3.9% in 2018. Health expenditure for capital formation on the other hand was LKR 44, 308 in 2017 and LKR 40, 230 in 2018. The per capita CHE stood at LKR 22, 314 ($146) in 2017 and LKR 25, 778 ($163) in 2018. Of the total CHE curative services took 73.7% and 73.4% in 2017 and 2018 respectively. Increasingly more resources are going to non-communicable diseases which took up 29.8% of the health financial resources in 2017 and 31.3% in 2018 against 18.8% and 20.2% for infectious diseases in 2017 and 2018 respectively. In terms of sources of funds for CHE, households accounted for 51.5% in 2017 and 48.8% in 2018.

The TB -NSP 2021-2025 is budgeted at US $29. 81 million over its five-year period with case finding and treatment allocated 60.2% of total budget and program management allocated 31.4%. The expected sources of funds to implement the TB-NSP include the Government of Sri Lanka which is expected to provide of US$14.7 million or 49% of the total TB-NSP budget needs, the Global Fund which is expected to provide US$ 5.65 million (19% of total budget) and SAARC, WHO and the World Bank expected to provide smaller amounts of financial resources. The NPTCCD anticipates that over the period covered by the TB-NSP 2021-2025, there will be a financial gap of US$ 7.5 million or about 25% of total budget need.

**Program Financing: Achievements**

It is impressive that despite the ongoing economic crisis, the GoSL has not reduced the proportion of the government budget that is allocated to health. Health service provision remains free for all services including TB services.

**Program Financing: Gaps, constraints, and weaknesses**.

* Even though the GoSL is providing 97% of its health budget, for TB, Government financing does not fund programme operations including training and supervision and also was not able to fund first line drugs in 2022.
* The country has been supported by the World Bank to implement a Primary Health Care System Strengthening Project. This project is promoting the delivery of a package of care to address the most pressing public health threats and includes TB. The TB financing opportunities that this project presented were not fully utilized.
* There have been no exploration of other approaches for domestic resource mobilization, for example use of corporate social responsibility and mobilization of funds from local philanthropists/philanthropic organizations.
* Scenario planning to determine the scope and scale of implementation of TB-NSP 2021-2025 interventions and activities based on mobilized resources is not apparent in the NSP. It is therefore difficult to discern what outputs and outcomes are expected to be achieved within the constrained budget environment or with the mobilized financial resources.
* There are significant concerns that TB does not enjoy its due political commitment and may thus not attract the financing (domestic and external) it needs for efforts to end it as a persistent national public threat to be enhanced.

**Program Financing: Recommendations**

To narrow the financing gap and ensure that the public health threat that TB poses in Sri Lanka is ended, it is recommended that the Ministry of Health undertake the following actions:

* Instead of pushing for the formation of a national TB commission, **consider setting up a Presidential Task Force for priority poverty related diseases, to include TB, that would spearhead the push for ending these diseases, including mobilizing the resources, both financial and non-financial, needed and holding key government agencies and other entities accountable.**
* Strongly consider mobilizing funds for First Line Drugs for the year 2024/25.

The NPTCCD is urged to:

* Engage with the leadership of the MoH and the Primary Health Care System Strengthening Project to explore opportunities for mobilizing additional financial resources for TB.
* Carry out a landscape analysis to identify alternative approaches to domestic resource mobilization (DRM) from individuals, corporations, and organizations.
* Consider strengthening the CNAPT and strategically use it to mobilize financial resources for TB, especially from domestic sources.
* Prioritize the implementation of interventions that represent the best value for money / highest return on investment with the available resources.

## 3.11. Program based TB research.

**Context**

Objective 5 of the TB-NSP 2021 -2025 is to strengthen quality and quantity of operational studies on TB. Three main activities were included under this objective: establish a national TB research network; conduct an annual symposium on TB and other respiratory diseases and maintain a research inventory on TB and other respiratory diseases.

**Program based TB research: key achievements**.

* A TB research committee is in place and even though it was inactive during the COVID-19 pandemic period, it has recently been activated and is holding quarterly meetings.
* A research repository has been developed. By the time of the review, a list of 18 studies carried out between 2020 and 2023, ranging from those in development to those that have been completed have been included in the repository. Additionally, there is a TB research repository published online by the NPTCCD which includes TB research carried out between 1946 and 2019[[30]](#footnote-30).
* Review of program data led to the conduct of a mortality survey which revealed that elderly people with diabetes had the highest death rates. Other studies that have been carried out include analysis of nutritional status of people with TB, a patient cost surveys whose results are being analyzed, and an inventory study to determine the level of underreporting. The NPTCCD is also involved in multi country studies such as the CRITC in SEARO study whose protocol is currently undergoing ethical review.

**Program based TB research: gaps, weaknesses, and constraints.**

* There seems to be inadequate use of data to stimulate operations/implementation research. For example, there were no obvious plans to study the drivers of the variations in the district wise distribution of TB, including RR/MDRTB across the country or implementation research to identify solutions that work for enhancing identification and notification of childhood TB.
* There were also no obvious plans for enhancing research capacity especially among program staff.

**Program based TB research: recommendations.**

* Use data to identify operations and or implementation research.
* Enhance capacity for research through training programs both short term(e.g. . Structured Operations Research and Training IniaTive (SORTIT))
* Of critical importance carry out implementation research designed to overcome programmatic challenges such as the under diagnosis and under notification of children with TB, optimal ways to screen and test people for TB etc.

# 4. Annexes

## Annex 1. GeneXpert Sites and Number of Functional Modules at each site.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Centre** | Number of machines | Model | Number of Functioning Modules | **Number of rounds per day** |
| CC Anuradhapura | 1 | GXIV - 4 - D | 2 | 3 |
| PGH Badulla | 1 | GXIV - 4 - D | 2 | 3 |
| TH Batticaloa | 1 | GXIV - 4 - D | 3 | 2 |
| TH Karapitiya | 1 | GXIV - 4 - D | 1 | 3 |
| CC Kandy | 1 | GXIV - 4 - D | 4 | 3 |
| GH Kurunegala | 1 | GXIV - 4 - D | 3 | 3 |
| NHSL | 1 | GXIV - 4 - D | 2 | 3 |
| NTRL | 1 | GXIV - 4 - D | 3 | 4 |
|  | 1 | GXXVI - 16 -D | 13 | 4 |
|  | 1 | GXIV - 4 - L  10C machine | 4 | On demand |
| PGH Rathnapura | 1 | GXIV - 4 - D | 3 | 3 |
| GH Kegalle | 1 | GXIV - 4 - D | 4 | 3 |
| NIHS | 1 | GXIV - 4 - D | 2 | 3 |
| TH Jaffna | 1 | GXIV - 4 - D | 3 | 2 |
| LRH | 1 | GXIV - 4 - D | 4 | 2 |
| FOM Colombo | 1 | GXIV - 4 - D | 4 | 8 |
| CC Polonnaruwa | 1 | GXIV - 4 - D | 4 | 3 |
| GH Nuwaraeliya | 1 | GXIV - 4 - D | NA | NA |
| GH Hambantota | 1 | GXIV - 4 - D | 4 | 3 |
| AMH | 1 | GXIV - 4 - D | 4 | 2 |
| CC Colombo | 2 | GXIV - 4 - D | 6 | 3 |
| GH Vavuniya | 1 | GXIV - 4 - D | NA | NA |
| GH Ampara | 1 | GXIV - 4 - D | 3 | 3 |
| Puttam CC | 1 | GXIV - 4 - D | 3 | 3 |
| GH Trincomalee | 1 | GXIV - 4 - D | 4 | 3 |
| GH Mannar | 1 | GXIV - 4 - D | 4 | 0 |
| GH Matale | 1 | GXIV - 4 - D | 0 | 0 |
| GH Matara | 1 | GXIV - 4 - D | 4 | 1 |
| GH Monaragala | 1 | GXIV - 4 - D | 2 | 3 |
| CSTH | 1 | GXIV - 4 - D | 4 | 3 |
| Prison Hospital | 1 | GXIV - 4 - D | 3 | 1 |

Annex 2: Detailed Laboratory Operational Plan as Outlined in NSP.

|  |  |  |  |
| --- | --- | --- | --- |
| **Indicator** | **Achieved** | **Partially**  **Achieved** | **Not**  **Achieved** |
| 1.1.1.1.a Construction of cough booths in selected hospitals and  chest clinics after needs assessment |  | X |  |
| 1.1.1.2.a Construction of Microscopy centres after needs  assessment |  | X |  |
| 1.1.1.2.b Purchase of microscopes | X |  |  |
| 1.1.1.3.a Purchasing vaccine carriers/cold boxes |  | X |  |
| 1.1.1.3.b Purchasing of Mini fridges for collection centres |  | X |  |
| 1.1.1.3.c Courier charges for transportation out of district-Local |  | X |  |
| 1.1.1.3.e Purchasing of reagents and consumables for microscopy | X |  |  |
| 1.1.1.3.f Purchase of sputum Cups | X |  |  |
| 1.1.1.4.a Adequate supply of (normal and ultra) GeneXpert  cartridges | X |  |  |
| 1.1.1.4.b annual Maintenance repair and calibration fee for  GeneXpert machines |  |  | X |
| 1.1.1.4.c Purchasing of GeneXpert machines (one GeneXpert  machine to district chest clinic with high case burden and to  replace old machines). |  |  | X |
| 1.1.1.4.d Replacing of modules of GeneXpert machines |  |  | X |
| 1.1.1.4.e Renewal of service contracts for GeneXpert machines on time |  |  | X |
| 1.1.1.4.f Purchasing of safety cabinets |  | X |  |
| 1.1.1.4.g Utilization of GeneXpert as the first line diagnostic test for all presumptive TB patients - pilot study in Gampaha |  |  | X |
| 1.1.1.6.a Maintenance and timely & complete update of  laboratory registers in all laboratories where TB diagnosis is made |  | X |  |
| 1.1.2.1.a Expansion of NTRL with molecular section,  MOTT identification section, EQA section, record room,  Training Unit and storage facilities |  |  | X |
| 1.1.2.1.b Courier charges for transportation of samples SNRL –  (International) |  |  | X |
| 1.1.2.1.c Provision of critical equipment - generator, cold  centrifuge |  |  | X |
| 1.1.2.1.d Construction and equipment provision for ITL with BSL3 facilities (To perform DST) - Anuradhapura |  |  | X |
| 1.1.2.1.e Construction of a new ITL in Batticaloa or Ampara |  |  | X |
| 1.1.2.1.f Supply of equipment to newly constructed ITLs |  |  | X |
| 1.1.2.1.g Purchasing of 2 MGIT -320 machines to ITLs |  |  | X |
| 1.1.2.1.h Establishment of whole genome sequencing/  SANGA sequencing facility at NTRL |  |  | X |
| 1.1.2.2.a Purchase of Solid culture consumables and DST |  | X |  |
| 1.1.2.2.b MGIT culture consumables and DST |  | X |  |
| 1.1.2.2.c Procurement of an additional LPA machine to the NTRL |  |  | X |
| 1.1.2.2.d Supply of laboratory consumables for LPA/ GeneXpert |  | X |  |
| 1.5.2.4.a Purchase of LAM test facilities to NTRL |  |  | X |
| 1.6.3.1.a Identification and screening of all child contacts  below 15 years old (irrespective of the sputum status and the  type of TB, using X-ray and GeneXpert). |  | X |  |
| 3.1.1.6.a Establishment of a referral pathway to order X-ray/  sputum/ GeneXpert free of charge for private sector patients |  | X |  |
| 3.1.1.6.c Distribution of sputum cups to private care providers |  |  | X |
| 4.1.2.1.a Development of comprehensive LIMS for NTRL and lab  network, and private sector and training |  |  | X |
| 4.1.2.1.b Development and integration of LIMS with ePIMS |  |  | X |
| 4.3.2.1.a Designing and development of a website for NTRL |  |  | X |
| 4.3.2.1.b NTRL website hosting and maintenance |  |  | X |
| 4.3.3.1.a Printing of Lab Register, Presumptive TB Register,  patient files, Contact Register and Interrupters Register |  | X |  |
| 4.4.1.1.a Timely submission of accurate & complete Case  Finding Report (TB-08), Sputum Conversion Report (TB-09),  Treatment Outcome Report (TB 10) and Programme Management (TB 12) by DTCOs and CDS | X |  |  |
| 4.4.1.2.a Timely submission of accurate & complete report by  NTRL (TB 15) |  | X |  |
| 4.5.3.4.a Supervision of 26 District labs by NTRL |  | X |  |
| 4.5.3.5.a Preparation of SOPs & check list for supervision of  microscopy centres. |  | X |  |
| 6.8.2.11.a Refresher training for MLT/GeneXpert site staff |  | X |  |
| 6.8.2.12.a Refresher training for PHLTs |  | X |  |
| 6.8.2.14.a Refresher training for MOs at DCCs |  | X |  |
| 6.8.2.15.a In-service training for NTRL lab MOs |  | X |  |
| 6.8.2.16.a In-service training for Lab orderly/ assistants in ITLs  by NTRL |  | X |  |
| 6.8.4.2.a Preparation of Training Modules for lab staff |  | X |  |
| 6.8.2.14.a Refresher training for MOs at DCCs |  | X |  |

## Annex 3 Total Number of Smear Microscopy Performed from 2018-2022

## Annex 4: List of review participants

|  |  |
| --- | --- |
| **International Experts** | |
| Dr. Chakaya J. Muhwa | WHO Consultant (Team Lead) |
| Dr. Asif Muhammad | PMDT – Consultant(WHO Consultant) |
| Dr. Sushil Pandey | WHO consultant - Lab |
| Ms. Soleil Labelle | WHO |
| Dr. Vladimir Mikic | M & E Consultant |
| Dr. Kamar Rezwan | WHO Regional Office for South east Asia |
| **National WHO Consultants** | |
| Dr. Chintha Samanmalie Dalpathadu | Consultant Respiratory Physician |
| Dr. Nilanthi Senanayake | Consultant Microbiologist |
| Dr. Priyadarshani Samarasinghe | Consultant Community Physician |
| **NPTCCD and District TB Technical Experts** | |
| Dr. Nirupa Pallewatte | Director/ NPTCCD |
| Dr. Amitha Feranando | Consultant Respiratory Physician |
| Dr. Ravini Karunaratilleke | Consultant Respiratory Physician |
| Dr. R.A. Samaranayake | Consultant Respiratory Physician |
| Dr. Preshila Samaraweera | Consultant Community Physician/ WHO |
| Dr. Mizaya Cader | Consultant Community Physician |
| Dr. Onali Rajapakshe | Consultant Community Physician |
| Dr. Hemali Jayasekara | Consultant Community Physician |
| Dr. W.D. Galagedara | Consultant Microbiologist/ NTRL |
| Dr. Kaushalya Rajapakshe | DTCO Gampaha/PMDT Coordinator |
| Dr. R.M.M.S. Bandara | DTCO Colombo |
| Dr. Dilini De Silva | MO/NPTCCD |
| Dr. Ruwanthika Kariyakarawana | MO/NPTCCD |
| Dr. Chamila Abeywickrama | MO/NPTCCD |
| Dr. A. Shiyam | Registrar/NPTCCD |
| Dr. Sujeewa Theannilawu | MO/NPTCCD |
| Dr. Ama Perera | MO/NPTCCD |
| **WHO Country Office, Sri Lanka, Technical Experts** | |
| Dr. Shalala Ahmadova | Public Health Administrator, WHO Country Office, Sri Lanka |
| Dr. Thiraj Haputhanthri | National Consultant, WHO Country office, Sri Lanka |
| Dr. Preshila Samaraweera | National Professional Officer, WHO Country Office, Sri Lanka |

**Overall Program Review coordinators**

* Dr. Mizaya Cader, Consultant Community Physician, Planning and M&E unit, NPTCCD
* Dr. Dilini de Silva, Medical Officer, Planning Unit, NPTCCD

## Annex 5: List of places, facilities and persons met.

**Mid Term Review 2023**

**Briefing – 04 / 09/ 2023**

|  |  |
| --- | --- |
| Dr. Chakaya J. Muhwa | WHO Consultant (Team Lead) |
| Dr. Asif Muhammad | PMDT – Consultant(WHO Consultant) |
| Dr. Sushil Pandey | WHO consultant - Lab |
| Ms. Soleil Labelle | WHO |
| Dr. Vladimir Mikic | M & E Consultant |
| Dr. Chintha Samanmalie Dalpathadu | Consultant Respiratory Physician |
| Dr. Nilanthi Senanayake | Consultant Microbiologist |
| Dr. Priyadarshani Samarasinghe | Consultant Community Physician |
| Dr. Nirupa Pallewatte | Director/ NPTCCD |
| Dr. Amitha Feranando | Consultant Respiratory Physician |
| Dr. Ravini Karunaratilleke | Consultant Respiratory Physician |
| Dr. R.A. Samaranayake | Consultant Respiratory Physician |
| Dr. Preshila Samaraweera | Consultant Community Physician/ WHO |
| Dr. Mizaya Cader | Consultant Community Physician |
| Dr. Onali Rajapakshe | Consultant Community Physician |
| Dr. Hemali Jayasekara | Consultant Community Physician |
| Dr. W.D. Galagedara | Consultant Microbiologist/ NTRL |
| Dr. Thiraj Haputhanthri | WHO Country office/SL |
| Dr. Kaushalya Rajapakshe | DTCO Gampaha/PMDT Coordinator |
| Dr. R.M.M.S. Bandara | DTCO Colombo |
| Dr. Dilini De Silva | MO/NPTCCD |
| Dr. Ruwanthika Kariyakarawana | MO/NPTCCD |
| Dr. Chamila Abeywickrama | MO/NPTCCD |
| Dr. A. Shiyam | Registrar/NPTCCD |
| Dr. Sujeewa Theannilawu | MO/NPTCCD |
| Dr. Ama Perera | MO/NPTCCD |

**Gampaha Visit- NHRD / NTRL /Chest Clinic / Hemas Hospital – Wattala 05/09/2023**

|  |  |
| --- | --- |
| Dr. Chakaya J. Muhwa | WHO Consultant (Team Lead) |
| Dr. Asif Muhammad | PMDT – Consultant(WHO Consultant) |
| Dr. Sushil Pandey | WHO consultant- Lab |
| Ms. Soleil Labelle | WHO |
| Dr. Vladimir Mikic | M & E Consultant |
| Dr. Priyadarshani Samarasinghe | Consultant Community Physician |
| Dr. Chintha Samanmalie Dalpathadu | Consultant Respiratory Physician |
| Dr. Nilanthi Senanayake | Consultant Microbiologist |
| Dr. K.K.M. Prasanthi | Deputy Director NHRD |
| Dr. Mizaya Cader | Consultant Community Physician/ NPTCCD |
| Dr. Onali Rajapakshe | Consultant Community Physician/ NPTCCD |
| Dr. Hemali Jayasekara | Consultant Community Physician/ NPTCCD |
| Dr. W.D. Galagedara | Consultant Microbiologist – NTRL |
| Dr. Eshanth Perera | Consultant Respiratory Physician- NHRD |
| Dr. W.N.S. Kularathne | Consultant Respiratory Physician- NHRD |
| Dr. W.G. Gunasinghe | Consultant Respiratory Physician- NHRD |
| Dr. Chintha Karunasekara | Consultant Microbiologist- NHRD |
| Dr. W.M.C.R. Wijekoon | Registrar/ Medical Admin. |
| Dr. K. Rajapaksha | DTCO Gampaha / PMDT Coordinater |
| Dr. R.R. Kariyakarawana | MO NPTCCD |
| Dr. Ahmed Shiyam | Registrar/ NPTCCD |
| Dr. Ama Perera | MO NPTCCD |
| Dr. Kasumi Pathirana | MO NTRL |
| Dr. Rasika Perera | MO NTRL |
| Dr. A. Fernando | MO NTRL |
| Dr. A.H.M. Nizri | MO NTRL |
| Dr. D.L.G. Perera | MO Planning /NHRD |
| Mr. W.B.S.S. Fernando | PHI |
| Mrs. J.S.Hettige (SMLT | Senior MLT |
| Mr. G.R.Udaya Kumara | MLT/ NTRL |
| Mr.I.D.K.A.Nawarathna | MLT/ NTRL |
| Mrs.M.K.R.I. Wickramarathna | MLT/ NTRL |
| Mrs.M.C.D.De Silva | MLT/ NTRL |
| Mrs.R.H.Vitharana | MLT/ NTRL |
| Mrs.D.P.R.A.A.Ilangarathna | MLT/ NTRL |
| Mrs.J.M.N.N.Jayarathna | MLT/ NTRL |
| Mrs.D.E.N.Udugamasooriya | MLT/ NTRL |
| Mrs.I.A.K.T.Wimalathissa | MLT/ NTRL |
| Mrs.A.P.L.D.C.K.Liyanage | MLT/ NTRL |
| Ms.M.M.P.Apsara | MLT/ NTRL |
| Mrs.L.N.K.Dilrukshika | PHLT/NTRL |
| Mrs.K.D.B.Perera | PHLT/NTRL |
| Mrs.S.M.S.K.Kumari | PHLT/NTRL |
| Mr.E.P.D.I.Prasad | PHLT/NTRL |
| Mr.B.M.A.K.Basnayake | PHLT/NTRL |
| **Hemas Hospital Wattala** | |
| Dr. Pranitha Somarathne | Consultant Microbiologist- Hemas Hospital Wattala |
| Dr. Tharindu de Mel | Manager-Medical Services- Hemas Hospital Wattala |
| Mrs. Sithumini Pushpanjali | Chief Nursing officer- Hemas Hospital Wattala |
| Mr. P.A.T. Hashan Kularathne | Infection control Nurse- Hemas Hospital Wattala |
| Ms. Nelum Sandamali | Quality officer- Hemas Hospital Wattala |
| Ms. Sivasothy Shamini | MLT- Hemas Hospital Wattala |

**Gampaha Visit- Negombo DGH / MOH Minuwangoda/ PMCU Minuwangoda on 06/09/2023**

|  |  |
| --- | --- |
| Dr. Chakaya J. Muhwa | WHO Consultant (Team Lead) |
| Dr. Sushil Pandey | WHO consultant Lab |
| Dr. Asif Muhammad | PMDT – Consultant(WHO Consultant) |
| Ms. Soleil Labelle | WHO |
| Dr. Vladimir Mikic | M & E Consultant |
| Dr. Priyadarshani Samarasinghe | Consultant Community Physician |
| Dr. Chintha Samanmalie Dalpathadu | Consultant Respiratory Physician |
| Dr. Nilanthi Senanayake | Consultant Microbiologist |
| Dr. Bodhika Samarasekara | Consultant Respiratory Physician/Negombo DGH |
| Dr. Mizaya Cader | Consultant Community Physician |
| Dr. Onali Rajapakshe | Consultant Community Physician |
| Dr. Hemali Jayasekara | Consultant Community Physician |
| Dr. P.C. Samaraweera | Consultant Community Physician /NPO-WHO |
| Dr. Akhila Gammalth | MO /DGH Negombo |
| Dr. R.R. Kariyakarawana | MO / NPTCCD |
| Ms. Dilini Wijesundara | PHLT |
| Dr. B.M.D Samarasekara | Medical Officer of Health(MOH)- Minuwangoda |
| Mr.J.T.C. Jayalath | A/SPHI – MOH/Minuwangoda |
| Mr. A.A.R.P. Amarasinghe | MOH Meerigama |
| Mr. A.D.R. Kumara Lal | PHI - MOH Office – Minuwangoda |
| Mr. K. Upul Shanthe | P.H.I- C.C.G |
| Mr. Saman Dissanayake | PHI – Chest Clinic – Gampaha |
| L.N.W. Wijesekare | Development officer |

**Colombo visit 07/09/2023 - Participants – Colombo Chest Clinic**

|  |  |
| --- | --- |
| Dr. Chakaya J. Muhwa | WHO Consultant (Team Lead) |
| Dr. Asif Muhammad | PMDT – Consultant(WHO Consultant) |
| Dr. Sushil Pandey | WHO consultant - Lab |
| Dr. Vladimir Mikic | M & E Consultant |
| Ms. Soleil Labelle | WHO |
| Dr. Chintha Samanmalie Dalpathadu | Consultant Respiratory Physician |
| Dr. Nilanthi Senanayake | Consultant Microbiologist |
| Dr. Priyadarshani Samarasinghe | Consultant Community Physician |
| Dr. T.G. Samarasekara | Consultant Nutritionist |
| Dr. Mizaya Cader | Consultant Community Physician |
| Dr. Hemali Jayasekara | Consultant Community Physician |
| Dr. M.R.K. Perera | SR/Respiratory medicine |
| Dr. R.M.M.S. Bandara | DTCO Colombo |
| Dr. Dilini de Silva | MO NPTCCD |
| Dr. Wasantha Wickramathilake | Add. DTCO Colombo |
| Dr. Anjali Senevirathne | MO-CCC |
| Dr. F.M. Jamaldeen | MO- CCC |
| Mrs. B.K.R. Hemali | N/O |
| Mrs. Manel Wijesundara | N/O |
| T. Sumithra | Radiographer |
| Y.U.A.S. Chathurantha | Physiotherapist |
| K.S. Ranasinghe | PHI -CCC |
| J.K. Guruge | PHLT |
| M.A.G.S. Madhuwanthi | MLT |
| Sanath Athauda | Dispensing officer |

**Meeting at the LRH (07/09/2023)**

|  |  |
| --- | --- |
| Dr. S. Senapathi | Deputy Director/ LRH |
| Dr. Channa De Silva | Consultant Paediatric Pulmonologist |
| Dr. L.D.S. Perera | Consultant Paediatrician |
| Dr. Dhammika Vidanagama | Consultant Microbiologist |
| Dr. Chakaya J. Muhwa | WHO Consultant (Team Lead) |
| Dr. Sushil Pandey | WHO consultant Lab |
| Soleil Labelle | WHO |
| Dr. Vladimir Mikic | M & E Consultant |
| Dr. Chintha Samanmalie Dalpathadu | Consultant Respiratory Physician |
| Dr. Nilanthi Senanayake | Consultant Microbiologist |
| Dr. Priyadarshani Samarasinghe | Consultant Community Physician |
| Dr. Mizaya Cader | Consultant Community Physician |
| Dr. Hemali Jayasekara | Consultant Community Physician |
| Dr. Savithri Dharmarathne | MO Planning LRH |
| Dr. Rathnayake | Registrar/LRH |
| Dr. R.M.M.S. Bandara | DTCO Colombo |
| Dr. Dilini De Silva | MO- NPTCCD |

**Meeting at NHSL (07/09/2023)**

|  |  |
| --- | --- |
| Dr. Chakaya J. Muhwa | WHO Consultant (Team Lead) |
| Dr. Sushil Pandey | WHO consultant/ Lab |
| Soleil Labelle | WHO |
| Dr. Vladimir Mikic | M & E Consultant |
| Dr. Priyadarshani Samarasinghe | Consultant Community Physician- |
| Dr. Nilanthi Senanayake | Consultant Microbiologist |
| Dr. Chintha Samanmalie Dalpathadu | Consultant Respiratory Physician |
| Dr. W.K. Wickremasinghe | DDG- NHSL |
| Dr. Nirupa Pallewatte | Director- NPTCCD |
| Dr. Pradeep Ratnayake | Deputy Director(OPD)- Cardiology NHSL |
| Dr. Asha Samaranayake | Consultant Respiratory Physician /NHSL |
| Dr. Upul Dissanayake | Consultant Physican /NHSL |
| Dr. Geethika Patabendige | Consultant Microbiologist/NHSL |
| Dr. Harsha Sathischandra | Consultant Physician/ NHSL |
| Dr. Mizaya Cader | Consultant Community Physician |
| Dr. Hemali Jayasekara | Consultant Community Physician |
| Dr. Rasanjani Premathilake | MOIC NHSL |
| Dr. Rasanjani Premathilake | MOIC NHSL |
| Dr. Dilini De Silva | MO- NPTCCD |
| Dr. Ama Perera | MO- NPTCCD |
| Dr. R.M.M.S. Bandara | DTCO Colombo |

**Visit to NHSL Microbiology Lab and Microscopy Center at Faculty of Medicine Colombo on 07/09/2023**

|  |  |
| --- | --- |
| Dr. Chakaya J. Muhwa | WHO Consultant (Team Lead) |
| Dr. Sushil Pandey | WHO consultant/ Lab |
| Soleil Labelle | WHO |
| Dr. Vladimir Mikic | M & E Consultant |
| Dr. Nilanthi Senanayake | Consultant Microbiologist/ FOM-Colombo |
| Dr. Priyadarshani Samarasinghe | Consultant Community Physician- |
| Dr. Chintha Samanmalie Dalpathadu | Consultant Respiratory Physician |
| Dr. Mizaya Cader | Consultant Community Physician |
| Dr. Hemali Jayasekara | Consultant Community Physician |
| Dr. R.M.M.S. Bandara | DTCO Colombo |
| Dr. Dilini de Silva | MO/NPTCCD |
| Ms. Renuka Jayalatharachchi | Chief MLT / MC – FOM Colombo |
| Ms. Gihani Perera | Technical Officer / MC – FOM Colombo |
| Mr. U.C.T. Ranasinghe | Senior MLT - NHSL |
| Ms. R.D.M.C. Wijesinghe | MLT - NHSL |
| Mr. Shalinda Mallawaarachchi | Lab-Attendant / MC – FOM Colombo |

**Meeting at the Ministry** **(07/09/2023)**

|  |  |
| --- | --- |
| Dr. Asela Gunawardena | Director General of Health Services/ Ministry of Health |
| Dr. S. M. Arnold | Deputy Director General(Public Health services)1 |
| Dr. Nirupa Pallewatta | Director / NPTCCD |
| Dr. Chakaya J. Muhwa | WHO Consultant (Team Lead) |
| Dr. Asif Muhammad | PMDT – Consultant(WHO Consultant) |
| Dr. Sushil Pandey | WHO consultant - Lab |
| Ms. Soleil Labelle | WHO |
| Dr. Vladimir Mikic | M & E Consultant |
| Dr. Chintha Samanmalie Dalpathadu | Consultant Respiratory Physician |
| Dr. Nilanthi Senanayake | Consultant Microbiologist |
| Dr. Priyadarshani Samarasinghe | Consultant Community Physician |
| Dr. Shalala Ahmadova | Public Health Administrator/ WHO |
| Dr. Onali Rajapakshe | Consultant Community Physician/ NPTCCD |
| Dr. Hemali Jayasekara | Consultant Community Physician/ NPTCCD |
| Dr. W.D. Galagedara | Consultant Microbiologist/ NTRL |
| Dr. Preshila Samaraweera | Consultant Community Physician/NPO/WHO |
| Dr. Thiraj Haputhanthri | WHO |
| Dr. Dilini De Silva | MO/NPTCCD |

**Meeting with the PMDT Coordinator/ Visit to MDR –TB ward at NHRD on 07/09/2023**

|  |  |
| --- | --- |
| Dr. Asif Muhammad | PMDT – Consultant(WHO Consultant) |
| Dr. Onali Rajapakshe | Consultant Community Physician/ NPTCCD |
| Dr. Kaushalya Rajapakshe | DTCO Gampaha/PMDT Coordinator |
| Dr. Ruwanthika Kariyakarawana | MO NPTCCD |
| Mr. Mahesh Gammune | Central Drug stores |
| Mr. Lakruwan Jayathilake | Central Drug stores |
| MOO – MDR TB ward NHRD  NOs – MDR TB ward NHRD | |

**Meeting with the Planning Unit -Ministry of Health / NMRA / MSD officials and PSSP Director 11/09/2023**

|  |  |
| --- | --- |
| Dr. Chakaya J. Muhwa | WHO Consultant (Team Lead) |
| Dr. Asif Muhammad | PMDT – Consultant(WHO Consultant) |
| Dr. Sushil Pandey | WHO consultant - Lab |
| Soleil Labelle | WHO |
| Dr. Vladimir Mikic | M & E Consultant |
| Dr. M.D.K. Rezwan | MO-TB/ WHO |
| Dr. Chintha Samanmalie Dalpathadu | Consultant Respiratory Physician |
| Dr. Nilanthi Senanayake | Consultant Microbiologist |
| Dr. Priyadarshani Samarasinghe | Consultant Community Physician |
| Dr. S. Sridharan | Deputy Director General- Planning |
| Dr. Nirupa Pallewatta | Director / NPTCCD |
| Dr. Vindya Kumarapeli | Director/ Policy Analysis and Development |
| Dr. Thilina Wanigasekara | Director/ Organization and Development |
| Dr. Upuli Wijemanne | Director / Planning |
| Dr. H.M.K. Wickramanayake | Director MSD |
| Dr. Vijith Gunasekara | CEO / NMRA |
| Dr. Jayasundara Bandara | Director/ PSSP |
| Dr. Mizaya Cader | Consultant Community Physician/ NPTCCD |
| Dr. Onali Rajapakshe | Consultant Community Physician/ NPTCCD |
| Dr. Hemali Jayasekara | Consultant Community Physician/ NPTCCD |
| Dr. Chithira Seneviratne | MO Planning Ministry of Health |
| Dr. Dilini De Silva | MO NPTCCD |
| Dr. Thiraj Haputhanthri | WHO |

**Galle Visit - Meeting attendees of stakeholder meeting at TH- Karapitiya and Thassim chest clinic 08/09/2023**

|  |  |
| --- | --- |
| Dr. S.D.U.M. Ranga | Director –TH Karapitiya |
| Dr Harshani Obeysekara | Deputy Director- TH Karapitiya |
| Dr. Nirupa Pallewatte | Director NPTCCD |
| Dr. Chakaya J. Muhwa | WHO Consultant (Team Lead) |
| Dr. Sushil Pandey | WHO consultant Lab |
| Soleil Labelle | WHO |
| Dr. Chintha Samanmalie Dalpathadu | Consultant Respiratory Physician |
| Dr. Nilanthi Senanayake | Consultant Microbiologist |
| Dr. Priyadarshani Samarasinghe | Consultant Community Physician |
| Dr. Mizaya Cader | Consultant Community Physician |
| Dr K.M .Somarathna | RDHS – Galle |
| Dr Hasitha Gajaweera | Consultant Paediatric PulmonologistTHKarapitiya |
| Dr Krishantha Jayasekara | Consultant Physician - TH Karapitiya |
| Dr R. P. Jayasinghe | Consultant Physician - TH Karapitiya |
| Dr Bhagya Piyasiri | Consultant Microbiologist - TH Karapitiya |
| Dr. Hemali De Silva | Consultant Paediatrician |
| Dr. Ahmed Shiyam | Registrar/ NPTCCD |
| Dr. M.C Mudannayake | DTCO Galle |
| Dr. Nalin | MO Planning/RDHS Galle |
| Dr. Geethika Sanjeewani | MO- Respiratory - TH Karapitiya |
| Dr. Geethanjali Gunarathne | MOIC OPD |

|  |
| --- |
| Dr. B.G.M.L.N. Abeykoon – MO/Thassim Chest Clinic (TCC) |
| DR. S.G. Wanigaratne - MO/TCC |
| Dr. M. Vithanage – MO /TCC |
| K.M.T. Wijayabandara - Nursing Officer / TCC |
| R.D.A.Dhanapala – Nursing Officer / TCC |
| G.J.L. Upulika – Nursing Officer / TCC |
| Dr. J.M. Wimalasundere – MO/ TCC |
| B.K.D. Randima – P.H.L.T. / TCC |

**PMDT Workshop – 08/09/2023**

|  |  |
| --- | --- |
| Dr. Asif Muhammad | PMDT – Consultant(WHO Consultant) |
| Dr. Onali Rajapakshe | Consultant Community Physician/ NPTCCD |
| Dr. W.D. Galagedara | Consultant Microbiologist/NTRL |
| Dr. Wathsala Gunasinghe | Consultant Respiratory Physician- NHRD |
| Dr. Kaushalya Rajapakshe | PMDT Coordinator/DTCO Gampaha |
| Dr. Ruwanthika Kariyakarawana | MO/NPTCCD |
| Dr. A.H.M. Nizri | MO NTRL |
| Dr. Kasumi Pathirana | MO NTRL |
| Dr. Rasika Perera | MO NTRL |
| Dr. A. Fernando | MO NTRL |
| DTCOs from District chest clinics |  |
| Senior Registrars/ NHRD |  |
| Medical officers in Chest clinic & MDR TB ward- NHRD |  |

**Kandy Visit - National Hospital –Kandy and DCC Kandy (13/09/2023)**

|  |  |
| --- | --- |
| Dr. Chakaya J. Muhwa | WHO Consultant (Team Lead) |
| Dr. Sushil Pandey | WHO consultant Lab |
| Dr. Asif Muhammad | PMDT – Consultant(WHO Consultant) |
| Soleil Labelle | WHO |
| Dr. Vladimir Mikic | M & E Consultant |
| Dr. M.D.K. Rizwan | WHO |
| Dr. Chintha Samanmalie Dalpathadu | Consultant Respiratory Physician |
| Dr. Nilanthi Senanayake | Consultant Microbiologist |
| Dr. Priyadarshani Samarasinghe | Consultant Community Physician |
| Dr. A. A. C. Jayantha | Deputy Director- NH Kandy |
| Dr. A. D. Siribaddana | Consultant Respiratory Physician – NH Kandy |
| Dr. Chathura weerasinghe | Consultant Respiratory Physician – NH Kandy |
| Dr. Onali Rajapakshe | Consultant Community Physician/ NPTCCD |
| Dr. Hemali Jayasekara | Consultant Community Physician/ NPTCCD |
| Dr. Kavinda Amarasinghe | DTCO- DCC Kandy |
| Dr. D. M. D. P. Dissanayaka | Add. DTCO/DCC Kandy |
| Dr. Chamila Abeywickrama | MO NPTCCD |
| Dr. Sujeeva Theannilawu | MO NPTCCD |
| Dr. Thiraj Haputhanthri | WHO |
| Dr. H. Jayasekara | MO OPD- TH Kandy |
| Ms. Bhagya Maduwanthi | DO – DCC KANDY |
| Ms. W. J. R. Kumudini | DO – DCC Kandy |
| Mr. A. M. Abeyrathna | Treasurer CNAPT |

**Special Stakeholders Meeting /11th September – 2023**

|  |  |
| --- | --- |
| Dr. Chakaya J. Muhwa | WHO Consultant (Team Lead) |
| Dr. Asif Muhammad | PMDT – Consultant(WHO Consultant) |
| Dr. Sushil Pandey | WHO consultant -Lab |
| Soleil Labelle | WHO |
| Dr. Vladimir Mikic | M & E Consultant |
| Dr. M.D.K. Rizwan | WHO |
| Dr. Chintha Samanmalie Dalpathadu | Consultant Respiratory Physician |
| Dr. Nilanthi Senanayake | Consultant Microbiologist |
| Dr. Priyadarshani Samarasinghe | Consultant Community Physician |

1. Dr. Lakshmi C. Somathunga –Additional Secretary (Public Health Services) – Ministry of Health
2. Dr. N.C. Pallewatte – Director – NPTCCD
3. Dr. S. Subaskaran – Director E&UH
4. Dr. B.K.R. Batuwanthudawa – Director – HPB
5. Dr. Hemantha Ranasinghe – Director / Prison Health Division
6. Dr. J. Vidanapathirana – Director/ NSACP
7. Dr. Chamendra Ranasinghe – Director – PMSD
8. Dr. Dilip Liyanage – Director/ PHSD
9. Dr. Sumal Nandasena – RDHS – Kalutara
10. Dr. K.Sripathapan – D/CMOH – CMC
11. Dr. Surangi Gamage – Consultant – Department of Ayurveda
12. Dr. Mizaya Cader – Consultant Community Physician/ NPTCCD
13. Dr. Onali Rajapakshe – Consultant Community Physician/ NPTCCD
14. Dr. Hemali Jayasekara- Consultant Community Physician/ NPTCCD
15. Dr. W.D. Galagedara- Consultant Microbiologist
16. Dr. Kanthi Ariyarathne – CCM – Executive Secretary
17. Dr. K. Pathirana – MO Epidemiology Unit - CMC
18. Mrs. R. P. Priyanthi – Social Services Officer – Department of Social Services
19. Dr. Damayanthi Kasturimudali- MOIC/Act. HOD -Lanka Hospitals
20. Dr. Prasad Herath – MO – Immigration Health Unit
21. Dr. Upul Gunasekara – MO – Police Hospital
22. Dr. Chamila Abeywickrama – MO/NPTCCD
23. Dr. Sujeewa Theannilawu- MO/NPTCCD
24. Dr. Dilini De Silva – MO/NPTCCD
25. Dr. R.R. Kariyakarawana – MO/NPTCCD
26. Dr.A.L.A. Shiyam – Registrar /NPTCCD
27. Dr. P.A.M. Perera – MO/NPTCCD

**Meeting with staff of Anlalytical Pvt.Ltd on 11/09/2023**

|  |  |
| --- | --- |
| Dr. Chakaya J. Muhwa | WHO Consultant (Team Lead) |
| Dr. Sushil Pandey | WHO consultant Lab |
| Dr. Asif Muhammad | PMDT – Consultant(WHO Consultant) |
| Soleil Labelle | WHO |
| Dr. Vladimir Mikic | M & E Consultant |
| Dr. Chintha Samanmalie Dalpathadu | Consultant Respiratory Physician |
| Dr. Nilanthi Senanayake | Consultant Microbiologist |
| Dr. Priyadarshani Samarasinghe | Consultant Community Physician |
| Dr. Mizaya Cader | Consultant Community Physician |
| Dr. W.D. Galagedara | Consultant Microbiologist/NTRL |
| Dr. Hemali Jayasekara | Consultant Community Physician- NPTCCD |
| Mr. S.N. Marasinghe | National Service Manager |
| Mr. Nipun Suraweera | Service Engineer |

**Debriefing –**  **15/09/2023**

|  |  |
| --- | --- |
| Dr. Chakaya J. Muhwa | WHO Consultant (Team Lead) |
| Dr. Sushil Pandey | WHO consultant Lab |
| Dr. Asif Muhammad | PMDT – Consultant(WHO Consultant) |
| Soleil Labelle | WHO |
| Dr. Vladimir Mikic | M & E Consultant |
| Dr. M.D.K. Rezwan | WHO |
| Dr. Chintha Samanmalie Dalpathadu | Consultant Respiratory Physician |
| Dr. Nilanthi Senanayake | Consultant Microbiologist |
| Dr. Priyadarshani Samarasinghe | Consultant Community Physician |

1. Dr. Lakshmi C. Somathunga – Additional Secretary (Public Health Services) – Ministry of Health
2. Dr. S.M. Arnold - Deputy Director General (Public Health Services) 1- Ministry of Health
3. Dr. Gamini Wijesooriya – DDG – MS – ministry of Health
4. Dr. N.C. Pallewatte – Director /NPTCCD
5. Dr. V. Kumarapeli – D/Policy and Development
6. Dr. Shalala Ahmadova- Public Health Administrator WHO
7. Dr. Rohini Wadanamby – President – Sri Lanka College of Microbiologists
8. Dr. R. Batuwanthudawa- Director /Health Promotion Bureau
9. Dr. Hemantha Ranasinghe – Director/ Prison Health Division
10. Dr. J. Vidanapathirana – director/ NSACP
11. Dr. S. Subaskaran – Director- Estate &Urban Health
12. Dr. P. Rathnasekare – D/D – NHSL
13. Dr. C.J.G,. Hapudeniya – RDHS – Colombo
14. Dr. Dilip Liyanage – D/PHSD
15. Dr. Channa De Silva – Paed. Pulmonologist – LRH – Colombo
16. Dr. Anoma Siribaddana – Consultant Respiratory Physician / NH Kandy
17. Dr. S. Muhunthun – Consultant Respiratory Physician
18. Dr. Neranjan Dissanayake – Consultant Respiratory Physician / T.H. Rathnapura
19. Dr. Dammika Vidanagama – Consultant Microbiologist – LRH
20. Dr. Riaz Mowjood – Consultant Respiratory Physician
21. Dr. Nilanganee - RE – RDHS /Gampaha
22. Dr. Kanthi Ariyarathne – CCM – Executive Secretary
23. Dr. Dilanka Thilakarathne – Deputy Director /Non Communicable Diseases
24. Dr. Chinthana Perera – Consultant Epidemiologist – Epidemiology Unit
25. Dr. Mizaya Cader – Consultant Community Physician/ NPTCCD
26. Dr. Onali Rajapakshe – Consultant Community Physician/ NPTCCD
27. Dr. Hemali Jayasekara- Consultant Community Physician/ NPTCCD
28. Dr. W.D. Galagedara- Consultant Microbiologist / NTRL
29. Dr. Sarath Bandara – DTCO – CCC
30. Dr. H.W. Sithara Rohana – DTCO – Combo East
31. Dr. Surangi kumarasinghe – DTCO CEBH
32. Dr. A H M. Nizri – MO/NTRL
33. Dr. M.T.Q.F. Shanat – MO – PDHS – Western Province
34. Dr. Thiraj Haputhanthri– WHO
35. Dr.A.L.A. Shiyam – Registrar /NPTCCD
36. Dr. Dilini De Silva – MO/NPTCCD
37. Dr. Chamila Abeywickrama – MO/NPTCCD
38. Dr. R.R. Kariyakarawana – MO/NPTCCD
39. Dr. Sujeewa Theannilawu- MO/NPTCCD
40. Dr. P.A.M. Perera – MO/NPTCCD
41. Dr. F. A. Z. Ahamed – MO / NPTCCD
42. C. Sangarakumaran – LFA
43. Ms. Sewmini Liyanage – Manager LFA
44. Mr. Nissan Gunasekare – Finance Specialist
45. Eng. Pubudu de Zoysa – PMU –PD

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