

MID-TERM REVIEW OF THE
NATIONAL TUBERCULOSIS CONTROL
PROGRAMME, TIMOR-LESTE

2019

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ABBREVIATIONS

ACF	Active Case finding
AIDS	Acquired Immunodeficiency Syndrome
ART	Antiretroviral Therapy
BCG	Bacille Calmette-Guerin
CHC	Community Health Center
DMC	Designated Microscopy Centre
DHIS 2	District Health Information System -2
DOT	Directly Observed Treatment
DOTS	Directly Observed Treatment, Short-course chemotherapy
DRS	Drug Resistance Surveillance
DR TB	Drug -resistant TB
DST	Drug Sensitivity Testing
HIV	Human Immunodeficiency Virus
IPT	Isoniazid (INH) Preventive Therapy (IPT)
JMM	Joint Monitoring Mission
LTBI	Latent TB Infection
MCH	Maternal and Child Health
MoH	Ministry of Health
MDR-TB	Multidrug-resistant Tuberculosis
MTR	Mid-Term Review
NGO	Non-Governmental Organization
NSP	National Strategic Plan
NTP	National Tuberculosis Program
NTRL	National TB Reference Laboratory
OPD	Outpatient Department
PHC	Primary Health Center
PLHIV	People living with HIV/AIDS
PSF	Promotor Saude Familia (community volunteers)
rGLC	Regional Green Light Committee
RR TB	Rifampicin-resistant TB
SAMES	Servisu Autonomi Medicamento Equipamento Saude
SISCa	Servisu Integradu da Saúde Comunitária (Integrated Community Health Services)
SNRL	Supra-National Reference Laboratory
TB	Tuberculosis
WHO	World Health Organization

EXECUTIVE SUMMARY

Due to the post-conflict reality of the country, Timor-Leste continues to face significant and very challenging governance, social development and public health situations. Despite the progress that has been made over the last decade, including through reconstruction of health facilities, expansion of community-based health services and deployment of trained health care professionals, the country still faces major public health challenges.

With a TB incidence rate of 498 per 100,000 and TB mortality rate of 106 per 100,000, Timor-Leste is seventh highest in terms of TB incidence rate, and has the highest TB mortality rate in the world. TB is the eight most common cause of death in the country. High levels of poverty, malnutrition, smoking, harmful use of alcohol, and indoor air pollution linked to the lack of access to clean cooking fuel are some of the key drivers fuelling the TB epidemic. According to the 2017 B patients cost survey, 83% of patients experienced catastrophic costs related to their TB diagnosis and care, mostly due to income loss and need for nutritional supplementation.

A Mid-Term Review (MTR) was conducted to assess the current TB epidemiology, review the progress made by the National TB Control Program (NTP), provide recommendations to inform the next National Strategic Plan for 2020-2025 to reach the targets of the End TB Strategy and Sustainable Development Goals.

Achievements

- The availability of more health care professionals in recent years, especially doctors, coupled with better access to Xpert MTB/RIF and Chest X-rays, provide an opportunity to improve care of *all* TB patients, beyond smear-positive drug-sensitive TB patients.
- Timor-Leste has good infrastructure at the public health facilities visited. The team noted clean, spacious, well ventilated out-patient departments and waiting areas at the national hospital, referral hospitals, community health centres (CHCs) and health posts visited.
- The 54 private health clinics which have come up in the country report to the Government on essential health indicators, including TB. TB medicines are not available in the private market. Thus, all cases are referred to the NTP or partner non-governmental organisations (NGO) for treatment.
- Anti-TB drugs and laboratory supplies were available in all sites visited by the review team. Except for HIV test kits, there has been no reports of stock-outs at the service delivery levels; temporary shortages are easily managed locally through re-distribution between health facilities.
- The Maternal Child Health (MCH) and malnutrition programs seems to be well-implemented priority programs at the district hospitals, CHCs and health posts. All the health care facilities visited by the team had dedicated space, equipment and staff focusing on these programs.
- Over the recent five years the treatment success rate of new and relapse TB cases slightly increased and in 2017 was reported 88.5%. The high level of treatment success is likely to contribute to reducing disease transmission and could be regarded as one of key factors to drive the TB epidemic downwards. However, the treatment success rate is likely to be over-estimated in the national data, as there is no routine recording of initial loss to follow-up.
- In 2018, the proportion of childhood TB among all notified TB cases was 8.4%, though lower than the expected 10-15%, it is better than the global average of 6%.
- Timor-Leste has substantially expanded HIV testing among people diagnosed with TB over the past several years, with the proportion tested increasing from 40.8% in 2013 to 83.0% in 2018. HIV prevalence among TB patients over the last six years ranged between 0.8% and 1.2%.
- Strengths of the TB surveillance system includes use of standard recording and reporting forms, case definitions aligned with WHO recommendations, analysis of national aggregated data, and supervisory system that is in place for data verification.
- Demand forecast for TB medicines is well coordinated by the NTP and a formal quantification committee is in place. The program uses modern tools (Quantimed) to prepare needs forecast based on program scale up targets and changes in treatment guidelines, the forecast report forms the basis for procurement plans.

- Timor-Leste is 98% Roman catholic country, as such the church has the influence and played an important role in the HIV response in Timor-Leste. The MTR team met with the Archbishop of Dili who offered the support of the religious body to extend all possible help to End TB in the country. This is a great opportunity for the involvement of the faith-based organizations and the church through their schools and clinics to reach out to people.

Challenges

- Overall challenges relate to translating policies and guidelines into practice in the field. This include slow adoption of newer and rapidly evolving policies, sub-optimal implementation of guidelines in a context where the need to accelerate TB response is critical to meet the End TB targets.
- Related to the broader health systems, challenges are linked to the centralised financial management causing delays in payments of peripheral health staff (e.g, honorarium for PSF volunteers), and fund allocation to municipalities. Some municipality health staff reported inadequate priority for TB program from domestic budget due to other competing health priorities, and the mis-understanding that all funding needs for the NTP are met through the Global Fund grant.
- Ministry of Health staff do not receive annual increments which can lead to a situation where a newly appointed doctor can draw the same amount as a person who has served for many years. Instances of pay disparity was brought to the team's attention, whereby two people with similar responsibilities may not be receiving the same amount. These could be demotivating factors.
- High prevalence of malnutrition, smoking, exposure to indoor solid fuel, increasing prevalence of diabetes and persistent challenges in access to affordable healthcare contribute to the persistence of the TB epidemic. Coupled with the disproportionately high proportion of TB patients facing catastrophic costs and the large funding gap for the NTP, the problems are daunting.
- In terms of case finding, TB notification rate sharply increased in 2009 and starting declining from 2010 by an average of 2.3% annually, suggesting a decline in case detection and a growing gap between notifications and true incidence. In 2018, only 3,782 incident TB cases were notified, which is only 57% of the estimated number of cases occurring in Timor-Leste.
- Active case finding (ACF), initiated since 2017, has failed to increase case finding in spite of the huge number of missed cases. In the last 18 months, ACF has notified about 3% of the cases. There is strong evidence that presumed cases are being missed at outpatient departments (OPD) of health facilities. Initial lost to follow-up cases are not documented and reported.
- The proportion of bacteriologically confirmed TB cases at national level increased from 48.5% in 2013 to 68.2% in 2017, but then sharply declined to 55.0% in 2018; There is a wide geographical variation in the proportion of bacteriologically confirmed Pulmonary TB cases, ranging from 27.3% to 88.2% by municipality;
- While childhood TB cases make up to 8.4% of all cases at national level, this proportion varies widely between municipalities, ranging from 2.4 % to 20% across municipalities. Over the past 3 years, there was a decline in proportion of children - from 12.4% in 2016 to 8.4% in 2018. This indicates under-diagnosis of TB in children. Symptom-based screening of children who are household contacts of infectious TB patients is recommended. Children less than 5 years, without active TB disease are to receive Isoniazid preventive treatment (IPT). This recommendation is not followed routinely, and if done, lacks systematic recorded.
- TB-HIV collaboration: Other than HIV testing of TB patients, implementation of the set of activities to reduce the burden of TB HIV, the so-called Three I's, is patchy and lacks proper documentation, resulting in non-availability of key data needed to monitor performance.
- Testing of all presumptive MDR/RR TB patients needs to improve – data collected during field visits in Dili show that nearly 30% of the retreatment patients and almost all patients who are smear positive on follow up did not get Xpert MTB/RIF test. The proportion of all notified TB cases tested on Xpert MTB/RIF was only 12% in 2017 and 15% in 2018.
- Of the 34 RR TB patients diagnosed in 2018, only 12 (35%) were initiated on treatment. The reason given by the staff was that 22 RR cases were new and repeat Xpert MTB/RIF was found to be negative. The mission followed up on 7 of these 22 patients. Of these 5 had prior history of TB and 2 had history of contact with MDR/RR patients within their family. Incomplete history of the patients has led to delayed treatment and continued transmission.

- Challenges related to care of DR-TB patients include dependence on one expert to manage MDR/RR patients throughout the country which causes delays in treatment initiation; use of injectable-based longer treatment regimen (8 Cm Lfx Eto Cs E Z / 12 Cm Lfx Eto Cs E) in the absence of audiometry test and insufficient adverse drug reaction monitoring; and a centralised model of care that involves hospitalisation for the entire 8 months intensive phase of treatment.
- The National TB Reference Laboratory was performing solid culture and drug susceptibility (DST) for the first-line and select second-line drugs. Since Feb 2018, the Biosafety Level 3 (BSL 3) facility has stopped functioning in want of repair of the Air Handling Unit and replacement of HEPA filters. In the absence of local agencies providing preventive maintenance and breakdown services for equipment, there is an ongoing risk of laboratory work getting stalled if any of the equipment breaks down.
- Concerning the TB surveillance system, it cannot provide a direct measure of the number of TB patients detected by health system, and is not strong enough to detect all TB cases in Timor-Leste.
- The NTP Procurement and Supply Management function is operating with high to critical risks in the operation and performance of processes for warehouse/stores operations management; distribution operations planning and transportation management; customer order fulfillment management; inventory control; health facility medicine management supervision and supply chain data management.

Recommendations

The biggest challenge lies in translating policies and guidelines into practice in the field. To improve upon that, we recommend strengthening the technical and management capacity of the NTP to:

- Assign focal points at the NTP central unit to serve as subject area experts for the thematic area they are in-charge of; activate National Technical Working Group on priority technical areas, such as MDR-TB, LTBI, Childhood TB, ACF, and laboratory strengthening with proper representations of experts available in the country. Example, the childhood TB group could include representatives from department of maternal child health (MCH) department of Nutrition of MCH, paediatricians from national hospital and NGO partners;
- Build management and clinical capacity at regional level to support programme implementation to health facilities in their catchment areas, to reduce dependence on central unit for supervision and monitoring
- Conduct regular visits to peripheral health facilities for program monitoring and on-the job training; promote internal evaluation (cross-learning visits). In addition, NTP should organise review meeting of all key program staff at least semi-annually to monitor progress, jointly identify challenges and solutions;
- Secure long-term international technical assistance from WHO to adopt and implement global policies and build capacity of local staff.

Recommendation related to addressing challenges related to the broader health system

- Use upcoming opportunities of revising/updating MoH policies to ensure TB is allocated its due priority and attention. This includes upcoming revision of the Health Sector Strategic Plan, PHC essential services, Essential Medical List, District Health Information System -2 (DHIS2), Public Financial Management System (PFMS) and Human Resources for Health.

Recommendation related to addressing social issues affecting TB patients

- Given that 83% of TB patients in Timor-Leste experience catastrophic costs, advocate for special package for TB patients from the Ministry of Social Solidarity;
- Establish the proposed National Task Force to End TB: An inter-ministerial, inter-sectoral body to advocate for prioritisation of TB as a public health problem in the country. Prior to launching it, NTP may consider consultations with stakeholders and other disease programs whether to set up a Task Force for TB only, or a Task Force for Health with different programs being part of it;
- Engage with the Archbishop of Dili and associated faith-based organisations, village chiefs, traditional healers, and TB survivors to broaden the narrative and engage them in the TB response;
- Engage the wider civil society and donors in the TB response. Involve them in the development of the national strategic plan (NSP), ensure their activities align with the NSP, conduct regular coordination meetings. WHO Timor-Leste could play a convening role this.

Recommendations related to financing of the NTP

- There is an urgent need for a resource mobilisation plan to secure increased allocation for the NTP from domestic budget, while simultaneously seeking multiple additional donors to fill the gap in 2020 and beyond. NTP and its partners should advocate with decision makers and influencers to prioritise TB through adequate allocation of domestic resources;
- The next funding cycle of the Global Fund in 2020 offers an opportunity to make the investment case for TB program in Timor-Leste. Development of a fully costed, national strategic plan to end TB will serve as a good advocacy document for resource mobilisation.

Improve case finding for *all* forms of TB

- Engage with national hospital and referral hospitals to conduct systematic screening of OPD patients for TB, fast-track diagnosis and treatment initiation, and serve as referral centres for clinical management of complicated TB patients;
 - Assign one coordinator at the National Hospital to link all TB related services within the hospital (out-patient and in-patient departments, drug store, TB lab, X-ray unit), maintain one TB register, follow up of transferred-out patients, and submit regular reports to the NTP
 - Considering the absolute number of TB cases in the country is small and there is enough Xpert MTB/RIF capacity, the NTP should move towards universal DST by Xpert MTB/RIF. This can be done in a phased manner in terms of patient categories (all notified TB patients first, followed by presumptive TB patients) and geography (high MDR/RR municipalities first, then country-wide);
 - Use Xpert MTB/RIF for diagnosis of extra-pulmonary and childhood TB especially for lymphnode and TB meningitis. The NTRL can prepare SOPs for collection and processing of extrapulmonary samples. Staff at the national and referral hospitals in the district should be sensitised/trained on sample collection;
 - Conduct an operational research to assess the sensitivity of active case finding (ACF) screening tools, diagnostic algorithm followed, and selection of high-risk groups for ACF to identify the best strategies;
 - Strengthen linkages with the other community-based, government programmes like SISCa and Saude-na-familia, and active case finding project implementers to improve awareness, conduct community and household TB screening, promote contact investigation and TB prevention;
 - Given the higher risk for TB among malnourished individuals and children, leverage the well-established MCH and Malnutrition program to establish a referral mechanism and integrate child TB-specific components in the management of malnutrition in children as well as in the MCH and Integrated Management of Childhood Illness (IMCI) training materials.
- The repair of the BSL-3 facility should be expedited and drug susceptibility test (DST) of 1st and 2nd line by solid and liquid culture initiated. Identify agencies or build capacity of local programme staff to provide maintenance and breakdown services for national TB reference lab and microscopes in the districts. Prepare plans for proficiency testing and accreditation for 1st and 2nd drugs by solid and liquid DST.
 - Strengthen external quality assurance (EQA) for smear microscopy and introduce EQA for Xpert MTB/RIF following the recommendations of the August 2019 Laboratory Monitoring Mission report. Decide whether or not to establish line probe assay (LPA) facility based on results of the drug-resistance survey.
 - Strengthen TB-HIV collaboration: The two programmes need to collaborate to improve documentation of TB-HIV collaborative activities, monitor the progress through regular meetings and joint visits. Of particular urgency is the need to systematically screen PLHIV for TB, increase uptake of TB preventive treatment, and ensure TB Infection Control in health care settings.
 - To reduce dependence on the sole MDR/RR -TB expert, train additional local Timorese physicians on clinical management of MDR patients, establish a Clinical Committee comprising of different specialist to discuss and decide on complicated MDR/RR cases, identify and capacitate institute(s) that could serve as specialised referral centres for MDR/RR, preferably in public health facilities.
 - Transition to WHO recommended all oral regimen for a duration of 18-20 months. The following steps to be taken for implementation of the new regimen - finalise the guidelines which are currently under revision, trainings, obtain regulatory approvals for second line drugs and procure it through the Global Drug Facility, ensure availability of tests for pre-evaluation and monitoring of patients. Implementing the all oral regimen, should provide opportunity to transition to a more decentralised, ambulatory model of care.

- Develop a simple algorithm to diagnose TB in children and to improve the preventive treatment coverage. The entry point to find TB in children can be from children with malnutrition, those with any symptom of TB, or those who had close contacts with a pulmonary TB patient. Xpert/ MTB RIF should be offered as the primary test, and all children who do not have active TB considered for preventive treatment. Suggested algorithm is in the childhood TB section of this report.
- Improving coverage of preventive therapy and other preventive measures by strengthening household contact screening and INH preventive treatment (IPT) provision for children in close contact with a PTB case; expand activities of partners in active case finding to identify and refer children who are eligible for IPT; expand eligibility age group for IPT to all children as recommended by the recent WHO guideline on the management of latent TB infection.
- Consider expansion of the target groups and shorter treatment options for programmatic management of latent TB infection (LTBI) based on the 2018 WHO LTBI guidelines and the SEARO Regional Action Plan. Shorter and safer treatment options (such as 3 HP) provide an opportunity to decentralise and achieve better treatment completion rates. Trainings of health care workers on LTBI management, providing job aids, and provision for travel support costs to conduct household visits for contact tracing are needed.
- Institutionalize the whole community outreach program for TB through the following means:
 - Identify and train community volunteers and make them responsible for pre-defined catchment areas (by households or populations). They can be used for active case finding, contact tracing, as treatment supporters, increasing awareness on TB, educating the community on nutritional value of locally grown fruit and vegetables;
 - Develop a clear plan to engage with traditional healers. Community has immense trust in traditional healers they can therefore play a huge role in spreading awareness about TB in the community, to remove stigma and in finding the people with TB symptoms;
 - Include faith-based organisations in the TB response planning and implementation. The schools run by the church are a good place for screening and awareness and education programs on TB. The clinics run by the church can provide TB services.
- National TB surveillance system: (i) Adopt and roll-out WHO standard District Health Information System 2 (DHIS 2) TB module and dashboard with long-term goal to move to case-based system once the capacity is in place (ii) Improve direct measurement of TB disease burden by conducting inventory studies to assess the gaps in notification. Consider to conduct TB prevalence survey for direct measurement of TB burden
- Procurement and Supply Management: (i) Review planned order schedules and use stock and consumption data to adjust morbidity/program-based medicine needs forecasts (ii) Provide technical assistance support to SAMES/MoH to improve warehouse operations, harmonize district and hospital order cycles; clarify responsibility of SAMES, MoH and Districts and optimize fulfillment of routine Health facility medicine needs; capacity building support to the district pharmacists office; and support a phased roll out of a robust eLMIS to districts and eligible health facilities

I. BACKGROUND

The Democratic Republic of Timor-Leste (RDTL), also known as Timor-Leste, is a young low middle-income country (LMIC), rising from a difficult past, having obtained its independence in May 2002 after voting to separate from Indonesia in 1999. The country is situated in the eastern end of the Indonesian archipelago with a population of nearly 1.3 million. 70% of the population lives in rural areas in small, dispersed villages isolated by mountainous terrain with generally very poor but improving roads and telecommunications. Poverty is high, with 41.8 percent of the population below the basic needs poverty line, and over 30 percent below the international \$1.90-a-day extreme poverty line. In rural areas, only 62% of women are literate, compared to 72% of men.

Timor-Leste is administratively divided into 13 municipalities and 65 sub-municipalities, 442 Sucos (villages) and 2,225 Aldeias (hamlets). The capital city of Dili has the highest population of about 170,000 and is divided into 5 administrative areas.

The Health Situation

The nutritional status of children is a major concern and is reported to be deteriorating, with rates of 58% for stunting in children, and an overall rate of anaemia of 38% for children aged 6-59 months. Although there are declining rates of fertility, the most recent survey results demonstrate that the total fertility rate for women is still very high at 5.7, with the unmet need for family planning of 32%. Timor-Leste has one of the highest maternal mortality ratios in the region of 557 per 1000 live births. Under 5 child mortality, though improving remains high, with wide variations in rates between some rural and urban areas (111 per 1000 births for Liquica rural district and 60 per 1000 for Dili, the capital city of Timor-Leste). These high mortality rates are attributable in part to low health services access, particularly in remote areas, but also in some rural and urban locations. 52.6% of one-year olds are fully immunized, and at last survey, 23% had received no vaccinations at all. Only 30% of women had their last delivery supported by a skilled provider, and only 22% delivered in facilities (Data sources – Timor-Leste Demographic and Health Survey 2009/10).



Tuberculosis Situation

According to the WHO Global TB Report 2018, Timor-Leste is a high-burden tuberculosis (TB) Southeast Asian country, with a TB incidence rate of 498 per 100 000, which is the seventh highest in the world; and with TB mortality rate of 106 per 100 000, which is the highest in the world¹. In Timor-Leste, TB is the eight most common cause of death².

In 2017 there were an estimated 6,500 estimated incident cases of TB (range: 4,200-9,200), equivalent to a rate of 498 (332-711) cases per 100,000 population. TB is most frequently seen among those aged 15-34 years. In 2018 only 3,782 incident TB cases were notified (283 cases per 100,000 population), which is only 57% of estimated number of cases occurring in Timor-Leste. The estimated prevalence of MDR/R-R TB is 3.3% (1.2-6.4) among new cases and 18% (11-26) among retreatment cases which is ~260 MDR/R-R cases (130 among the notified TB cases) annually. HIV testing of TB patients has expanded substantially, with 83% of TB patients tested in 2018. The

¹ Global tuberculosis report 2018. Geneva: World Health Organization; 2018. License: CC BY-NC-SA 3.0 IGO

² Institute of Health Metrics and Evaluation, Seattle, Washington, USA. <http://www.healthdata.org/timor-leste>, Accessed 5th October 2019

prevalence of HIV among TB patients was 1.2%. According to routine surveillance data in 2018 the proportion of child TB cases among all notified was 8.4%, which is within the plausible range of 5-15% for low- and middle-income countries like Timor-Leste. Consistent with global data, notification of new and relapse TB cases is greater in males than females. In 2018 male to female ratio in Timor-Leste was 1.3:1. In 2018, treatment success rate was 89%, among new and relapse TB patients and 85% among previously treated TB patients.

A national Drug Resistance Survey (DRS) was underway at the time of the MTR visit. The DRS will measure the prevalence of drug resistance among new and previously treated sputum smear positive pulmonary TB cases. Drug sensitivity patterns obtained from the survey will inform suitable second line treatment regimen for the country.

The TB patient cost survey conducted from Oct 2016 – March 2017 highlighted that 83% of TB patients experienced catastrophic costs related to their TB diagnosis and care, which is highest in the world. Income loss and nutritional supplementation accounted for 40.7% and 37.9% of these costs, respectively

Some of the key drivers for TB in Timor-Leste, besides HIV infection, are undernutrition, tobacco use, harmful use of alcohol, indoor air pollution and diabetes mellitus. 25% of the population was undernourished which gets worse among children, with 58% of children below 5 years stunted and 19% showing signs of wasting. Timor-Leste has one of the highest prevalence of smoking in the world (78.1% among males and 6.3% among females) another risk factor for developing TB and poor treatment outcomes. Other risks factors include indoor air pollution (only 7% of the populations have access to clean fuel for cooking), and increasing prevalence of diabetes mellitus.

Mid-Term Review of the NTP

A team of experts, including 7 international consultants along with the staff of WHO Country Office staff and the NTP visited health facilities at all levels of the health system, interviewed numerous TB patients and DOT providers, held discussions with several NGOs, and consulted representatives of various MOH departments in order to review progress in TB control in Timor-Leste since the last External Review Mission in February 2017. International consultants with different areas of expertise most pertinent to the focus areas of the review, visited the country during August and September 2019. Focus of the Mid-Term Review (MTR) was on TB epidemiological review, NTP in the context of the overall health system, TB laboratory, Programmatic management of DR-TB, TB-HIV, Childhood TB, Community engagement and Procurement and Supply Management (PSM). Terms of Reference for the MTR, teams and field visits schedule can be seen in Annex 1 and Annex 2 respectively.

The recommendations of the MTR will provide strategic direction for the future development of the NTP and form the basis for a revision of the National Strategic Plan (NSP) for 2020-2025, The Mid-Term Review mission to review progress towards WHO Global TB control targets was planned and coordinated by the NTP and WHO Country Office for Timor-Leste.

2. HEALTH SYSTEMS INCLUDING ORGANISATION OF TB SERVICES

Structure of the health care system³

Patient services are delivered through a network of health care facilities. There are 6 district hospitals, 63 Community Health Centres (CHCs) at sub-district level and 236 Health Posts at the village level. The Health Posts at 1000 population coverage is the smallest unit providing health care services in the country. For areas not accessible to the population, a program referred to as “integrated community health services” or *Servisu Integradu da Saúde Comunitária (SISCa)* is being implemented for provision of a Basic Services Package (BSP), comprising of Maternal Health, Child Health (including immunization), Communicable Diseases, Non-communicable diseases, Health Promotion and Environmental Health. Health Posts are manned by a team of 3 – 4 health personnel including a doctor, CHCs provide primary health plus service and has 2 – 10 health posts in its catchment area. For secondary health care services, there are 5 referral hospital located in the municipalities of Timor-Leste namely, Baucau, Bobonaro, Covalima, Oecusse and Ainaro. The capital, Dili has the national hospital Hospital Nacional Guido Valadares (HNGV), the largest referral and tertiary care set up in Timor-Leste.

Civil society, in the form of health NGOs are very active in some parts of the country, and a private sector in the form of private medical clinics (n = 54) is beginning to emerge in the capital city and some district towns. The administration and management of health systems are centrally managed through the Ministry of Health (MoH) at Dili. The MoH is responsible for developing the policy, technical guidelines, and administration of complete health systems. Health services are based on delivery of a package of basic services that includes maternal, neonatal and child health, immunization programmes, TB, HIV and Malaria services. The health system is primarily staffed by trained health staff. Many of the existing staff has been trained in Cuba, Indonesia or Australia. Nurses and doctors are now also trained at the University of Timor-Leste. In 2018, the doctor population ratio in the country was 8.9 per 10,000 population, higher than the median for other countries in WHO South-East Asia region of 5.9 per 10 000 population.

Structure of the NTP⁴

Oversight of TB control program is implemented by National Tuberculosis Control Program (NTP), which is organized in three layers. At the 13-municipality level, TB coordinator leads and coordinates the TB control program in their municipality. Similarly, at district level the TB control program is coordinated by 77 TB responsible, and the services are integrated in the general health services. The program activities at the community and village level is facilitated by community volunteers - Promotor Saude Familia (PSF)- who assist in identification and referral of TB suspects and support in treatment of diagnosed TB cases. At national level, NTP staff consist of one National TB Program Manager, M&E officer, data entry clerk, and six regional officers.

The Central Management Unit of Tuberculosis is responsible for formulation of technical and operational guidelines and policies, trainings, planning and overall implementation of programme activities in the country including procurement and supply of commodities for the NTP, coordination with all stakeholders, monitoring and evaluation of the program. *At the Municipality Level*, the Municipality TB coordinator is specifically responsible for the organization of TB activities. The Municipality CHC serves as the designated microscopy centre, while the other CHCs receive sputum, do fixation and send smears to the designated microscopy centres (DMCs) for microscopy. The Municipality keeps sufficient stock of TB drugs and laboratory reagents. There is stock for 6 months (3 months stock + 3 months reserve) at Municipality level. The Senior Laboratory Technicians (SRTs) at the Municipality level prepare and distribute laboratory reagents and ensure regular and adequate supply of reagents and sputum containers in health facilities. The SRTs also supervise all the laboratory activities in the Municipality and facilitate quality assurance in sputum microscopy. *At the sub-Municipality level*, the NTP is implemented through the sub-Municipality level CHCs or Health Posts. Each CHC has more than one doctor, and a team of 7-10 people, and at each Health Post primary care services are provided by a team of 3- 4 health personnel including a doctor. CHCs which serve as designated microscopy centres also have a laboratory

³ WHO 2016. Country Cooperation Strategy Timor – Leste 2015 – 2019

⁴ Report of the External Review Mission (2017), National TB Control Program, Timor Leste

technician. The functions of sub-Municipality level are implementation, monitoring and supervision of TB control activities in its designated geographical areas. Delivery of health care for TB control is done by the primary health services, as per the policies stated in the NTP manual. Sub-Municipality facilities keep a stock for two months (one-month stock + one-month reserve). Treatment supervision is provided by the health workers in the primary health care services (CHCs, Health Posts etc.), non-governmental organizations, and community volunteers such as Promotor Saude Familia (PSF) who are engaged in the SISCa program.

TB services are a part of the comprehensive service package and delivered through all levels of the health system. Both TB diagnostic and treatment services are fully integrated into the general MOH infrastructure, using common health facilities as well as general health staff as health workers, nurses and doctors at implementing facilities. Only managerial staff is program specific, which is common practice for all health programs and is seen as an indispensable requirement for the effective functioning of the NTP.

The mainstay of diagnosis is sputum microscopy. There are 76 sputum smear microscopy laboratories and 7 of which are equipped Xpert MTB/RIF machines. Culture and drug sensitivity testing (DST) is conducted at the National TB Reference Laboratory (NTRL,) a Biosafety Level 3 (BSL 3) laboratory set up by KOICA in 2016. The doctors and health personnel at the health posts and CHC level are responsible for patient referral and sputum transportation.

Support to NTP by other Ministries and Partners

The NTP is integrated within the structure of the Ministry of Health and follows the policies and principles of the MoH. There are various Directorates in the MoH including community health, finance and planning, human resource, procurement and logistics. Each of these directorates is headed by national directors. Each directorate then has Departments with specific functions and lead by departmental heads. Thus, the hierarchy of MoH is well defined which assist in taking timely, well-coordinated management decisions and ensuring accountability. The NTP is supported on health promotion, HMIS, logistics, HR, financial, procurement and legal issues by concerned departments of the MoH as well as coordination support from the Directorate of Externally Funded Programmes. The NTP is also supported by the other arms of the MoH including the National Health Laboratory, National and referral hospitals, Institute of health Sciences and SAMES which is an autonomous body supporting procurement and logistics management of health products.

Outside of the government, the major technical support for the NTP is from the World Health Organization. NTP has also received technical and commodity assistance from Global Drug Facility (GDF), UNITAID, Green light Committee (GLC), KOICA, JICA, NIRT Chennai, and independent consultants. A number of NGOs have also been engaged with the NTP for several years in providing services for TB. Some are active throughout the country but most operate only at the local level.

Financing of NTP activities

The NTP is funded by international donors and its domestic budget. The Global Fund has been a major donor of the national programme since 2005. This funding has helped set up the programme and supports all major activities. Korea International Cooperation Agency (KOICA) gave one-time support of US \$ 2.1 million to set up the NTRL, a BSL III laboratory to strengthen the MDR TB services by performing culture and DST, and capacity building of program staff. Small grants for operational research, community sensitizations and advocacy, programme support for module development, equipment and drugs have been given by World Health Organization, Burnet Institute, Australia National University, Menzies School of Health Research and others.

Table I below shows the funding need, source and gap from 2016 to 2020. At present, most of the TB control activities are supported through the Global Fund grant. Domestic funding supports staff costs, infrastructure and basic resources. The funding need is increasing to 7 m US\$ in 2020 from 5.37 m US\$ in 2018. However, there is a reduction in the donor funding which is reducing from 2.26 m US \$ (68% of the total requirement) in 2018 to 1.19 m US\$ in 2020 (17% of the total funding need). The domestic funding has also gone down considerably, from 1.02 m US\$ to 0.87m in 2019. With the donor funding coming down and domestic funding not covering up

there will be a significant funding gap of over 50% in 2019 and 2020. The current GF grant with an allocation of 4.8 m US\$ over 3 years (2018-2020) ends in Dec 2020.

Table 1: NTP funding need, source and gap from 2016 to 2020.

Year	Funding need (US \$)	Domestic funding (US \$)	Donor Funding (US \$)	Main Donors (US \$)	Funding gap (US \$)
2016	6.09 m	1.02 m (17%)	4.65 m (76%)	Global Fund, KOICA	0.42 m (7%)
2017	3.39 m	0.54 m (16%)	2.32 m (68%)	Global Fund, WHO	0.52 m (16%)
2018	5.37 m	0.85 m (16%)	2.26 m (42%)	Global Fund, WHO	2.25 m (42%)
2019	4.93 m	0.87 m (18%)	1.39 m (28%)	Global Fund, WHO	2.66 m (54%)
2020	7.00 m	0.12 m (18%)	1.19 m (17%)	Global Fund	4.55 m (65%)

Data Source: MTR Concept Note

Other general observations

- Timor-Leste has good infrastructure at the public health facilities visited. The team noted clean, spacious, well ventilated out-patient department and waiting areas at the national hospital, referral hospitals, CHCs and health posts visited. Good doctor patient population ratio in recent years, in one CHC visited by the team, there were over 10 doctors
- The 54 private health clinics which have come up in the country report to the Government on essential health indicators, including TB. Anti TB medicines are not available in the private market. Thus, all cases are referred to the NTP or partner NGOs for their treatment.
- Anti-TB drugs and laboratory supplies were available in all sites visited by the review team. Except for HIV test kits, there has been no reports of stock-outs at the service delivery levels, temporary shortages are easily managed locally through re-distribution between health facilities
- Strong leadership for the NTP through a competent NTP manager who has served the programme consistently for several years, complemented by a team of dedicated staff at the Central TB Unit.
- Challenges related to adoption of newer and rapidly evolving policies, optimal implementation of guidelines, and need to accelerate TB response to meet the targets to end TB
- Concerning the broader health systems, challenges are related to centralised financial management causing delays for peripheral health staff to be paid (e.g. honorarium for PSF volunteers), delay in fund allocation to municipalities, inadequate priority for TB program from domestic budget due to other competing priorities and the mis-understanding all funding needs are met through the Global Fund grant.
- No annual increments for MOH staff which can lead to a situation where a newly appointed doctor can draw the same amount as a person who has served for many years., Pay disparity issues among MoH staff were brought to our attention, whereby two people with similar responsibilities may not be receiving the same amount. These are all important factors affecting staff morale and motivation.
- The availability of more health care professionals, especially doctors in recent years provide an opportunity to strengthen the NTP for improving care of *all* TB patients, beyond smear positive cases which remains the focus, as diagnosis is mostly based on sputum smear microscopy
- The Maternal Child Health (MCH) and malnutrition programs seems to be well-implemented priority programs at the district hospitals, CHCs and health posts. All the health care facilities visited by the team had dedicated space, equipment and staff focusing on these programs

Recommendations

The biggest challenge lies in translating policies and guidelines into practice at the field level. For that to happen, we recommend strengthening the management capacity of the NTP to:

- Assign focal points at NTP cell for different technical areas. As appropriate, strengthen the NTP team with doctors who can lead and impart necessary skills to manage *all* TB patients, including for clinical management of extra-pulmonary TB patients, paediatric TB, DR TB and TB patients with other co-morbidities.
- Activate National Technical Working Group on priority technical areas, form sub-groups as needed – e.g, MDR-TB, Latent TB Infection (LTBI), Paediatric TB, Active Case Finding (ACF), laboratory etc.
- Build management and clinical capacity at regional level to support programme implementation to health facilities in their catchment areas, to minimise dependence on a central team for supervision monitoring
- Conduct regular visits to peripheral health facilities – internal evaluation (cross-learning visits), program monitoring, supervision and on-the job training. In addition, NTP central cell should organise review meeting of NTP program staff at least semi-annually to monitor progress, identify challenges and solutions to address them.
- Secure long-term international technical assistance from WHO to adopt and implement global policies, build local staff capacity

Recommendation related to addressing challenges related to the broader health system

- Use upcoming opportunities of revising/updating MoH policies to ensure TB is allocated its due priority and attention. This includes upcoming revision of the Health Sector Strategic Plan, PHC essential services, Essential Medical List, District Health Information System -2 (DHIS2), Public Financial Management System and Human Resources for Health.
- Engage national hospital and referral hospitals for intensified case finding for TB through systematic screening of OPD patients and clinical management of complicated TB patients
- Assign one coordinator at the National Hospital to link all TB related services within the hospital (out-patient and in-patient departments, drug store, TB lab), maintain one TB register, follow up with transferred out patients and report to the NTP
- Strengthen linkages with the other community-based government programmes like SISCa and *Saude-na-familia* and active case finding project implementers to improve awareness, conduct community and household TB screening, contact investigation and TB prevention
- Leverage the well-established Maternal Child Health (MCH) and Malnutrition program to establish a referral mechanism and include TB screening in their programs to identify malnourished individuals and children who face a disproportionate risk for acquiring TB

Recommendation related to addressing social issues affecting TB patients

- Given that 83% of TB patients in Timor-Leste experience catastrophic costs, advocate for special package for TB patients from Ministry of Social Solidarity
- Advocacy with decision makers and influencers to prioritise TB and create demand for TB services
- Engage with the Archbishop of Dili and associated faith-based organisations, village chiefs, traditional healers, and TB survivors to broaden the narrative and engage them in the TB response
- Establish the proposed National Task Force to End TB: An inter-ministerial, inter-sectoral body for advocacy and prioritisation of TB as a public health problem in the country
- Engage wider civil society and donors in the TB response: engage them in the development of the national strategic plan (NSP), ensure their activities align with the NSP, conduct regular coordination meetings – WHO Timor-Leste could play a convening role this.

Recommendations related to financing of the NTP

- The next funding cycle of the Global Fund in 2020 offers an opportunity to make the investment case for TB program in Timor-Leste. Development of a fully costed, national strategic plan to end TB will serve as a good advocacy document for resource mobilisation
- There is an urgent need for a transition plan under which there is an increasing support from domestic resources for TB services and active seeking of multiple additional donors to fill the gap in 2020 and beyond

3. REVIEW OF THE TB EPIDEMIOLOGY

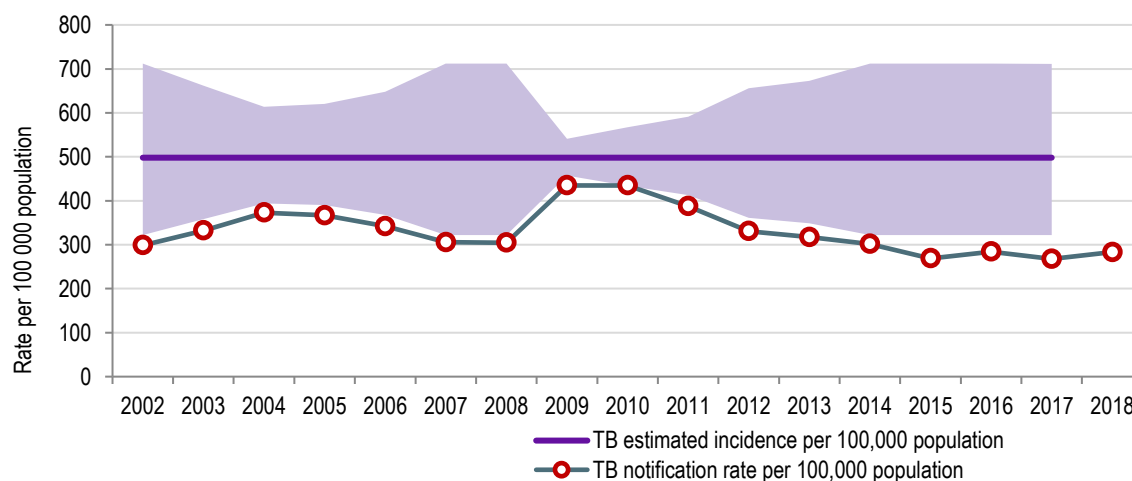
Since 2002 TB incidence and mortality in Timor-Leste largely remained stable. At the same time TB notification have steadily increased. The mean annual increase in TB notification of new and relapsed cases between 2013 and 2018 was 7.8%. The observed increase in notification could be attributed mainly to improvement of TB treatment coverage and reporting. Thus, the gap between estimated and notified TB cases notably decreased. Sharp year-to-year fluctuation, unusual and wide variation of TB notification data disaggregated by site of disease, bacteriological confirmation and child TB across the provinces indicates that TB diagnostic services and procedures are unstable at sub-national level, due to non-availability of qualified human resources, capacities and available resources.

Analysis of the level and trends in TB incidence

Over the recent 15 years estimated TB incidence rate remained stable. In 2017 there were an estimated 6,500 estimated incident cases of TB (range: 4,200-9,200) in Timor-Leste, equivalent to a rate of 498 (332-711) cases per 100,000 population.

FIGURE 1. ESTIMATED TB INCIDENCE RATE AND NOTIFICATION OF INCIDENT TB CASES, PER 100,000, 2002–2018

Shaded area around lines indicate uncertainty range



Data source: Global TB database

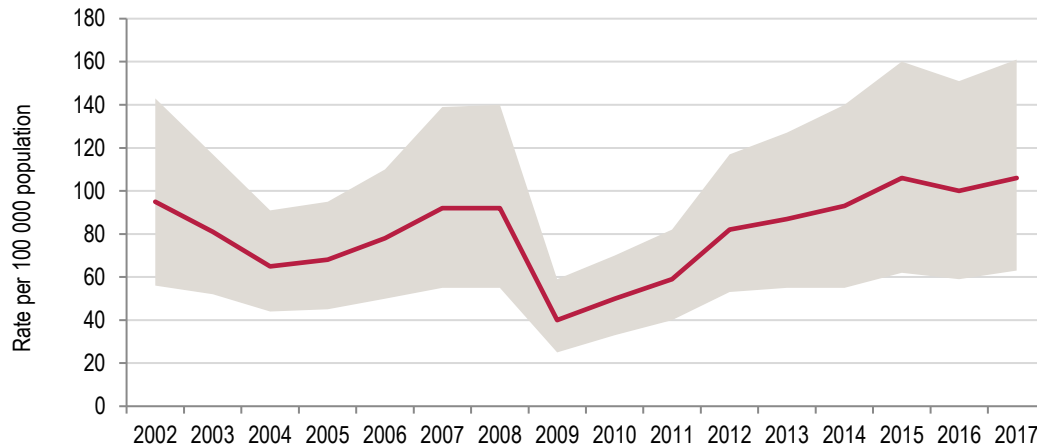
Analysis of the level and trend in TB mortality

IN THE ABSENCE OF A VITAL REGISTRATIONS SYSTEM IN TIMOR-LESTE, TB MORTALITY IS MEASURED INDIRECTLY BY MULTIPLYING ESTIMATES OF TB INCIDENCE BY ESTIMATES OF THE CASE FATALITY RATE (CF. GLOBAL TB REPORT 2018, WHO, TECHNICAL APPENDIX). AS A RESULT, THESE ESTIMATES LEAD LARGE UNCERTAINTY. THUS, ACCORDING TO WHO ESTIMATES, IN 2002 THE TB MORTALITY RATE (EXCLUDING TB/HIV DEATHS) WAS ESTIMATED AT 95 (RANGE: 56-143) PER 100,000 POPULATION. BETWEEN 2002 AND 2009 MORTALITY RATE HAS DECLINED WITH SOME FLUCTUATION. THEN THE TREND OF TB MORTALITY CHANGED THE DIRECTION AND UP TO 2017 INCREASED ABOUT 12% ANNUALLY. IN RECENT THREE YEARS MORTALITY RATE HAD BEEN STABILIZED. BY THE END OF 2017, THE ESTIMATED TB MORTALITY RATE IN TIMOR-LESTE WAS REPORTED AS 106 (RANGE: 63-161) PER 100,000 POPULATION, WHICH IS THE HIGHEST REPORTED TB MORTALITY RATE IN THE WORLD⁵. (Figure 2).

FIGURE 2. ESTIMATED TB MORTALITY RATE PER 100,000 POPULATION, TIMOR-LESTE 2002–2017

⁵ Global tuberculosis report 2018. Geneva: World Health Organization; 2018. License: CC BY-NC-SA 3.0 IGO

Shaded area around lines indicate uncertainty range

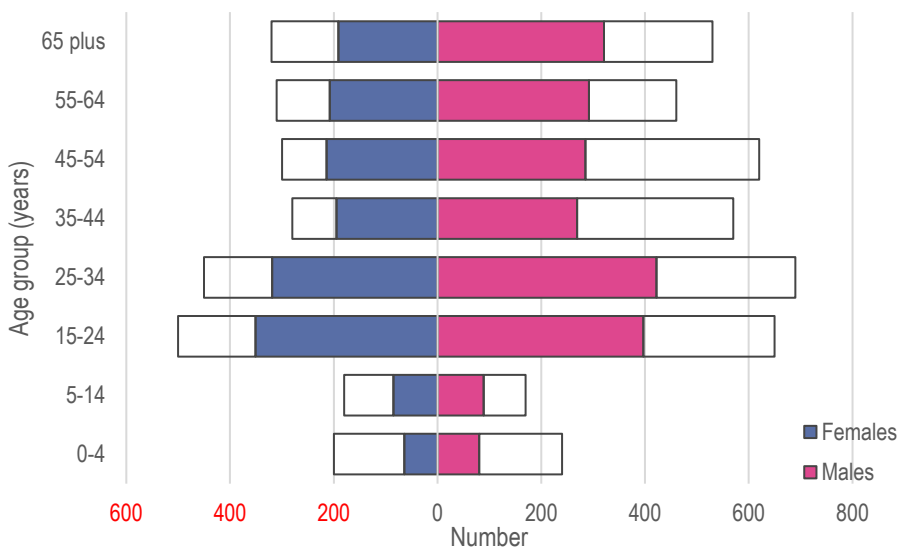


Data source: Global TB database

Level and trend of TB in age-specific notification rates

Figure 3 shows notified number of new and relapse TB cases by sex and age groups in 2018 against estimated number of incident cases. TB is most frequently seen among those aged 15-34 years.

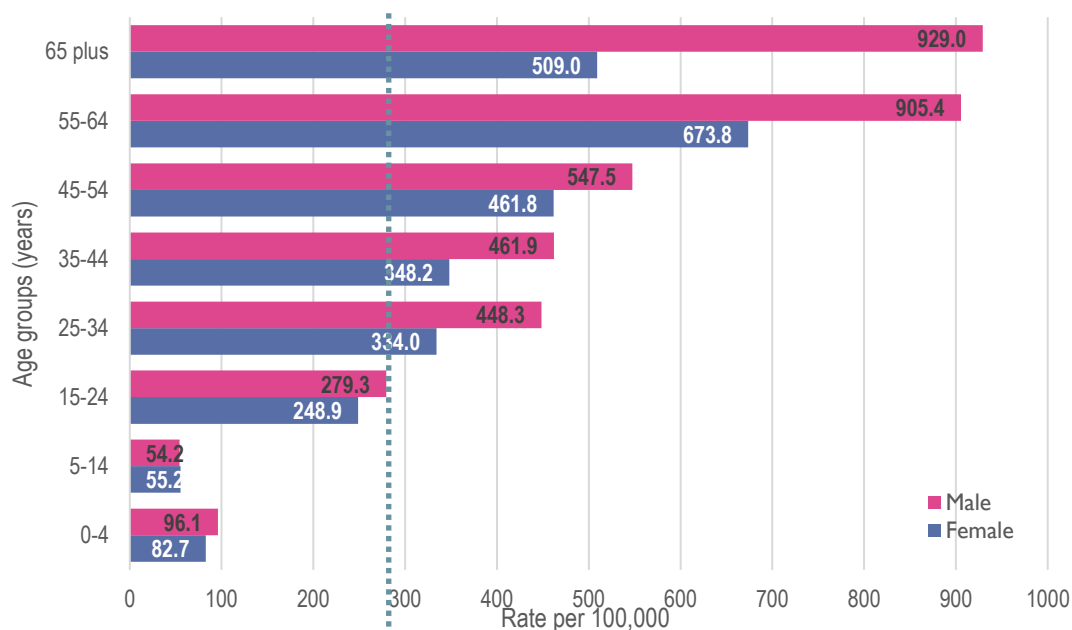
FIGURE 3. ESTIMATED VS NOTIFIED NUMBER TB CASES BY AGE AND SEX



Data source: Global TB database

While looking at age and sex-specific notification rate, the TB notification increases with increase of age. This is common pattern observed in many Asian countries. Among the females the highest age-specific notification rate is observed among those aged 55-64 years, while among the males the highest age-specific notification rate is seen in those over 64 years. Age-specific notification rates always should be accounted in cases of calculation of the yield of ICF in specific group at risk population (Figure 4).

FIGURE 4. AGE AND SEX SPECIFIC NOTIFICATION RATES OF NEW AND RELAPSED TB CASES IN 2018



Data source: Global TB database

National average rate
283/100,000

The key trends of TB disease observed in Timor-Leste are as follows:

- TB notification rate starting from 2010 declined in average of 2.3% of annual percent of change, suggesting a decline in case detection and a growing gap between notifications and true incidence. In 2018 only 3,782 incident TB cases were notified (283 cases per 100,000 population), which is only 57% of estimated number of cases occurring in Timor-Leste (Figure 1)
- There was wide geographic variation of TB notification rates across the municipalities. It could be due to true difference in TB burden across the municipalities, as well as access of population to health care services and quality of services to detect and report TB cases. One of the reasons of high notification rate in Dili is that the TB patients referred from rural communities and with confirmation of TB diagnosed are notified in Dili. According to current surveillance system it is not possible to identify true notification data from the catchment area true population.
- There is a wide geographical variation in the proportion bacteriologically confirmed N&R PTB cases, ranging from 27.3% to 88.2% by municipality;
- The proportion of bacteriologically confirmed TB cases at national level increased from 48.5% in 2013 to 68.2% in 2017, but then sharply declined to 55.0% in 2018;
- TB is most frequently seen among those aged 15-34 years, while the age-specific notification rates increases with increase of age.
- Child TB cases makes 8.4% at national level, while at municipality level the proportion of child TB ranged between 2.4 to 20.0%. Over the recent 3 years there was remarkable decline of proportion of children from 12.4% in 2016 to 8.4% in 2018.
- The proportion of males over the last years remained consistently higher than women at national level, while at sub-national level male to female ratio ranged between 0.9 and 1.9. Between 2013 and 2018 there was just very slight increase the proportion of males from 53.7 to 57.0%.
- The proportion of extrapulmonary cases among new TB cases gradually increased from 12.6% in 2013 to 19.7% in 2018 most likely indicating improved access of population to tertiary care
- In the period 2013–2018 the percentage of retreated cases among all notified cases varied between 1.8 and 8.0% without any clear trend over the time.

- Over the recent five years the treatment success rate of new and relapse TB cases slightly increased from 83.9 in 2013 to 88.5 in 2017. While reported death rates and treatment failure rates are low, there is a concern about the very high proportion of cases that were not evaluated.

Major recommendations

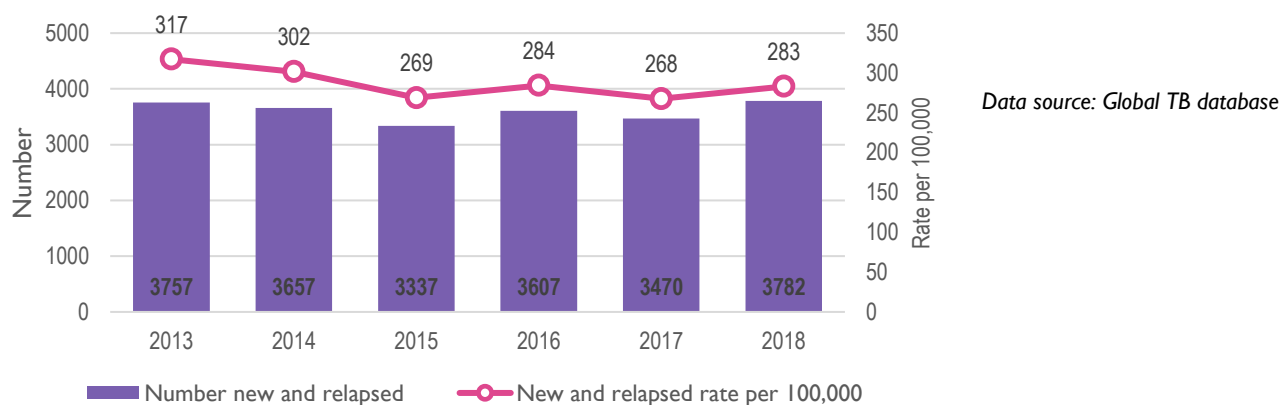
- Develop a routine procedure for to follow up individual patients between facilities. Presumptive TB registers, laboratory registers, and treatment registers should be cross-checked to ensure that all bacteriologically confirmed TB cases are enrolled into treatment.
- Adopt and roll-out WHO standard DHIS2 TB module and dashboard with long-term goal to move to case-based system once the capacity is in place. Historical data stored in excel sheets should be imported in this database for trend analysis;
- A descriptive epidemiology annual report should be produced annually using data from the previous year
- Introduce contact tracing register. Identify key indicators to evaluate progress contact tracing. Revise quarterly report forms to record more detailed data on contact tracing in all municipalities
- Consider conducting national TB prevalence survey, which will provide data that directly measure TB prevalence and inform estimates of TB incidence.
- Investigate the reason of low yield of presumptive TB cases among OPD visitors and reasons of missing to diagnose TB among OPD visitors and take action to address these. Promote active case finding among OPD visitors and TB close contacts. Set monitoring indicators and targets.
- All TB cases should be notified including primary lost-to-follow-up cases and included into cohort analysis
- Increase Gene-expert testing coverage: National diagnostic algorithm should be revised so upon availability, the Gene-Xpert test is implemented routinely to all presumed TB cases as the point of care diagnostic test. NTP should target to reach universal Gene-Xpert testing coverage per End-TB strategy goal.
- Ensure that all patients are tested for bacteriological confirmation.
- Conduct an inventory study to assess under-reporting between presumptive TB registers, laboratory register and treatment registers.

4. CASE FINDING: ANALYSIS AND INTERPRETATION OF LEVEL OF AND TRENDS IN TB NOTIFICATIONS

Time-series trend of TB notification

The number of notified new and relapse TB cases in Timor-Leste slightly increased from 3,757 cases in 2013 to 3,782 in 2018. However, in relative to population in the same period TB notification rate declined from 317 to 283 per 100,000 because of rapid population growth (Figure 5).

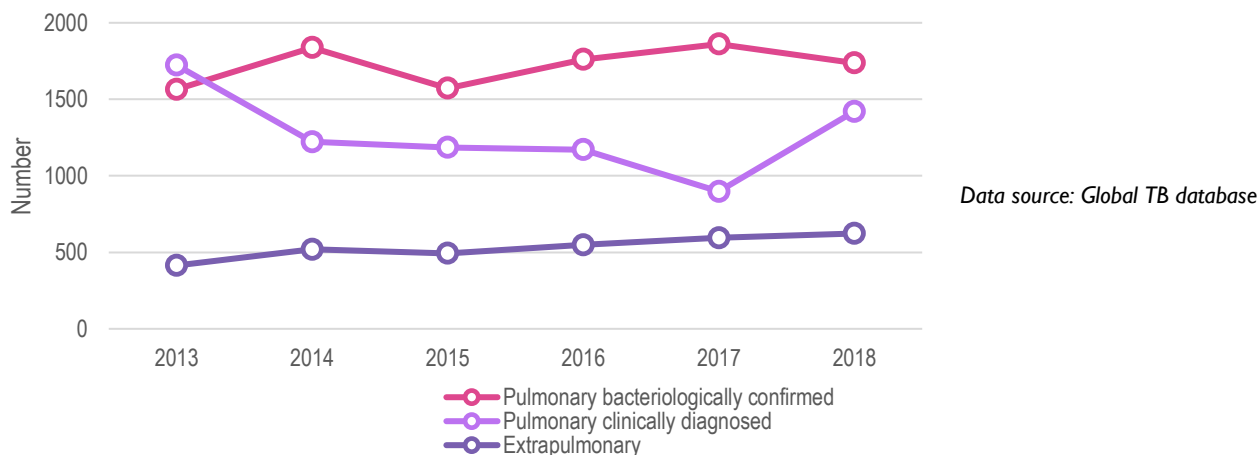
FIGURE 5. TIME-SERIES TREND OF NATIONAL TB NOTIFICATION, 2013-2018



Trend of TB notification by bacteriological confirmation and site of disease

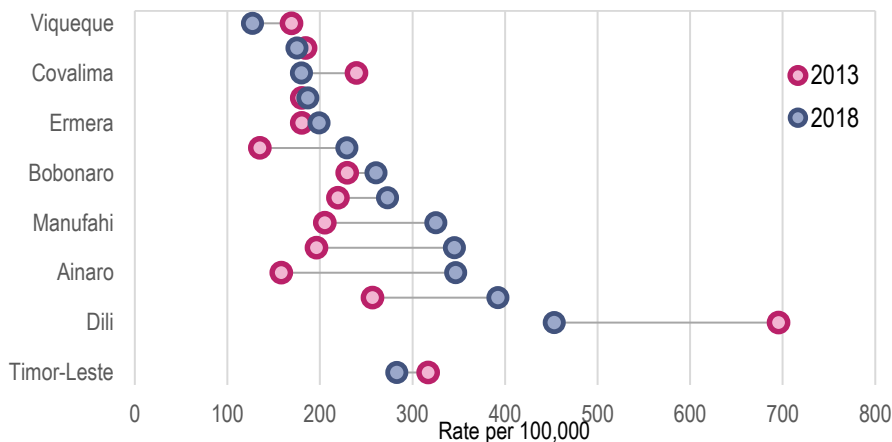
As shown in Figure 6, notified number of new TB cases disaggregated by site of disease and bacteriological confirmation have no clear trend over the time and show sharp year-to-year variation: Between 2013 and 2018 the number of new extrapulmonary TB cases increased on average by 8.2% per year. In comparison, the annual increase of bacteriologically confirmed pulmonary TB cases over the same period was 2.1%, while the clinically diagnosed new pulmonary cases declined -3.9% annually (Figure 6). Thus, despite of introduction and roll-out of Gen-Xpert in the country, there was no notable improvement case finding and laboratory confirmation.

FIGURE 6. TREND IN NUMBER OF NOTIFIED NEW TB CASES BY LABORATORY CONFIRMATION AND SITE OF DISEASE



Trend in TB notification by municipality: At the municipality level, TB notification rate in 2018 was the highest in Dili (457/100,000) and lowest in Viqueque (127/100,000). Between 2013 and 2018 some municipalities have seen marked increases in case notification (Aileu, Bobonaro, Liquica, Manufahi, Oecuse, Ainaro, Baucau), while others have observed significant decrease (Viqueque, Covalima, Dili), and others have not changed.

FIGURE 7. TB NOTIFICATION RATE AT MUNICIPALITY LEVEL IN 2013 AND 2018



Large discrepancy of TB notification rates between municipalities and Dili is explained by fact that the TB patients diagnosed in Dili (including residents of other municipalities) are registered in Dili. Therefore, the notification rate of rural municipalities is most likely under-estimated, while notification in Dili is over-estimated. And the magnitude of this distortion is unknown as the size of population registered outside of their area of residence is not known. The variation in TB notification rates could be due to true difference in TB burden across the municipalities, as well as capacities of health facilities to detect and report TB cases

Active Case finding (ACF): Under the Global Fund, several partners have been implementing ACF activities for people living in “hot spot” areas, household contacts of TB patients, congregate settings of Dili and remote rural areas. The strategies for the ACF include door-to-door screening for cough ≥ 2 weeks, enhancing the capacity of PSFs in home visits/sputum collection, community mobilization, as well as active identification of close household TB contacts. Screening algorithm include symptom check followed by mobile x-ray and sputum testing by Xpert. According to routine project data from eight districts in 2018 and during the first two quarters in 2019, 35,882 people from different risk groups were screened for TB, 7,484 (21%) were identified as presumptive cases. Of them 188 (2.5%) were diagnosed with the TB by Xray and/or GeneXpert examination. The yield and number needed to screen (NNS) among by implementing partner organization is provided in Table 2.

TABLE 2. YIELD AND NNS UNDER ACF ACTIVITIES FOR TB AMONG RISK GROUPS IN TIMOR-LESTE, 2017–2018

Organization	Population screened (a)	Presumptive TB		Diagnosed with TB		Yield (c/a)	NNS (a/c)
		n (b)	%	n (c)	%		
IOM	14,627	5,469	37%	73	1.33%	0.50%	200
Caritas	9,747	1,105	11%	52	4.71%	0.53%	187
Klibur Domin	11,508	910	8%	63	6.92%	0.55%	183
Total	35,882	7,484	21%	188	2.51%	0.52%	191

The yield of TB is low, NTP and partners should aim for much higher yield of TB cases through ACF as it targets adult high-risk groups. Possible reason for comparatively low case detection might be selection bias (missing the most vulnerable during screening as they hard to reach), low sensitivity of screening tools and diagnostic algorithm. Symptom check as a screening tool have been proven as not efficient in one of recent meta-analysis of TB prevalence surveys implemented in Asia showing that 40–79% of confirmed TB cases did not report TB symptoms and were only detected due to chest X-ray screening of all survey participants⁶.

⁶ Onozaki I, Law I, Sismanidis C, Zignol M, Glaziou P, Floyd K. National tuberculosis prevalence surveys in Asia, 1990-2012: An overview of results and lessons learned. *Trop Med Int Heal.* 2015;20(9):1128-1145. doi:10.1111/tmi.12534

5. LABORATORY SERVICES AND NETWORK

Shortening the duration of disease through detection and treatment of cases will reduce the prevalence of TB in the population, and therefore, transmission. In Timor-Leste the laboratory network consists of 76 smear microscopy centres, located across the country (serving about 18,000 population per facility on average), 7 Xpert MTB/RIF sites and the national TB reference laboratory in the capital Dili.

National TB Reference laboratory (NTRL): The NTRL is located in Dili and has a Biosafety Level 3 (BSL 3) culture and drug susceptibility testing (DST) facility developed by Korea International Cooperation Agency (KOICA) and is functional since April 2016. The lab is equipped with a MGIT 320, Xpert MTB/RIF (4 module) and LED-FM. Currently the lab has 5 lab technicians, one data entry officer, one microbiologist (International expert) under the overall supervision of the Executive Director.

The NTRL was performing solid culture and DST for the first line drugs (Rif, INH, Sm and Emb) and second line drugs Oflox and Km. The BSL 3 facility has stopped functioning since Feb 2018 in want of repair of the Air Handling Unit (AHU) and replacement of HEPA filters. The lab re-initiated cultures in late 2018 for the ongoing drug resistance survey (DRS) and follow up of MDR/RR patients on treatment. Efforts are being made for repairing the BSL 3 facility with funds having been allocated and vendor identified. DST and liquid culture will be initiated only after the BSL3 is functional again and after performing the required 100 DSTs the lab can go for proficiency testing and accreditation by Supra-national Reference Laboratory (SNRL) in Chennai. In the interim, till the lab gets accredited, the samples for DRS and MDR/RR patients diagnosed through Xpert MTB/RIF under the programme are sent to SNRL Chennai for DST.

The programme is moving towards universal DST and as per the revised algorithm all TB patients will be offered DST for Rif, INH and second line drugs (FQs and SLIs) as per the recent WHO guidelines. While DST for Rif will be by Xpert MTB/RIF the DST for other drugs will done at NTRL by phenotypic method (following accreditation). The phenotypic DST has a long TAT and can impact clinical management of the patients resulting in unfavourable outcomes. LPA can provide the DST results rapidly for appropriate patient management. The DRS survey results will estimate the prevalence of resistance to the individual drugs and these can be considered for establishing the LPA facility.

Xpert MTB/RIF: In 2018, there were 4 Xpert sites. The location, capacity and utilization of the Xpert sites in 2018 is shown in the Table 3.

Table 3. Location, capacity and utilization of the Xpert MTB/RIF in 2018

Sites	Capacity	Total Tested	Utilization	MTB Detected	RR diagnosed
NTRL	2500	2257	85%	247	13
Klibur Domin	2500	1331	50%	157	17
Bairo-Pite	2500	226	9%*	30	4
Maliana	2500	305	12%	12	0
Total	10560	4119	39%	446	34

In May 2019, three more sites (Oecusse, Viqueque and Maubisse) were added increasing the Xpert sites to seven. The capacity and utilization of the Xpert sites from Jan-Jun 2019 are in the Table 4.

Table 4. Location, capacity and utilization of the Xpert MTB/RIF: Jan to June 2019

Sites	Annual Capacity	Total Tested (Jan-Jun 2019)	Utilisation (Jan-Jun)	MTB Detected	RR TB Diagnosed
NTRL	2500	993	75%	78	22
Klibur Domin	2500	947	72%	79	22
Bairo-Pite	2500	181	14%	16	5
Oecuse*	2500	20*	5%*	1	1
Viqueque*	2500	92*	22%*	2	0
Maliana**	2500	3**	2%**	0	0
Maubisse	2500	54	65%	7	1
Total	17500	2290	44%	183	30

*The Xpert machines have been installed in May to June 2019. Utilisation has been calculated accordingly.

**The Xpert machine was installed in May 2019 but 2 modules are not functional. Utilisation has been calculated accordingly.

With these three additional machines, the utilization of the Xpert capacity has increased from 39% (2018) to 44% (Jan-Jun 2019). However, it is still sub-optimal. The total Xpert capacity with these 7 Xpert machines is 17500. An additional Xpert machine will be installed in Lautem in 2020 further increasing the capacity to 20,000 tests annually. There is no EQA mechanism being implemented for Xpert MTB/RIF presently.

Smear Microscopy: There are 76 labs performing smear microscopy. Municipality wise smear positivity and annual slide volume rates for 2018 are in the table below.

Table 5. Location, capacity and utilization of the Xpert MTB/RIF: Jan to June 2019

Districts	Total Slides	Total positive slides	Annual slide volume rate	Smear positivity rate
Dili	12029	815	11214	6.8
Manatutu	1876	65	1811	3.5
Lautum	2043	108	1935	5.3
Ermera	4304	306	3998	7.1
Ainaro	1113	169	944	15.2
Oecusse	3417	332	3085	9.7
Liquica	2790	207	2583	7.4
Covalima	1662	134	1528	8.1
Baucau	1727	133	1594	7.7
Viqueque	894	120	774	13.4
Bobanaro	2863	210	2653	7.3
Maunfahe	1614	104	1510	6.4
Aileu	2146	130	2016	6.1
Total	38478	2833	35645	7.4

NTRL is responsible for EQA of all the labs which includes onsite evaluation (OSE) and Random blinded re-checking (RBRC). RBRC is being done regularly with the LTs of the labs bringing the required number of positive and negative slides to the NTRL. However, onsite visits are few and irregular. The OSE (whenever conducted) and RBRC reports are not shared with the respective labs and there is no follow up on action taken.

Recommendations:

- The repair of the BSL-3 facility should be expedited and the first and second line DST by solid and liquid culture to be initiated. The staff has been trained in solid and liquid DST almost a year ago and will require

refresher training /reorientation. The lab has ~700 MGIT tubes which are due to expire in Nov 2019 unless the liquid culture and DST is initiated in September 2019.

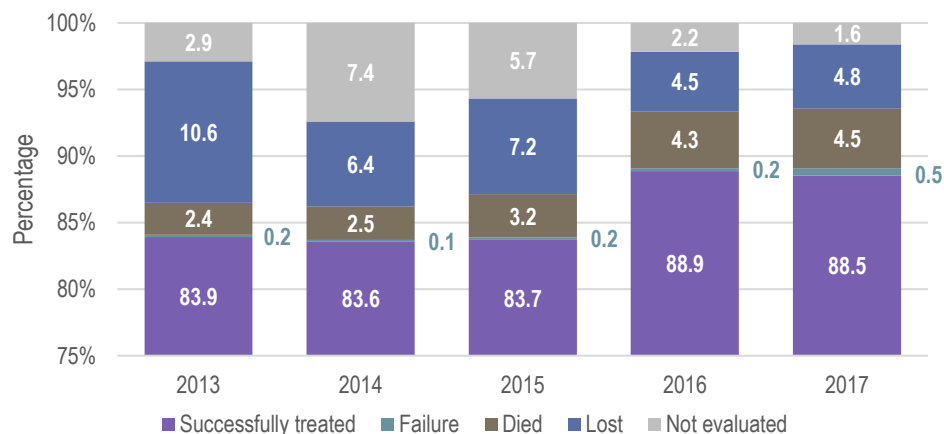
- Plan for proficiency testing and accreditation for first and second line drugs by solid and liquid DST should be prepared in consultation with the SNRL, Chennai. The SNRL should provide all necessary support to the NTP in this process.
- In 2018-2019 (upto July) the lab has performed 981 L-J cultures mainly on smear positive samples under DRS. Results for 811 cultures are available of which 70% are positive, 28% negative and 2% contamination. The reasons for high negative rates need to be ascertained and could be due to aggressive decontamination (considering the low contamination rate) or delayed transport of samples.
- Efforts should be continued to identify agencies which provide preventive maintenance and breakdown services for BSL-3 and lab equipment at NTRL and microscopes in the districts. Simultaneously the programme should build its capacity and hire and train a local biomedical engineer (or equivalent) for routine maintenance and minor repairs of lab equipment. The training can be done at SNRL, Chennai or in Indonesia.
- Less than half of the available Xpert capacity (17500 annually) is currently utilized. The following recommendations can help in optimizing the utilization.
 - Establishing an efficient sample collection and transport system: Under the DRS samples are being transported from all the municipalities to the Xpert sites and NTRL within the prescribed timelines through human carriers who are adequately incentivized for this work. The same mechanism can be replicated for transporting samples from the microscopy labs to the Xpert sites.
 - Promote use of Xpert for diagnosis of childhood TB and extrapulmonary TB. Develop SOP for collection, transport and processing of different extrapulmonary samples (Pus, tissue, body fluids etc.) at NTRL. The doctors at the national hospital can be trained to perform gastric lavage/aspiration on children with presumptive TB who are unable to produce sputum. They can also be trained to collect and send the samples from presumptive EPTB patients to the NTRL.
 - The programme should transition to universal DST. This can be done in a phased manner- initially doing DST for all notified TB patients by Jan 2020 and expanding this to test all presumptive TB cases with Xpert by Jul 2020. A detailed implementation plan should be prepared which includes the Xpert capacity required, number of tests to be performed, sample transport from CHCs to Xpert sites, rapid communication of results etc.
- Plan the establishment of the Line Probe Assay (LPA) facility: The decision to establish the LPA facility can be taken based on the results of the ongoing DRS which will estimate the prevalence of INH resistance among TB patients and FQ resistance among MDR/R-R TB patients.
- Strengthen the External Quality Assurance (EQA) for smear microscopy: The senior LTs at the 13 District Microscopy Centres (DMCs) should be actively engaged in the process and allocated 5 microscopy centres each. The senior LTs will perform OSE and RBRC regularly (quarterly basis) and follow up on the recommendations and action taken. The NTRL will supervise the senior LTs and also conduct the OSEs and RBRC for the DMCs and a few randomly selected microscopy centres. SOP should be prepared by the NTRL on these lines and the senior LTs sensitized/trained and the process implemented.
- Introduce EQA for Xpert MTB/RIF: The EQA for Xpert MTB/RIF should include the following components:
 - It should be ensured that the annual calibration is done timely.
 - The NTRL should monitor the rate of invalid results and errors on a monthly basis and take appropriate action.
 - Panel testing should be performed annually. The panels (MTB neg; MTB pos,Rif sens; MTB pos, Rif Res) will be prepared by NTRL and supplied to all Xpert sites for testing.

6. TREATMENT OUTCOMES

TB treatment is one of the most effective interventions in TB control to reduce the prevalent cases in the population and reduce the transmission of infection. Over the recent five years the treatment success rate of new and relapse TB cases slightly increased and in 2017 was reported 88.5%, which is marginally below End TB strategy target of 90% (

Figure 8). The increase of treatment success rate was mainly due to decline of patients who were lost to follow-up and not evaluated. While the proportion of those who died increased, the proportion of those with treatment failure remained overall stable below 1%.

FIGURE 8. TRENDS OF TREATMENT OUTCOME OF NEW AND RELAPSED TB CASE IN TIMOR-LESTE 2013-2017



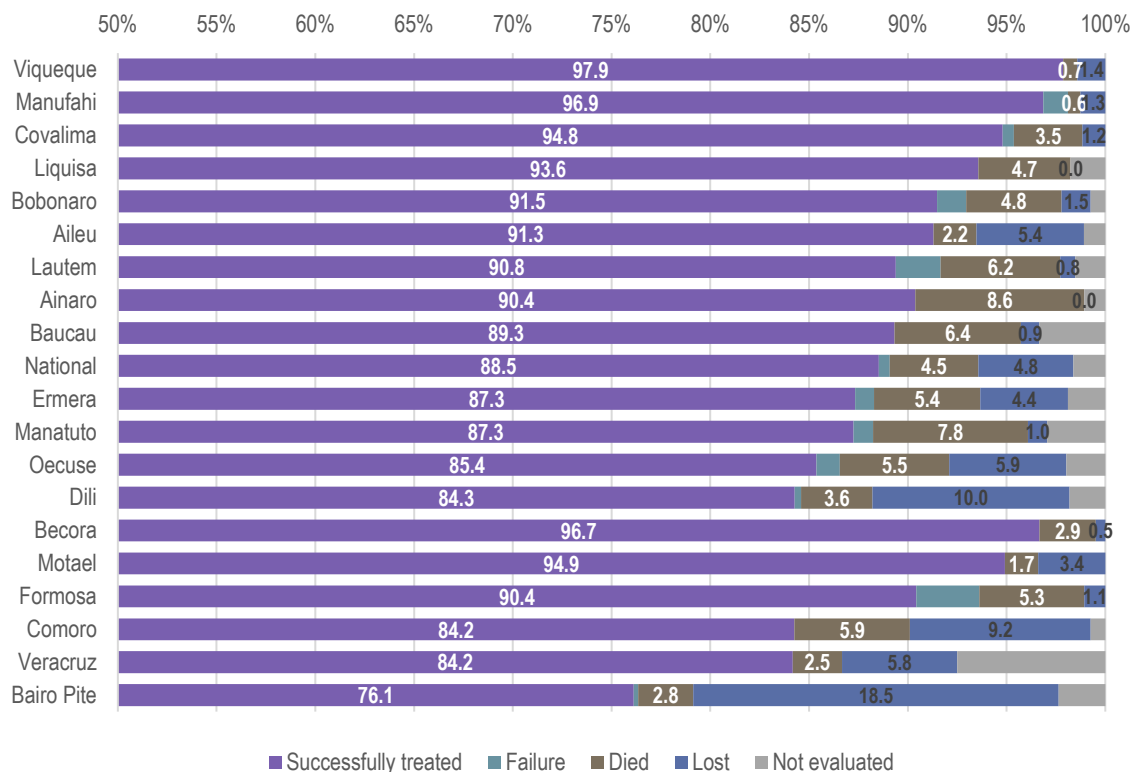
Data source: Global TB database

Figure 9). Main reason of low treatment success rate in Dili reporting units are lost to follow-up, which is related to lack of mechanism of communication between tertiary clinics and peripheral health structure. The residents of provinces who initiate the treatment in the tertiary facilities in Dili, are expected to continue their treatment in their local health facility, however, there are no mechanisms in place to ensure that the patients after discharge from the hospital actually continue the treatment under the supervision of local health facility. Another concerning issue is the remarkable death rate observed in several municipalities, such as Ainaro (8.6%), Manatuto (7.8%), Baucau (6.4%), Lautem (6.2%). High death rate was explained by the delay in start of treatment: the patients are often identified only in advanced stage of disease. Therefore, special attention should be given to those municipalities to undertake interventions aimed to increase population awareness on TB and scale-up of active case-finding among OPD patients and other identified population at risk.

The observation of records at the facilities indicated that the patients identified with bacteriologically confirmed TB and initially lost to follow-up are not included into cohort analysis, which is not correct and leads to over-estimation of treatment outcome. Furthermore, we observed that surveillance system managed to evaluate more patients than were originally registered. While we assume that some of these might be transferred in, or due to late original submission of case notifications, this flags an issue with data quality assurance and needs to be further investigated.

The high level of treatment success is likely to contribute to reducing disease transmission and could be regarded as one of key factors to drive the TB epidemic downwards. However, the treatment success rate is likely to be over-estimated in the national data, as there is no routine recording of initial loss to follow-up.

FIGURE 9. TREATMENT OUTCOMES OF NEW AND RELAPSED TB PATIENTS BY REPORTING UNITS, TIMOR-LESTE 2017



The NTP policy of providing directly observed treatment (DOT) is not strictly enforced for those who seek treatment at health care facilities. Most commonly, patients are provided with drug supplies of several days up to two weeks during the intensive phase of treatment, and one-month drug supplies during the continuation phase. Drug intake is solely controlled on the basis of NTP drug blisters, which the patients are required to present to the treatment facilities before additional drugs are distributed. For those patients receiving treatment in the community from PSF, daily DOT is more feasible as access barriers are minimised.

Recommendations

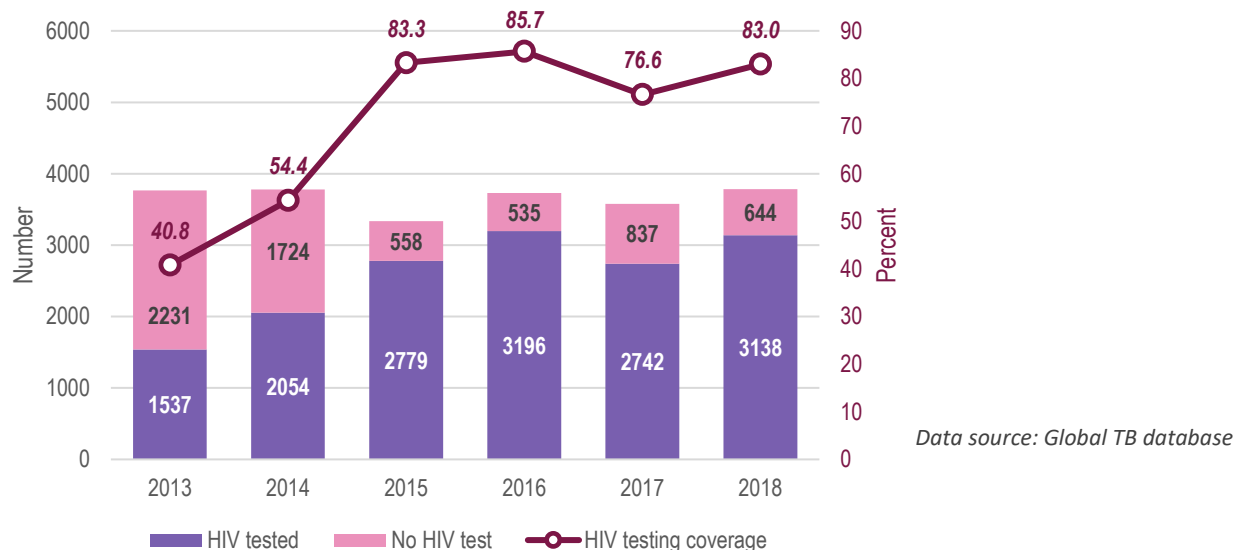
- Patients identified with bacteriologically confirmed TB and initially lost to follow-up should be included into cohort analysis to prevent over-estimation of treatment success rate. Mechanism for routine recording of initial loss to follow-up to be put into place.
- From 2015 to 2017, it was observed that surveillance system managed to evaluate more patients than were originally registered- example, 3,543 were evaluated for treatment outcome in 2017 whereas 3,470 were notified a year back. While some of these might be transferred in, or due to late original submission of case notifications, this flags an issue with data quality assurance and needs to be further investigated.
- To decentralise TB care and improve treatment adherence, promote wider use of PSF volunteers to provide treatment support for TB patients. Issues regarding timely payment of honorarium to PSF needs to be resolved.
- There is limited adverse drug management, as ancillary drugs are frequently not available and staff training on ADR management is insufficient.

7. TB-HIV COLLABORATION

This section is largely derived the epidemiological review conducted as part of the TB Mid-Term Review (MTR) and from the Joint Monitoring Mission Report of the HIV programme conducted prior to the TB MTR. Meeting with HIV Program Manager was not possible as she was travelling at the time of the TB MTR, planned visits to ART centres in select referral hospitals could not take place due to time constraints.

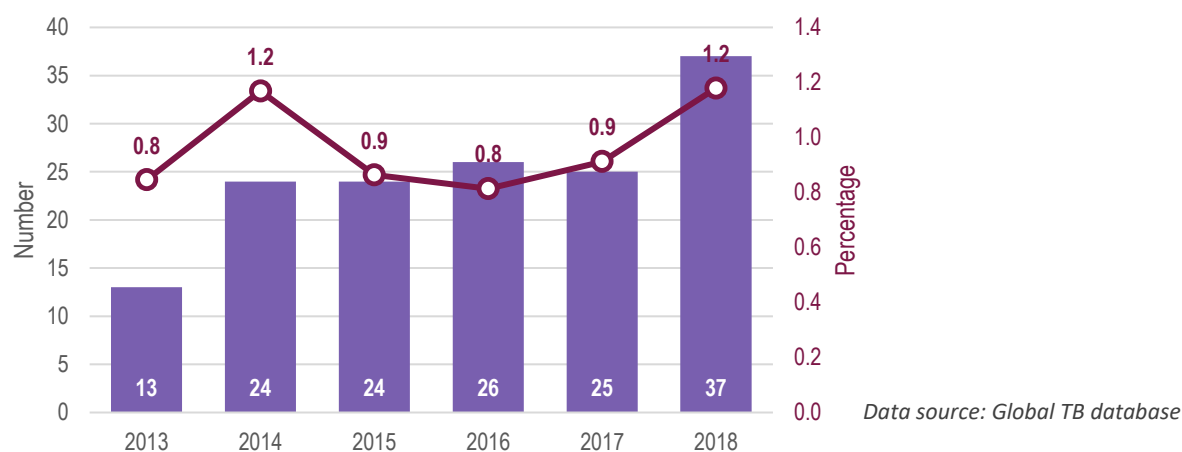
Timor-Leste has substantially expanded HIV testing among people diagnosed with TB over the past several years, with the proportion tested increasing from 40.8% in 2013 to 83.0% in 2018 (Figure 10).

FIGURE 10. TREND IN NUMBER AND PROPORTION OF TB PATIENTS WITH KNOWN HIV STATUS



Despite of impressive increase of HIV testing coverage absolute number of TB/HIV co-infected cases between 2014 and 2017 remained stable around 25 cases annually and increased to 37 cases in 2018. The HIV prevalence among TB patients over the last six years ranged between 0.8% and 1.2% (Figure 11).

FIGURE 11. NUMBER TB/HIV CO-INFECTED PATIENTS AND PROPORTION OF TB/HIV AMONG TESTED



Other aspects of TB-HIV collaborative activities, summarised below, need much strengthening. Particularly the set of activities to reduce the burden of TB among PLHIV, the so-called 3Is – Intensified TB case finding among PLHIV, TB preventive treatment and early Antiretroviral treatment (ART), and TB Infection Control in health care and congregate setting

Implementation of the four pronged strategy on TB-HIV Collaboration in Timor-Leste	
<p style="text-align: center;">Prevention</p> <p>1. TB Preventive Therapy Status: Patchy implementation, % of PLHIV newly enrolled in HIV care receiving IPT is unknown and not reported to WHO</p> <p>2. Air-borne Infection Control: Status: Fast tracking of chest symptomatic is reported to be ongoing in all the referral hospitals, MTR team could not observe the same</p> <p>3. Awareness generation Status: Weak counselling and awareness generation related activities</p>	<p style="text-align: center;">Early Detection of TB / HIV</p> <p>1. 100% coverage of PITC in TB patients Status: 80% of TB patients tested for HIV in 2018</p> <p>2. PITC in Presumptive TB cases Status: Not initiated</p> <p>3. Rapid diagnostics for detecting TB & DR-TB in PLHIV Status: Patchy implementation, not properly documented</p> <p>4. ICF activities at all HIV settings - ICTC, ART Status: 4 symptom screening ongoing but not documented)</p>
<p style="text-align: center;">Prompt Treatment of TB / HIV</p> <p>1. Prompt initiation of TB Treatment Status: Ongoing</p> <p>2. Early Initiation of ART: Status: Not known: within 8 weeks?</p>	<p style="text-align: center;">Management of special TB / HIV cases</p> <p>1. TB / HIV in children (Not reported)</p> <p>2. TB / HIV in pregnant women (Not reported)</p> <p>3. Drug Resistant TB / HIV (Not reported)</p> <p>4. TB / HIV patients on PI-based ART (Not reported)</p>

Performance on TB-HIV collaborative activities: 2018 program data

- 83% TB patients with known HIV status
- TB-HIV co-infection: 37/3906 (1.2%)
- Of 387 PLHIV currently alive on ART, exact status on TB screening and testing is unknown
- % of PLHIV newly enrolled in HIV care who received INH preventive therapy is unknown
- Patchy implementation and weak documentation TB-HIV collaborative activities in the field
- Weak monitoring and evaluation of TB-HIV collaborative activities

Recommendations

- HIV-TB coordination should be strengthened with regular meetings and joint monitoring of TB-HIV collaborative activities. Documentation of TB-HIV collaborative activities need to be strengthened
- Consider TB patients (in addition to pregnant women and patients with sexually transmitted infections) when quantifying requirement of HIV test kits. Inf fact, the MTR team heard from several health facilities visited that thee was a shortage of HIV test kits in the past 1 year.
- Ensure universal testing of all TB patients for HIV, maintaining a line listing of TB-HIV patients referred to the HIV program for Antiretroviral Therapy, Cotrimoxazole prevention treatment and other services
- TB screening of HIV positive patients should be documented at the Antiretroviral Therapy (ART) centres and a line list made for all referrals to TB program to facilitate follow up
- The issue of screening PLHIV for latent TB infection and provision of INH preventive therapy should be jointly discussed by both programs, and implementation monitored on a monthly basis

8. PROGRAMMATIC MANAGEMENT OF DRUG-RESISTANT TB

Case finding Strategy: The current criteria for presumptive MDR/R-R TB patients include all retreatment TB cases, all new and retreatment cases who are smear positive on follow up, contacts of MDR/RR patients with symptoms of TB, PLHIV patients with symptoms of TB

Number of presumptive MDR cases tested and diagnosed since 2014 is presented in the Table 5. In 2017 and 2018 several presumptive TB patients have also been tested under the ongoing active case finding interventions using Xpert MTB/RIF. This has resulted in a significant increase in number of Xpert MTB/RIF tests, the number of TB and RR-TB cases diagnosed.

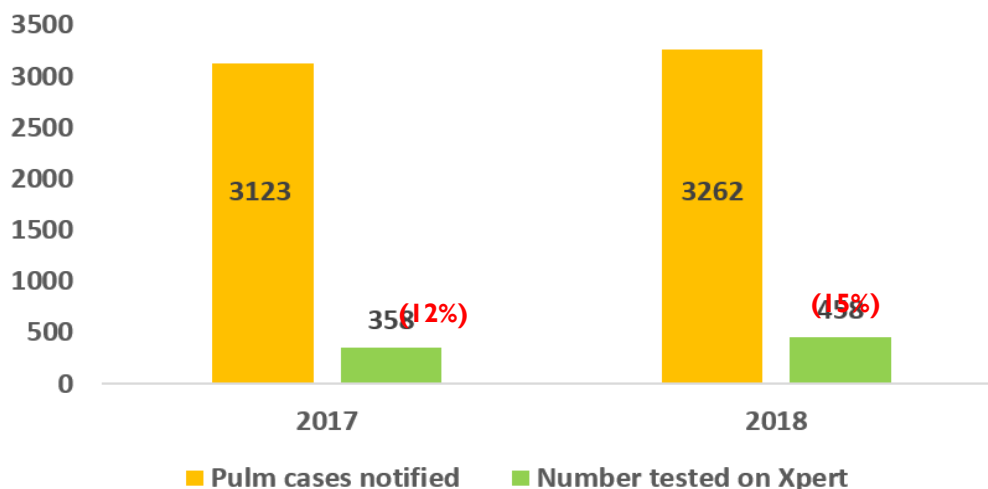
Table 5. Presumptive MDR cases tested and diagnosed, 2014-2018

Year	No of presumptive TB patients tested on Xpert	Number diagnosed as TB	Number diagnosed as RR-TB	No of presumptive MDR TB patients tested on Xpert	Number diagnosed as RR-TB	Total R-R diagnosed
2014	-	-	-	119	3	3
2015	-	-	-	181	4	4
2016	-	-	-	210	6	6
2017	1856	310	2	277	3	5
2018	3625	402	28	189	6	34

Key observations:

- Visits to some of the microscopy laboratories and health facilities in Dili showed that all presumptive MDR/RR TB patients, as per the current criteria are not tested. Nearly 30% of the retreatment cases and almost all smear positive on follow up are missed.
- Screening of close/family contacts of all MDR/RR cases is not done. In a few cases where it is done it is not recorded on the treatment card.
- Overall the proportion of all notified TB cases tested on Xpert MTB/RIF is ~15% (Figure 13). This is despite the fact that there is sufficient Xpert capacity.

FIGURE 13: TB CASES – PROPORTION OF NOTIFIED PULMONARY TB CASES TESTED ON XPERT



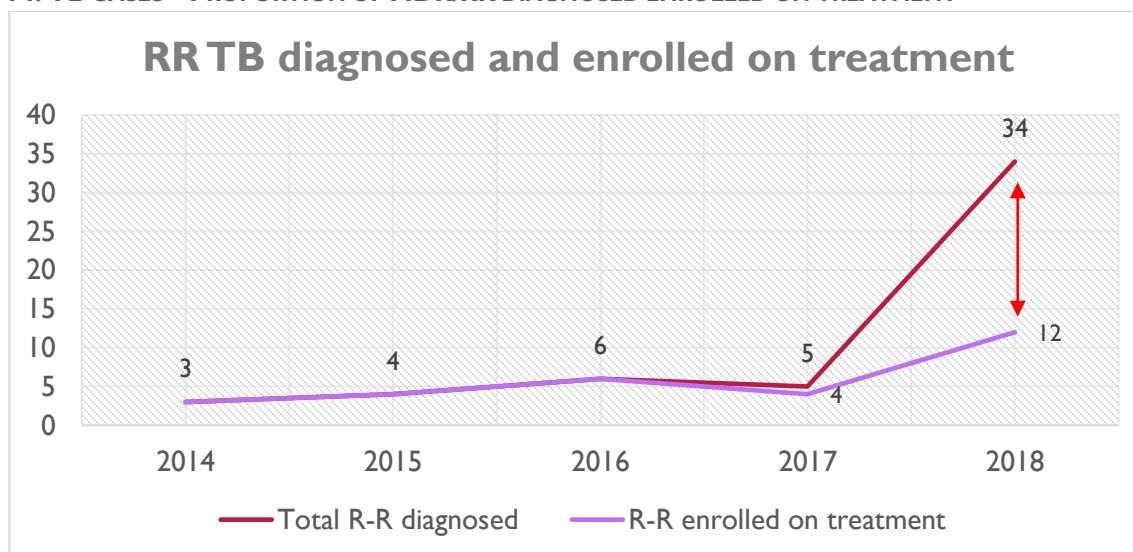
Recommendations:

- It should be ensured that all presumptive MDR cases as per the current criteria are identified and their samples are collected and sent for diagnosis. To monitor the proportion of presumptive MDR cases tested a simple format can be used for reporting by all municipalities every quarter.
- Strengthen contact tracing which can easily be done by the PSF/community volunteers delivering the monthly rations to the patient's residence.
- Strengthen linkages with the other Government programmes like SISCa and Saude-na-familia and active case finding projects implemented by the partners.
- Use Xpert MTB/RIF for diagnosis of extra-pulmonary TB especially for lymphnode and TB meningitis. The NTRL can prepare SOPs for collection and processing of extrapulmonary samples. Staff at the National Hospital and referral hospitals in the district should be sensitised/trained on sample collection.
- Considering that the absolute number of TB cases is small and there is enough Xpert capacity the NTP should move towards universal DST by Xpert MTB/RIF. This can be done in a phased manner in terms of patient categories and geography. Include all notified pulmonary TB cases and implement the revised criteria in high MDR/RR prevalent districts - Dili, Manatutu, Bobonaro, Baucau and Liquica. Subsequently, expand the revised criteria to all the municipalities. Once this is done, transition to testing all presumptive TB patients by Xpert MTB/RIF.
- An operational plan should be prepared for implementing the above expansion taking into account the training of staff, mechanism for sputum collection and transportation and availability of the Xpert cartridges.

Treatment initiation and delivery: Treatment for drug sensitive TB is initiated by the doctors at the CHC in all 13 municipalities using standard first line regimen CAT I (2HREZ/4HR) and CAT II (2HREZS/1HREZ/5HR) for new and previously treated patients respectively.

Patient enrolment: The number of patients diagnosed and enrolled on treatment from 2014 to 2018 is shown in Figure 14 below. In 2018 with increased availability and use of Xpert MTB/RIF especially for active case finding interventions there has been a sudden increase in the number of RR cases diagnosed (n=34). In 2017 of the 5 RR patients diagnosed 4 were enrolled on treatment. In 2018 of the 34 RR cases diagnosed only 12 (35%) were initiated on treatment. The reason given by the staff was that 22 RR cases were new and repeat Xpert MTB/RIF was found to be negative. The mission followed up on 7 of these 22 patients. Of these 5 had prior history of TB and 2 had history of contact with MDR/R-R patients within their family. *Incomplete history of the patients has led to delayed treatment and continued transmission.*

FIGURE 14: TB CASES – PROPORTION OF MDR/RR DIAGNOSED ENROLLED ON TREATMENT



Treatment regimen and model of care: Treatment for MDR/RR-TB patients is initiated at Klibur Domin treatment center in Liquica after a complete pre-treatment evaluation. The tests are conducted at the National Hospital. Standardised treatment with second line drugs (including injectable) in accordance to the WHO PMDT guidelines (2011) is being currently used. 8 Cm Lfx Eto Cs E Z / 12 Cm Lfx Eto Cs E

RR TB patients are hospitalized at the 14 bedded infection control compliant wards at the Klibur Domin DR-TB center for the complete duration of intensive phase of treatment. While admitted, the patients are followed up clinically by an clinical specialist from the National Hospital who visits the facility daily.

Klibur Domin does not have facilities to manage any severe complications/adverse reactions (ARs). The nearest tertiary centre is the National Hospital at Dili in which a ward has been identified for admitting the MDR patients. Audiometry is not available at Klibur and National Hospital and hence ototoxicity is not monitored. Samples for second line DST sent to SNRL, Chennai and results not available prior to treatment initiation.

After the injectable phase the patients are referred to their respective districts where they continue ambulatory treatment and follow up smears are done. DOT is weak during the ambulatory phase with patients being handed over medicines for upto 4 weeks for self-administration.

Follow up cultures and other investigations are done regularly at the NTRL and National Hospital respectively while the patients are admitted at Klibur Domin. Audiometry is not available at the National Hospital hence there is no monitoring for ototoxicity. During the ambulatory phase follow up cultures and investigations are done irregularly due to non-availability of necessary facilities for sputum transportation, blood investigations and X ray at the peripheral health facilities.

Recording of adverse drug reactions (ADRs) is on an adhoc basis. During the injectable phase the ADRs and their management is recorded by the treating physicians and nursing staff in the patient case records. These are not entered in the treatment card. During the ambulatory phase ADRs are not recorded at all.

There is no standard regimen defined for treatment of H mono resistance and pre-XDR and XDR TB patients. Newer and repurposed drugs (Bdq, Dlm, Lzd, Cfz and Mfx) are not approved by the regulatory body and are not available in the country.

Treatment outcomes of the MDR/RR patients: The programme achieved 100% treatment success rate from 2011-2014. Since 2015 the outcomes have been ~50% -80% due to loss to follow up and deaths. There have been no formal death audits for ascertaining the reason for death. Of note, the number of patients enrolled on treatment between 2011 to 2017 ranged from 2 to 6 patients per year, so interpreting percentages can be misleading.

Recommendations:

- Henceforth for any new case (i.e without prior history of TB) found to be RR positive on Xpert MTB/RIF
 - Elicit prior history of TB treatment. In some cases where the patient may not be aware of TB disease he/she (and family members) should be asked about any prolonged treatment the patient may have taken in the past, any treatment which caused orange discoloration of urine and also shown anti TB drugs to confirm if the patient had taken them.
 - Elicit history of contact with MDR/RR patient.
 - In case the above are not elicited the patient should be referred to the Clinical Committee for MDR TB for a detailed clinically and radiological assessment. The Committee will take the decision for repeating Xpert MTB/RIF and the decision to initiate or defer the treatment in such cases.
- All the 22 patients found to be RR initially but negative on repeat Xpert should be tracked, re-assessed (as per the guidance above) and initiated on treatment if required.
- There is currently only one expert physician managing the MDR/RR patients. It is strongly recommended that the other local Timorese physicians be trained in clinical management of MDR patients. The identified doctors should be trained on clinical and programmatic management of DR-TB and then posted along with

the specialist. This will ensure that there is no interruption in service delivery if the current specialist is not available or leaves.

- Establish a Clinical Committee which consist of pulmonologist, internist, paediatrician and psychiatrist to discuss and decide on complicated MDR/RR cases. Other specialists like nephrologist, cardiologist, gynaecologist can be invited members in case their expert advice is needed. Rather than establishing a new Committee the scope of the existing aDSM Committee can be enhanced and the relevant experts can be included. The specialist physician managing the MDR/RR patients currently will be the member Secretary and will coordinate the Committee meetings. The Committee should meet regularly to review the progress of the patients on treatment and discuss complicated MDR/RR cases. The Committee can consult experts from neighbouring countries like Indonesia for complicated cases.
- Transition to WHO recommended all oral regimen for a duration of 18-20 months. The following steps to be taken for implementation of the new regimen - finalise the guidelines which are currently under revision, trainings, obtain regulatory approvals for second-line drugs and procure it through GDF, ensure availability of tests for pre-evaluation and monitoring of patients.
- The NTP, while implementing the all oral regimen, should also consider transitioning to an ambulatory patient centred model of care. The patient can be admitted upto 4 weeks at Klibur Domin for pre-treatment evaluation and initiation of treatment. Those who tolerate the treatment well and are clinically stable can be discharged to continue the treatment on an ambulatory basis. The patient can be followed up on a monthly basis at the referral hospitals in the municipalities and at 2 monthly intervals at Klibur Domin and National Hospital. Patients with serious ADRs can be referred to National Hospital/Klibur Domin for further management. However, prior to this transition it should be ensured that the mechanisms are established for supervised treatment in the field; monitoring of the patients at CHC/referral centres with facilities for investigations and X rays; strengthening aDSM- recording, reporting and management of adverse reactions; transporting patients with serious ADRs to National Hospital/Klibur Domin
- Efforts should be made to achieve 100% successful outcomes. Death audit should be conducted in all deaths while on treatment and analysed. Strengthen treatment adherence support through counselling, timely provision of incentive and community and civil society participation.
- Establish a centre of excellence (CoE) for management of MDR and other complicated TB cases and serve as a national training centre for TB, DR-TB and TB-HIV for staff at all levels. Assess and identify potential centre (s) for such (amongst the national hospital, referral hospitals and Klibur Domin) which can be strengthened for this purpose by providing additional HR and infrastructure. This centre (s) can be linked with existing CoE/national institutes in India/Indonesia for technical support.

9. CHILDHOOD TB

Burden of child TB in Timor-Leste. In 2018, the number of TB cases (all forms) in children (aged 0-14 years) was 318, which accounted for 8.4% of all notified TB cases in the country. There has been an increasing trend of the case finding from 2014 to 2016, but started decreasing thereafter (Figure 14). Another problem noticed for the case finding was a wide variation between municipalities (range 2.4% to 20%) and the fact that in almost all of the municipalities the proportion was less than the target of 15% (Figure 15). This indicates under-diagnosis of child TB.

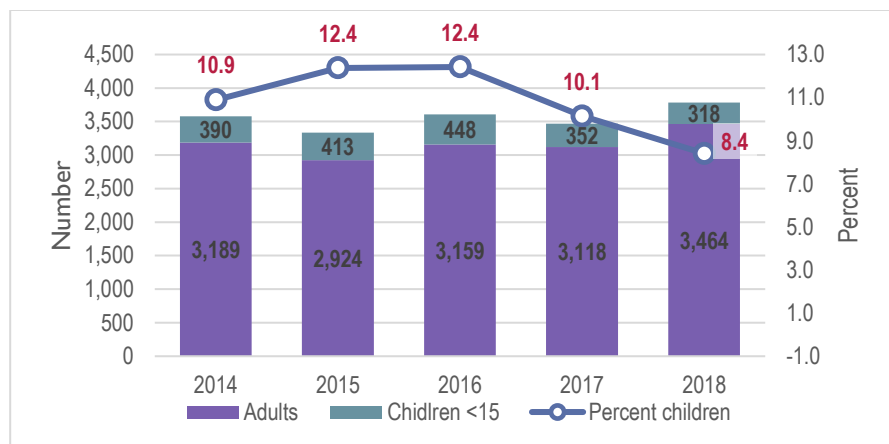


FIGURE 14. PROPORTION OF CHILDHOOD TB AMONG ALL TB CASES: 2014 – 2018

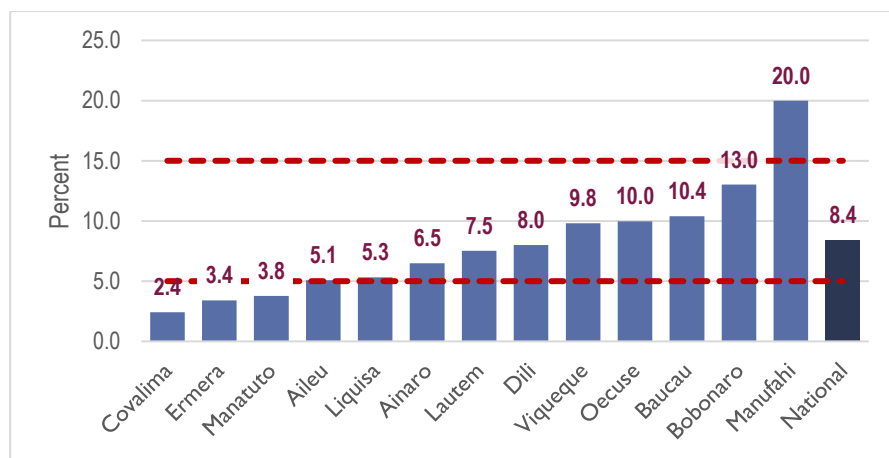


FIGURE 15. PROPORTION OF CHILDHOOD TB AMONG ALL TB CASES IN 2018, BY MUNICIPALITY

The most common forms of childhood TB being treated and reported by NTP were sputum smear-negative and extrapulmonary TB. This is as expected. However, the cases are more common in 5-14 year olds than in 0-4 year olds for all disease categories (Figure 16). This is not as expected and indicated underdiagnosis of TB among young children. The global data suggests that the ratio of childhood TB in the age group 0-4 should be 1.5-3.0 higher than that of those aged 5-14 . This

assumption is based on the known increased susceptibility to infection, disease and disseminated disease (e.g. TB meningitis, miliary TB) in young children (< 4 years).

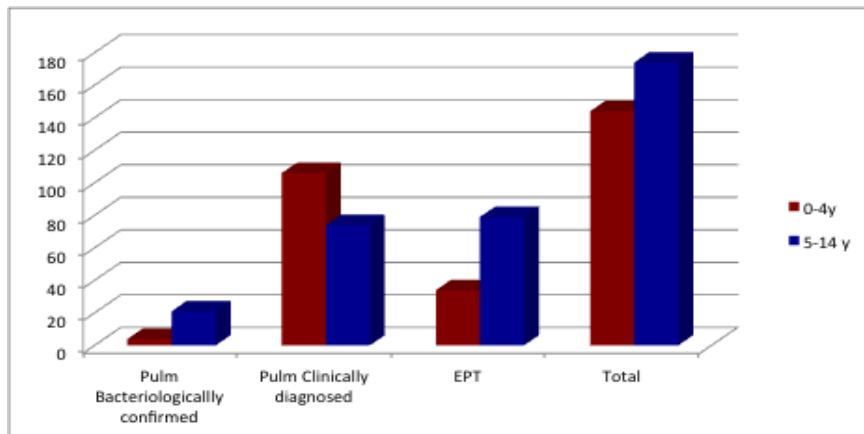


FIGURE 16. CHILDHOOD TB CASES BASED ON AGE AND TYPE OF TB, 2018

Political will: Even though not a priority, the NTP has good willingness and made efforts for the management of childhood TB in the country, with a very strong and good commitment from the NTP manager. An external review on childhood TB in Timor-Leste has been done previously. Nevertheless, there has not been a significant progress since then.

NTP has not designated a person in the NTP as a focal point of childhood TB, which is of importance to lead and coordinate the management of TB in children in the country. In addition, a child TB working group within the NTP, which also plays an important role in other countries has not been established.

Guidelines and training: NTP Timor-Leste has developed a national guidelines for management of TB in children, which was published in 2017. This is a stand-alone guideline, separated from the adult guideline. The guideline was developed by the NTP and covered all of the aspects of the management of childhood TB, in term of case finding, treatment (both drug sensitive and drug resistant TB), prevention and risk assessment; including contact investigation and IPT provision. The guidelines have been distributed to CHCs, but the doctors in CHCs (at least at Laulara CHC) and pediatricians in the National Hospital were not aware about the guideline.

The previous JMM recommended more training to increase the capacity of staff at all levels of the healthcare services in the diagnosis and treatment of TB in children, and training of collecting sputum through gastric aspirates for doctors and nurses at the district hospitals. Training on child TB has been conducted by the NTP for doctors at the CHCs, but not covered most of the doctors. No training module was available at the time of JMM for review. The effectiveness or the impact of the trainings has not been evaluated yet, but there is an impression that the training had very minimal impacts on the case finding and management of TB in children in Timor-Leste. As training is currently the feasible way to increase the capacity of health care works, the NTP should analyse why the training was not useful in improving the management of TB in children at all level.

Diagnosis of childhood TB: The diagnostic algorithm of TB in children has been available in the 2017 National Guideline of the management of tuberculosis in children. The algorithm flow is clear, but does not give detailed information on how to diagnose TB in children clinically. In addition, with the current algorithm the diagnosis of TB tends to be centralized at the National hospital. Observation at the CHCs

documented that the doctors at the CHCs never diagnosed TB in children, but giving treatment after the child was diagnosed by a pediatrician at the hospital. Meanwhile, information from the pediatricians at the National Hospital, most childhood TB treated in the National Hospital were with extrapulmonary TB, which some was in late condition. This may indicate low awareness of child TB in the community as well as problem of early detection of TB in children by health workers at the CHCs.

Globally, most of the diagnosis of TB in children is clinical diagnosis, which is based on a triad of TB symptoms, evidence of TB infection (history of close contact, positive tuberculin skin test or IGRA) and CXR supportive of TB. Establishing a clinical diagnosis of non-complicated pulmonary TB in children should be a competency of a medical doctor at the primary level of healthcare. With the current diagnostic algorithm in Timor-Leste, there is a high possibility of underdiagnosis of TB in children at the CHC level.

Chest X-ray machines, which is used to help in diagnosing TB in children, are currently only available in 5 Municipality hospitals and the National Hospital. Access to these hospitals is challenging in some remote area due to geographical condition as well as community knowledge/awareness. The unstable stock of tuberculin solution has been acknowledged as global issue. However, whenever possible, this should be provided by NTP to avoid overdiagnosis, in particular in children with unclear history of close contact with a TB case.

The number of malnourished children in Timor-Leste is high. Nevertheless, they were hardly ever been screened for TB. Integration between Department of Nutrition of Ministry of Health (MoH) and NTP in this issue has not been established. Similarly, integrated management of childhood illnesses (IMCI) has been trained to most health workers in Timor-Leste by Department of Maternal and Child Health of MoH; however there has been no coordination or integration between MCH and NTP. In fact, the recent IMCI has listed TB as one possibility in children with cough > 2 weeks, fever and malnourished.

Treatment of TB in children: The current recommendation for treatment is using Fixed Dosed Combination (FDC) drug, with a dosage of 50H/75R/150Z. There are no problems in the availability and distribution of the drugs in most CHCs.

Contact investigation: Screening of child household contacts of source cases with smear-positive disease is recommended. The national guideline suggests to use a symptom-based screening, which is appropriate for a limited resource setting like most areas in Timor-Leste. Nevertheless, this recommendation has not been routinely done, and if done, no systematic recording and reporting is available.

Isoniazid preventive treatment is also recommended for child contacts (aged < 5 years), who have no TB disease or those with HIV infection. The IPT is provided by the NTP and is available in the health facilities. However, there is no data at the national level of the coverage of IPT provision among child contact.

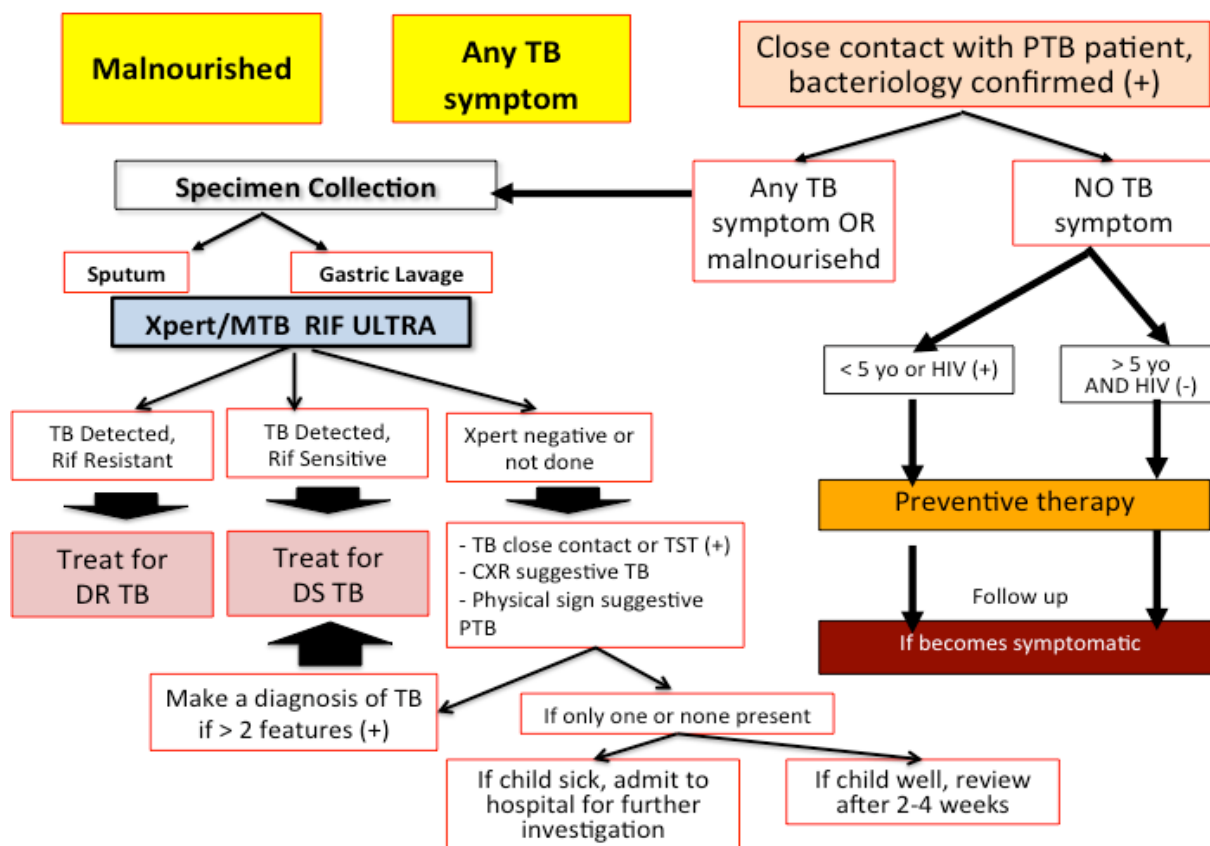
Partners and NGOs in Timor-Leste have conducted active case finding which includes screening people who are household contacts of a TB case. However, their target was only finding TB patients, and did not include identifying children who were eligible for IPT.

Recommendations

- Improve commitment and political will by

- Designating a dedicated person to serve as a childhood TB focal point in the NTP.
- Form a child TB working group in the NTP which involved persons from the NTP, Department of MCH in MoH, Department of Nutrition of MCH, clinicians (paediatricians and general physician), and partners.
- Strengthening advocacy, communication and social mobilization for childhood TB
- Improving community awareness of TB (including childhood TB). Community campaign for TB should be conducted. Walk for talk forum is a good opportunity to start.
- Improving case finding. Develop a simple algorithm to diagnose TB in children and to improve the preventive treatment coverage. Suggested algorithm as follows:

FIGURE 17. ALGORITHM FOR CHILD TB DIAGNOSIS AND PREVENTIVE TREATMENT



The entry point to find TB in children can be either from children with malnutrition, any symptom of TB or those who had a close contact with a pulmonary TB patient (bacteriologically confirmed). All of these children should be screened for the possibility of TB. Collecting sputum in children has been thought to be challenging with low yield of positive bacteriology confirmation. However, with the increasing number of DRTB cases in TL, we should put this as the first step to diagnose TB in children. Clinical diagnosis will be more likely in children, and this should be a competency of doctors at the CHCs to establish the diagnosis.

- Conduct training on childhood tuberculosis for all doctors and TB program staffs at the CHCs and Health Posts. To improve the effectiveness of the training, it should be conducted in an interactive

way, which stimulates participants to be more active. The suggested topics for training on child TB (i) Early detection of TB in children (ii) Diagnostic algorithm, including performing tuberculin skin test and reading CXR (iii) Sputum induction of gastric lavage (iv) Contact investigation and preventive treatment (v) Drug resistant TB (vi) leadership

- Pursue the offer from Dr Daniel from Bairo Pite clinic to use the facility for practical training of health care workers on childhood TB management
- Conduct operational research. Health care workers can be trained to develop a simple proposal on a small operational research based on the problem at the catchment area of each CHC.
- Integration of MCH, Nutrition and NTP. The NTP should ensure the integration of child TB-specific components in the management of malnutrition in children as well as in the MCH and IMCI training materials. This has been recommended by the previous JMM and should be followed up urgently.
- Improving coverage of preventive therapy and other preventive measures by:
 - Strengthening contact screening and Isoniazid Preventive Therapy (IPT) provision for children with close contact with a PTB case, to ensure 100% Pulmonary TB cases are investigated for child contacts management, at least 80% child contacts eligible for IPT on IPT and 90% completion of the treatment.
 - Strengthening coordination between partners and CHCs in conducting active case finding. Expanding the activities of partners in active case finding to identify and refer children who are eligible for IPT. If possible, the NGOs in collaboration with CHC may provide IPT directly to eligible children during the home visits.
 - Figure 17 suggest to give IPT to eligible child contact under 5 years of age. This can be expanded to all children as recommended by the recent WHO guideline on the management of latent TB infection.

10. LATENT TB INFECTION

Prevention of active TB disease by treatment of Latent TB Infection (LTBI) is a critical component of the WHO End TB Strategy. In the context of the Ending TB, it has now become imperative to also prevent TB wherever we treat for TB. The efficacy of currently available treatments ranges from 60% to 90%. The potential benefit of treatment should, however, be carefully balanced against the risk for drug-related adverse events. The updated WHO LBI guidelines (2018), and the renewed priority following the 2018 UN High Level Meeting targets, which includes significantly scaling up the uptake of TB preventive therapy, provide opportunities to scale up LTBI management at the programmatic level. The availability of shorter and safer treatment options for LTBI presents another opportunity.

Observations

- The team noted that contact tracing was happening in some places, but not systematically. During home visits of patients, we noted several children living with bacteriologically confirmed TB cases who were not screened nor offered preventive treatment
- Six months of daily Isoniazid (INH) treatment is the standard regimen used in the country. INH was available in the facilities visited. LTBI testing is not available nor performed as the focus for preventive treatment is children under 5 years and PLHIV who can be initiated on treatment without testing
- The NTP recording and reporting formats used in health care facilities needs to be strengthened to capture information on household visits, screening of household contacts, screening results, initiation and completion of INH preventive treatment (IPT). The TB treatment cards already have space to capture household contact screening, but this is not always completed.
- There is no information regarding management of LTBI among people living with HIV. Proportion of HIV positive screened for TB, the uptake of IPT among PLHIV is unknown.
- Active case finding activities implemented by partners does not include LTBI management

Recommendations

- Home visits for screening household contacts of bacteriologically positive patients need to be systematically conducted, recorded, reported and reviewed regularly.
- For the two groups that do not need LTBI testing – children less than 5 year and PLHIV- there is an urgent need to scale-up uptake of IPT. This will entail close collaboration with HIV program, maternal and child health, nutrition programs of the MOH
- Active case finding interventions should not stop at finding people with active TB disease. Screenings conducted at community and household levels provide an opportunity to also screen close contacts of infectious TB patients for LTBI and offer IPT to eligible patients after active TB has been ruled out. PSF volunteers should also be trained and engaged in contact tracing and offering IPT to eligible patients.
- Consider expansion of the target groups and shorter treatment options for programmatic management of LTBI based on the 2018 WHO LTBI guidelines and the SEARO Regional Action Plan. Shorter and safer treatment options (such as 3 HP) provide an opportunity to decentralise and achieve better treatment completion rates. Trainings of health care workers on LTBI management, providing job aids, and provision for travel support costs to conduct household visits for contact tracing (CT) are needed.
- Monitor the expansion of contact tracing and IPT, identify key indicators to evaluate progress contact tracing, and evaluate the quality of implementation at the district and national levels;
- Strengthen recording and reporting for contact tracing and IPT. Fully implement registration of contacts and outcome of contact tracing in TB treatment cards, introduce contact tracing and TPT registers (or modify TB register to capture this information), revise quarterly report forms to capture information on CT.
- Consider expansion of the target groups and shorter treatment options for programmatic management of latent TB infection (LTBI) based on the 2018 WHO LTBI guidelines and the SEARO Regional Action Plan. Shorter and safer treatment options (such as 3 HP) provide an opportunity to decentralise and achieve better treatment completion rates. Trainings of health care workers on LTBI management, providing job aids, and provision for travel support costs to conduct household visits for contact tracing are needed.

11. COMMUNITY ENGAGEMENT

As a part of the national TB program Mid-Term Review, a review of the current community engagement in programme planning and monitoring and delivery of service was undertaken from 19-20 September 2019. The team visited Klibur Domin DR-TB Center and Bairo Pite Clinic, met with community health workers - Promotor Saude Familia (PSF), a village chief and a traditional healer. The team also met with the Bishop of Dili. Community engagement in Timor-Leste presently is limited to providing directly observed treatment (DOT) to diagnosed TB patients. The engagement of the community in service delivery and in actively finding the persons with TB symptoms is very limited and leaves a huge gap in achieving the targets.

Observations

- Both the health facilities visited, Klibur Domain and Bairo Pithe clinic were well set up and well maintained with committed staff and leadership
- After TB diagnosis, patients are sent to Klibur Domin for treatment and patients are admitted as in-patients for 2 months if diagnosed with drug-sensitive TB and 6-8 months if drug -resistant TB (DR TB). However, they have to wait for the DR TB expert to visit before being initiated on treatment. There is only one DR TB expert in the country based in the capital city and sometimes it could be weeks before the patients are put on treatment.
- PSF volunteers and the Project officer we met in Liquica municipality area linked to the Klibur Domin.
- The responsibilities are limited to DOT Provider, finding people with TB Symptoms, and sharing information. Villagers reach out to them when they are sick with cough and they visit and collect sputum samples from patients. They also report to the sub district health centre.
- The PSF gets paid USD 60, when a person is diagnosed, put on treatment and completes 6 months treatment. Home visits are limited to 2-3 households each month by the PSF and 6-7 by the project officer.

Visiting Ms. Pasquella, Community Volunteer (PSF) at Vatu Rou village (Vatu Nau sub-village); and Mr. Cezar Tusantos, Project Officer, Klibur Domin (Maubara sub-district) with WHO Country Team and NTP Team.



- The visit to the traditional healer was very interesting. Though there was no obvious conflict between the traditional and 'modern' approaches working together side by side, it was very clear that the traditional healing and medicines derived from the plants and herbs and prescribed by the traditional healers were considered far superior. There is immense trust in the healers.
- The traditional healers are also a close community and periodically meet to learn from each other. This provides an opportunity to harness this mechanism and build TB into it.
- Meeting with the village chief in Bairo Pithe, highlighted the fact that there needs to be better coordination as the chief had no idea about the PSF or any other community workers working for TB in his village.
- Timor-Leste is 98% Roman catholic country. Meeting with the Bishop of Dili was very encouraging. The enthusiasm of the religious body to extend all possible help to End TB in Timor-Leste is very commendable. This is a great opportunity for the involvement of the faith-based organizations and the church through their schools and clinics to reach out to people.

Recommendations

- Institutionalize the whole community outreach program, the same frame work for the system should be adopted all over the country and linked directly to the NTP
- Provide transport support as per the terrain, motor cycles or bicycles etc. for volunteers to visit households on a daily basis for symptomatic screening and sputum collection as needed

- Special focus on screening contacts of bacteriologically confirmed TB patients
- Develop simple tools for information and awareness on TB, to recognize symptoms and where to go and what to do.
- Emphasis on prevention – simple measure like cough etiquette and cross ventilation (though the areas visited are very open with good cross ventilation)
- Develop simple reporting formats for PSF, Village Volunteers
- Train volunteers and make them responsible for 200 households (look at ASHA program in India for ideas)
- The Community workers will need to be paid a small salary regularly rather than based on patients completing treatment as there is no incentive to visit other house holds for finding people with TB symptoms
- Move from passive to active action to go from house to house every day
- Train doctors and nurses in DR TB, address the delay in treatment initiation for those diagnosed with DR TB due to lack of DR TB expert in the country
- Develop a clear plan to engage with traditional healers. Traditional healers can play a huge role in spreading awareness about TB in the community, to remove stigma and in finding the people with TB symptoms. There is need to set up a program for this with clear objectives and a few identified interventions. It can start with a small group of traditional healers initially which can then be expanded subsequently.
- Include faith-based organisations (FBO) in the TB response planning and implementation. The schools run by the church are a good place for screening and awareness and education programs on TB. Similarly, the clinics run by the church can become TB centres
- Kitchen gardens – Educate the communities on the nutritional value of locally grown fruit and vegetables. Encourage kitchen gardens as most of the houses visited had huge land surrounding each house and many fruit trees, but unfortunately not consumed due to lack of knowledge regarding nutritional benefits

National Task Force on TB: Community perspectives and input

This was seen as a good idea but the community was really unable to relate this and figure out how this task force could play a role in addressing the many challenges and barriers they identified. The HIV and Malaria Programs already have National level bodies, the recommendation from the stakeholder consultation was to look at integrating TB into it. It was not realistic they felt to expect the Prime Minister to be chairing this in addition to other exiting health committees at the national level. There were some concerns raised as to the effectiveness and sustainability of the TB National Task Force

Recommendations:

- A few consultations with local stakeholders and other disease programs to plan and develop a joint plan
- Consider a Task Force for Health with different programs being part of it. This will enable cross learning and fill the gaps of weak areas.

Mr. Cipriano Ramos- Traditional Healer- Sub Village Mubaralisa, Village Darulema. He is seen here standing by the TB posters he has put up in his home and said that he talks to people who come to him with cough about TB



I2.PROCUREMENT AND SUPPLY MANAGEMENT OF THE NTP

This report follows a high-level review of national PSM systems as part of a joint tuberculosis (TB) program review in Timor-Leste. The HPM Specialist from The Global Fund supported the review of the program procurement and supply management (PSM) thematic as an observer on the joint review mission team. This review takes into consideration that some PSM functions are TB program-specific such as demand forecast and quantification of health products while others are shared with other programs. As such, the performance of shared services such as warehousing, inventory management and distribution were reviewed from integrated service point of view considering the responsibility/accountability matrix for each process.

Combining the national PSM review as part of the TB program review enabled us to gain valuable insight of the Timor-Leste TB program implementation and key programmatic challenges that have a bearing on supply chain performance and vice versa. However, it also meant that detailed assessment of each PSM function was not possible given the constraint of time and the multi-disciplinary nature of the teams that were interviewing staff during meetings and field visits. Furthermore, the schedule of appointments missed some of the key PSM stakeholders particularly senior management at Servisu Autonomi Medicamento Equipamento Saude (SAMES) and the Department of Pharmaceutical Services at Ministry of Health. As such the assessment is largely high level and the recommendations are presented as supply chain strategic/policy options for consideration by accountable/responsible entities.

Objectives, outcomes and approach of the PSM review

- Undertake a review of the national supply chain management processes and identify challenges/risks with a focus on management of TB and HIV program medicines
- Propose improvement recommendations to adopt new approaches (innovation)

Key observations/findings and supply chain process improvement recommendations

Core process risk/maturity review:

#	Core PSM process/function	Accountable /Responsible	Consulted /Informed	Est. Risk level	Recomm. NSP 3-year target
1	Product specification and demand forecasting/quantification	MoH-TB/MoH-HIV/MoH-DGF	SAMES, MoH-CH(Pharm), MoF, MoH-HIV, SC Comm, partners	Medium	Low
2	Procurement planning, contracting and contract management	MoH-DGF/MoF-Proc	SAMES, MoH-CH(Pharm), MoF, MoH-HIV, SC Comm, partners	Low	Low
3	Customs and port clearance operations management	SAMES/MoF-Proc, MoH-DGF	MoH-TB, MoH-CH(Pharm)	Medium	Medium
4	Central warehouse operations management	SAMES-Warehouse/MoF-Proc, MoH-DGF	MoH-TB, MoH-CH(Pharm)	High	Medium
5	Inventory control and distribution planning	SAMES/MoH-TB/HIV, MoH-CH(Pharma)	District/Municipality, SC Comm, MoF, partners	Critical	Medium
6	Customer order fulfillment processes				
6a.	Determine HF requirements, create and submit HF order	HF/District, MoH-CH(Pharma)	SAMES, MoH-TB/HIV	Critical	High
6b.	Review/approve/consolidate HF orders, submit to SAMES, manage district budget	District/MoH-CH(Pharma)	HF, SAMES, MoF/MoH-DGF	High	Medium
6c.	Validate order, schedule order as planned, create sales order & reserve inventory	SAME-Sales/SAMES-Finance	SAMES-Warehouse/Transport, Districts, MoH-CH(Pharma), MoH-TB/HIV, MoH-DGF	Medium	Low

6d.	Create warehouse pick, pack/check/label/stage customer orders	SAMES-Warehouse	SAMES-Sales/Transport/QA	High	Medium
6e.	Consolidate loads, plan routes, select transport options, load/deliver to district HQ	SAMES-Transport/District	SAMES-Sales/Warehouse, Districts, HF	High	Medium
6f.	Select and deploy last mile delivery option to HFs	District/SAMES-Transport	SAMES-Sales/Warehouse, Districts, HF	Critical	Medium
6g.	Close order (receive PoDs, invoice customer and issue account statement)	SAMES-Sales/SAMES-Finance	District/Municipality, MoF, MoH-CH(Pharma)	Medium	Low
7	HF product management sub-process management (store/pharmacy practices, store conditions, records/reporting)	HF/District, MoH-CH(Pharma)	SAMES, MoH-TB/HIV, MoH-DGF, SC Comm, partners	Critical	Medium
8	SC data management (LMIS) - collection, transmission, validation, analytics/use, storage	MoH-CH(Pharma)	SAMES, MoH-TB/HIV, MoH-DGF, districts	Critical	High
9	SC oversight, coordination and strategic planning	MoH-CH(Pharma)/SC Comm	SAMES, MoH-TB/HIV/Malaria, MoH-DGF, partners, districts/municipality	Medium	Low

The recommended risk improvement targets are indicated in the last column of the table above.

Review of NTP PSM achievements and recommendations

The availability of medicines was 100% at all sites visited by the review team. However, there are opportunities for improvement due to inefficiencies in some functions of the supply chain as indicated by the level of operational risk and potential wastage and high cost of operations.

The program registered achievements and **LOW to MEDIUM** risks in the operation and performance of processes for product selection and specifications, demand forecasting, procurement planning and management and central level coordination of TB program medicine management.

- Demand forecast for TB medicines is well coordinated by NTP, a formal quantification committee is established. The program uses modern tools (Quantimed) to prepare forecast reports, the exercise is supported by GLC/GDF technical assistance, assumptions to the needs forecast including program scale up targets and changes in treatment guidelines are documented, the forecast report is the basis for TB medicine procurement plans.
- The residual risk in forecast processes arises from the lack of reliable supply chain data to inform adjustments to morbidity-based needs forecast for medicine needs. Forecasts are currently largely based on disease morbidity data and program targets. There are important gaps in the availability of supply chain data (i.e. stock and consumption data). District stock data is collected but not consolidated for sharing with program headquarters to inform aggregate planning for national needs.
- SC data gaps and the inadequate scheduling of replenishment stock has resulted in overstock of some TB medicines at SAMES. There is a risk of expiry due to overstock, but this is lower than in previous years.
- The procurement of medicines through GDF (TB) and Wambo (HIV/Malaria) is an effective procurement and QA risk mitigation measure. Availability of TB medicines was 100% at SAMES, District & CHCs visited

Recommendations:

- (I) Review planned order schedules and use stock and consumption data to adjust morbidity/program-based medicine needs forecasts (by 31 December 2019)
 - There is an immediate need for NTP to review schedules of planned and confirmed orders for TB medicines in view of the overstock of some items particularly pediatric formulations at SAMES and to consider aggregate stock at the District level. Furthermore, quantification of TB medicine requirements for the next round of grants shall be based on both program targets and stock/consumption data from

district LMIS reports or collected through onsite supervision visits. Additionally, the Quantification committee shall incorporate the SAMES TB/HIV Store Pharmacist.

Review of NTP PSM gaps & recommendations

On the other hand, the program PSM function is operating with **HIGH to CRITICAL** risks in the operation and performance of processes for warehouse/stores operations management, distribution operations planning and transportation management, customer order fulfillment management, inventory control/management, HF medicine management supervision and supply chain data management.

Observations in warehouse, inventory & distribution management

- While the use of mSupply for stores and stock management is commendable, data use for planning and optimization of supply chain operations is sub-optimal.
- The warehouse lay out is adequate including the segregation of special store areas, order staging, office space and the intended flow of goods from receiving to put-away to order processing and dispatch operations. However, the capacity of the store is no longer adequate, the store was congested at the time of our visit, the order staging area and the receiving bay were overfilled.
- The central store was fairly clean and orderly, stock cards were updated, and staff were motivated and open to new ideas to improve their work. We also observed that staff required training in managing complex warehouse operations. PSM-related standard operating procedures (SOPs) were available at the central level but not observed at the district and health facility level.
- There is currently no clear segregation of teams and responsibilities for sales, warehousing, inventory management and order delivery functions. For example, annual stock count is supervised by warehouse staff with little or no oversight from finance/audit. Validation of customer orders and approval for processing is also done by store keepers.
- There were cases of multiple products being placed on the same location/pallet and a batch of the same product being split and put away at various locations. There are gaps in the logic for pick versus bulk storage and the ranking of bins to aid picking activities, this is affecting the efficiency of the store and can be a cause of errors. There was no cycle counts record on the bin cards. Access control is not strictly managed and max-min thermometers-hygrometers are either not functional or not used for recording.

Observations in distribution, customer order fulfillment and supply chain data management

- The country SC network size is relatively small consisting of 1 central warehouse, 5 Regional referral hospitals, 13 district hospitals and 69 Community Health Centers. The terrain is challenging and roads but the farthest CHC is still reachable within 12 hours from Dili. The NTP program supply chain network is even smaller because TB diagnostic and treatment services are delivered only at hospitals and 18 CHCs in the country of which 6 CHCs are in Dili. Dili accounts for nearly 50% of cases diagnosed in the country.
- The target max Inventory for central warehouse is considered optimal but it is currently exceeded for some products due to inadequate scheduling of orders. The target max/min inventory for district level is expected to be high due to the long stock review/resupply cycle of 3 months. As such, the likelihood of excess or understock is high, there was evidence of many emergency district orders even for hospitals where the cycle is monthly.
- This process starts when the HF reviews its stock and makes a request to the District Pharmacist or Disease Coordinator for stock replenishment to a point when goods are received, a proof of delivery is signed and SAMES invoices for goods and services.
- The timely submission of requests and the accurate quantification of requirements by the HF stores in-charge is most critical. The apparent weaknesses in store conditions, store practices and stock keeping records at HF level coupled with inadequate supervision of the district by the central MoH team and HFs by the District Pharmacist makes process 6(a) one of the most vulnerable to failure in the national SC link. For example, procedures for TB products management do not provide for use of stock cards, regular physical stock counts and access control at CHCs.
- There are multiple program-specific systems parallel to the established structures managed by the District Pharmacists to request for replenishment of health products. As a result, SAMES receives multiple health product orders through different channels at different dates for the same HFs. This situation undermines the

ability of SAMES to serve its clients. As such, process 6(b) is poorly managed and needs to be refined for all health product requests to follow a common schedule and approval through the District Pharmacist in collaboration with District disease advisors. Additionally, HF store staff require training and continuing supportive supervision from the District Pharmacist and disease coordinators, this is currently lacking due to work load and lack of resources for the district pharmacist.

- The number of emergency orders and orders submitted outside SAMES proposed schedule is very high. Some HFs or districts were not able to collect and transport their products from SAMES on time. This creates congestion at SAMES because of limited space around the dispatch area.
- There are important gaps in the existing supply data reporting systems (LMIS). The few LMIS forms submitted by CHCs to the District Pharmacists as part of the medicines requisition process are not routinely consolidated or shared with MoH HQ. Reported data is occasionally entered in Ms excel tools which are not suitable for a national system to support SC management.
- The lack of essential supply data to inform operations management, demand forecasting and SC planning decisions at district and HQ is a major concern. The lack of basic indicators for supply chain performance monitoring contributes to the lack of appetite for SC data.

Recommendations:

- (2) Technical assistance support to SAMES/MoH
 - to improve warehouse operations, clarify/train and segregate staff roles, optimize order picking, establish routine warehouse performance metrics, and design and manage a robust HF order cycle and delivery plan.
 - to harmonize district and hospital order cycles and transition from a deliver-to-district model to a direct-deliver-to-HF model across the country.
 - Training for 2 persons at an efficient public-sector warehouse (e.g. KEMSA/JMS/NMS) for the TB/HIV Store keeper at SAMES and the Logistics officer responsible for customer order delivery
 - Support recruitment of one local Pharmacist-store keeper to assist in managing donated items including GF stock
- (3) Clarify responsibility of SAMES, MoH and Districts and optimize fulfillment of routine Health facility medicine needs
 - Implement a harmonized order schedule for HIV, TB, Malaria and other essential medicines required by the district (part of b).
 - Establish a memorandum of understanding between the “Ministry of Health – Pharmacy” as representative of all District and “SAMES as a provider of health products PSM services” to clarify responsibilities and performance targets for each party to be monitored on a quarterly basis.
- (4) Capacity building support to the district
 - Material and technical support to facilitate the District Pharmacists Office to provide onsite coaching and mentoring support for health facility stores/pharmacy staff twice a year for all CHCs in the country. The district pharmacists or assistant district pharmacist to be trained to assess health product management performance of the HF at each visit in the area of stores practices, updated records/reports, availability of vital medicines, compliance to use guidelines and dispensing services. The District Pharmacist shall discuss with HF staff and provide support to address priority problems to enable service improvement over time
- (5) Support a phased roll out of a robust eLMIS to districts and eligible health facilities
 - Scale up a simplified version of mSupply to Districts stores, Hospitals and CHCs with access to electricity and internet. A paper-based LMIS reporting system is recommended to supplement the electronic reporting at sites that require more time to implement electronic systems. Districts and Hospitals to export and share monthly inventory and consumption reports to MoH-HQ@Pharmacy with access for SAMES, TB/HIV/Malaria programs to facilitate supply performance monitoring (e.g. monitor product use, product availability, compliance to guidelines, monitor stock outs) and planning (e.g. needs forecast).

13. MONITORING AND EVALUATION SYSTEM: ASSESSMENT

The Timor-Leste NTP oversees a traditional, aggregate paper-based system which relies on district TB coordinators to compile aggregate quarterly data reports from the community health centers (CHC) of the catchment area which are sent to the national level. There are in total 18 reporting units in the Timor-Leste: one in each of the 12 municipalities, and 6 in Dili. All service delivery points systematically use standardized TB collection forms and tools to ensure uniformity. In 2015 the system been updated for 2013 WHO definitions⁷ and have been rolled out following a training and updated guideline. At the national level M&E officer at the NTP collects aggregate data in numerous excel spreadsheets and currently there is no central single database for aggregate reports.

The flow of patients to TB diagnosis and treatment starts with one of the following situations. A patient may present to health facility by self-referral, community PSF referral, or by NGOs as part of active case finding interventions. TB responsible of the health facilities coordinates their diagnosis and the consequent procedures as necessary. Then if a patient is positive, he/she will start treatment and continue the medication in a health facility which is convenient for the patient.

Recording and reporting forms

The NTP adopted recording and reporting documents in general follow WHO recommended “Definitions and reporting framework for tuberculosis -2013 revision”. Presumptive TB patients are registered in the TB Suspect Register. Once sputum smear is collected for examination Sputum Request Form is completed which accompanies a biological sample sent to a laboratory and receive results for diagnosis or follow-up. The requestor completes the upper portion of the form, including basic demographic and contact details of the patient being tested, while the lower part of the form is used to communicate results back to the facility that requested the tests. All tests performed in the laboratory are recorded in TB Laboratory Register. Once a patient diagnosed with TB, a TB Treatment Card is completed, which contains important administrative and technical details about the patient and his/her treatment. In addition, TB treatment card contains information on close contacts of TB patients and outcome of contact tracing. The card is usually kept at the treatment center. TB treatment card regularly is updated. For the child contacts under five years of age, who start LTBI treatment “TB preventive treatment card” is completed. All patients diagnosed with TB are recorded in TB Register, which is used to monitor program performance, summarize testing results, treatment decisions to determine whether basic diagnostic and treatment guidelines are correctly implemented. They serve also to generate reports and programmatic indicators to higher administrative level. If the patients choose to take treatment in a different area other than the diagnostic area, a TB Referral Form is completed for the patient which is sent to respective facility. TB patient identity card is also given to all TB patients under treatment.

In addition to these tools that there are other forms used for TB case reporting. These reporting formats are due on quarter basis. Quarterly Report on TB case-finding is standard report based on “TB Register” and “TB Suspect Register” to show the number of tuberculosis cases that were diagnosed and registered during a quarter, suspects examined, as well as information about HIV/TB co-infection and HIV care. Quarterly Report on TB treatment outcome enumerates the treatment outcomes of patients registered in TB register in the quarter that ended 12 months previously. The report includes information on TB/HIV activities to allow to update the data collected during the TB registration.

Similarly, there are individual Treatment cards for RR-MDR TB patients, MDR-TB register and Report on RR-TB treatment outcome.

In addition of the above forms, there is Monthly reports on facility performance and logistics in triplicate, which is prepared by in charge of health facilities (CHC). This reporting forms contains 97 indicators, part of which duplicate standard quarterly report indicators; however, they also contain many additional indicators related to TB. The CHC sends the monthly reports to the District health officer (DHO/DTC) in each municipality in

⁷ Definition and reporting framework for tuberculosis, 2013 revision (updated December 2014). Geneva: World Health Organization; 2013. WHO/HTM/TB/2013.2 <http://www.who.int/tb/publications/definitions/en>

triplicate. One report is sent to the office of Health Management Information System (HMIS), one is sent to NTP and the third copy kept with the District Officer.

Data quality control and verification

Data quality control and verification is implemented at facility, municipality and national levels. At facility level quality control is implemented during the supervisory visits using standard checklist, which contains qualitative measurement of data quality of the audited facility, accuracy, cross-check of data, compliance to treatment monitoring guidelines⁸. Final data quality and verification is implemented at national level on quarterly basis – by comparing the reported data. Feedback is provided to municipality staff if any problem is identified. Flow of information of TB surveillance is shown in Figure

Strengths of the current systems

Recording and reporting forms and case definitions are in line with WHO standards. During our review, the facilities that we visited were maintaining appropriate TB treatment registers and forms. Data quality in some of the facilities was high (although not perfect). Reported and recounted data of notified TB cases matched in all facilities visited.

Data are verified at facility, municipality and national level. All facilities are providing data.

Challenges with the current systems

Recording and Reporting forms

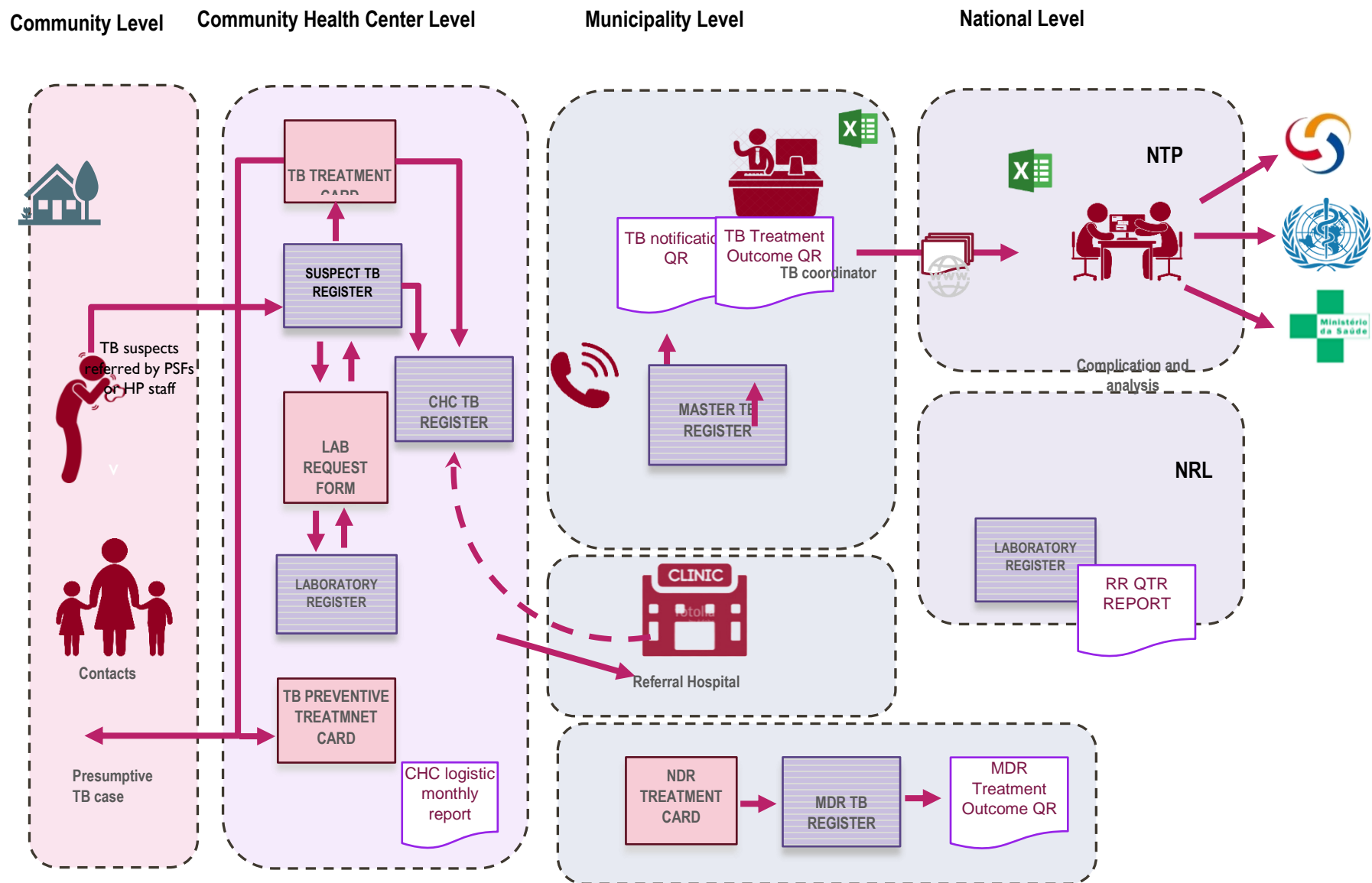
- Suspected TB registers in several facilities visited were not fully completed. The results of laboratory examination or TB treatment number (for those with positive test results) were missing in most of cases.
- Completeness of TB registers varied from facility-to-facility. In several facilities with large number of patients registered by referrals of referral hospitals, the initial and follow-up laboratory test results as well as treatment outcomes were missing. It was unclear how the treatment outcomes were reported.
- Only one of the facilities visited maintained IPT individual treatment cards, while in the rest of facilities visited those cards were missing. There were some remarks on the number of children receiving IPT in TB treatment cards, however, without any identifier (such as surname, name, date of birth etc.)
- Registration of contacts and outcome of contact tracing in individual treatment cards was implemented only partially.
- Some patients were referred for sputum smear microscopy bypassing TB officer. Such cases were not recorded in presumptive TB register and referring care provider for sputum smear examination didn't use standard sputum request form.
- Monthly reports on facility performance and logistics (which contained some additional TB programmatic related monitoring indicator) was completed only partially and almost was not analyzed at the national level.

Data flow across the facilities

There was no uniform approach on place of registration of the patients diagnosed at the referral hospitals. Thus, the registration of hospitalized patients in Mobiss referral hospital was carried out in the nearest CHC. Such approach on one hand inflated the notification of TB patients at the CHC, on the other hand, the patients were not properly followed, transferred and evaluated for treatment outcome. It is not excluded that some of the patients were double registered in their catchment area and it was not clear if the patients continue their treatment in their sub-districts. Failure to register the patients in the area of residence preclude the analysis of notification data by place and identify the areas with high TB burden. Large number of patients were diagnosed and started the treatment in Dili or referral hospitals. However, it is unknown whether the patient continue their treatment in their districts. There was no follow-up mechanism

⁸ Monitoring and Evaluation Plan 2015-2020, National Tuberculosis Control Program, Ministry of Health, Timor-Leste

FIGURE 18. DIAGRAM OF TB INFORMATION FLOW



Use of data for actions

- There were no mechanisms in place to ensure that patients with positive smear test results who do not show-up are traced to start TB treatment. In one of the facilities visited 18.5% of patient for the audited period were initial lost-to-follow up. Such cases were not documented, reported and included into cohort analysis of treatment outcome. In addition, in most of facilities we identified discrepancies between the number of laboratory tests and recorded number of presumptive TB cases.
- In several facilities visited we observed low proportion of presumptive TB cases among OPD (below 1%) and high rate of sputum smear positivity among tested, which indicates that TB presumption is very restrictive (low sensitivity): TB is not considered as a possible diagnosis among out-patients and most likely considerable proportion of TB patients were missed in the initial screening process at primary health care settings.
- Microscopy smear positivity among the patients enrolled into treatment in several facilities was very high (almost reaching 100%), indicating that health systems are not capacitated to diagnose smear-negative TB cases and such cases most likely are missed to receive appropriate treatment.

Supervision

- TB officers have limited resources to travel within the municipalities for contact tracing and follow-up the initial and late lost-to-follow-up cases. In one of the facilities the notified number of cases at the latest quarter was 2 times lower compared to the same quarter of the previous year. Such discrepancy was explained by the fact that TB district coordinators didn't receive fuel and means for motorbike maintenance and therefore the contact tracing were not implemented consistently.
- There were no copies completed supervisory checklist or feedback form.
- Supervisory checklists are too complicated and are not fully completed by regional coordinators during the supervisory visits.

Data analysis and data driven decision making

- There is no single data repository for historical data which can be used for time trend analysis.
- No descriptive annual surveillance report produced and disseminated.
- A National Vital registration system does not exist.

Recommendations

Recording and reporting

- Develop a routine procedure for to follow up individual patients between facilities. Presumptive TB registers, laboratory registers, and treatment registers should be cross-checked to ensure that all bacteriologically confirmed TB cases are enrolled into treatment. TB registration number should be recorded in the laboratory and suspect TB register as an evidence of enrollment into treatment. Supervisory visits should ensure that this activity is being undertaken and should cross-check the registers and remind clinical staff to fill in any missing data.
- All bacteriologically and clinically confirmed TB cases should be notified, including initial defaulters and cases that die prior to starting on treatment.
- Conduct an inventory study to assess under-reporting from referral health facilities, and between presumptive TB registers, laboratory register and treatment registers.
- Introduce contact tracing register. Identify key indicators to evaluate progress contact tracing. Revise quarterly report forms to record more detailed data on contact tracing in all municipalities: number of identified contacts of all newly diagnosed TB patients, number screened, number symptomatic, number diagnosed, number of children initiated on IPT, number of children completing IPT.
- Adopt and roll-out WHO standard DHIS2 TB module and dashboard with long-term goal to move to case-based system once the capacity is in place. Historical data stored in excel sheets should be imported in this database (tbhistoric.org) for trend analysis;
- Once DHIS2 module with historical data and dashboard is in place, organize workshop for TB coordinators on Understanding and Using TB data for informed decision-making and action;
- Currently data reporting process starts from municipality level. NTP might consider introducing facility level reporting to be aggregated at municipality level.
- Ensure that DR-TB programmatic reports are submitted to NTP (RR-TB notification, intermediate treatment outcome and Treatment outcome of RR-TB enrolled into SLD treatment)
- A descriptive epidemiology annual report should be produced on a yearly basis using data from the previous year.

Improve direct measurement of TB disease burden

- Consider conducting national TB prevalence survey, which will provide data that directly measure TB prevalence and inform estimates of TB incidence. The prevalence survey can also be used to:
 - Identify and map high risk groups for TB (“know your epidemic”) and assess the barriers to health care these groups face. Subsequently, work to improve access to health care, specifically for TB, among those identified to be high risk groups for TB. This might include development/revision of vulnerability assessment checklist.
 - Understand the extent of unknown or undiagnosed cases and the characteristics of these cases. Alternatively, a delay in diagnosis survey may be undertaken to understand the length of time persons with TB remain undiagnosed and untreated.

Data quality assurance

- Investigate the reasons for sharp year-to year variation of notified TB cases by reporting unites and establish whether these are data quality problems, true changes in case finding effort, laboratory performance, clinical practice, or some combination thereof.
- Routine cross-checking of registers should be implemented at data quality workshops, with quantitative data collected on referrals and loss to follow-up during screening and diagnosis.
- The supervisory checklist should be revised. In particular:
 - a) Ensure that all standard paper tools are present, filed appropriately, and being properly used and maintained;
 - b) Include routine cross checking of different data sources (presumptive, laboratory and treatment registers; treatment cards and treatment registers; treatment registers and aggregate report forms)
 - c) Include quantitative indicators of data quality, which should be monitored at national level.

Child TB and TB preventive treatment surveillance

- Ensure that all facilities have and are using contact tracing and IPT registers
- Introduce routine household source contact tracing and contact tracing of adults focusing on potentially exposed children.
- Develop SOPs for monitoring the expansion of contact tracing and IPT, and evaluate the quality of implementation at the district and national levels;

Laboratory surveillance

- Ensure that all patients are tested for bacteriological confirmation.
- Increase Gene-xpert testing coverage: National diagnostic algorithm should be revised so upon availability, the Gene-Xpert test is implemented routinely to all presumed TB cases as the first diagnostic test. NTP should target to reach universal Gene-Xpert testing coverage per End-TB strategy goal.
- Amend quarterly report forms to collect data on Gene Xpert testing, develop national targets for coverage, and monitor progress towards these.

Death registration

- TB mortality should be monitored through routine causes of death registration in a vital registration system and/or by conducting a TB mortality survey to provide estimates for deaths due to TB.
- Improve the accuracy and completeness of mortality data to better estimate TB mortality by strengthening reporting of causes of death in hospitals through training and assessing accuracy of coding (ICD-10)

ANNEX I: TERMS OF REFERENCE FOR THE MIR-TERM REVIEW

TB Laboratory (MTR Dates: 5-9 Aug 2019)

1. Undertake feasibility evaluation for laboratory capacity and infrastructure needs to establish molecular Line Probe Assay (LPA) in NTRL at Timor-Leste, for rapid results and appropriate treatment for TB patients.
2. Discuss feasibility and way forwards to expand culture, DST at national and subnational level to support MDR TB scaling up treatment and associated costed plan.
3. Support the estimation of laboratory test needed in adaptation of new WHO recommendation on MDR TB treatment and LTBI treatment
4. Recommend interventions to create an effective laboratory network at different level
5. Review the TB and MDR-TB Guidelines on the laboratory component and provide guidance to finalise the guidelines

MDR TB (MTR Dates: 5-9 Aug 2019)

1. Assess progress in the implementation of TB control activities under the National TB Programme in implementation and expansion of the MDR-TB services, universal access to TB/MDR-TB diagnosis and treatment including plan for laboratory scale-up
2. Review the progress by the National TB programme against the recommendations of the WHO monitoring mission 2017
3. Assess the infection control measures for TB and MDR TB including infrastructural requirements at all the tertiary and secondary hospitals
4. Evaluate the readiness to start new recommended all-oral regimen as per updated WHO guidelines, phasing out of previous ones and provide recommendations.
5. Review the TB and MDR-TB Guidelines on the MDR-TB component and provide guidance to Finalise the guidelines

Integrated and comprehensive community mobilization (MTR Dates: 16-20 Sep 2019)

1. Review the current community engagement interventions in programme planning, monitoring and delivery of services.
2. Discuss and present options of integrated and comprehensive community mobilization to support TB, HIV, and Hepatitis service delivery, to high risk groups as well as general population.
3. To review the ACSM implementation plan for Timor-Leste

TB epi-review and surveillance (MTR Dates: 18-27 Sep 2019)

1. To conduct desk review and produce evidence-based TB epidemiological assessment report for gap analysis, update policy guidance and propose interventions in the NSP 2020-2025 towards ending TB epidemic as per End TB Strategy and the Regional Strategic Plan.
2. Assess the case notification and treatment outcomes of the previous years; Analysis of trends in the proportion of notified cases: a) by type of TB disease –bacteriologically confirmed and extra-pulmonary TB; b) by age group, including the proportion of cases among children (0-4, 5-14); c) by category (retreatment out of the sum of new and retreatment cases).
3. Analysis of trends in age and sex specific case notification rates, the average age of newly notified cases and the extent to which these can be explained by demographic and other factors. Any data available on TB high risk groups such as people living with HIV, elderly, people with diabetes, Prisoners etc; numbers, denominators; and if available proportions and trends.
4. Assess the missing cases and how these were addressed;
5. Analysis of the geographic distribution of case notification rates among sub-national areas and how this has changed over time and exploration of reasons for observed trends and geographical Variations. This include but not limited to, the availability of TB diagnostic services, case finding activities, changes in the ratio of TB cases to the number of people investigated for “presumptive” TB, health systems characteristics, determinants of TB risk factors.
6. Define and compile data that are relevant to assess the extent to which changes in TB disease burden in recent years (e.g. for the last 5–10 years) can be explained by –a) TB-specific Interventions/programmatic efforts; b) Factors that are not specifically related to TB-specific funding and associated interventions
7. Demonstrate feasible models/methods to estimate current trends of TB epidemiology in the country for appropriate interventions that need to be addressed by the National TB Control Programme for further resource mobilization both domestic and donors-based on findings from the WHO TB Surveillance checklist, and an assessment of whether baseline or repeat survey (e.g prevalence survey, inventory study) is needed and if so what timing would be appropriate

8. Assess monitoring and supervision systems, revise recording & reporting (R&R) formats as per the revised TB/MDR-TB Guidelines and provide recommendations to improve the quality of programme data
9. Discuss and revise the targets based on TB UNHLM country targets
10. Undertake Monitoring accountability framework (MAF) baseline assessment for TB.
11. To submit a final report of the Epidemiological assessment at the end of the assignment

Health system influence and TB program contribution to health system (MTR Dates: 18-27 Sep 2019)

1. Review the progress by the National TB programme against the recommendations of earlier JMM.
2. Assess programmatic achievement, challenges and way forward for the National TB Control Programme on TB.
3. Define the steps to be taken to improve the programme's performance or redefine the programme's strategic direction and focus based on innovation and rapid changes in TB diagnosis and treatment planned; this may include suggesting revisions to policies and strategic plans
4. Review and discuss potential of further decentralization of TB care and control to village (Suko)/ sub-village (Aldea) level
5. Discuss and present different options of human resource solution for NTP in national, regional, and district/ sub-district level.
6. Assess the performance of the programme in delivering TB services, and assess any inequities in access to and quality of care
7. Evaluate the arrangements and mechanisms for ensuring the engagement and participation of other stakeholders, such as representatives from other sectors (e.g., justice, labour, social Protection), NGOs, other civil society organizations and affected communities; Framework for conducting reviews of tuberculosis programmes
8. Identify gaps and recommend ways of improving NTP capacity to manage international funding more efficiently
9. Assess the financial situation and human resources (Long Term International TA requirement) considering the programme's performance and demands for ending TB in Timor-Leste
10. To conduct the desk review along with the field visits to assess the programmatic achievements including the implementation of Global Fund grant – progress, challenges, and come up with Recommendations

TB-HIV (MTR Dates: 23-27 Sep 2019)

1. Assess TB-HIV collaborative interventions at policy, monitoring and implementation level
2. Evaluate, discuss, and recommend service delivery integration to follow up patients comprehensively
3. Discuss joint planning of both programs, propose timeline and a sample of townships/states/regions to start
4. Discuss strategies to increase TB prevention coverage among PLHIV including LTBI management
5. Discuss and guide on the possibility of having an integrated TB-HIV proposal Latent TB Infection (**LTBI**)

Management (MTR Dates: 23-27 Sep 2019)

1. Review the current delivery mechanism and policies for providing preventive treatment
2. Discuss stepwise work to expand LTBI and resource implication
3. Review country readiness to adopt new WHO recommendations on shorter TPT regimen
4. Guidance on adoption of the Regional TPT plan in Timor-Leste

Childhood TB (MTR Dates: 23-27 Sep 2019)

1. Evaluate the policy guidelines and practice of TB diagnostic in children.
2. Discuss the improvement of diagnostic algorithm with reference to the diagnostic algorithm proposed for screening mothers and their children
3. Discuss adaptation of childhood TB regimen for both drug sensitive or drug resistant patients. Following the new recommendation of MDR TB regimen, recommend steps of adaptation for children
4. Discuss and recommend strategies to increase TB prevention among children contact of TB patients

Procurement & Supply System (MTR Dates: 23-27 Sep 2019)

1. Evaluate the challenge of current supply system, related to the adaptation of new drugs, new tools, and new methods.
2. Propose improvement of system, related the current context, to be agile and flexible to new approaches and innovation
3. Assess the Drug supply chain management for first line, second line and MDR TB drugs.
4. Discuss on the options of system to provide good quality and quantity medicines on time, and drug supply management to minimize expiry and prevent shortage

ANNEX 2: FIELD VISITS: TEAMS, PLACE AND PEOPLE MET

Schedule For 2019 TB Mid-Term Review/ Joint Monitoring Mission, Timor-Leste

Date	Time	Activities	Place
19-20 Sep 2019	9.00 - 17.00	Field Visits* (<i>PSM Team field visits is separately attached</i>)	Municipalities/ Community Health Centers
23 Sep 2019	9.00 - 11.30	Meeting with Director DNCD, Head of CDC, NTP and WHO Representative	Presentation on TB situation & Progress by NTP, at Lahane Office. Discussion
	11.30 – 12.30	Meeting with Division of Global Fund/ Finance Team	CDC, Lahane
	12.30 - 13.30	Lunch	
	13.45 - 15.00	Meeting with WR - WHO Meeting with Global Fund CCF Chair	WHO Country Office CCM Secretariat/ PM House
	15.15 - 17.30	Meeting with Existing Partners (IOM, Klibur Domin, Bairo Pite Clinic and Caritas Dili); and Potential Partners – (Maluk Timor, Clinic Café Timor, HAI and Catalpa)	Presentations on progress by Existing Partners (10 Mins each) at Lahane CDC Meeting Room. Discussion
	14.30 – 17.30	PSM team led by Mr David <i>Bagonza</i> (Global Fund Expert on PSM) & Dr Manoj Toshniwal (Consultant NSP): - Meeting with DGF PSM team (Alcino & co.) - Meeting UNDP/DFAT	DGF
24-25 Sep 2019	9.00 - 17.00	Field Visits*	Municipalities/ Community Health Center
26 Sep 2019	9.00 - 11.00	De-briefing on initial TB MTR findings by all external experts to WHO/ Health System Experts (Dr Rui, former Prime Minister), WHO Health System, Nutrition & NCD Team, & Dr Vineet Bhatia (WHO/ SEARO) & MOH	WHO Meeting Room A (All Regional Supervisors and M&E Officer – NTP, Sr Narciso, Director Policy)
	11.00 - 11.30	Meeting HIV & Malaria Program Manager/PSM (<i>Only by PSM Team</i>)	TBD
	11:30 - 12:30	Medicine Regulatory authority to review access and quality monitoring of TB medicines (<i>Only by PSM Team</i>)	TBD
	11.00 - 17.30	Report Consolidation (2PM – 3 PM: <i>Meeting with the PSM Team</i>)	WHO Meeting Room
27 Sep 2019	08.30 - 9.30	Meeting with Hon'Health Min/ VHM	Caicoli, MOH
27 Sep 2019	10.00 - 17.00	Debriefing Meeting	Hotel Timor Plaza
28 Sep 2019		Departure	

FIELD VISIT SCHEDULE (19-20 Sep and 24-25 Sep 2019)

Date	Time	Place of Visit	Team Members
19-20 Sep 2019			
Team I			
19 Sep 2019	9.00-12.30	Klibur Domin to meet with Traditional healers and PSF	1. Bessina Kumar 2. Father Adriano & Father Francisco Barreto 3. Alino Gonzaga 4. Oscar 5. Dr Mia Domingas 6. NTP Car 7. WHO Car
	14.00-15.00	Meeting with church Leader (Father Juvito)	
	15.30-17.30	Meeting community Leader will identify (Bairo Pite Village Chief) Visit TB patient house (Patient of Bairo Pite)	
20 Sep 2019	9.00-10.30	Meeting with Bishop Dili	1. Bessina Kumar 2. Father Adriano & Father Francisco Barreto 3. Sr Costa 4. Oscar 5. Dr Mia Domingas 6. NTP Car 7. WHO Car
	11.00-12.30	Meeting with TB Patients (Formosa CHC)	
	14.00-15.00	Visit TB patient house (Patient of Bairo Pite)	
	15.00-16.30	Visit PSF (Hera Village) and Church Leader in Hera	
Team II			
19 Sep 2019	9.00-12.30	Ermera (Gleno)	1. Dr Arax Hovhannesian 2. Gracinda 3. Jennifer 4. Bernardino 5. Diver Alberto
	14.00-17.00	National Lab Visit (Dr Arax to join Team III)	
20 Sep 2019	9.00-12.30	Dili (Bairo Pte Clinic & Motael) Epi-Review (Desk Review)	1. Dr Arax Hovhannesian 2. Gracinda 3. Jennifer 4. Bernardino 5. Driver Alberto
	14.00-17.00	Liquica (Liquica Vila & Bazartete)	
Team III			
19 Sep 2019	9.00-10.30	Meeting with Dili municipality Director, TB Coordinator, DPHO – CDC, and Sr Laboratory Technician	1. Dr Jamie Tonsing 2. Constantino Lopes 3. Basilio 4. Dr Debashish Kundu 5. WHO car 6. NTP Car
	11.00-12.30	National Hospital (Executive and Clinical Directors)	
	14.00-17.00	National Laboratory	
		Meeting with Global Fund CCM Chair	
20 Sep 2019	9.00-10.30	Meeting with Bishop, Delhi (Jamie and Debashish to Join Team I)	1. Dr Jamie Tonsing 2. Dr Debashish Kundu
	11.00-12.30	Meeting with National Laboratory	
	14.00-17.00	Meeting with National Hospital (Executive and Clinical Directors)	
		Meeting with the GF CCM Chair	

24-25 Sep 2019			
Team I			
24 Sep 2019	9.00-10.30	Meeting with Head of MCH Department	1. Dr Rina Triasih 2. Alino Gonzaga 4. Basilio 5. Oscar 6. NTP Car 7. WHO Car
	11.00-12.30	Meeting with Head of Nutrition depart Program	
	14.00-16.00	Visit Alola Foundation	
	16.00 – 17.00	Meeting with Sra Lourdes	
25 Sep 2019	9.00-12.00	Visit Laulara CHC	
	14.00-16.00	Visit Vera Cruz CHC	
	16.00-17.00	Return to Dili	
Team II			
24 Sep 2019	9.00-10.30	Meeting With Director of Manatutu Municipality	1. Dr Jamie Tonsing 2. Constantino Lopes 3. Dr Debashish Kundu 4. CCM 5. NTP Car 6. WHO Car
	11.00-12.30	Visit Manatutu CHC	
	14.00-16.00	Visit Vemase CHC (Baucau)	
25 Sep 2019	9.00-10.00	Meeting with Director of Baucau Municipality	
	11.00-12.30	Meeting with Baucau Hospital Director	
	14.00-16.00	Visit TB Program and TB Laboratory	
	16.00-19.00	Return to Dili	
Team III			
24 Sep 2019	9.00-10.30	Visit Aileu CHC	1. Dr Arax Hovhannesyan 2. Gracinda 3. Dr Etelvina 4. Dr Mia Domingas 5. Bernardino 6. Diver Alberto
	11.00-12.30	Maubesse Hospital	
	14.00-16.00	Maubesse Clinic	
25 Sep 2019	9.00-10.00	Meeting with Director of Ainaro Municipality	
	11.00-12.30	Visit Ainaro Vila CHC	
	14.00-16.00	Return to Dili	
End of Field Visits			