

**National Strategic Plan
for Prevention of
Re-establishment of Malaria
in Timor Leste
2021-2025**

**National Malaria Programme
Timor Leste**

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Acronyms used

ABER	Annual Blood Examination Rate
ACD	Active Case Detection
ACT	Artemisinin based combination Therapy
API	Annual Parasite Incidence
BSP	Basic Services Package
Bti	<i>Bacillus thuringiensis israeliensis</i>
BW	Body Weight
CHC	Community Health Centres
CHV	Community Health Volunteers
CQ	Chloroquine
DOTS	Directly Observed Treatment Schedule
DRTL	Democratic Republic of Timor Leste
ELISA	Enzyme-Linked ImmunoSorbent Assay
G6PDd	Glucose-6-phosphate Dehydrogenase deficiency
GFATM	Global Fund to Fight AIDS, Tuberculosis and Malaria
GPS	Global Positioning System
HR	Human Resources
iDES	Integrated Drug Efficacy Surveillance
IEC	Information, Education and Communication
IGR	Insect Growth Regulator
IPVM	Integrated Pest and Vector Management
IR	Insecticide Resistance
IRS	Indoor Residual Spraying
LLIN	Long Lasting Insecticide-treated Nets
LSM	Larval Source Management
M&E	Monitoring and Evaluation
MCH	Maternal and Child Health
MDA	Mass Drug Administration
MMO	Municipality Malaria Officer
NGO	Non-Governmental Organization
NHSSP	National Health Sector Strategic Plan
NMP	National Malaria Programme
NMS	National Malaria Strategy
PCD	Passive Case Detection
PCR	Polymerase Chain Reaction
Pf	<i>Plasmodium falciparum</i>
PSF	<i>PromotorSaúde Familiar</i> /Community Health Volunteers
RDT	Rapid Diagnostic Tests
SISCa	ServisuIntegrado da SaúdeComunitária/Integrated Community Health Services
SOP	Standard Operational Procedures
WHO	World Health Organization
WHOPES	World Health Organization Pesticide Evaluation Scheme

Executive Summary

The epidemiology of malaria in Timor Leste has changed dramatically in the last 10-15 years. The last indigenous case was detected in June 2017 and external review team confirmed that indigenous malaria transmission has been interrupted in the country. This achievement is a result of a well-funded Programme with a technically strong strategy built on the foundation of a rapidly evolving health system that is providing basic health services down to the household level. Given this scenario, the National Strategic Plan for prevention of re-establishment of malaria 2021-2025 was developed in keeping with the vision, mission and objectives of the Ministry of Health of Timor Leste building on the gains thus achieved.

The objectives of the programme for the period 2021-2025 are

1. To prevent re-establishment of malaria transmission in Timor Leste.
2. To maintain zero mortality due to locally acquired malaria.
3. To achieve WHO malaria-free certification.

The plan relies on three key interventions (focussed intensified surveillance and vigilance, case management and malaria prevention) and two supporting elements (expanding research and innovation for improved delivery of services and strengthening the enabling environment) as recommended in the Global Strategy for Malaria 2016-2030.

Focussed intensified surveillance and vigilance is based on the universal access to malaria diagnosis and treatment. The epidemiological stratification for malaria transmission has been updated and the suspected malaria case definition has been modified based on the recommendations of the external review conducted in February 2020. RDTs will be available at all primary care facilities including in the private and NGO sectors. All suspected cases will be tested for malaria. All cases will be notified immediately (within 24 hours) by telephone. All cases will be investigated within 2 days of notification and RACD and entomological surveillance will be completed within 7 days of notification; response will be mounted within 10 days of notification of a case. Case and foci investigation and response will be based on national guidelines.

Case management focuses on universal access to quality assured malaria treatment at all levels. All cases will be treated according to National Malaria Treatment Guidelines. Clinicians will be trained annually on new developments. Quality assurance of microscopy will be strengthened.

All susceptible populations will have universal access to malaria prevention including LLINs and IRS. A revised plan for vector control has been developed. Chemoprophylaxis will be introduced for travellers to malaria endemic areas.

Sustained political and financial commitment will be ensured by the establishment of 1) a Ministerial level Task Force for prevention of re-establishment of malaria in the country, and 2) an independent committee to review the malaria situation in the country and to advise the National Malaria Programme and Ministry of Health. Cross border collaboration with Indonesian colleagues in West Timor will be further enhanced with facilitation of WHO and the GFATM.

As in the past quality assurance of all activities will be monitored. A new set of IEC material will be developed to suit the prevention of malaria phase.

Other activities that will be conducted are monitoring and evaluation and capacity building with re-orientation of the work force.

It is envisaged that Timor Leste will be able to apply for ‘malaria-free’ certification by WHO in 2021/2022.

1. Background

1.1 Introduction

Malaria was a major public health problem in the country 15 years ago. With implementation of evidence based malaria control measures, the incidence of malaria decreased from 223,002 cases in 2006 and the last indigenous case of malaria was reported in June 2017.

The National Strategic Plan 2018-2022 had a goal of eliminating transmission of indigenous malaria by 2021. The last indigenous case of malaria was reported in June 2017. The external mid-term review team was convinced that indigenous malaria transmission has been interrupted in the country in February 2020. Eight imported malaria cases were reported in 2018 and 9 imported malaria cases were reported in 2019. All imported malaria cases had acquired the disease from neighbouring Indonesia.

The National Strategic Plan for prevention of re-establishment of malaria focuses on maintaining the gains achieved over the last 10-15 years for a sustainable programme that would enable the country to obtain WHO certification as a 'malaria-free' country. It also elaborates plans how the programme should be re-structured post 'malaria-free' certification as part of the general public health services.

1.2 Country profile

The location of the Republica Democratica de Timor-Leste (referred to as Timor Leste in subsequent sections of this report) in Timor island is shown in Figure 1. It occupies primarily the eastern half of the island of Timor, with West Timor province being part of the Republic of Indonesia. The country includes the nearby islands of Atauro and Jaco, and also Oecussi, an exclave in Indonesian West Timor. The island of Timor is located at coordinates between 8°50'S and 125°55'E, and the country covers a total area of 14,918.7 square kilometres (General Directorate of Statistics 2015). The island topography consists of 80% mountains with the highest peak of Tatamailau, sometimes referred to as Mount Ramelau, reaching up to 2960 m. The maximum east-west length is 364 kms and the maximum north-south length is 149 kms (General Directorate of Statistics, 2017). The coastal plains are narrow swamp and there are no major highland valleys or permanent rivers. The sub-municipalities bordering West Timor municipalitiess are given in Table 1.

The country is divided into 13 municipalities (formerly called districts) which includes Dili, the capital of the country. Each municipality is divided into sub-municipalities (formerly called sub-districts), and each sub-municipality is divided into sucos (village); each suco (village) comprises a few aldeias (hamlets). In total, there are 13 municipalities, 65 sub-municipalities, 442 sucos and 2225 aldeias (General Directorate of Statistics, 2017). Dili is the largest city and the main port. The second-largest city is the eastern town of Baucau. Dili has the only functioning international airport; there is an airport in the exclave of Oecusse with regular flights to and from the mainland. There are also airstrips in Atauro island, Baucau, Fuiloro, Maliana, Suai and Viqueque.



Figure 1. Map of Timor Leste in Timor island

Table 1. East and West Timor bordering municipalities/districts and sub-municipalities

East Timor bordering municipalities	East Timor bordering sub municipalities	West Timor bordering districts
Covalima	Tiliomar	Malaka
	Fatumean	Malaka
	Fatulilik	Malaka
Bobonaro	Bobonaro	Belu
Oecusse	Nitibe	Kupang
	Panche Macasar	Timor Tengah Utara (TTU)
	Passabe	Timor Tengah Utara (TTU)
	Oesilo	Timor Tengah Utara (TTU)

The President of the republic is the head of state of Timor Leste elected by popular vote for a five-year term. The leader of the majority party elected to Parliament is invited to be the Prime Minister by the President. The Prime Minister functions as the head of government. The President appoints the Council of Ministers on the recommendation of the Prime Minister. The Ministry of Health is under the purview of the Minister of Health.

Power is delegated from the central administration to the local administration (municipality) (Government of the Democratic Republic of Timor Leste). Health services are provided by the local administration. There are two special economic zones in Timor-Leste, Oecusse and Atauro

that are managed through ZEESM (Special Social Market Economic Zone), a national development programme used to implement innovative governmental policy. Oecusse is a coastal enclave in the western part of the island of Timor and Atauro Island is 36 kms to the north of Dili. The administration of the Special Economic Zone has, to a large extent, autonomous privileges with different rules and regulations which govern the rest of the country. The government expects large scale economic activity in the areas in the future. Currently, major construction activities are being carried out with the influx of foreign workers. As the Oecusse municipality is an exclave in Indonesian West Timor, supervision and malaria control and prevention of re-introduction activities have always been difficult. With the new administration as a special economic zone, there are issues with implementation of malaria control activities.

The census of 2015 enumerated the population as 1,183,643 comprising 50.8% males and 39% of the population being under 15 years with national median age of 19 years (General Directorate of Statistics, 2016). In 2019, the population was estimated to be 1,271,694. Based on the 2015 census, seventy percent of the population lived in rural areas and the rest in urban areas. The average household size was 5.8 persons. The literacy rate was 84% with rates being similar in males and females. The unemployment rate was 47% with the rate being higher in females (56% vs 39%). 50% of households had access to improved sanitation facilities (General Directorate of Statistics, 2016a).

Tetun is the most common language in the country and is the first official national language. Portuguese, spoken by few people, is the other official language. English and Indonesian are working languages. There are other languages spoken by the indigenous populations across the country.

Timor Leste has a market economy that depends upon exports of a few commodities such as coffee, marble, oil, and sandalwood. Timor now has revenue from offshore oil and gas reserves. The majority of the population is engaged in subsistence farming. In 2014, 42% of the population was living in poverty (General Directorate of Statistics, 2016b; Asian Development Bank); 63.4% of the population had access to electricity in 2016 (Asian Development Bank). The economy is dependent on government spending and, to a lesser extent, assistance from international donors.

The climate, which has significance influence in malaria transmission, can be classified into wet and dry seasons, but variations exist between the north coast, south coast and the eastern district of Lautem. In general the dry season lasts from May to November, with average temperatures varying between 20-33⁰C. During this period the north coast receives virtually no rain, whereas the cooler central mountains and the south coast get an occasional shower. Creeks and rivers dry up and the vegetation become dry and brown. Around October to November the “build-up” to the rainy season brings oppressive humidity, occasional showers and temperatures increase to 29 – 35⁰C. From December until April, with the arrival of the rains, flooding occurs in many parts and travel becomes difficult. The environmental conditions are favorable for perennial malaria transmission.

1.3 Country profile at a glance

Total population (2016) ¹	1,205,067
Gross national income per capita (PPP international \$, 2013) ¹	6,410
Life expectancy at birth m/f (years, 2016) ¹	67/70
Under 5 mortality rate (per 1,000 live births, 2017) ²	48
15-60 years mortality rate m/f (per 1000 population, 2016) ¹	176/122
Total expenditure on health per capita (international \$, 2014) ¹	102
Total expenditure on health as % of GDP (2014) ¹	1.5
Maternal mortality ratio (per 100,000 live births, 2015) ²	215
Neonatal mortality rate (per 1000 live births, 2017) ²	21
Mortality due to non communicable diseases (% , 2016) ²	19.9

¹ World Health Organization. WHO Country Office, Timor Leste.

<https://www.who.int/countries/tls/en/> (accessed on 22nd January 2020)

² Asian Development Bank. Poverty in Timor Lestes. <https://www.adb.org/countries/timor-leste/poverty> (accessed on 22nd January, 2020)

1.4 The health system

Medical and health care is enshrined as a fundamental right of a citizen in the Constitution of Timor Leste. The State is obliged to protect and promote that right through the establishment of a national health system that is universal, general, free-of-charge wherever possible, and managed through a decentralized participatory structure.

While acknowledging that health problems and their determinants are not solely within the boundaries of the health sector and its responsibility, the Ministry of Health envisions a broad definition of health to ensure *"Healthy East Timorese people in a healthy East Timor"*. The Ministry of Health envisages a Timorese community enjoying a level of health that will allow them to develop all their potentialities in a healthy environment. The vision also reflects an aim to reduce poverty to a point where the level of production and income allows all Timorese individuals to enjoy a healthy life and to have the minimum means to cover basic needs.

In consistent with the vision statement, the mission of the Ministry of Health is to strive to ensure the availability, accessibility and affordability of health services to all East Timorese people, to regulate the health sector and to promote community and stakeholder participation as well as other sectors.

Based on these three mission components (ensuring availability, regulating and promoting participation) the Ministry of Health expects to contribute to the overall goal of improving the health status of East Timorese by providing quality healthcare to East Timorese by establishing and developing a cost-effective and needs-based health system which will specially address the health issues and problems of women, children and other vulnerable groups, particularly the poor, in a participatory way.

The National Health Sector Strategic Plan 2011-2030 (NHSSP) adopts a ‘client centered’ approach considering both the supply and demand sides of healthcare. It emphasizes social values in equity,

culture awareness, professionalism, integrity and ethics, right to best possible health care and accountability. These goals are then translated into a set of policy objectives linked to government priorities for the health sector. They are: 1) to strengthen the stewardship role of the MoH in the development of a strong integrated national health system; 2) to ensure access to and provision of quality PHC services and hospital care services; 3) to meet human resources needs; 4) to invest sufficiently and appropriately in health infrastructure; and 5) to strengthen health administration and management services.

The Ministry of Health comprises 5 directorates for community health services; planning and finance; administration, logistics and procurement; hospital and referral services; and for human resources. The National Malaria Programme is under the Department of Communicable Disease Control which is under the Directorate of Community Health Services. The curative institutions are under the Directorate of Hospital and Referral services.

Medical care in Timor Leste is provided by 6 hospitals (5 Regional Hospitals and one National Hospital), 70 community health centres and 309 active health posts in the public sector; in addition there are 31 active private sector providers, most of whom are located in Dili registered with the National Malaria Programme (Table 2 and Figures 2 and 3). The government plans to have 442 health posts in the country, one each for each suco. Primary health care services are provided through the District Health Service structure, with Community Health Centres, Health Posts and Mobile Clinics servicing geographically defined populations within a framework of the basic services package (BSP) while incorporating SISCa (Integrated Community Health Services). The essential services package is currently being revised to cater to the needs of the MOH. Management authority and responsibility has been devolved to district health teams.

The nearest facility based services to the community are delivered through a network of Health Posts staffed by a team of one clinician, one nurse and one midwife, able to deliver a minimum package of curative and preventive/promotive care. At sub-municipality level, Community Health Centres (CHC) provide a higher level of services than the health posts, have a wider range of staff and provide mobile clinic services and technical and managerial support to health posts. Some CHCs have inpatient facilities.

Municipality CHCs provide inpatient and outpatient services, with a staff component of 10-14 including a physician (the “Municipality Medical Officer”), with mobile phone communication and access to ambulance services. Depending on the vicinity of referral hospitals, inpatients are admitted to an observation unit with two to four beds for pre-referral stabilization of severe cases, or to a ward of 10-20 beds having basic diagnostic facilities for essential tests. Where there is no health post available in remote communities, CHCs provide basic mobile clinic services on a regular basis using a motorbike on a twice-per-week basis.

The community based activities consist of SISCa (Servisu Integradu Saude Komunitaria) in villages; mobile services are conducted at other sites e.g. schools, markets, community structures and “mop up” services are regularly conducted according to programmatic needs. SISCa clinics serve populations of 1000-2000 and provide a combination of services ranging from antenatal care, maternal and child health care, immunization, health promotion and prevention, and diagnosis and treatment of common conditions.

As part of primary health care services, a national family health programme was initiated in July 2015. In this programme, domiciliary visits are made by teams comprising a doctor and health staff stationed at health posts with the aim of identifying health problems in families and prioritizing them. Details of households and family members including their health status are obtained. Persons with health conditions and illnesses that require further treatment and/or follow up are identified. These persons are referred for appropriate care. Data are entered into a national database.

Table 3 gives the projected health professionals cadre for Timor Leste for the period 2019-2023. Currently, there are 614 doctors, 419 nurses and 616 midwives. Some information was missing. Based on the estimated number of health care workers in government facilities and in private sector facilities, the MoH in the past had estimated that private clinics may be handling up to a quarter of basic health service delivery. There is greater use of private facilities amongst the non-poor, with over 29 percent using private or church facilities compared to 14 percent of the poor. There are also about 32 faith-based clinics across the country.

The main feature of the health sector is the decentralization of health service delivery, through devolution of key management responsibilities and resources to district health and personalized or autonomous health services. The municipality health system takes on a more implementation role of national policies while gradually taking charge, through the Municipality Health Management Teams (MHMT) in developing their own plans, supervising, coordinating, and monitoring and evaluating all activities at the district level, which reflects specified local needs. The main focus is on integrated community health care services in the form of a package called, 'basic services package', (BSP) which articulates a service delivery structure that begins in the local community and works its way to the national level for specialized services. The package requires an appropriate mix of inputs related to human resources, infrastructure and commodities to ensure delivery. BSP is responsive to needs of each level. CHCs are service delivery units under the municipality health system and are responsible for BSP implementation.

While sector strategic plans and delivery packages exist, implementation is a major challenge due to several factors: critical shortage of HRH, inadequate funding, and redundancy or limited impact/interest for policy. While the number of health facilities has increased significantly over the years, nearly a third of the people still live more than 5 km from the nearest health facility; the referral system is weak, staff shortages and regular stock-out of medicines are major barriers to delivery of optimal health care services. A system for supervision, monitoring and evaluation exists but it is weak. The late release of funds for supervision, insufficient funds, inadequate transport arrangements and lack of supervisory skills affect the frequency of supervision which in turn impacts negatively on quality of services rendered.

Table 2. Healthcare institutions testing for malaria in Timor Leste

Municipality	Hospital	Community Health Centre (CHC)	Health Posts			SISCa			Private Clinics		
			Active	Non-active	Total	Active	Non-active	Total	Active	Non-active	Total
Aileu	0	4	12	0	12	33	0	33	1	0	1
Ainaro	1	4	18	3	21	36	0	36	2	0	2
Baucau	1	9	27	0	27	60	0	60	3	0	3
Bobonaro	1	7	25	0	25	50	0	50	2	0	2
Covalima	1	7	21	0	21	10	20	30	2	1	3
Dili	1	6	24	0	24	18	0	18	8	0	8
Ermera	0	6	27	0	27	52	4	56	6	0	6
Lautem	0	5	26	0	26	34	0	34	2	0	2
Liquiça	0	3	26	0	26	19	0	19	1	2	3
Manatuto	0	6	19	2	21	27	2	29	0	0	0
Manufahi	0	4	24	1	25	29	0	29	2	0	2
Oecusse	1	4	17	0	17	8	10	18	0	0	0
Viqueque	0	5	43	0	43	47	0	47	2	0	2
Timor Leste	6	70	309	6	315	423	36	459	31	3	34

Timor-Leste: Health Facilities

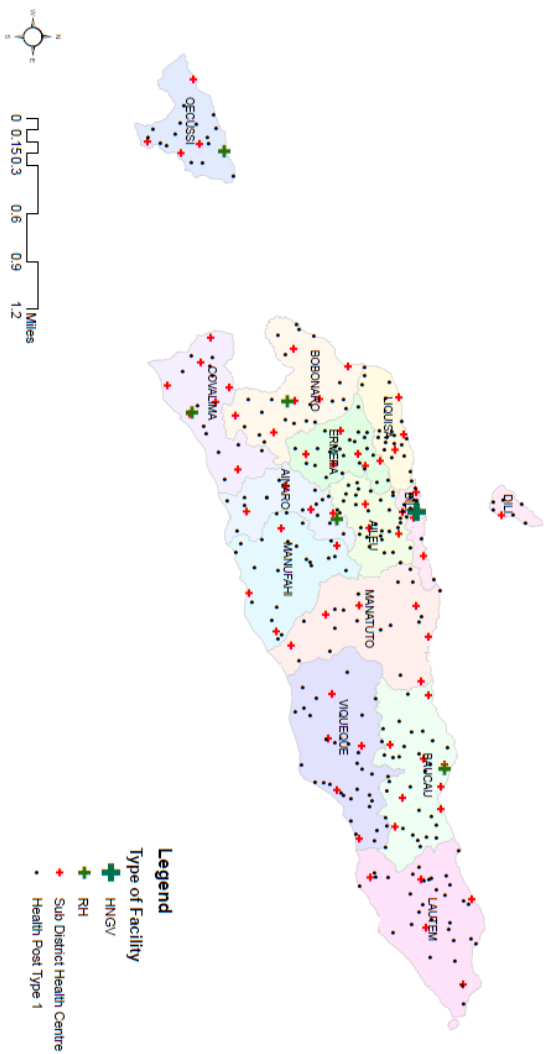


Figure 2. Locations of public sector health care facilities

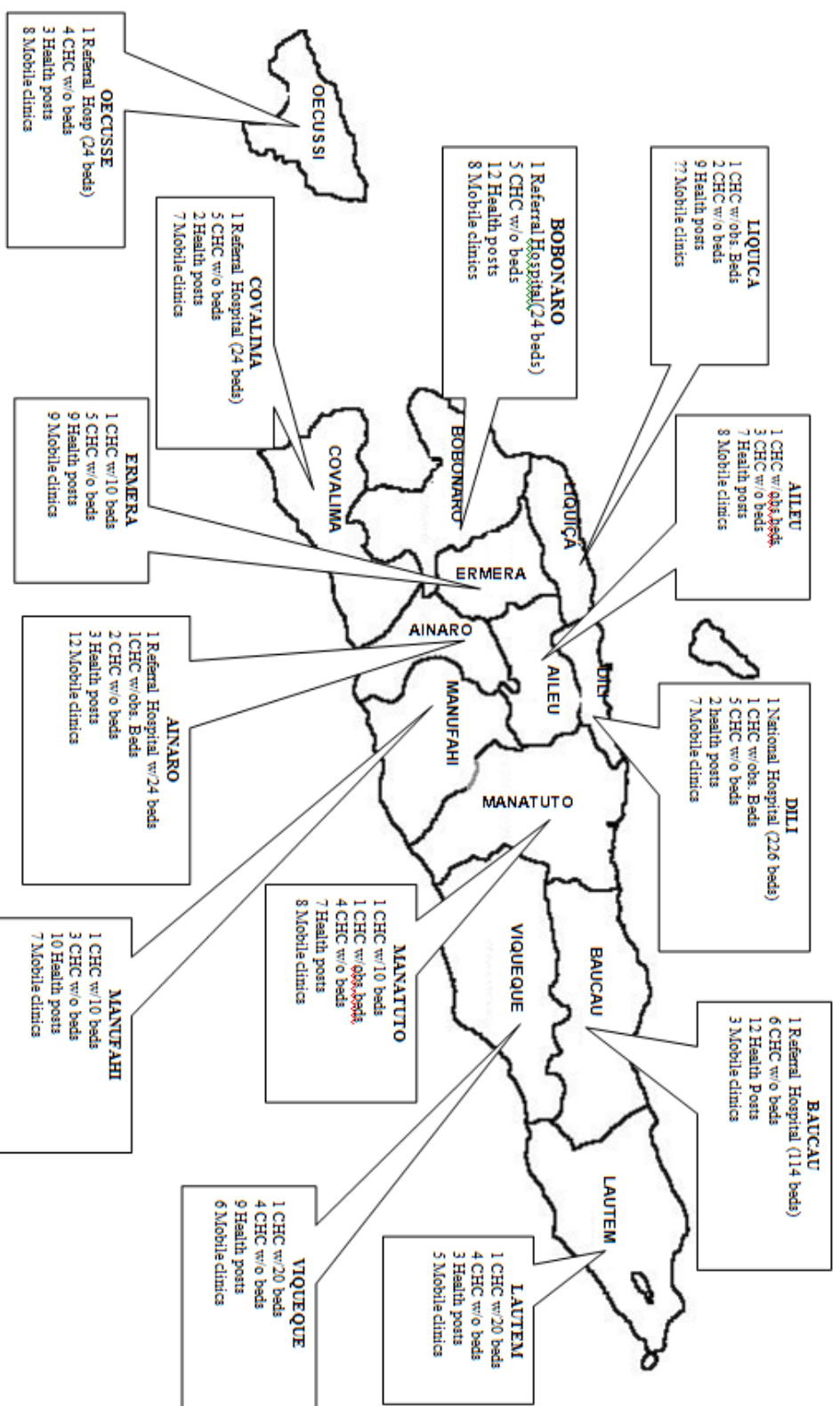


Figure 3. Distribution of public sector healthcare facilities

Table 3. Projected health professional cadre 2019-2023

Municipality	Medical Officers	Nurses	Dental Nurses	Midwives	Technical Officers			Physiotherapists	Nutritionists
					Pharmacists	Laboratory Analysts	Radiographers		
Aileu	10	21	3	21	10	12	0		3
Ainaro	12	12	3	18	10	9	0		3
Baucau	7	11	5	14	16	15	0		5
Bobonaro	19	11	6	16	26	6	0		6
Covalima	24	15	6	23	20	16	0		6
Dili	2	2	2	8	13	0	0	0	6
Ermera	27	38	6	41	13	7	0		6
Lautem	9	17	5	32	20	7	0		5
Liquiça	3	12	3	14	15	8	0		3
Manatuto	4	11	6	4	20	3	0		6
Manufahi	10	14	4	14	19	2	0		4
Viqueque	4	6	5	35	38	4	0		5
HoReX Baucau	10	20	2	5	6	5	6	5	4
HR Maliana	4	6	1	0	3	1	2	2	1
HR Maubessi									
HR Suai									

Data for Oecusse and some hospitals are missing

The health situation in Timor-Leste is far from ideal. Among the more serious problems are high infant mortality rates and under-5 mortality rates caused by infectious diseases. Maternal and child malnutrition is a major problem. There is a high incidence of preventable communicable diseases such as tuberculosis, childhood respiratory infections, diarrheal diseases and a rising incidence of non-communicable diseases. Malaria was a major problem in the country and was ranked 2nd in the list of top ten priority diseases 10 years ago. The last indigenous malaria case was reported in June 2017.

1.5 Overview of the National Malaria Programme

Malaria was a major public health problem in the country 15 years ago. With implementation of evidence based malaria control measures, the incidence of malaria decreased from 223,002 cases in 2006 and the last indigenous case of malaria was reported in June 2017.

The National Malaria Control Programme (NMP) was established in 2003 under the Communicable Disease Control Division. At its inception in 2003, the National Malaria Unit had Programme Manager and one National Malaria Control Officers and one Driver employed by a GFATM round 2 Grant. NMP was responsible for planning, implementation, monitoring and evaluation of malaria control activities in the country. The staffing pattern and the funding sources of staff of the programme at the National and Municipality levels are given in Table 4.

At the National level, there is a Programme Manager under whom all NMCP activities are carried out. The National Malaria Programme was strengthened in 2010 through a GF round 7 grant. Under the Programme manager at national level there are four regional malaria officers, one M and E officer, one data entry officer, 3 vector control officers, an administrative officer and an entomology team consisting of 4 entomology assistants and an insect collector. In addition, the National Malaria Programme engages 36 volunteers; in the border municipalities of Oecusse, Bobonaro and Covalima they assist the NMP to track migrants, remind residents to use LLINs and also detect and treat infections. A long Term technical adviser funded by the global fund was recruited to improve the technical and managerial capacity of the National Malaria Programme.

The Municipality Health Teams are responsible for municipality health planning, coordination of health service delivery, management of logistics, and monitoring and evaluation. At the municipality level, one Municipality Public Health Officer (MPHO) attached to each municipality is responsible for communicable diseases control. The Municipality Health Teams work in consultation and in coordination with the Regional Malaria Officers at the National level. Municipality Malaria Officers have been appointed to all 13 districts. Focal points for malaria were appointed for 29 high risk malaria sub-municipalities in 2009 and 36 were appointed in 2012. Four regional entomological teams were established in 2013. Based on the recommendation of the external review team in 2017, the regional-based entomological teams were terminated; currently the entomological team at the national level conducts entomological surveillance throughout the country as and when needed.

Table 4. Staffing pattern of the National Malaria Programme

Level	Staff category	Number	As of 31 st December 2019, number of staff supported by	
			Government ¹	Global Fund ²
National	Programme Manager	1	1	
	Regional Malaria Officers	4	1	3
	Vector Control Officers	3	1	2
	M&E Officer	1		1
	Data Entry Officer	2		2
	In-charge Entomology Officer	1		1
	Senior Entomology Officers	1		1
	Junior Entomology Officers	3		3
	Insect collectors	1		1
	Cleaner	1		1
	Drivers	5		5
	Total	23	3	20
Municipality	Municipality Malaria Officers	13	13	
	Assistant Municipality Malaria Officers	13		13
	Administrative Post/submunicipality Malaria Officers	67		67
	Malaria Officer (Hospitals)	6		6
	Drivers	13		13
	Total	112	13	99
	Grand Total	135	16	119

¹ Staff funded by the government are permanent.

² The contracts of all staff funded by GFATM expired on 31st December 2019. Currently they are working without a contract or financial remuneration.

Furthermore, spraying supervisors and spray machine operators were recruited as temporary staff from August to December every year since 2010 to carry out IRS in epidemic prone areas of six municipalities prior to the malaria high transmission season. Five drivers at national level and one driver for each municipality are in place.

The organogram of the National Malaria Programme is given in Figure 4. The implementation arrangements are given in Figure 5.

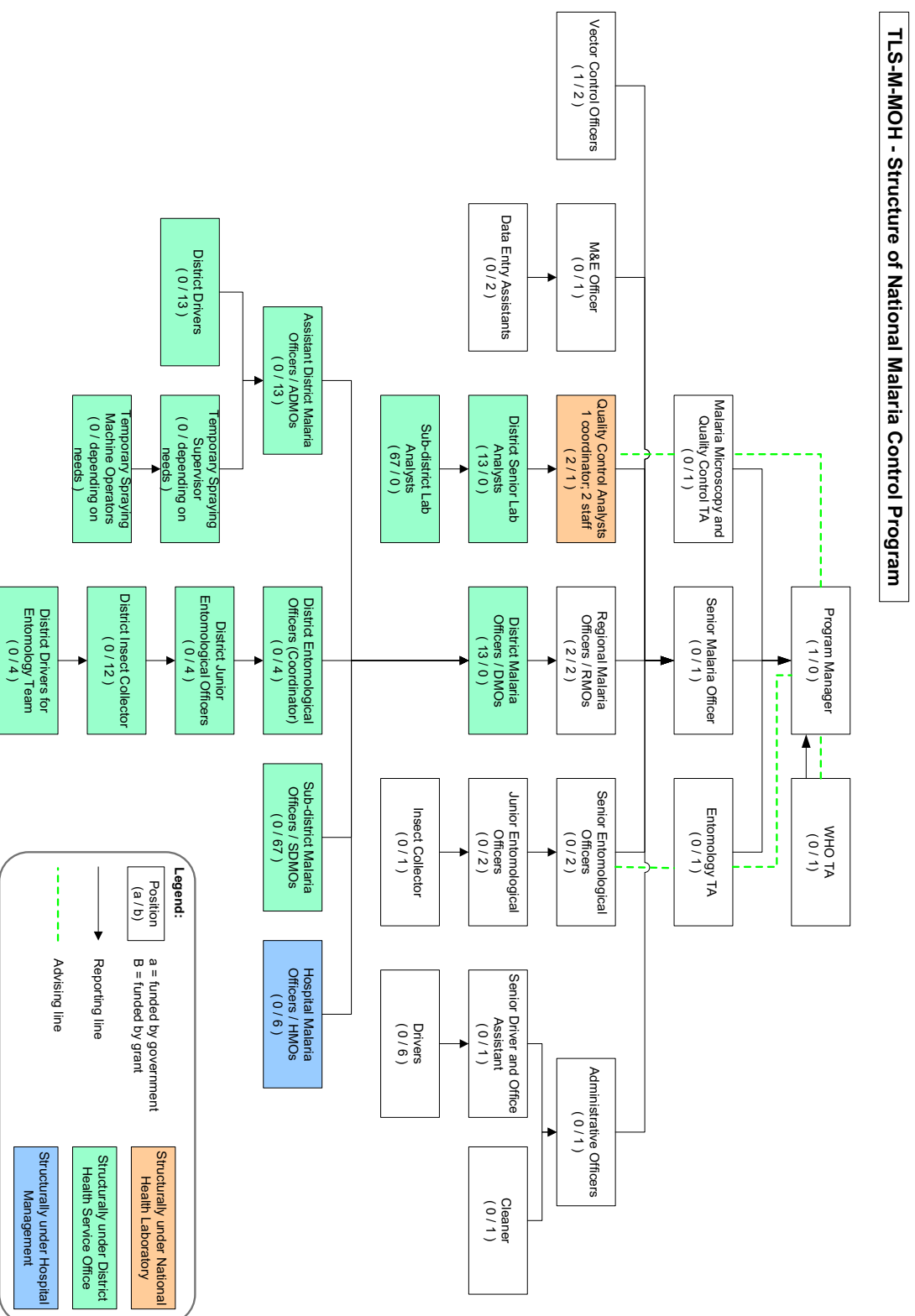
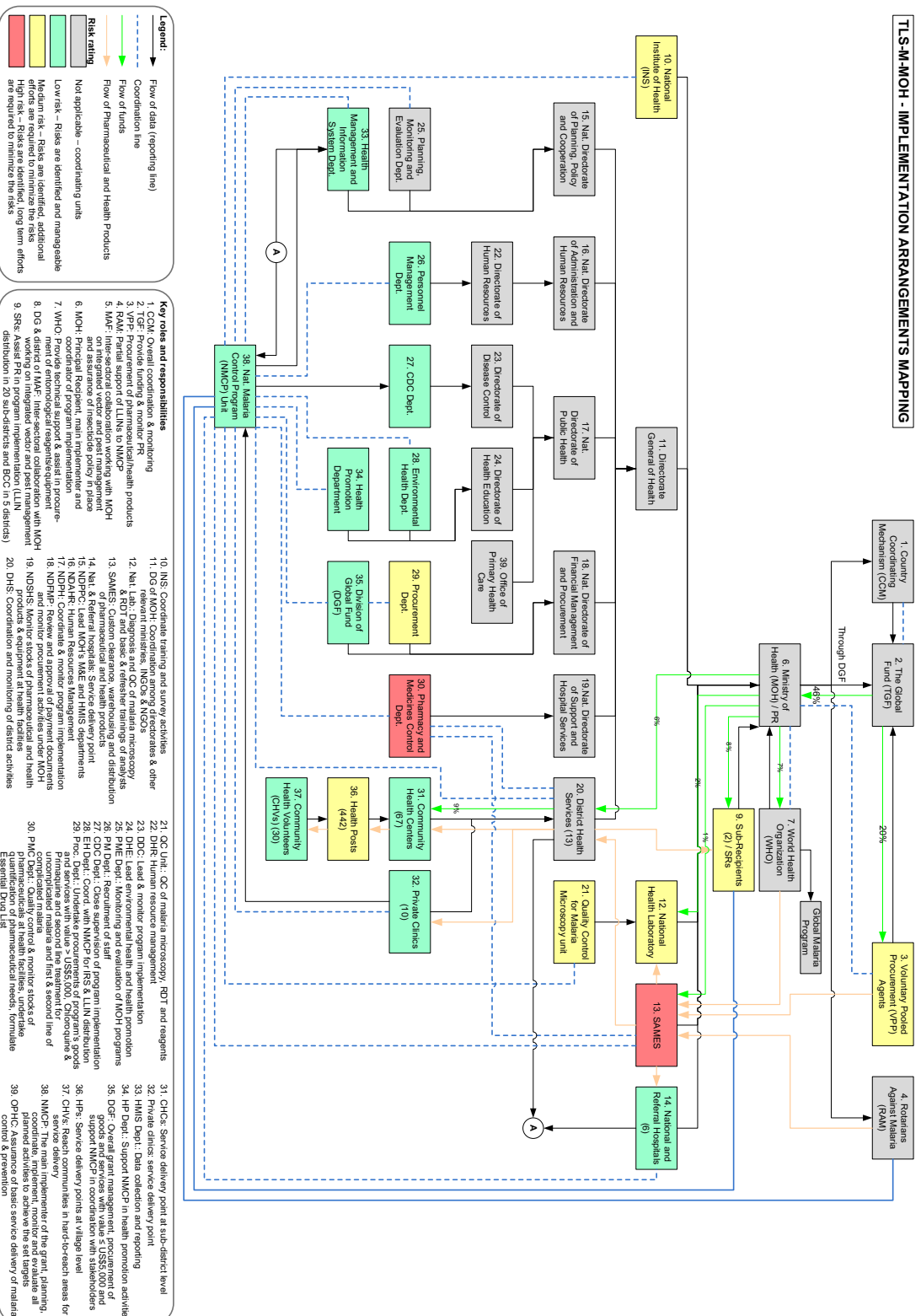


Figure 4. Organogram of the National Malaria Control Programme

TLS-M-MOH - IMPLEMENTATION ARRANGEMENTS MAPPING



1.6 Milestones of National Malaria Programme in Timor Leste (Figure 6)

- 2005 –Establishment of the National Malaria Control Programme in Timor Leste with two Officers
- 2006-Implementation of the National Malaria Control Strategy 2003-2013
- 2007- Implementation of National Malaria Treatment Guidelines
- 2007 July: Introduction of ACT and monovalent RDT (which detects *P. falciparum*)
- 2009 April – Initiate GF round 7 for malaria control
- 2009 September-Strengthening of the National Malaria Control Programme by employing National and Regional Malaria Officers, Entomology Teams, Quality Control Analysts, and District Teams consisting of 13 District Malaria Officers and 29 malaria focal points in high risk malaria sub-districts.
- 2010- Revision of the National Malaria Control Strategy 2010-2020
- 2010- Distribution of 166,605 LLINs to children <5 and pregnant women
- 2010 August-December- Implementation of Indoor Residual Spraying (IRS) as a pilot study in 5 sub-districts in Covalima, Manatuto and Dili Districts
- 2011 February- Introduction of bivalent RDTs which detect both *P. falciparum* and *P. vivax*
- 2012 January- initiation of GF round 10 malaria grant
- Expansion of IRS to 6 districts.
- 2013- Treatment based on confirmed diagnosis
- 2013- Universal coverage of risk population with LLINs
- 2016- Transited into pre-elimination/elimination phase
- June 2017 – Last indigenous case of malaria reported

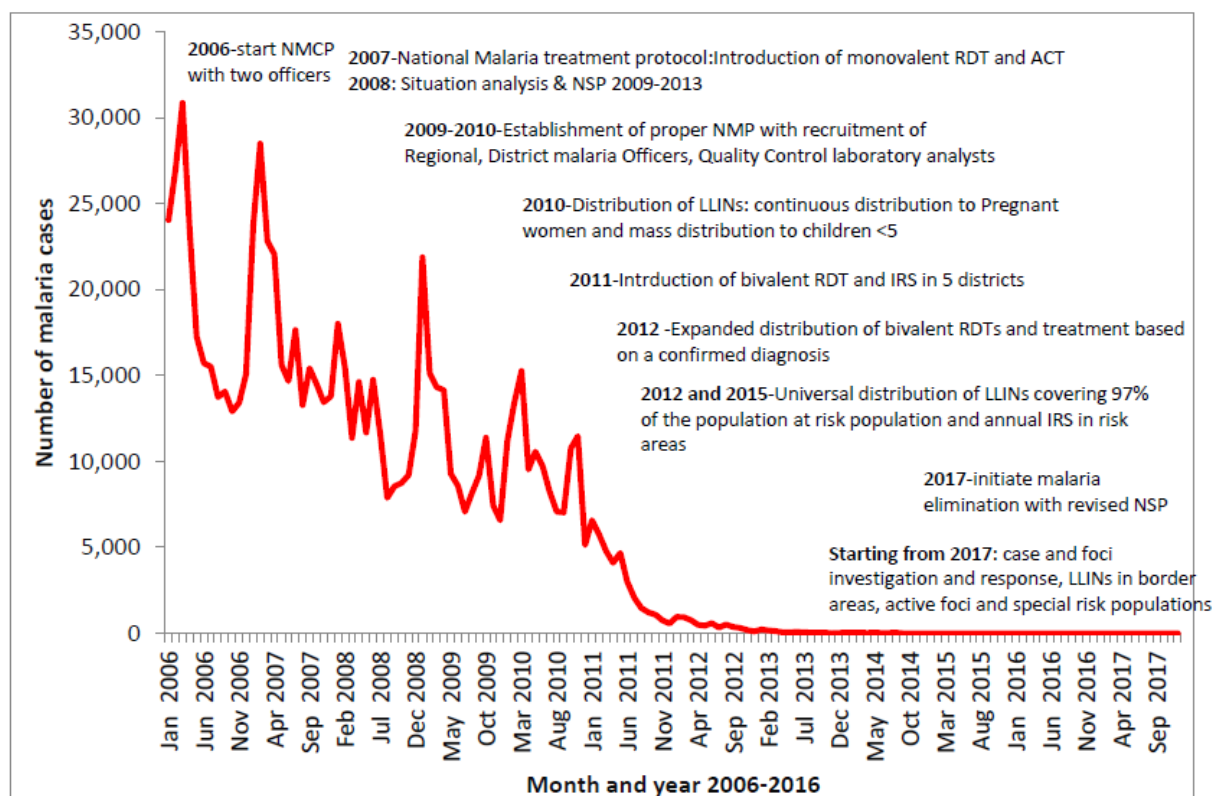


Figure 6. Trends of malaria and milestones of National Malaria Programme in Timor Leste 2006-2017

1.7 Malaria Situation in the country

The malaria landscape in Timor Leste has dramatically changed in the last 15 years (Table 5). The incidence of malaria has reduced from 223,002 cases in 2006 and the last indigenous case was reported in June 2017. There have been no malaria deaths since 2015 (Table 5). In 2018, 8 cases of imported malaria were detected and in 2019 9 cases of imported malaria were detected (Tables 5 and Figures 7-10).

In the past, there was perennial transmission with the incidence peaking from January to March of each year corresponding to the monsoonal showers (Table 6). The peaks were not as much accentuated as initially after the introduction of LLINs and IRS just prior to the peak season. Even during elimination and in the prevention of re-introduction/re-establishment phase the most number of imported cases are detected in January and February of each year. This is because some families who have relatives in the neighbouring West Timor in Indonesia spend Christmas with their families in West Timor and return to Timor Leste after a few days, with some having acquired malaria during the high transmission season in West Timor. The malaria incidence in 2017 and 2018 by age groups (Table 7) clearly suggests that indigenous transmission is not taking place; in 2019, the three children under fifteen who were detected with malaria were imported cases among refugees from Papua in Indonesia.

A major reason for the decline in the number of cases reported is the decrease in the number of clinical treated cases due to the rapid scale-up of quality malaria diagnosis by microscopy or RDTs in remote areas through community health volunteers and other health staff. A later directive to treat only confirmed cases also helped. The other important reason for the decline in the malaria incidence was the scaled-up vector control operations based on results of entomological surveillance.

Malaria deaths

The highest number of deaths due to malaria (n=58) were reported in 2006 and 2010. The number of deaths due to malaria has shown a steady decline since then and zero deaths were reported since 2015. The decline in the trend of deaths due to malaria is a direct result of early detection of cases, provision of effective treatment and making available intravenous drugs and suppositories in CHCs with inpatient facilities and in higher levels institutions.

Malaria parasites

In the past, *P. falciparum* was the predominant species among malaria infections. There were also a number of mixed infections. With the reduction in the number of reported cases, there is no clear cut trend in the parasite species; *P. falciparum*, *P. vivax* and mixed infections are reported. As point of care reliable testing for G6PDd is not available in the country, the NMP administers weekly doses of primaquine over 8 weeks under DOTS for vivax infection since October 2016. For *P. falciparum* infections, the stat dose of primaquine was started at the same time. *P. ovale* and *P. malaria* have not been diagnosed in Timor Leste.

Despite a decline in the number of infections detected, the NMP has maintained a ABER of approximately 10% during the period 2016-2019 and achieved the target in the performance framework. Currently, RDTs are also done when microscopy is available and performed. This may be a good practice as the skills of Laboratory Analysts may also be waning due to the low number of infections being reported. All positive cases are microscopically confirmed at the National Laboratory.

Case classification was started in 2016 prior to the launch of the elimination programme in 2017. Table 9 gives the breakdown of the malaria cases since 2016 by case classification. In 2016, there were 10 imported cases followed by 13, 8 and 9 from 2017-2019, respectively. In 2019, two imported cases with *P. vivax* relapsed and were classified as imported cases. Most imported cases have been detected in Dili (the capital) and Oecusse municipalities. Many travelers visit Dili being the capital city. Oecusse municipality is an enclave surrounded by West Timor which is endemic for malaria.

Of the 40 imported cases reported since 2016, 28 (70%) infections have been in Timorese nationals who had travelled to Indonesia for various purposes (Table 10). In 2017, 10 imported infections were detected among a group of fishermen in Atauro island who had visited nearby Indonesian islands for fishing activities. Some of these infections were detected during RACD. Even in the past, such infections acquired by fishermen during their trips to nearby Indonesian islands have been detected in this population.

Table 5. Number of malaria cases detected and deaths by species 2006-2019

Year	Population	Clinically treated cases	Confirmed cases	Pf^1	Pv	Mixed cases	Total	Deaths	API ² (/1000)	Incidence (/1000)
2006	1,015,187	185,106	37,896	24,219	13,477	200	223,002	58	37	220
2007	1,047,632	168,533	46,869	34,174	12,544	161	215,402	26	45	206
2008	1,080,742	97,621	45,973	34,406	11,295	272	143,594	10	43	133
2009	1,114,534	85,799	40,999	34,517	12,246	567	133,129	56	37	119
2010	1,149,028	78,822	40,250	28,350	11,432	154	119,072	58	35	104
2011	1,092,104	16,418	19,740	14,261	3,759	1,720	36,153	16	18	33
2012	1,118,429	940	5,262	2,016	2,288	958	6,202	4	5	6
2013	1,145,048	17	1025	373	512	140	1042	3	0.90	0.91
2014	1,172,529	5	342	118	139	85	347	1	0.29	0.30
2015	1,183,643	0	80	33	24	23	80	0	0.07	0.07
2016	1,205,067	1	94	51	11	32	95	0	0.08	0.08
2017	1,226,879	0	30	11	5	14	30	0	0.02	0.02
2018	1,249,085	0	8	4	2	2	8	0	0.01	0.01
2019	1,271,694	0	9	2	7 ³	0	8	0	0.01	0.01

¹ For % Pf calculation, Pf and mixed infections were included

² For API calculation, only confirmed malaria cases were taken

³ One episode was a relapse

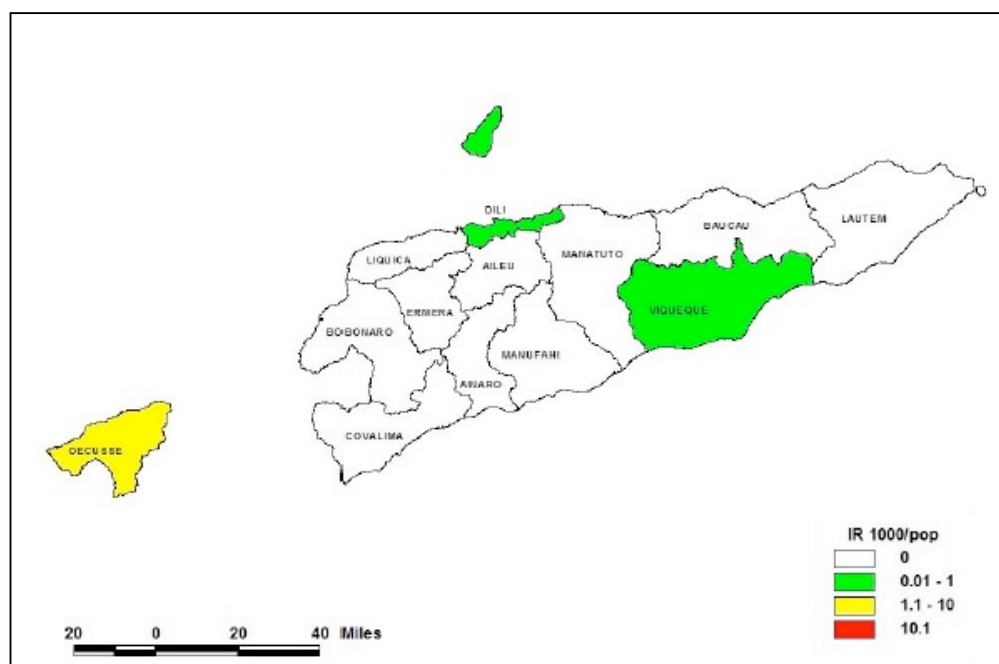


Figure 7. Malaria incidence in Timor Leste 2016

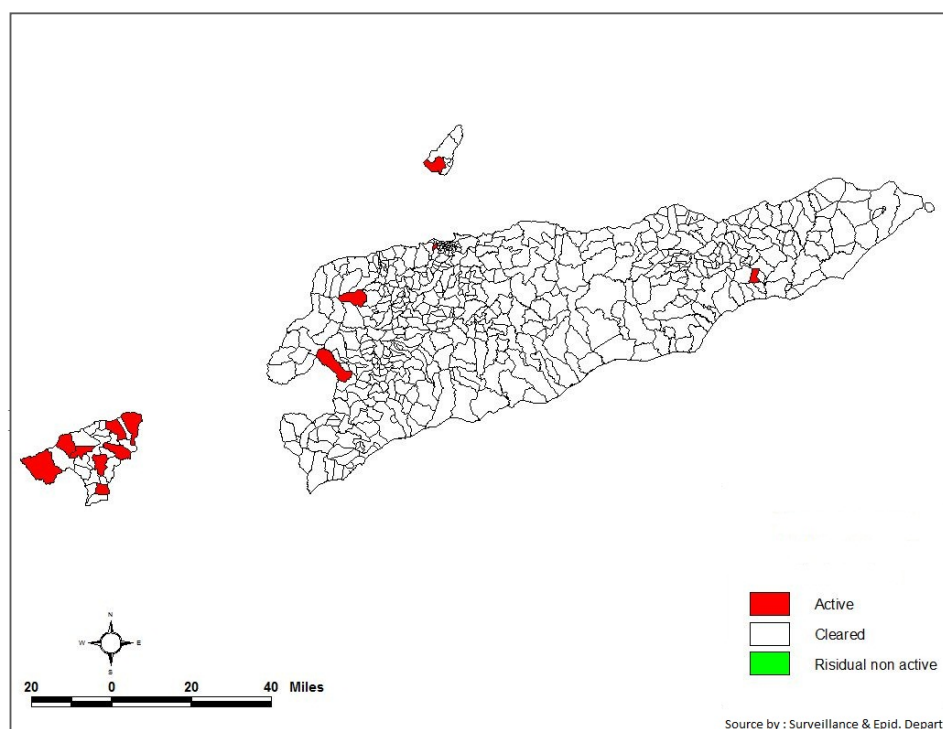


Figure 8. Malaria cases in Timor Leste 2016

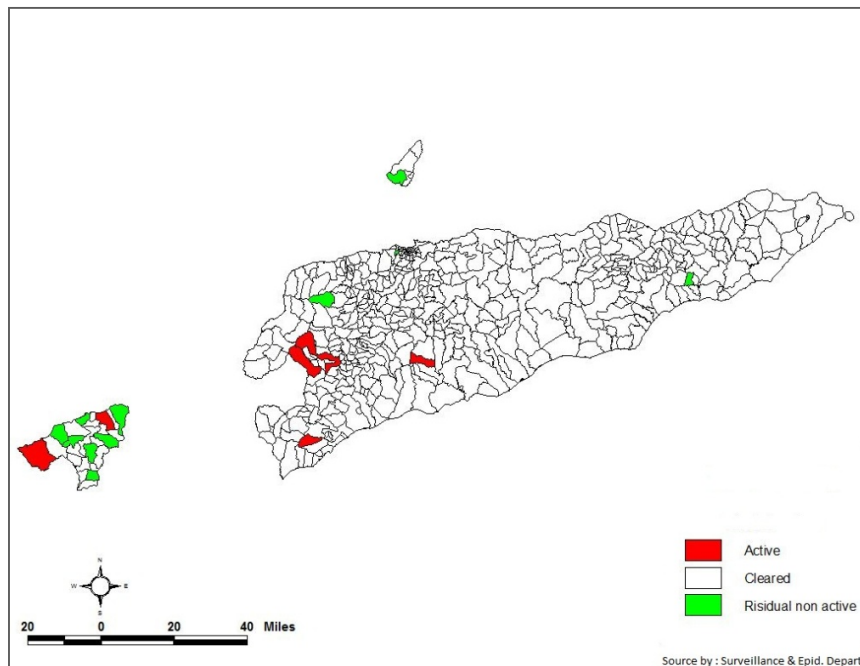


Figure 9. Geographic distribution of malaria cases in 2017

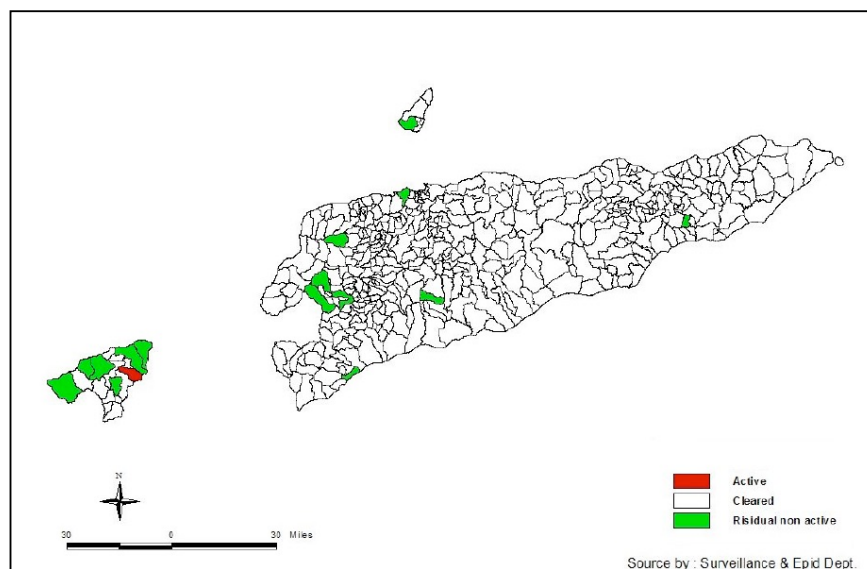


Figure 10. Distribution of malaria foci in 2018

Table 6. Number of malaria cases in Timor Leste by month 2006-2019

Month	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
January	24,051	23,726	18,007	21,873	11,200	6,586	969	227	51	15	11	8	4	1
February	27,017	28,470	15,397	15,122	13,413	5,783	948	184	42	18	5	12	1	1
March	30,842	22,826	11,374	14,316	15,265	4,790	787	143	42	6	14	1	0	0
April	23,381	22,050	14,621	14,147	9,522	4,104	504	65	30	13	10	2	0	0
May	17,260	15,601	11,695	9,288	10,564	4,675	455	65	42	7	14	3	0	0
June	15,709	14,679	14,752	8,574	9,732	3,004	594	76	29	8	15	2	0	1
July	15,523	17,639	11,568	7,074	8,271	2,061	340	71	30	5	3	1	0	0
August	13,748	13,276	7,884	8,147	7,085	1,472	531	53	51	3	2	0	0	0
September	14,077	15,426	8,553	9,173	7,043	1,220	370	50	8	2	5	0	2	1
October	12,912	14,470	8,749	11,385	10,767	1,092	330	56	11	0	5	1	0	3
November	13,410	13,450	9,219	7,446	11,463	760	201	19	6	1	4	0	0	2
December	15,072	13,789	11,775	6,584	5,133	572	119	33	5	2	7	0	1	0
Total	223,002	154,438	215,402	143,594	119,458	36,119	6,148	1042	347	80	95	30	8	9

Table 7. Malaria incidence by age group 2006-2019

Year	0-15 years			> 15 years		
	Population	Number of cases (%)	Annual Parasite Incidence (per 1000 population)	Population	Number of cases (%)	Annual Parasite Incidence (per 1000 population)
2006	179,743	82,186 (37%)	457	835,444	140,816 (63%)	169
2007	182,487	78,806 (36%)	432	865,145	136,596 (64%)	158
2008	186,543	51,500 (36%)	276	894,199	92,094 (64%)	103
2009	196,148	46,177 (35%)	235	918,386	86,592 (65%)	94
2010	199,556	38,865 (33%)	195	949,472	80,209 (67%)	84
2011	199,556	10,929 (30%)	55	949,472	25,135 (70%)	26
2012	184,057	1,548 (25%)	8	964,901	4,600 (75%)	5
2013	200,875	225 (22%)	1.12	972,354	817 (78%)	0.84
2014		48 (14%)			299 (86%)	
2015		12 (15%)			68 (85%)	
2016	175,518	9 (9.5%)	0.05	1,045,106	86 (90.5%)	0.08
2017	155,796	1 (3.3%)	0.01	1,071,082	29 (96.7%)	0.03
2018	158,616	1 (12.5%)	0.01	1,090,469	7 (87.5%)	0.01
2019	497,074	3 (33.3%)	0.01	774,620	6 (66.6%)	0.01

Other risk groups include students, farmers, travelers, migrant workers and residents in border areas. All the infections among the foreigners were in Indonesian nationals who had come to the country for various reasons including business and migrant labour.

Previous MIS surveys have revealed LLIN usage among pregnant women and children under 5 is about 90 percent. Still pregnant women are considered a risk population and a LLIN is provided to pregnant females during the antenatal period through continuous distribution by the maternal health programme.

There still exists hard-to-reach areas which are addressed by posting malaria volunteers (currently, there are 33 Community Health Volunteers posted) in cluster of hamlets (villages) far from peripheral health posts. Those volunteers are equipped with RDTs, ACTs, CQ and educational materials such as flipcharts. In 2015 and 2016, approximately 30% of cases were detected in the community by these Community Health Volunteers highlighting their roles in the control and elimination phases.

Malaria vectors

Based on entomological studies that were carried out in the past, *An. barbirostris* and *An. subpictus* have been incriminated as the principal and secondary vectors of malaria, respectively, in Timor Leste. More details of malarial vectors are given in the sections on entomological surveillance and vector control.

Malaria foci

A malaria focus is a defined and circumscribed locality situated in a currently or formerly malarious area and containing the continuous or intermittent epidemiological factors necessary for malaria transmission. Focus investigation and classification commenced in 2016. Details of focus investigations since 2016 are given in Table 11.

In 2016, there were 22 active foci. In 2017, six new foci emerged. By the end of 2017, 16 active foci in 2016 were classified as “Residual Non-active”; there were 12 “Active” foci at the end of 2017. By end of 2018, all active foci in 2017 were classified as “Residual Non-active”. By end 2019, there was no local transmission for three years in 16 foci, and these were classified as “cleared”.

Table 8. Parasitological surveillance performance 2006-2016

Year	Population	Number of blood smears examined	No of RDTs used	Number of blood smears examined + Number of RDTs used	Number of people tested	Number of microscopically and RDT confirmed cases	<i>P. falciparum</i>	<i>P. vivax</i>	Mixed	TPR ¹ (%)	ABER ² (%)
2006	1,015,187	96,485	NA	96,485		37,896	24,219	13,477	200	39.28%	9.50%
2007	1,047,632	114,283	NA	114,283		46,869	34,174	12,544	161	41.01%	10.91%
2008	1,080,742	92,870	NA	92,870		45,973	34,406	11,295	272	49.50%	8.59%
2009	1,114,534	85,538	34,152	119,690		40,999	34,517	12,246	567	34.25%	10.74%
2010	1,149,028	110,494	85,751	196,245		40,250	28,350	11,432	154	20.51%	17.08%
2011	1,080,742	82,175	127,272	209,447		19,740	14,261	3,759	1,720	9.42%	19.38%
2012	1,114,534	64,318	117,599	181,917	117,599	5,211	1,962	2,288	958	4.43%	10.55%
2013	1,145,050	56,192	121,991	178,183	121,991	1,025	373	512	140	0.84%	10.65%
2014	1,172,528	30,515	86,592	117,107	87,209	342	118	139	85	0.39%	7.44%
2015	1,183,643	30,253	91,277	121,530	91,277	80	33	24	23	0.09%	7.60%
2016	1,205,067	30,703	91,277	138,877	108,174	94	51	10	33	0.09%	8.80%
2017	1,226,879	27,300	138,574	165,874	138,574	30	11	5	14	4.5*10 ⁻⁴	6.9%
2018	1,249,085	45,946	144,178	190,124	144,178	8	4	2	2	5.6*10 ⁻⁵	11.3%
2019	1,271,694	49,896	217,168	267,064	217,168	9	2	7	0	4*10 ⁻⁵	17.08%

¹ Test Positivity Rate (TPR) was calculated as ((Number of microscopically and RDT confirmed cases)/(Number of blood smears examined+Number of RDTs used))*100 for years 2006-2011. From 2012 onwards, TPR was calculated as ((Number of microscopically and RDT confirmed cases)/(Number of people tested))*100.

² Annual Blood Examination Rate (ABER) was calculated as ((Number of blood smears examined+Number of RDTs used)/(population))*100 for years 2006-2011. From 2012 onwards, ABER was calculated as ((Number of people tested)/(population))*100.

Table 9. Classification of cases 2016-2019

Year	Municipality	Post Administrative	Indigenous				Introduced				Imported				Relapsing/Recrudescen				Induced				Total					
			Pf	Pv	Mixed	Total	Pf	Pv	Mixed	Total	Pf	Pv	Mixed	Total	Pf	Pv	Mixed	Total	Pf	Pv	Mixed	Total	Pf	Pv	Mixed	Total		
2016	Bobonaro	Maliana	1	-	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	2	-	-	-	
	Dili	Dom Aleixo	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	
		Alauro	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	
	Emera	Harohi	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1		
	Oe-Cusse	Parte Macassar	38	1	17	56	-	-	-	-	2	1	1	4	-	-	-	-	-	-	40	2	18	60	-	-	-	
		Oesilo	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	1	1	1	
		Passabe	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	
	Viqueque	Nitibe	3	6	8	17	1	-	1	2	1	2	3	6	-	1	-	1	-	-	5	9	12	26	-	-	-	
		Uatucartau	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	
		TOTAL	46	7	28	81	1	-	1	2	3	3	4	10	-	1	-	1	-	-	50	11	33	94	-	-	-	
2017	Bobonaro	Maliana	2	-	3	5	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	3	5	-	-	-		
	Covailina	Calaceo	-	-	-	0	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	1	1	1	1	1	2	
		Suai	-	1	-	1	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	1	1	2	2		
	Dili	Tiomar	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
		Nain Feto	-	-	-	0	-	-	-	-	4	-	-	4	-	-	-	-	-	-	4	-	-	4	-	-	4	
	Liquica	Alauro	-	-	-	0	-	-	-	-	1	1	4	6	-	-	-	-	-	-	1	1	4	6	-	-	6	
		Manbana	-	-	-	0	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	1	1	-	-	1	
	Maufáhe	Same	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1		
	Oe-Cusse	Parte Macassar	-	-	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	3	3	
		Nitibe	2	2	2	6	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	2	3	2	7	7	
TOTAL		4	3	9	16	-	-	-	-	6	1	6	13	-	1	-	1	-	-	10	5	15	30	-	-	-		
2018	Covailina	Suai Vila	-	-	-	0	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1	-	1	1	-	-	1	
	Dili	Vera Cruz	-	-	-	0	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	1	-	1	-	-	1	
		Manbana	-	-	-	0	-	-	-	-	2	-	2	-	-	-	-	-	-	-	-	2	-	2	-	-	2	
	Oe-Cusse	Parte Macassar	-	-	-	0	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1	-	-	1	-	-	1	
		Nitibe	-	-	-	0	-	-	-	-	3	-	3	-	-	-	-	-	-	-	3	-	3	3	-	-	3	
		TOTAL	-	-	-	-	-	-	-	-	4	4	8	-	-	-	-	-	-	-	4	4	-	8	-	-	8	
	Dili	Cristo Rei	-	-	-	0	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	1	-	1	1	-	-	1
			Dom Aleixo	-	-	-	0	-	-	-	-	-	6	-	6	-	-	-	-	-	-	-	6	-	6	-	-	6
		Oe-Cusse	Parte Macassar	-	-	-	0	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	1	-	1	-	-	1
			Nitibe	-	-	-	0	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	1	-	-	1
TOTAL	-	-	-	-	-	-	-	-	-	2	7	9	-	-	-	-	-	-	-	2	7	-	9	-	-	9		
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		

Table 10. Nationality of imported cases

Year	Nationality		Total
	Timorese	Indonesian	
2016	8	2	10
2017	11	2	13
2018	7	1	8
2019	2	7	9
Total	28	12	40

Case management

Curative care in Timor Leste is provided by 6 hospitals (5 Regional Hospitals and one National Hospital), 70 community health centres and 309 active and 6 non-active health posts in the public sector; in addition there are 31 active private sector providers registered with the Ministry of Health, most of whom are located in Dili (Table 1 and Figure 4). The government plans to have 442 health posts in the country, one for each suco. Three hundred and fifteen health posts have been established but only 309 are currently active (Table 1). Clinicians are attached to the National Hospital, 5 Referral Hospitals and 70 Community Health Centers and HPs. Most of the clinicians have been trained in Cuba. At the end of 2016, there were 614 medical officers in government health care institutions. The HR data base has not been updated since. The new batches of doctors have been trained on implementation of the National Malaria Treatment Protocol by the NMP. In addition to doctors, a clinical nurse is also appointed to Health Posts. They are capable of examining blood using RDTs and assist in malaria diagnosis and treatment.

Early diagnosis and treatment of malaria patients with effective antimalarials is a major activity in the prevention of re-introduction/re-establishment phase. The primary objective is to detect early and provide effective treatment to ensure rapid and complete elimination of Plasmodium parasites from the patient's blood in order to prevent progress of uncomplicated malaria to severe disease or death and to prevent onward transmission of the infection by reducing the infectious reservoir and preventing the emergence and spread of resistance to anti-malarial medicines.

The National malaria Treatment Protocol giving details and guidelines for treatment of malaria patients, is available. Drugs to be used and the dosing patterns and frequencies have been clearly outlined.

Diagnostic services and treatment are available in all health care institutions. In addition, malaria volunteers working in remote hard-to-reach areas are also provided with RDTs and antimalarial medicines including ACT and chloroquine. Currently, treatment for malaria is provided after confirmation of the diagnosis either by RDT or microscopy.

Table 11. Malaria foci and their status 2016-2019

Municipality	Sub-municipality	Suco	Community	Parasite Species	Malaria foci and their classification 2016-2019							
					2016		2017		2018		2019	
					No. of local cases	Focus status	No. of local cases	Focus status	No. of local cases	Focus status	No. of local cases	Focus status
Dili	Atauro	Macadade	Anartuto	Pf	1	Active	0	Residual non-active	0	Residual non-active	0	Cleared
	Don Alexio	Comoro	Beto Rosario	Pf	1	Active	0	Residual non-active	0	Residual non-active	0	Cleared
Oecusse	Pasabe	Abani	Baitopope	Pf, Pv	1	Active	0	Residual non-active	0	Residual non-active	0	Cleared
	Panche Macasar	Nipane	Bausiu (Aosank)	Pf, Pv	15	Active	0	Residual non-active	0	Residual non-active	0	Cleared
		Nipane	Sacato (Faotique)	Pf, Pv	5	Active	0	Residual non-active	0	Residual non-active	0	Cleared
		Nipane	Bausiu (Oebon)	Pf, Pv	3	Active	0	Residual non-active	0	Residual non-active	0	Cleared
		Costa	Sanane	Pf, Pv	8	Active	2	Active	0	Residual non-active	0	Residual non-active
		Taiboco	Maquelab	Pf, Pv	2	Active	0	Residual non-active	0	Residual non-active	0	Cleared
		Costa	Mahata	Pf, Pv	16	Active	1	Active	0	Residual non-active	0	Residual non-active
		Nipane	Sacato (Mopo)	Pf	5	Active	0	Residual non-active	0	Residual non-active	0	Cleared

Municipality	Sub-municipality	Suco	Community	Parasite Species	Malaria foci and their classification 2016-2019									
					2016		2017		2018		2019			
					No. of local cases	Focus status	No. of local cases	Focus status	No. of local cases	Focus status	No. of local cases	Focus status		
		Naemeco	Baqui	Pf	1	Active	0	Residual non-active	0	Residual non-active	0	Cleared		
		Lifau	Tulaica	Pf	1	Active	0	Residual non-active	0	Residual non-active	0	Cleared		
	Nitibe	Bene-Ufe	Nactuca	Pf, Pv	5	Active	0	Residual non-active	0	Residual non-active	0	Cleared		
		Suniufe	Oelhanoe	Pv	1	Active	3	Active	0	Residual non-active	0	Residual non-active		
		Suniufe	Cabana	Pf	1	Active	0	Residual non-active	0	Residual non-active	0	Cleared		
		Bene-Ufe	Lamasi	Pf, Pv	3	Active	0	Residual non-active	0	Residual non-active	0	Cleared		
		Bene-Ufe	Citrana	Pf, Pv	5	Active	1	Active	0	Residual non-active	0	Residual non-active		
		Bene-Ufe	Bitila	Pf, Pv	5	Active	3	Active	0	Residual non-active	0	Residual non-active		
	Oesilo	Usatasae	Sifin	Pf	1	Active	0	Residual non-active	0	Residual non-active	0	Cleared		
Bobonaro	Maliana	Tapomemo	Tunu Bibi	Pf, Pv	2	Active	0	Residual non-active	0	Residual non-active	0	Cleared		
		Ritabuou	Mahui	Pf, Pv	0		1	Active	0	Residual non-active	0	Residual non-active		

Municipality	Sub-municipality	Suco	Community	Parasite Species	Malaria foci and their classification 2016-2019							
					2016		2017		2018		2019	
					No. of local cases	Focus status	No. of local cases	Focus status	No. of local cases	Focus status	No. of local cases	Focus status
					0		1	Active	0	Residual non-active	0	Residual non-active
		Tapomeno	Manu Aman	Pf	0							
		Tapomeno	Pip Galak	Pf	0		1	Active	0	Residual non-active	0	Residual non-active
		Riabouu	Uat	Pf, Pv	0		1	Active	0	Residual non-active	0	Residual non-active
Manuafai	Same Villa	Letefoho	Tomnamo	Pf, Pv	0		1	Active	0	Residual non-active	0	Residual non-active
Covalima	Suai Villa	Becco	Nul Laran	Pv	0		1	Active	0	Residual non-active	0	Residual non-active
Ermera	Hatolia	Asalu Sare	Sare	Pf, Pv	1	Active	1	Active	0	Residual non-active	0	Residual non-active
Viqueque	Vatucarabau	Loiolu	Assafeidau	Pf	1	Active	0	Residual non-active	0	Residual non-active	0	Cleared

P. falciparum has been the most prevalent species in the country. The national malaria treatment protocol has been updated in 2017 (5th edition) in line with the treatment guidelines of the World Health Organization. The salient features of the treatment protocol are summarized below:

- ✓ Artemether 20mg - lumefantrine 120mg (AL) has been used as the first line antimalarial therapy for confirmed uncomplicated malaria (for both *P. falciparum* and *P. vivax*). The first line treatment for *P. vivax* infections were changed from chloroquine to AL in 2017.
- ✓ A stat dose of Primaquine 0.25 mg/kg bw has been included for the treatment of uncomplicated falciparum malaria in the latest edition of the treatment guidelines. Testing for G6PDd is not required for administration of a single dose of Primaquine,
- ✓ Uncomplicated falciparum in pregnancy is treated with Quinine plus Clindamycin over 7 days. AL is given during lactation.
- ✓ The second line drug for treating uncomplicated *P. falciparum* malaria is Quinine plus Clindamycin or Doxycycline for 7 days except pregnant and lactating women and children under 8 years. Pregnant and lactating women and children under 8 are given Quinine plus Clindamycin for 7 days.
- ✓ For *P. vivax* infections, due to unavailability of reliable point of care testing facilities for G6PDd, 8-week Primaquine regime is given at weekly intervals.
- ✓ A DOTS strategy has been employed where health workers visit the houses of patients. This is also done for the 8-week Primaquine therapy.
- ✓ Vivax patients not responding to AL are treated with Quinine and Clindamycin for 7 days including pregnant and lactating women. In the absence of Clindamycin, Doxycycline can be given for 7 days except in pregnant and lactating females and children under 8 years.
- ✓ In case of mixed infections, patients are treated with AL and a 8-week Primaquine course.
- ✓ Severe malaria patients are treated with artesunate suppositories at the pre-referral level with the exception of pregnant women during their 1st trimester of pregnancy. In the absence of artesunate in peripheral health care facilities, quinine (20mg/kg bw) is split into two and one dose is given in the anterior part of the thigh and the other in buttock, both intramuscularly, before referral. In referral hospitals, artesunate IV or IM, or Artemether IM or Arteether IM is administered till the patient is recovering and able to take medicines (ACT) orally. Alternatively, quinine dihydrochloride is used intravenously.

As part of the revised treatment protocol, guidelines for effective management of uncomplicated malaria and severe and complicated malaria with specific procedures have been produced and disseminated targeting health personnel at health posts and community health centers. WHO prequalified ACT and other antimalarials are procured.

Due to the decreasing number of malaria cases, it has become difficult to estimate the number of antimalarial medicines required. At present, CHCs are provided with 10 adult doses of AL; if cases have been reported, then additional doses for the number of cases reported is added to the stock of 20. Each health post is provided with 2 adult doses of ACT. In addition, the municipality malaria officers have a buffer stock. For CHCs in Oecusse district as distribution is difficult due to their geographic location, 30 adult doses of ACT are given.

As expected, there is some wastage of drugs. This wastage is justified as preventing an outbreak of malaria is more important given the waning immunity of the population with the decline of transmission. This is preferable to having a stock out during an emergency.

There was a stock out of primaquine in health institutions in 2016. However, the DMO had buffer stocks. Hospitals are supplied through SAMES without NMP involvement.

In most health care facilities where microscopy is available, RDT is used as well to cross-check results.

Regular training and refresher training are provided to health workers on malaria diagnosis and treatment protocol.

In the past, Suldox (Sulfadoxine-pyrimethamine) and Artan® (artesunate 50 mg tablets) were found in a private sector pharmacy after the change of SP to Coartem for the treatment of falciparum malaria. There are no formal inspectors to check pharmacies regularly.

A patient card (kept by the patient) is being given to patients which helps in monitoring patient compliance.

Integrated Drug Efficacy Surveillance (iDES)

In the past when the case load was high, Therapeutic Efficacy Studies (TES) to assess the safety and efficacy of artemether-lumefantrine and chloroquine for the treatment of *P. falciparum* and *P. vivax* uncomplicated malaria, respectively, was carried out in 2013. Results of those studies show an Adequate Clinical and Parasitological Response (ACPR) above 90% for artemether-lumefantrine and Late Parasite Failure Rate for chloroquine was 17.5%. Based on these results, first line treatment for *P. vivax* was changed from chloroquine to artemether-lumefantrine.

With the reduction in the number of cases, integrated drug efficacy surveillance has been started. All diagnosed patients are followed up as given in the document “Actions to be performed when a malaria patient is reported”.

1.8 Moving from malaria elimination phase to prevention of re-establishment phase

Timor Leste has moved from the malaria elimination phase to the prevention of re-establishment of malaria phase. The last indigenous malaria case was reported in June 2017. This drop has come about due to a well-funded programme with a technically strong strategy built on the foundation of a rapidly evolving health system that is providing basic health services down to the household level.

Through this national strategic plan the country proposes to prevent re-establishment of malaria and obtain ‘malaria-free’ certification from WHO building a sustainable programme integrated with the national health services.

2. STRATEGIC FRAMEWORK (2021–2025)

2.1 Vision, mission, goals, objectives and guiding principles

VISION

A “Malaria-Free” Timor Leste to enable the people of DRTL to achieve their maximum potential.

MISSION

Plan and implement a comprehensive programme to prevent re-establishment of malaria in Timor Leste.

GOAL

To remain free of indigenous malaria.

OBJECTIVES

4. To prevent re-establishment of malaria transmission in Timor Leste.
5. To maintain zero mortality due to locally acquired malaria.
6. To achieve WHO malaria-free certification.

GUIDING PRINCIPLES

- Building country ownership and leadership, and fostering partnerships between the National Malaria Programme and communities, other sectors (agriculture, finance, education, defence, etc), implementing partners including non-governmental organizations and faith based organizations, UN agencies, developmental partners, and technical agencies to forge the elimination phase through a multi-sectoral approach.
- Efforts towards prevention of re-establishment of malaria through combinations of interventions responding to local needs and adapted to country specifications.
- Intensified malaria case-based surveillance and case and foci investigation are required to prevent re-establishment of malaria.
- Universal access to malaria diagnosis and treatment.
- Universal access to malaria prevention in vulnerable populations.
- Having systems that provide real time information that will enable early response when cases are detected.
- Equity in access to services for the most vulnerable and hard-to-reach populations.

2.2 Strategies

Objective 1: To prevent re-establishment of malaria transmission in Timor Leste.

- a. Provide to universal access to malaria diagnostic and treatment services free of

charge

- b. Detect all infections early and to treat all patients with quality assured antimalarials based on national treatment guidelines to ensure radical cure and prevention of secondary transmission.
- c. Ensure all suspected cases are tested for malaria (microscopy or RDT).
- d. Notification of all positive infections within 24 hours.
- e. Investigate all cases and foci within 2 days of notification.
- f. Protect vulnerable populations.
- g. Respond quickly to prevent indigenous transmission of malaria (including distribution of LLINs and/or IRS, larviciding and environmental manipulation and management if needed).
- h. Quality assurance of malaria diagnostic services.
- i. Re-orient public and private health sector staff towards prevention of re-establishment of malaria.
- j. Re-orient National Malaria Programme towards prevention of re-establishment of malaria.

Objective 2: To maintain zero mortality due to locally acquired malaria.

- a. Provide universal access to malaria diagnostic and treatment services free of charge.
- b. Detect all infections early and to treat all patients with quality assured antimalarials based on national treatment guidelines to prevent complications and secondary transmission.
- c. Ensure all suspected cases are tested for malaria (microscopy or RDT).
- d. Ensure availability of antimalarial medicines at all diagnostic and treatment facilities including injectable medicines at all hospitals and treatment centres with in-ward facilities.
- e. Ensure availability of adequate intensive care facilities in all referral hospitals and in the National Hospital.

Objective 3: To obtain WHO malaria-free certification.

- a. Correct deficiencies highlighted in the external review of the programme in February 2020.
- b. Apply for 'malaria-free' certification in 2021/2022.

Prioritization

Based on updated epidemiological stratification of potential malaria transmission in the country, priority is given to areas bordering West Timor that includes border areas of Bobonaro and Covalima municipalities and Oecussi municipality which is exclaved by West Timor. In West

Timor, the malaria incidence is about 2-10 per 1000 population and the area is in the control phase. There is a relatively porous border and undocumented travel across the border frequently takes place.

High risk groups and mobile populations across the border need to be identified and protected. In addition, farmers engaged in slash and burn agricultural practices specially in the border areas and migrant fishermen are also vulnerable to malaria.

Programme phasing

Timor Leste has entered the prevention of re-establishment of malaria phase. Therefore, a new definition for a suspected malaria case has been derived. Based on vulnerability and receptivity, the epidemiological stratification of potential malaria transmission has been updated. While universal access to malaria diagnosis and treatment will be ensured, universal access to malaria prevention will be targeted to vulnerable population and routine IRS will be gradually phased out depending on epidemiological and entomological findings, and malaria situation in West Timor. Entomological surveillance will focus on spot surveys to map receptivity in the country that would provide evidence for updating epidemiological stratification of risk areas in the country. The NMP will have to be restructured in a phased manner ensuring that efforts to prevention of re-establishment of malaria in the country are not compromised.

2.3 Key interventions and supporting elements

The prevention of re-establishment strategy of the National Malaria Programme is based on the following three key interventions and two supporting elements. The three key interventions are:

1. Focused intensified surveillance and vigilance
2. Case management.
3. Malaria prevention.

The two supporting elements are:

1. Expanding research and innovation for improved delivery of services
2. Strengthening the enabling environment.

2.4 Intervention 1 – Focused intensified surveillance and vigilance

Targets:

100% of suspected malaria patients receive a parasite-based diagnosis

100% of cases are notified within 24 hours

100% of cases are investigated within 2 days of notification

In 100% of cases investigated, RACD and entomological surveillance will be completed by 7 days and response (IRS, LLINs and other vector control methods) initiated within 10 days if necessary.

100% of foci and investigated and their status reported annually.

100% of cases and foci are classified

The country was epidemiologically stratified based on the risk of malaria transmission which is dependent on the receptivity and vulnerability of the area. Based on the recommendation of the external review, the existing epidemiological stratification was updated as given in table 12. The epidemiological stratification of potential malaria transmission will be reviewed every two years and re-stratified if required based on risk factors, importation of cases and revised vector mapping (see sections 2.4.2 and 2.6 on entomological surveillance and vector control, respectively).

2.4.1 Parasitological surveillance

As the country has moved from the malaria elimination phase to the prevention of re-establishment of malaria phase, a suspected malaria case for diagnostic testing of patients seeking healthcare was defined based on the stratum of detection.

2.4.1.1 Definition of a suspected malaria case

In **Stratum 1** (as given in Table 13)

All persons with acute febrile illness.

In **other Strata**,

Persons with acute febrile illness with one or more of the following features:

- i. No obvious alternative cause of the fever
- ii. History of traveling to malaria endemic areas within 1 year (<http://www.who.int/malaria>).
- iii. Known history of malaria within 3 years
- iv. History of blood or blood products transfusion within 3 months
- v. Patients with hepatomegaly and/or splenomegaly
- vi. any individual presenting with clinical features of severe malaria (refer to the National Malaria Treatment Protocol)
- vii. Any individuals presenting with clinical features of severe malaria (refer National Malaria Treatment Guidelines)

All suspected malaria cases have to be tested for malaria using RDTs. In institutions with microscopy facilities, all suspected cases should be tested using both RDTs and microscopy.

2.4.1.2 Types of parasitological surveillance to be carried out

Passive Case Detection

The types of parasitological surveillance to be carried out in different strata for different scenarios are summarised in Table 13. In stratum 1, Activated Passive Case Detection (APCD), where all fever cases have to be tested for malaria, should be carried out in all health care institutions and where ambulatory healthcare services are provided. APCD will also be performed in areas of both strata in which an introduced or indigenous case is reported and where there is an active focus up to three months. In all other strata facilities for Passive Case Detection (PCD) should be available and should be carried out using RDTs and microscopy where available.

Table 12. Updated epidemiological stratification of malaria risk in Timor-Leste in 2020

	Stratum 1: High risk of transmission	Stratum 2: Moderate risk of transmission	Stratum 3: Low risk of transmission	Stratum 4: Very low risk of transmission
Receptivity	Yes			
Vulnerability	Extensive migration of workers, students and fishermen and their families from malaria endemic areas of Indonesia	Moderate migration of workers and fishermen and their families from malaria endemic areas of Indonesia. Refugees	No or little migration from risk areas	Very little migration
	No border with West Timor			
	Border with Indonesia or extensive coastal contact			
	Slash and burn cultivation in the border areas and fishing folk visiting nearby Indonesian islands	Slash and burn cultivation	Less slash and burn cultivation	
Municipalities/ areas in the stratum	Oecusse municipality, Atauro island and border sub districts/ admin. Posts (Bobonaro, Covallima)	Bobonaro, Covallima beyond border sub municipalities, mainland Dili municipality, sub districts/admin. post of Ermera, Manufahi and Viqueque Municipalities where cases were reported	Ainaro, Baucau, Liquisa and Manatuto municipalities, sub districts/admin. Posts of Ermera. Manufahi and Viqueque where cases were not reported, Aileu and Lautem districts lowland areas	Aileu and Lautem municipalities highland areas

Table 13. Surveillance activities to be conducted by stratum

Activity	Stratum 1	Stratum 2	Stratum 3	Stratum 4	Where
Passive Case Detection	Activated Passive Case Detection (all fever cases = suspected malaria)	Passive case detection based on the narrower case definition of suspected malaria case. Occurrence of a case may trigger temporary, local activated passive case detection			Public, private, faith based, armed forces & police clinics and laboratories, SISCA and other mobile clinics
Proactive Case Detection	Migrant workers, fishermen, farmers practising slash and burn agriculture in border areas, security and police officers, and students*	Yes, if risk groups present			In workplaces or communities of migrant workers, fishermen, camps and hostels
Reactive Case Detection	Contact tracing and Mass Blood Survey in a 1.5 km area around the residence of a confirmed case. Three times at 14-day intervals and once per year for three years				Community, workplace, camps, hostels
Case and Foci Investigation and Response	Yes				
Case and Foci Classification	Yes				

*If there are no cases detected by proactive case detection among permanent residents in villages in 2020, then proactive case detection may be discontinued. If however, proactive case detection in villages detects case(s) in a given municipality in 2020, it should continue in that municipality.

Proactive Case Detection

Proactive case detection is useful in special population groups that are considered vulnerable to the importation of malaria cases. Proactive case detection will focus on identified risk groups using RDT. Proactive Case Detection (PACD) will be carried out in all identified high risk groups such as migrant populations including workers, businessmen, fishermen, security and police officers, and students in all strata. In stratum 1, PACD among permanent residents of villages PACD may be continued if cases are detected by this method in 2020. In all other strata, PACD will not be carried out among permanent residents of villages. PACD will be conducted by Municipality Malaria Officers in coordination with Regional Malaria Officers and sub district/administrative post malaria officer.

Reactive Case Detection

Reactive Case Detection (RACD) is the active detection of malaria infections once a case or a cluster of cases are reported. Reactive Case Detection (RACD) comprises 1) tracing of contacts of confirmed cases who shared the same exposure as the case, and 2) detecting cases in the neighbourhood of the residence of a reported case through Mass Blood Surveys (MBS). The Mass Blood Surveys will be repeated thrice in a 1.5 km radius area in the neighbourhood of the reported case 14 days apart. RACD will be conducted by Municipality Malaria Officers in coordination with Regional Malaria Officers and sub district/administrative malaria officer.

An awareness programme on the symptoms of malaria, methods of prevention and the importance of testing for malaria if someone develops fever will be carried out during RACD

2.4.1.3 Case detection

Universal access to malaria diagnosis and treatment will be ensured. RDTs will be made available at all healthcare institutions including the private and NGO sectors (includes faith-based organizations) and malaria volunteers. Microscopy facilities will be available at all hospitals, selected CHCs and at district level. Blood smears and blood dots on the filter papers of the confirmed malaria cases will be taken on filter papers on days 0, 3, 21 and 28 and sent the Army Medical Research Institute in Melbourne, Australia as per the guidelines for external quality control.

All cases will be confirmed by quality assured microscopy by a class 1 laboratory analyst attached to the Municipality if available with coordination of QC analysts National Laboratory.

2.4.1.4 Notification of cases

All confirmed cases will be notified to the Municipality Malaria Officer and National officers immediately (within 24 hours) by telephone by the relevant malaria officer/focal point attached to the sub district/administrative post or health institution. All notifications will be recorded in the malaria case register maintained at the health care institution or CHC by the sub district malaria officer/malaria focal point.

2.4.1.5 Case investigations

Case investigation will be carried out whenever a confirmed malaria case is detected. Case investigation involves obtaining a detailed history that should include patient information and

travel history, possible contacts and medical history to assess response interventions; the case investigation will be completed within 2 days of notification of the case by the Municipality Malaria Officer in coordination with the sub district malaria officer/focal point or relevant designated officer at the health post. Existing case and focus investigation forms will be updated and training will be conducted to the regional and municipality malaria officers.

Information generated from a case investigation allows the classification of a case by origin of infection. In prevention of re-establishment phase, case investigation is important to determine whether the patient has contracted the disease overseas or locally. It also assesses factors that may lead to onward transmission. The detailed history will include:

- *Obtaining a detailed case history:* Patient demographic and contact information and clinical details on the current infection such as onset date, species, treatment etc.
- *Obtaining a travel history:* patients travel history (international and local) categorized into travel over the last 2 weeks, previous malaria history, blood transfusion history, family members malaria history, and contact history (international and local).
- *Reviewing past malaria cases from the area:* Histories of all malaria cases reported from the area within the past three years should be reviewed to assess whether local transmission is taking place and whether the locality needs to be classified as a focus of transmission.

2.4.1.6 Focus investigations

A malaria focus is defined as a locality situated in a formerly receptive malarious area with the continuous or intermittent epidemiological and ecological factors necessary for malaria transmission. A focus investigation will be carried out whenever a case is detected from a focus. Focus investigations will be carried out regularly until the focus is cleared coordinated by the Municipality Malaria Officer and the Regional Malaria Officer with coordination of sub district malaria officer/malaria focal point.

A locally acquired case indicates that local transmission has occurred. Focus investigation and response measures including parasitological surveillance will be carried out as given below.

1. Reactive case detection to screen the population within 1.5 km radius of the emergence of each case;
2. Treating all cases according to National Treatment Guidelines;
3. All fever cases reporting to healthcare institutions in the area will be screened for malaria (APCD);
4. Mapping of localities where transmission occurs, vector breeding locations and risk populations in the focus area will be mapped;
5. Entomological surveillance will be carried out to guide response and vector control;
6. Vector control activities will be evaluated and supplementary vector control measures, if required, will be provided;
7. The vector species present, their abundance, where they are located and their feeding behaviour will be described.

Any additional cases of malaria that are detected during RACD within the focus will undergo a full and separate case investigation process.

2.4.1.7 Ensuring rapid response

Target:

RACD and entomological surveillance completed within 7 days of notification of 100% of cases

Response initiated within 10 days of notification of 100% of cases

The response should be directed to prevent onward transmission of infection. The response includes the following:

- ✓ RACD includes contact tracing and carrying out ACD through mass blood surveys three times 14 days apart will be carried out in a 1.5 km radius of the residence of the reported case. The initial RACD activities will be completed within 7 days of notification of the case.
- ✓ Entomological surveillance will be carried out in a 1.5 km radius of the residence of the reported case to detect presence of vectors in the area, their species composition and abundance, feeding and resting behaviors, and insecticide resistance monitoring. Details of techniques that will be used are given in section 2.4.2.
- ✓ Mapping & describing vectors (larval & adult), their breeding habitats and behavior based on entomological surveillance will be done.
- ✓ Vector control activities focusing mainly on IRS, and distribution of LLINs when indicated, will be carried out within 10 days of notification of a case within a 1.5 km radius of the residence of a reported case (more details are given in section 2.4.2.2). Larval control, environmental modification and management will be carried out if necessary.
- ✓ Mapping of at risk populations will be carried out in stratum 1 localities and active foci
- ✓ APCD for at least 3 months will be initiated in any stratum whenever an introduced or indigenous case is reported. APCD will be conducted in all areas in stratum 1 and areas in which there are active foci.

In addition, the following activities will be conducted:

- Mobilizing community support for case investigation and response.
- Raising awareness of the community regarding the potential for spread of malaria in the area, preventive measures to be taken, to get tested for malaria if a person develops fever and the importance of taking the full course of treatment if infected with the malaria parasite.
- Raising awareness of the community and leaders on malaria vector breeding places and engaging community participation for environmental manipulation and management, if necessary
- If an introduced or an indigenous case is reported,
 - Health authorities of the area will be immediately notified through municipalities and other central level authorities.
 - All public and private medical practitioners and healthcare institutions in the area will be alerted to the malaria case reported and advised to carry out APCD.

- The assistance of the media will be sought to inform the public of potential onward transmission of infection.

2.4.1.8 Case classification and response

Once the case investigation is completed, all results of the case investigation will be presented to the Case Review Committee. Classification of the case will be based on the characterization of the case using information collected during the investigation (i.e. travel history, infection history) and an understanding of the different intervals in the life cycle of malaria parasites (Table 14). The case may be classified as imported, introduced, indigenous, induced, or recrudescence/relapse of *P.vivax* and *P.ovale* and response will be done by 10 days of notification.

Table 14. Classification of malaria cases and response

Case Classification	Description	Epidemiological significance	Response
Imported	An infection acquired outside Timor Leste	Not locally acquired	- Investigation and response within 1.5 km radius around index case - RACD (contact tracing and MBS three times 14 days apart) - iDES - Entomological surveillance (larval & adult) - Mapping of at risk populations - Vector control (LLINs and/or IRS) & response if vector present -Awareness programmes to the community leaders and community and health officials -Community mobilization through established village and other public networks. -Awareness programmes to the community leaders

Case Classification	Description	Epidemiological significance	Response
			and community and health officials
Introduced	An infection that is biologically plausible and at a spatial and temporal distance from an observed imported case	Locally acquired	- Investigation and response within 1.5 km radius around index case - RACD (contact tracing and MBS three times 14 days apart) - iDES - Entomological surveillance (larval & adult) - APCD in healthcare institutions in the area - Mapping & describing of vectors (larval & adult), their breeding & behaviour - Mapping of at risk populations - Vector control (LLINs and/or IRS) & response if vector present - Awareness programmes to the community leaders and community and health officials -Community mobilization through established village and other public networks.
Indigenous	An infection that was probably derived from locally transmitted cases, with no evidence that it was imported or linked directly to an imported case	Locally acquired	- Investigation and response within 1.5 km radius around index case - RACD (contact tracing and MBS three times 14 days apart) - iDES

Case Classification	Description	Epidemiological significance	Response
			- Entomological surveillance (larval & adult) - APCD in healthcare institutions in the area - Mapping & describing of vectors (larval & adult), their breeding & behavior - Mapping of at risk populations - Vector control assessment (LLINs and/or IRS) & response -Awareness programmes to the community leaders and community and health officials - Community mobilization through established village and other public networks.
Induced	An infection the origin of which can be traced to a blood transfusion or other form of parenteral inoculation of the parasite but not to transmission by a natural mosquito-borne inoculation	Not locally acquired	- Investigation and response within 1.5 km radius around index case - RACD (contact tracing and MBS three times 14 days apart) - iDES - Entomological surveillance (larval & adult) - Mapping of at risk populations - Vector control assessment (LLINs and/or IRS) & response -Awareness programmes to the community leaders and community and health officials

Case Classification	Description	Epidemiological significance	Response
			- Community mobilization through established village and other public networks.
Relapse/ recrudescence	A relapse is attributed to activation of hypnozoites of <i>P. vivax</i> or <i>P. ovale</i> infection acquired previously. A recrudescence is a recurrence of asexual parasitaemia of the same genotype(s) that caused the original illness, due to incomplete clearance of asexual parasites after antimalarial treatment (it is not a re-infection)	Either	For relapses -Investigation and response within 1.5 km radius around index case - RACD (contact tracing and MBS three times 14 days apart) - iDES - Entomological surveillance (larval & adult) - Mapping of at risk populations - Vector control assessment (LLINs and/or IRS) & response -Awareness programmes to the community leaders and community and health officials - Community mobilization through established village and other public networks. For recrudescence - Continue already started response

See documentation of surveillance activities regarding maintaining files for reported cases (section 2.4.1.10).

2.4.1.9 Focus classification and response

A focus investigation is conducted by a Rapid Response Team (RRT) to determine the response measures necessary to eliminate or prevent re-establishment of transmission. Based on the case investigation classification and the epidemiological history of locally acquired

cases in the foci, a focus can be classified into one of three classifications as given below (Table 15).

Table 15. Classification of malaria foci and response

Focus	Definition	Response
<i>Active</i>	A focus with ongoing transmission. Locally acquired case(s) have been detected within the last 12 months.	• Investigation and response within 1.5 km radius around index case • RACD to be repeated thrice at 14-day intervals • APCD in healthcare institutions in the area • Entomological surveillance • Mapping & describing of vectors (larval & adult), their breeding & behavior (if not collected within previous 3 years) • Mapping of at risk populations • Vector control assessment (LLINs and/or IRS) & response • Community mobilization through established village and other public networks.
<i>Residual non-active</i>	Transmission interrupted recently within 1-3 years. The last locally acquired case(s) was detected at least 12 months ago.	• PCD in healthcare institutions • Entomological surveillance • Mapping & describing of vectors (larval & adult), their breeding & behavior (if not collected within previous 3 years) • RACD in years 2 and 3 (once) • Mapping of at risk populations • Vector control assessment (for LLINs and/or IRS) & response
<i>Cleared</i>	A focus with no local transmission for more than 3 years. A focus with absence of locally acquired cases for at least 3 years, where only imported/relapsing/recrudescent/induced cases occurred in the last 12 months.	• PCD in healthcare institutions • Continue with case investigation and response.

*All foci will be monitored at least twice a year until the focus is classified as “cleared”. See documentation of surveillance activities regarding maintaining files for foci (section 2.4.1.10).

2.4.1.10 Documentation of surveillance activities

For malaria elimination certification, a rigorous review of the programme is done by an expert panel. The panel looks for evidence that malaria transmission has been interrupted and that the system is capable of responding to outbreaks if any occurs. The following activities will be carried out.

Maintaining individual case files

A separate paper based file for each case will be maintained at municipality and national level in addition to a computerized system. The file shall contain the following:

- ✓ The completed case and focus investigation form
- ✓ Details of ACD conducted in the area
- ✓ Details and summary results of entomological investigations conducted
- ✓ A map of the area
- ✓ Actions taken

The Municipality Malaria Officer will be responsible for maintaining files at municipality level. The original file will be sent to the National Malaria Programme and a copy will be kept at the Municipality Malaria Office. The Regional Malaria Officers, M&E Officer and the Programme Manager shall be responsible for this activity at the central level.

Maintaining municipality and national malaria case registers

The Municipality Malaria Office will maintain a municipality malaria case register. In addition, the National Malaria Programme will maintain a national malaria case register. The programme will continue to maintain this register.

The national malaria case register will contain the following information:

- ✓ Case number
- ✓ Name of patient
- ✓ Age and sex of patient
- ✓ Permanent home address and contact details including mobile phone number
- ✓ Occupation
- ✓ Details of institution where the case was detected
- ✓ Method of diagnosis (ACD, PCD etc)
- ✓ Species and parasitaemia
- ✓ Treatment provided
- ✓ Likely location of acquiring infection with supporting evidence
- ✓ Case classification
- ✓ Names and signatures of review panel.

Existing case base database will be updated and maintained. The Regional Malaria Officers, M&E Officer and the Programme Manager shall be responsible for this activity at the central level.

Maintaining files for foci

A separate folder for each focus will be maintained and updated annually. The folder will contain the following:

- ✓ Focus ID
- ✓ The completed focus investigation form

- ✓ Details of malaria cases detected.
- ✓ Details of ACD conducted in the area
- ✓ Details and summary reports of entomological investigations conducted
- ✓ Annual summary results
- ✓ A map of the area
- ✓ Actions taken

The Regional Malaria Officers, M&E Officer and the Programme Manager shall be responsible for this activity.

National malaria focus register and data base

A malaria focus register having the following basic information will be maintained and updated annually:

- ✓ Focus ID
- ✓ Focus name
- ✓ Municipality
- ✓ Population
- ✓ Number of malaria cases by month
- ✓ Treatment details of cases
- ✓ Details of entomological investigations conducted
- ✓ Actions taken
- ✓ Focus classification
- ✓ Names and signatures of review panel.

Existing focus database data-base will be maintained. The Regional Malaria Officers, M&E Officer and the Programme Manager shall be responsible for this activity at the central level.

Additional activities

All surveillance activities will be documented and archived. The following documents will be maintained by the M&E Officer and the Programme Manager.

- ✓ Annual reports of the national malaria programme.
- ✓ Reports of reviews of the programme including Global Fund reviews.
- ✓ National Strategic Plan for malaria elimination.
- ✓ National M&E plan.
- ✓ Case and focus files.
- ✓ Case and focus registries.
- ✓ Details of blood examination for malaria.
- ✓ Details of routine entomological surveillance activities.
- ✓ Details of Vector Control activities
- ✓ Details of community engagement.
- ✓ Details of inter-sectoral collaboration activities.

2.4.1.11 Strengthening supervision and monitoring and evaluation of surveillance activities

In order to ensure that activities are carried out according to plan as recommended in the external review report, supervision of surveillance activities will be strengthened. Supervisory visits will be undertaken on a regular basis for monitoring case and foci investigations, vector control activities and data recording and reporting at the municipality level by the national level staff.

Monitoring and evaluation is a key component of an elimination programme. Regular review meetings (at least once in three months) will be held to monitor progress at the municipality levels. At central level, progress review meetings will be held at least once in every three months. Annual progress review meetings will be held with the participation of National and Municipality Malaria Officers and officers responsible for prevention of re-establishment of malaria at the administrative post level, vector control and entomology officers.

A separate budgetary allocation will be made for supervision, and monitoring and evaluation.

2.4.1.12 Strengthening capacity of rapid response teams

A designated rapid response team comprising four to eight personnel from among national (Regional Malaria Officer, Entomology team, Vector Control Officer, QA/QC lab analyst of National Laboratory) and municipality officers (Municipality Malaria Officer, Sub district malaria/malaria focal point, Municipality Officer responsible for vector control and entomology) that can be deployed at short notice and can carry out the above activities has already been established. A Rapid Response Team at national level will be dispatched to areas where a case is reported and to monitor foci at regular intervals. The national level team consists of the Regional Malaria Officer assigned to the respective municipality (for supervision, assisting in mass blood survey) Regional Vector Control Officer (supervision, assisting in IRS/LLIN distribution), a quality control laboratory analyst (for confirmation of the malaria case by microscopy, training iDES and to assist in the mass blood survey) and a entomology team consisting of 5 officers (for entomological surveillance); two vehicles will be designated for this purpose.

The members of the team may be personnel who perform other routine work but will be released for rapid response.

The municipality team will comprise different categories of personnel – municipality malaria officers, entomology officers from municipality or and national level, sub-municipality malaria officer (or other designated personnel), Health Promotion Officer and a driver. The team will have a designated leader (Municipality Malaria Officer) and be assigned a vehicle when needed. Adequate buffer stocks of RDTs, antimalarial medicines, LLINs, insecticides and other consumables will be stocked and made available when needed.

Mock exercises will be carried out annually in areas in stratum 1 and another selected area.

2.4.1.13 Improving data flow, dissemination of information and feedback

In the surveillance system operated by the National Malaria Programme, the NMP checks all data coming in from the municipalities, verifies them and forwards verified data to the national HMIS. Due to the verification of data, there are delays in providing data to the national HMIS.

The NMP collects data in aggregate and case based formats. Two web-based systems have been developed for aggregate and case based formats using the DHIS2 platform but their use is constrained due to internet connectivity. The aggregate format is used with data being entered at municipality and sub-municipality level. The format for the case based data is currently not user-friendly. A medical informatics specialist will be hired to make the output user-friendly. A

computer software specialist will be hired to develop an application to automatically upload verified which will reduce delays in uploading verified data to the HMIS.

The web-based surveillance application is hosted by an individual. The NMP will communicate with HMIS and make arrangements to host the surveillance system application in an official server of the Ministry of Health.

2.4.1.14 Mapping of cases and epidemiological features using geographical information systems

Mapping of epidemiological and case data aids planning and monitoring of activities in the prevention of re-establishment phase. Mapping will be done using the DHIS2 platform. Regional Malaria Officers and the M&E officer will be trained in the use of DHIS2 mapping function. Regional, Municipality, sub-municipality malaria officers, Entomology officers and vector control officers will be provided with GPS monitors and tablet computers to record and transmit geographic data pertaining to all malaria cases. Regional, Municipality, sub-municipality malaria officers and vector control officers will be trained on use of GPS monitors and transmission of data. GPS monitors will be used to record geographic data pertaining to IRS, LLINs and vector breeding places. The GIS data base will be maintained by the M&E officer.

2.4.1.15 Engaging the private and other sectors in surveillance

32 out of 37 private and faith based organisation clinics/laboratories are sending data to the National Malaria Programme through Municipality Malaria Officers. Some private sector institutions are sending data on ad hoc manner and need to be coordinated for sending data monthly manner. The NMP through the National Laboratory and Municipality Health Services will collaborate with the private and other sectors including the faith-based healthcare institutions to obtain surveillance data during the prevention of re-establishment phase. This will be done through gaining the trust of private and other sector organizations through training of their personnel, accepting laboratory analysts of these sectors for the accreditation programme conducted by the NMP and providing quality assured RDTs free of charge. In return, the private and other sector organizations will be mandatorily obliged to provide surveillance data to the NMP. Refresher training or training will be carried out to the clinicians and laboratory technicians attach private sector and faith based organisation using the existing guidelines. Institutions that provide data will be invited to participate at quarterly review meetings of the NMP.

2.4.2 Entomological surveillance

Entomological information is important to assess receptivity in the prevention of re-establishment of malaria, to select appropriate vector control interventions and to monitor their impact on vector mosquito populations. Entomological surveillance will be re-oriented to contribute to the refinement of the stratification by characterizing receptivity of all strata through spot surveys and on focus investigations. Entomological surveillance will be carried out as follows:

2.4.2.1 Entomological spot surveys

Entomological spot surveys will be carried out throughout the country in all strata by the national entomology team to characterize receptivity. Entomological spot surveys will include assessment of species distribution and densities (cattle baited traps collections) and aquatic larval habitats (larval dipping). The areas for conducting spot surveys will be prioritised as follows:

- a. areas with increased risk (stratum 1, and areas with environmental change including flooding);
- b. border areas or transport routes linked to endemic municipalities/countries with high risk for importation of malaria or vectors;
- c. Previously highly malarious areas with no updated entomological information in the past 3 years (strata 2, 3, 4).

Based on the results of entomological spot surveys, maps of receptive risk areas will be generated and updated regularly depending on the dynamics between receptivity and importation risks. Data from this exercise will be used for epidemiological stratification of the risk of re-establishment of malaria in the country. Entomology Officers will be trained by an expert on planning of the Entomological spot surveys, mapping of receptive risk areas and data analysis.

2.4.2.2 Entomological surveillance for case investigation

Entomological surveillance as part of case and foci investigation will be carried to determine vector abundance and potential for onward transmission in areas where cases have been reported. Entomological techniques used for this operations may include cattle baited net trap collections, larval collections, human landing collections and any other method as required. Furthermore, insecticide resistance will be monitored. Entomological surveillance for case investigation will be carried out by the national team and completed within 7 days of notification of a case.

2.4.2.3 Entomological surveillance for trend observation

Entomological surveillance for trend observation will be carried out at two sentinel sites (one in the mainland and one in Oecusse municipality) by the national entomology team for monitoring of composition and behaviour of mosquito vector populations. Sampling techniques used will include cattle baited trap and hut collections, techniques to determine resting and feeding behaviours and larval surveys. Frequency of monitoring will be reduced to twice a year, during the expected peak of vector density.

2.4.2.4 Insecticide resistance monitoring

Insecticide Resistance (IR) monitoring will be conducted routinely once per year as per recommendations in the insecticide resistance monitoring and management plan. Monitoring will be conducted twice per year, if an adequate sample of mosquitoes cannot be collected. In addition, insecticide resistance monitoring will be done as part of the response when cases are reported. The findings of these investigations will form the basis of selection of appropriate vector control interventions and monitoring their impact on mosquito populations. Insecticide resistance (IR) monitoring will be done using standard WHO bioassay kits in two sentinel sites. Surveys will be conducted in additional sites if required (e.g. in outbreak areas where IR may be responsible for the outbreak and in areas at high risk of IR).

Use of insecticides in vector control will be guided by technical recommendations provided in the National Insecticide Resistance Monitoring and Management Plan which was developed based on WHO's 'Global plan for insecticide resistance management in malaria vectors'. This plan will be updated.

2.4.2.5 Monitoring coverage and quality of vector control interventions

The National Malaria Programme will monitor the coverage and quality of vector control interventions such as IRS, LLINs, and the residual efficacy of insecticides with time using bio-efficacy tests and surveys in areas where vector control measures have been instituted.

2.4.2.6 Improving safety in entomology laboratory

As the entomology laboratory is located in an office building, the external review team has recommended improving safety in the laboratory. Double screens will be provided at the entrance into the area where live mosquitoes are held for rearing. The entrance area room of the laboratory will be renovated and will be equipped with insect cabinets and slide boxes for storing the insect reference collection.

2.4.2.7 Entomology Data analysis and reporting:

Entomology data will be analysed and annual report will be prepared.

2.5 INTERVENTION 2 – Case management

2.5.1 Universal access to malaria diagnosis and treatment

Targets:

100% of persons have access to malaria diagnosis and treatment

100% of suspected malaria patients receive a parasite-based diagnosis

100% of confirmed malaria patients receive effective treatment based on national treatment guidelines within 24 hours of confirmation of diagnosis.

In Timor Leste, achieving universal access to malaria diagnosis and treatment requires three channels of service delivery: the public sector, community based organisations and the private sector. In order to ensure universal case-detection, management, surveillance and reporting during the prevention of re-establishment phase, private sector and community based organisation providers will be required to test and treat patients according to National Malaria Treatment Guidelines, and will be required to notify all positive cases to the local health authorities within 24 hours of diagnosis. The Ministry of Health has already declared malaria a notifiable disease.

Universal early diagnostic testing of all suspected cases as per revised definition, based on blood examination by RDTs or microscopy, will be made available at all health care institutions in the public sector, the private sector and outlets of community based organizations, i.e., at all primary care settings. RDTs will be available in all primary care settings including outreach services. Microscopy facilities will be available at all hospitals, vila CHCs and at municipality level. RDTs will be available in all existing Health Posts as currently practised. Quality RDTs and ACTs, as currently practised, will be available with malaria volunteers (PSF-Promotor Saude Familiar) wherever they are employed. Diagnostic methods having a higher sensitivity than RDTs and microscopy, such as Polymerase Chain Reaction (PCR) or other molecular based techniques, will be established and used in specific situations when there are discrepancies in the diagnosis but will not be used for routine case detection and management.

Treatment for falciparum and non-falciparum malaria will be based on national treatment guidelines, which are in-line with WHO guidelines. Currently, ACTs (artemeter/lumefantrine) is

the recommended first line antimalarial drug for the treatment of uncomplicated vivax and falciparum malaria except in the first trimester of pregnancy. A single dose of Primaquine 0.25 mg per kg bw is given to falciparum patients as a stat dose to eliminate gametocytes that may transmit the disease. This does not require prior testing for G6PDd and has been recommended as safe by WHO. Due to unavailability of point of care testing facilities for G6PDd at present and based on the recommendations of the external review, the 8-week Primaquine regime will be given at weekly intervals for 8 weeks under DOTs. The DOTS strategy for all the all confirmed malaria patients will be continued.

2.5.2 Strengthening diagnostic services

2.5.2.1 Provision of RDTs to healthcare institutions

Rapid Diagnostic Tests (RDTs) for detection of falciparum and or/non-falciparum infections will be available at all the public health sector institutions, NGO run health facilities, private sector healthcare institutions and at the community level. RDTs will be provided free of charge by the NMP to NGO run health facilities and private sector healthcare institutions; these institutions in return have to provide surveillance data to the NMP and confirmed malaria cases will be informed within 24 hours of the report of the case. All newly recruited Health Volunteers, relevant staff of NGO run facilities and private sector will be given training or refresher training on RDT use and interpretation of results. All RDT positive cases will be confirmed by microscopy.

2.5.2.2 Strengthening microscopy-based diagnosis

Microscopy based surveillance will form the basis of confirmation of all infections in the prevention of re-establishment phase. Quality assured microscopy will be made available at hospitals, vila Community Health Centers and at municipality level.

Newly recruited laboratory analysts will be trained in microscopy and already recruited laboratory analysts will receive re-fresher training annually. Analysts whose performance is good will be retained.

A multi-head microscope with camera and computer connection will be procured for training at the central laboratory. New malaria microscopy bench aids will be made available at all health facilities, where malaria microscopy will be performed.

2.5.2.3 Support case management, including the management of severe malaria

Clinicians “forgetting malaria” may lead to delays in diagnosis and treatment resulting in severe malaria and onward transmission of the infection. Clinicians will be annually updated on the need to consider malaria in the differential diagnosis of fevers and the importance of testing for malaria. They will be apprised of the new suspected malaria case definition. The training sessions (both group and individual) will be organized through the national and Municipality Health System. In addition to the need for testing of suspected malaria patients, clinicians will be updated on features and diagnosis of severe malaria, need for immediate notification and treatment guidelines. In addition, special training will be provided to clinicians (national, referral hospitals and CHCs with beds) on the management of severe malaria.

The National Treatment Guidelines will be revised. Warning signs/symptoms of severe malaria and related precautions will be included in the guidelines. In addition, when prescribing primaquine, advice health personnel should give patients/relatives about its potential adverse events will be included. Clinicians will be instructed to strictly follow the national treatment

guidelines. All medical practitioners will be trained on the need for advising on personal protection and chemoprophylaxis to all travellers going to malaria endemic areas.

Defined stock levels of oral and parenteral antimalarial medicines will be maintained depending on the health care facility level and the malaria stratum.

2.5.2.4 Directly Observed Treatment Schedule (DOTS), and follow up of confirmed cases

Confirmed malaria cases will be admitted, where possible, to ensure compliance to treatment. Patients, who are not admitted to wards, will be treated using a DOTS strategy where compliance to treatment will be directly observed by a health care personnel or Community Health Volunteer. In such situations, health care personnel will visit the patients to administer all doses.

Data on efficacy of recommended antimalarial medicines are needed to ensure that all infections are radically cured and malaria transmission is interrupted. Drug efficacy monitoring will be integrated with case-based surveillance. All patients will be followed up for 28 days (Days 0, 1, 2, 3, 7, 14, 21 and 28) as part of the integrated Drug Efficacy Surveillance (iDES) as outlined in NMP guidelines to ensure complete recovery, clearance of parasites and monitor the adverse effect of the anti malarials use for treatment.

2.5.2.5 Provide community based diagnosis and treatment for malaria

Timor Leste has a well-established free community based diagnosis and treatment services for malaria delivered by outreach clinics and Community Health Volunteers. Outreach clinics conducted by SISCA services include malaria diagnosis and treatment. Malaria diagnosis and treatment will be included in the Essential Services Package that is being planned for the future. All suspected malaria cases (based on the new definition) will be tested for malaria using RDTs and treated based on National Treatment Guidelines.

In the past, Community Health Volunteers substantially complemented and extended the reach of health services, particularly in rural and remote hard-to-reach malarious areas especially along the West Timor - East Timor border (stratum 1). Currently, existing volunteers carry out active surveillance, diagnose malaria using RDTs, treat uncomplicated malaria cases, supervise DOTs treatment, monitor LLIN usage by the community and conduct IEC activities by visiting houses in assigned areas. Volunteers will monitor population movements, refer severely ill malaria patients, and assist in case and foci investigations and response. On-the-job training will be provided to CHVs by municipality and sub municipality malaria officers. CHVs will meet regularly with supervisors and officers of the nearest health institution to assess inventories of supplies, and crosschecking and reporting of data.

2.5.2.6 Provide diagnostic and treatment services for the armed forces and the police

Malaria diagnostic and treatment services for the armed forces and the police will be provided free of charge. Clinicians in the armed forces and the police will be trained on diagnosis and treatment of malaria. RDTs will be provided to the armed forces and the police and they in return will have to provide data on their usage to the National Malaria Programme. Confirmed cases will be informed to the NMP within 24 hours of the diagnose of the case. Microscopy or RDT based screening will be carried out for all armed forces personnel after deployment in malaria endemic areas. In addition, personnel travelling to malaria endemic countries will be advised on chemoprophylaxis.

2.5.2.7 Provide malaria diagnostic and treatment services at border crossing points

Facilities providing malaria diagnostic and treatment services at border crossing points have been established. This activity will be continued and RDTs and ACTs will be available at these border crossing points. All services will be provided free of charge irrespective of the nationality of the person seeking treatment.

2.5.2.8 Strengthening and monitoring private sector and faith based organizations case management services

Engagement of the private sector and faith based organization in malaria diagnosis and treatment is critical in the prevention of re-establishment phase. At present, RDTs are given to private and NGO sector healthcare institutions; these institutions in return provide surveillance data to the NMP. Whenever a positive case is detected, the patient is referred to the NMP for confirmation of diagnosis by microscopy and treatment. The NMP will continue to provide quality assured RDTs to private and NGO sector healthcare institutions.

The National Laboratory will carry out malaria microscopy training of laboratory analysts engaged in malaria diagnosis working in the private sector and in faith based organizations as has been done in the past. Training and refresher training will be provided to clinicians and laboratory analysts working in private sector and faith based organizations.

2.5.2.9 Screening of blood donors

All blood donors will be screened for malaria using RDTs at the National Hospital. This activity will be done by the staff at the National Laboratory. All positive RDTs will be reconfirmed by malaria microscopy.

2.5.2.10 Screening pregnant women in malaria foci

As pregnancy is no longer a risk condition for malaria but is a risk condition for severe malaria, screening of pregnant women for malaria will only be done in stratum 1 areas and in active foci using RDTs at the first antenatal clinic visit whenever necessary. Positive cases will be treated as per National Malaria Treatment Protocol.

2.6 INTERVENTION 3 – Malaria Prevention

An. barbirostris and *An. subpictus* have been incriminated as the primary and secondary vectors of malaria in Timor Leste. Use of Long Lasting Insecticidal Nets (LLINs), Insecticide Residual Spraying (IRS), larval breeding source reduction, use of larvivorous fish and personnel protection methods have been used as vector control measures in the country to great effect; the two major strategies for malaria prevention have been LLINs and IRS.

In the prevention of re-establishment phase, universal access to prevention will be limited to areas in stratum 1 and in potential foci. A potential focus is defined as an area which is receptive and in which imported malaria cases are been reported. In the other strata, vector control measures will be confined to areas around where cases are reported.

Use of insecticides in vector control will be guided by technical recommendations provided in the National Insecticide Resistance Monitoring and Management Plan which was developed based on WHO's 'Global plan for insecticide resistance management in malaria vectors'. This plan will be updated.

2.6.1 Long lasting insecticidal nets (LLINs)

Mass distribution of LLINs at the rate one net per two persons will be distributed in areas of stratum 1 and continuous distribution to pregnant women in stratum 1, risk groups (border police, fishermen who go and stay in Indonesian islands for fishing purposes, migrant workers, farmers engaged in slash and burn cultivation in the border areas, etc.), in foci until they are classified as “cleared” and in potential foci. The strategy of mass distribution of LLINs in stratum 1 will continue as long as the epidemiological situation persists; this strategy will be reviewed before the next distribution cycle taking into consideration the malaria situation in West Timor when the number of imported malaria cases may decrease when West Timor reaches elimination levels. Mass distribution of LLINs for risk groups and potential foci will be reviewed before each distribution cycle.

Mass distribution of LLINs will be carried out as a response to detection of imported cases if required based on the presence of vectors found from Entomological surveillance. If an introduced or indigenous case is detected, 1.5 km radius around the residence of the malaria case will be covered with LLINs. A buffer stock of 10,000 LLINs will be kept, if required, in case of a disaster or unforeseen situation.

Continuous distribution will be carried out for pregnant women in sucos having areas stratified in stratum 1 through antenatal clinics and among newly identified risk groups.

WHOPES approved LLINs will be procured.

2.6.2 Indoor Residual Spraying (IRS)

As entomological surveillance data has shown that the biting habits of vector mosquitoes extend from early evening to dawn extending beyond the sleeping times under nets, indoor residual spraying was started in selected areas and extended further in the malaria control and elimination phases.

2.6.2.1 Routine IRS

In the prevention of re-establishment phase IRS will be used selectively as and when needed. One spray cycle was carried out prior to the transmission season following the rainy season which extends from January to April of each year. Routine 1-cycle IRS will be conducted in 2020 in stratum 1 and in all foci until the foci are classified as “cleared”. IRS in border area sub-municipalities in stratum 1 will continue depending on the malaria situation in West Timor. This strategy will be reviewed before the next IRS cycle taking into consideration the malaria situation in West Timor when the number of imported malaria cases may decrease when West Timor reaches elimination levels. **If the current epidemiological profile of malaria transmission stays the same**, and after careful review of epidemiological and entomological data annually, routine IRS will be phased out from 2021 to 2023 as follows:

2021: Atauro island of Dili municipality

2022: Sub Districts/Administrative posts Border areas Bobonaro municipality

2023: Oecusse municipality and border sub districts of Covalima Municipality

2.6.2.2 Focal IRS: IRS as part of response when cases are detected

IRS will be carried out as part of response when a malaria case is detected if the area is receptive. 1.5 KM area around the residence of the malaria cases will be selected for focal IRS.

2.6.3 Other methods

2.6.3.1 Larval source management (LSM) and larval control

LSM will be implemented in stratum 1, other areas where cases have been reported and Stratum 2 (where applicable) through community mobilization where vector-breeding sites are ‘few, fixed and findable’ identified through larval surveillance carried out by the national entomology team in coordination with Municipal Malaria and Entomology/vector control Officer and sub district/admin Post Malaria Officer/focal point to complement other vector control strategies. As the national Malaria Programme is in the prevention of re-establishment phase, it is important to carry out environmental manipulation and management to reduce larval breeding.

The use of larvivorous fish such as *Apolocheilus panchax* which is indigenous to Timor Leste may be used as a larval control method. Larval control will be carried out mainly in the dry season when permanent breeding sites of vectors are reduced and concentrated into a few manageable and treatable areas in areas of stratum 1 and in surrounding areas where cases have been reported. In addition, the Insect Growth Regulator (IGR), *Bacillus thuringiensis israeliensis* (Bti), will be applied to semi-permanent breeding locations prior to the wet season.

2.6.3.2 Use of mosquito repellents

Entomological investigations have revealed that the vectors of malaria *An. barbirostris* and *An. subpictus* show exophilic behaviour and start biting from 6:00 pm throughout the night till the next morning. Villagers and labourers who work during the night (road construction workers, seasonal farmers etc.) may be protected from mosquito bites when they are not protected from LLINs or IRS, especially when outdoors. The use of larval control methods will be promoted through community participation. IEC materials have already been developed to promote these practices under the Integrated Vector and Pest Management project carried out successfully in Manatuto Municipality. IPVM can be implemented wherever possible in collaboration with the Ministry of Agriculture in the rice cultivation areas to reduce the malaria vector density with help of farmers and farmer families.

2.6.3.3 Integrated vector management

In accordance with the national policy, the choice of insecticide will take into account safety, efficacy, cost, availability, and susceptibility of vectors based on the national insecticide resistance monitoring and management plan of Timor Leste.

Insecticides used for IRS will be of a different class to that used for LLINs as per WHO recommendations and the updated national insecticide resistance monitoring and management plan of Timor Leste. The insecticides used for IRS will be rotated yearly or once in two years. The pesticide law which has been drafted will be reviewed, revised if necessary, and implemented.

A summary of vector control methods that will be used are given in Table 16.

Table 16. Summary of vector control methods to be used in Timor Leste 2021-2025

Scenario	LLINs	Focal IRS	Other methods
Stratum 1 - border areas (including the entire sub district/Administrative Post)	+ (mass distribution)	+/- (targeted to be phased out after review depending on epidemiological and entomological data)	+ (where applicable)
Risk groups	+ (continuous distribution)	+/- (after review depending on epidemiological and entomological data)	+ (where applicable)
Focus	+ (mass distribution until focus status becomes “cleared”)	+/- (after review depending on epidemiological and entomological data until focus status becomes “cleared”)	+ (where applicable)
Potential focus	+ (mass distribution based on epidemiological and entomological data)	+ (after review depending on epidemiological and entomological data)	+ (where applicable)
Response to case investigation (imported case)	+/- (mass distribution depending on receptivity of the area)	+/- (depending on receptivity of the area)	+ (where applicable)
Response to case investigation (introduced or indigenous)	+ (mass distribution)	+ (Focal IRS)	+ (where applicable)
Pregnant females	+ (only in sub districts/Admin. posts of areas classified as stratum 1)		

2.6.4 Malaria chemoprophylaxis

As the country is free of indigenous malaria transmission, efforts should be initiated to minimise the risk of imported malaria due to travel of Timorese to malaria endemic areas by prescribing chemoprophylaxis during overseas travel. It is not possible to cover the regular migration of Timorese across the border to West Timor but other travellers who travel for official and business purposes. These groups include armed forces and police personnel who are engaged in UN peace keeping forces, businessmen, and travellers for other purposes including for leisure.

Chemoprophylaxis will be advocated for use based on the national guidelines, in addition to advising on use of personal protection methods during their overseas travel. A national guideline will be developed separately or incorporated in the National Treatment Guidelines for malaria.

All medical practitioners will be trained on the need for advising on personal protection and chemoprophylaxis to all travellers going to endemic areas. They will be advised on referring to the WHO information on malaria endemic countries.

The NMP will work with armed forces and their medical officers to ensure all personal and, if possible, collective preventive measures for travel to endemic countries/areas are provided. The NMP will engage with the Ministry of Foreign Affairs to protect exchange groups visiting African countries from importation of malaria to the country.

The NMP will contact travel agencies and conduct seminars to educate them on the importance of the need to inform travellers of the benefits of chemoprophylaxis. The NMP will assist travel agencies in educating travellers regarding protecting against malaria during overseas travel to malaria endemic countries. Suitable IEC material will be prepared and shared with them.

2.7 SUPPORTING ELEMENT 1 - Expanding research for innovation

This supporting element is important in the prevention of re-establishment phase to ensure that planned activities are been carried out effectively in a scenario where the case load is very low. It is also important to find out whether the health system is vigilant to meet any eventuality.

With the limited resources available, the following studies will be carried out:

- a. Assess use, acceptability and quality of vector control interventions in stratum 1 areas to ensure optimal implementation and to indicate any corrections, if required;
- b. Tracking insecticide resistance at least once a year according to the latest WHO protocol;
- c. Integrated drug efficacy surveillance;
- d. Regular audits of whether all suspected malaria cases are being tested;
- e. Assess the effective lifespan of unused LLINs beyond the date of expiry; and
- f. genotyping of malaria parasites.

Annual review of research

A Technical Working Group for research will be established to identify and prioritise implementation research for malaria elimination. This committee will organise and conduct an annual review of research conducted in the country to update programmatic strategies and future research priorities.

2.8 SUPPORTING ELEMENT 2 -Strengthening the enabling environment

As described in the ‘Strategy for Malaria Elimination in the South-East Asia Region (2016–2030)’, ‘Supporting Element 2’ will:

- Strengthen and maintain political commitment and ensure adequate financial support for elimination;
- Support capacity development appropriate to the implementing strategy;
- Strengthen health systems to facilitate elimination;
- Provide comprehensive services to meet the needs of all at risk populations, including mobile populations and migrants; and
- Foster inter-sectoral collaboration, community involvement and collective action.

Timor Leste has gone beyond elimination and is now in the prevention of re-establishment phase. Good leadership in, and management of, the malaria programme is essential to ensure prevention of re-establishment of malaria in Timor Leste given the competing priorities the country faces straddled with a limited resource. Operations will need to be managed with rigor and flexibility, supported by robust monitoring and quality control. The programme will need to be responsive to the evolving needs of the prevention of re-establishment phase.

An enabling environment for the smooth functioning and cordial working partnerships of all stakeholders of the prevention of re-establishment programme will be set up. The following activities will be carried out:

2.8.1 Ensure political commitment and financing

The Government of the DRTL is committed to obtain ‘malaria-free’ certification by WHO. This requires that the government provides stewardship to all activities of the prevention of re-establishment of malaria programme. For this purpose, a high-level national, inter-sectoral Task Force for the prevention of malaria in Timor-Leste will be established directly under the auspices of the Prime Minister. The membership of the commission shall include the Ministry of Health, parliamentarians, representatives of armed forces and border police, the economic development zones, representative from other ministries (agriculture, defense, finance, etc) civil society and the corporate sector. The terms of reference of the commission shall include resource mobilization, inter-sectoral collaboration and cross-border/international collaboration. The Task Force shall meet every 6 months and review progress of the prevention of re-establishment of malaria programme. The National Task Force on Prevention of Re-establishment of Malaria will take the lead in ensuring political commitment and sustaining funding for the programme.

The WHO Framework for Malaria Elimination, 2017 calls for establishing an independent National Malaria Advisory Committees in malaria-eliminating countries. Timor Leste is categorised by WHO as one of the countries that can be certified as ‘malaria-free’ by 2021. The purpose of this committee is to provide an external view of progress and gaps in malaria elimination programmes, assist in adapting WHO guidance to the national context, and review malaria trends and progress towards elimination and certification. The Terms of reference of the Independent National Malaria Elimination Committee in TL was revised using the generic terms of reference given in WHO guidelines. Establishment of this committee is one criterion that needs to be fulfilled for WHO ‘malaria-free’ certification. An independent Malaria Advisory Committee comprising Ministry of Health officials, academia other stakeholders will be established to oversee prevention of re-establishment activities and to advise the NMP on measures to be taken. This Advisory Committee may include overseas malaria experts who may join the meeting online.

Malaria will be included in the Essential Services Package of the primary health care programme that the Ministry of Health is preparing to implement in the future. This will ensure that all suspected malaria cases will be tested for malaria and all confirmed cases will be treated according to National Malaria Treatment Guidelines.

GFATM has enabled the Ministry of Health to carry out the National Malaria Programme with funding through 4 grants from 2006 onwards. The programme has achieved remarkable results where the incidence of malaria has declined dramatically from 223,002 cases in 2006 to zero indigenous cases in 2018 and beyond (Table 5). The country has eliminated malaria transmission. The success of the programme is testimony to the good use of funds.

In preparation for applying for “malaria-free” certification the government will have to show greater commitment in sustaining the programme further. The government will have to fulfil co-financing commitments and show preparedness to sustain the programme achievements in the medium (absorption of staff first) and in the long term (taking over all commodity costs). In the past, the government has shown commitment to malaria control and its elimination by recruiting 13 District Malaria Officers and other staff in to the permanent cadre of the National Malaria Programme. The government proposes to absorb more staff in the future based on a revised Human Resources plan that will be developed. Recruitment of staff will be on a staggered basis. With time the government will absorb costs of commodities as well. A plan for these activities will be developed and implemented.

An independent Malaria Advisory committee will be established, and case and focus classification will be confirmed as per the TOR of the committee.

2.8.2 Cross border collaboration

East Timor shares borders with Indonesia’s West Timor, there is a lot of unregulated movement across these borders. The incidence of malaria in West Timor ranges from 2-10 per 1000 population while in some areas it is <1 per 1000 population; West Timor is still in the control phase.

“Cross Border Initiative collaboration meetings” between Indonesia and Timor Leste have been held in 2017 and in February and August 2019. The national programmes have presented their activities for control and elimination of communicable diseases, especially HIV/AIDS, Tuberculosis and Malaria. Joint action plans and guidelines for cross border collaboration have been developed. However, there is no mechanism for regular exchange of information. For effective exchange of information, the NMP, Timor-Leste will have to work directly with their Nusa Tenggara Timor counterparts to understand the surveillance systems and the interventions.

Steps will be taken with the mediation of the high-level Task Force, WHO, the Global Fund and Rotarians Against Malaria to share detailed information about any new malaria cases in Timor-Leste or in one of the four bordering districts of Indonesia in real time. This will be followed up by sharing information on any focus and on measures taken in reaction to the case/focus.

The experience of Timor-Leste will be shared with the Indonesia/NTT/West Timor malaria programme staff through sharing of detailed reports, meetings and study tours in Timor-Leste.

The malaria programmes of the two areas will meet at least once in six months to share epidemiological and operational data and experiences to strategically plan joint control/prevention of re-establishment activities. In addition, sub-municipality information will be shared on a monthly basis.

Malaria diagnosis and treatment centres will be established at official border crossings and ports of entry including the airports and the port. At the airport and port, infrastructure will be developed and personnel will be trained on malaria diagnosis.

The high level Task Force will liaise with the Global Fund to consider the possibility of using savings from MEMTI financing for accelerating progress in West Timor especially in the border areas.

2.8.3 Quality assurance

Targets

95% Agreement rate for microscopy and RDTs

100% procurement of WHO pre-qualified RDTs

100% procurement WHO pre-qualified ACTs

100% of confirmed malaria cases treated according to national malaria treatment guidelines

2.8.3.1 Quality assurance of Microscopy

Quality assurance of microscopy is important to ensure that the results obtained are accurate, reliable and reproducible. Quality assured microscopy is essential in the prevention of re-establishment phase to ensure laboratory analysts do not lose their skills in detecting malaria parasites as they see few positive slides. The existing quality assurance system will be strengthened. SOPs for malaria microscopy, RDT and Quality Assurance and Quality Control of malaria microscopy are available but need to be reviewed and revised.

A consultant on microscopy and RDT quality assurance will be recruited to work in the country for about four months. The consultant will review all SOPs related to microscopy and revise them

if necessary, and will prepare SOPs for quality assurance of RDTs based on collection of samples of unused RDTs and exposure to an antigen-containing sample. A new panel of positive slides will be prepared for assessing diagnostic skills of Laboratory Analysts. Slide banks at central and municipality levels will be maintained for training and testing.

All Laboratory Analysts performing microscopy will be provided with a refresher training every year at the National Laboratory.

The External Competency Assessment which has been started by the National Malaria Programme will be continued every two years targeting senior laboratory analysts attached to the Quality Control Laboratory, the National Laboratory and in the municipalities.

Quality assured diagnostic services will be provided throughout the country. This will be provided through confirmation of all cases and cross checking of 10% of negative blood smears. Cross checking of blood smears will be done by staff at the National Laboratory and level 1 grade laboratory analysts who have been accredited by the external accreditation system.

Expert laboratory analysts (Grades 1 and 2) attached to the National Laboratory and district senior analysts in municipalities will carry out supervision at municipality level, provide re-fresher training for existing laboratory analysts and basic training for newly recruited laboratory analysts attached to healthcare institutions in public, private and NGO sectors. They will oversee procurement and distribution of quality microscopes, slides and reagents. Senior laboratory analysts in municipalities will carry out supervision of laboratory analysts attached to CHCs.

External quality assurance of the blood smears will be continued by sending blood smears and blood samples on the filter papers to Army Medical Research Institute, Melbourne, Australia

2.8.3.2 Quality assurance of RDTs

WHO pre-qualified RDTs will be procured. QA of RDTs and SOPs for QA of RDT are in place and will be revised if required. QA of RDTs will be continued as currently practised (batch testing, testing of field samples, and supportive supervision).

2.8.3.3 Quality assurance of antimalarial medicines

Adequate supplies of quality assured antimalarial medicines will be ensured. WHO pre-qualified ACTs and primaquine will be procured. Antimalarial treatment will be available and distributed only by the NMP through SAMES. The quality of antimalarial medicines will be monitored by SAMES. If required, samples of antimalarial medicines will be sent to a specialised laboratory in the region for testing.

2.8.3.4 Quality Assurance of case management

Supervision on case management will be strengthened at public, private and NGO sector institutions with clear protocols in accordance with the National Malaria Treatment Guidelines. Clinical audits will be carried out as a routine activity. Corrective measures will be instituted in suspected or under-performing institutions by re-training staff and monitoring the institutions closely.

2.8.3.5 Integrated Drug Efficacy Surveillance

Data on efficacy of recommended antimalarial medicines are needed to ensure that all infections are radically cured. Integrated Drug Efficacy Surveillance will be integrated with case based surveillance. All patients (regardless of age and parasitaemia levels) will be treated under direct

observation. All patients will be clinically and parasitologically assessed on days 0, 1, 2, 3, 7, 14, 21, and 28. All blood smears collected on days 0, 1, 2, 3, 7, 14, 21 and 28 days will be examined by expert laboratory analysts. Blood dots on the filter papers and blood smears on day 0, 1, 2, 3, 7, 14 and 21 will be sent to Army Malaria research Institute in Australia.

2.8.3.6 Engaging the private and other sectors

During the prevention of re-establishment phase, it is necessary to detect all infections early through the health system including from the services provided by the public and private sectors and community based organizations. Staff from the private sector and community based organizations will be trained in malaria diagnosis and be invited to participate in external accreditation assessments free of charge. RDTs will be given free of charge to these institutions. The institutions that participate in these training programmes will be requested to share data with National Malaria Programme to strengthen surveillance. Furthermore, clinicians in the private sector and in community based organizations will be trained on National Malaria Treatment guidelines.

2.8.3.7 Monitoring coverage and quality of vector control interventions

WHO pre-qualified products for malaria prevention (LLINs and insecticides for IRS) will be procured. These will be pretested before use.

The National Malaria Programme will monitor the coverage and quality of vector control interventions such as IRS, LLINs, and the residual efficacy of insecticides with time using bio-efficacy tests and surveys.

2.8.4 Ensure robust health sector response

A robust health sector response is required to successfully implement a prevention of malaria re-establishment programme. Although standard operating procedures for response and other functions have already been developed, there still exist some gaps in response. The gaps are due to administrative, financial and technical reasons.

Based on prevention of re-establishment of malaria strategy, all cases have to be notified within 24 hours, investigated within 2 days, RACD and entomological surveillance completed within 7 days and a response mounted within 10 days of notification. For this purpose, an emergency fund will be established whereby funds could be released at short notice to carry out these activities.

A number of vacancies exist in health institutions. These vacancies will be filled at the earliest to ensure that all persons have universal access to malaria diagnosis and treatment. All new recruits will be trained on relevant aspects of the prevention of re-establishment programme. In addition, staff already in the programme will be provided with re-fresher training on prevention of re-establishment of malaria.

Procurement and supply chain management has to be strengthened to prevent stockouts and to minimise wastage due to expiry of diagnostics and antimalarial drugs. Currently, MSupply, a pharmaceutical supply chain software programme, is being used.

Health sector responsiveness has to be improved to provide a wide range of services especially primary health care services. Integrating malaria prevention of re-establishment activities with

activities of other programmes such as immunization and MCH will ensure universal access to malaria diagnosis and treatment.

Frequent training and reminding health workers about malaria is necessary. Health workers including clinicians will be trained annually on malaria diagnosis and treatment.

2.8.4.1 Essential Services Package

The proposed Essential Services Package for malaria is shown in Table 17.

Table 17. Proposed Essential Services Package for Malaria

	Stratum 1: Oecusse; border sub-districts in Bobonaro and Coailima municipalities; Atauro island	Other strata: Rest of the country
Diagnosis/Passive case detection by RDT testing of all suspected malaria cases and microscopy confirmation of positives	Suspected malaria case definition: All patients presenting with fever	Suspected malaria case definition: All patients presenting with fever with - No obvious alternative cause of the fever - History of traveling to malaria endemic areas within 1 year - Known history of malaria within 3 years - History of blood or blood products transfusion within 3 months - with hepatomegaly and/or splenomegaly - any individuals presenting with clinical features of severe malaria (refer National Malaria Treatment Guidelines)
Treatment of uncomplicated malaria	At all health facilities (including health post) where detected, by DOTs	
Treatment of severe malaria	At hospital, initiated at a CHC, if needed	
Malaria vector control accompanied by IEC	Universal coverage with LLINs through mass distribution every 3 years and to pregnant women; universal coverage with IRS to	Only for migrant groups and as part of response to a case/focus

	Stratum 1: Oecusse; border sub-districts in Bobonaro and Coalima municipalities; Atauro island	Other strata: Rest of the country
	be phased out conditionally over 2021-2023	
Active case detection	Regular screening of all migrant/mobile groups with contact with endemic area accompanied by IEC and promotion of use of government healthcare services	Same response to any migrant/mobile groups with contact with endemic area that might be identified
Surveillance and response	Immediate notification of all positive cases (within 24 hours), case and focus investigation, focal surveillance (usually mass blood survey) (within 7 hours) and vector control (usually LLIN + IRS) response (within 10 days) led by NMP	

2.8.4.2 National Malaria Programme tasks in municipalities based on the ESP

Based on the essential services package, the national malaria programme tasks needed in needed and implemented in municipalities are shown in Table 18.

Table 18. National Malaria Programme tasks to be implemented in municipalities based on the malaria ESP

	Stratum 1	Outside stratum 1
Passive case detection	Maintenance of stocks of RDTs and antimalarial medicines at all health facilities Regular orientations for doctors, laboratory staff, pharmacists and malaria officers Supervision of passive case detection at all health facilities Reporting on stocks of antimalarial medicines and on stock and consumption of RDTs, recording and reporting data, IEC	
Reaction to a case	Immediate treatment as per national malaria treatment guidelines at any healthcare facility and immediate reporting, IEC	
Active case detection	Regularly in all identified risk groups (migrants and mobile populations) accompanied by IEC	Exceptionally, if a risk group is identified, IEC
Continuous vector control	Universal coverage through mass distribution of LLINs every 3 years + continuous distribution of LLINs to all pregnant women and malaria risk groups + IRS 1 round per year. Related IEC, training, recruitment of IRS personnel, monitoring, reporting, bioassays, annual insecticide resistance monitoring to be implemented	Vector mapping and environmental manipulation and management when necessary, IEC, data recording and reporting
Reaction to a focus or potential focus	Mass blood survey, IEC, entomological assessment, possibly LLIN and IRS, reporting and follow-up	Same as strata 1

2.8.5 Strengthening health sector work force and malaria expert base

2.8.5.1 Human Resource Training

The National Health Sector Strategic Plan for 2011 to 2030 (NHSSP) and the National Strategic Plan for malaria elimination 2017 to 2021 (NMS) have identified capacity building as an essential component in the achievement of the strategic goals of providing comprehensive quality primary and hospital care services, establishing a strong support system for healthcare delivery, and promotion of greater community and partnership participation in the improvement of the health system. For the national malaria programme, capacity building has been identified as a priority to consolidate the gains achieved through continuous investments in malaria control and elimination.

The human resource capital in the country at both the central and municipality levels have to be re-oriented to conduct prevention of re-establishment of malaria activities. The following categories of staff require further training and enhancing of skills.

- ✓ Malaria Volunteers require training in using RDTs, interpreting results, treating patients, surveillance and maintaining records and stock balances.
- ✓ National, municipality and sub-municipality malaria unit staff require re-fresher training in basic malariology and surveillance (including case and focus investigation and response) with regard to prevention re-establishment activities.
- ✓ National and municipality malaria officers require training in leadership and management.
- ✓ .
- ✓ At the national level, a malaria expert base should be developed. The training of at least 2 persons at master's level in malariology/epidemiology and/or entomology will be undertaken. Training of these staff will have benefits for other disease control programmes as well.

Training in the following areas will be expedited to ensure successful implementation of the elimination phase:

- Programme management skills – programme management training will be provided to national staff and all MMOs.
- Analytical skills for planning, implementation and monitoring and evaluation of the programme should be provided to senior programme management, M&E Officer, Regional and Municipality Malaria Officers. The same staff categories need more training on case and focus investigation and classification and on use of DHIS case-based data system
- Surveillance (training has been provided but more training is required for strengthening below mentioned areas)
 - Case investigation and classification
 - Focus investigation and classification
 - Response
 - Preparation of risk maps using DHIS2 platform or GIS package
- Refresher training for the National and Municipality Malaria Officers and training for the Sub District/Admin. Post Malaria Officers on existing online web-based online surveillance using DHIS2 platform for malaria aggregate and case and focus investigation data with coordination of HIMS.

- Regional, municipality and sub-district/admin. Post malaria officers and vector control officers need more training in communication skills, advocacy, networking and community mobilization.
- Senior entomological staff needs more training in data analysis, interpretation and report-writing. National and municipality Entomology officers should be trained on planning of Entomological spot surveys for mapping for development of a map of receptive areas, data analysis, interpretation and reporting under the prevention re-establishment setting
- Annual training and re-training of clinicians. Train district coordinator medical officers and district malaria officers centrally, to serve as trainers of trainers. Support with annual update and a wall-poster showing flow-chart for case management.
- All health staff needs re-training in RDT use drawing attention to the criteria for suspected malaria and the need for all health staff to be alert to the possibility of occurrence of a malaria case as well as of factors causing increased risk.
- Refresher training of the laboratory staff attached to National Laboratory and Senior Municipality on quality control and Quality assurance of malaria microscopy and RDT and Laboratory staff attach to Hospitals and CHCs (specially Villa CHCs) on malaria microscopy
- Logistics management to include forecasting, inventory management, storage and distribution for staff at all levels. Two staff members at national level will be trained.
- Communication and facilitation skills for staff at all levels
- Advocacy, networking and community mobilization for staff at all levels.
- Re-training of staff to for new roles in the re-structuring of the National Malaria Programme and the establishment of a Vector Borne Disease Control Unit under the CDC directorate.

A study tour for 6 national level staff will be organised in a country that has been certified “malaria-free” to learn about preparations required for application for malaria-free certification.

2.8.5.2 Update Human Resource (HR) development plan

Most of the officers (3 Regional Malaria Officers, 5 Entomology Officers, 2 Vector Control Officers, M and E Officer and Assistant Municipality and Sub District/Admin Malaria Officers, and drivers) attached to the National Malaria Programme are temporary and funded by the Global Fund. It is important to recruit these highly trained and motivated staff as permanent officers of the Ministry of Health for the sustainability of the prevention of malaria re-establishment programme.

The HR plan will be reviewed and updated taking into consideration the roles and responsibilities, and the skills required of staff during the prevention of re-establishment phase and post-certification period. New job descriptions including that of a permanent Deputy Programme Manager will be developed and task shifting will be required. Staff will be recruited as permanent staff in a phased manner. These staff can be integrated to assist other vector borne disease control programmes after the country has achieved “malaria-free” certification.

2.8.5.3 Technical Assistance

Providing technical assistance through an expert malariologist has been instrumental in Timor Leste interrupting malaria transmission in the country. The long-term malaria consultant will continue to support the programme for periods of three to four months per year, not necessarily continually. Furthermore, remote consultation will be provided whenever necessary. The consultant will assist in planning and monitoring and evaluation of operations, training in re-establishment phase and in proposal preparation. It would be extremely useful, if the consultant could be recruited for an inter-country post, working for 3 months per year in Timor-Leste and 3 months per year in West Timor or Nusa Tenggara Timor in Indonesia. WHO can coordinate with two countries for this recruitment. Rotarian Against Malaria can facilitate for this technical assistance.

Quality assurance of microscopy has been developed with technical assistance. To upgrade the QA for microscopy and to re-train laboratory analysts, a consultant will be hired for 4 months to review and update SOPs and for training of laboratory analysts.

Entomology surveillance during implementation of prevention of re-establishment setting will be strengthened with technical assistant. National and municipality Entomology officers will be trained on planning of Entomological spot surveys for mapping for development of a map of receptive areas, data analysis, interpretation and reporting under the prevention re-establishment setting.

Two web-based systems have been developed for aggregate and case based formats using the DIHS2 platform and National and Municipality Malaria Officers were trained. These officers need improvement of their capacity. Medical Informatics Specialist will be recruited to provide refresher and basic training for the National and Municipality Malaria Officers, and Sub District Malaria Officers for strengthening the application web based malaria surveillance system with coordination of the HIMS department. A computer software specialist will be recruited to develop an application to automatically upload verified which will reduce delay in uploading verified data to HIMS.

2.8.6 Enacting and enforcing legislation

Enacting and enforcing legislation is important to ensure that all malaria cases are notified, antimalarial drugs are procured only by the Ministry of Health, and that pesticides are regulated.

2.8.6.1 Legislation for notification of cases

Malaria is a notifiable disease. Private and NGO sector healthcare institutions are collaborating with the NMP with surveillance and notification of cases. RDTs are provided free of charge to private and NGO sector healthcare institutions which in turn provide surveillance data and notify cases. This collaboration will be strengthened and extended with opening up of new primary care centres.

2.8.6.2 Legislation to control sale and quality of antimalarial medicines

The presence of antimalarial medicines including oral artemisinin monotherapies have disappeared from the private sector markets as they are no longer in demand. Legislation will be enacted for antimalarial medicines to be procured only by the Ministry of Health to ensure availability of quality medicine. Random checks and raids of medicine outlets will be carried out by officers of the Ministry of Health and the Police.

2.8.6.3 Legislation to control sale and quality of pesticides

There is a draft pesticide law which has not been approved as yet. A pesticide law is required to avoid marketing of counterfeit pesticides and importation of expired pesticides to delay the emergence of insecticide resistance in malaria vectors and other pests of public health importance. The MOH will work with the Ministry of Agriculture to finalise the pesticide law by inclusion of pesticides used for public health purposes in to the existing Law. MOH will facilitate the MOA to obtain approval from parliament.

2.8.7 Information Education Communication, Advocacy and Community Participation

The behaviour change communication strategy of the programme was developed as an integral part of the National Strategic Plan (NSP) of Malaria Control for 2015-2020. It was prepared in consultation with other stakeholders, from the results of rapid needs assessment conducted in the previous years, and a desk review of the existing policies, guidelines, plans and experiences from activities in the communities. The strategy includes audience segmentation, key messages and channels of communication, giving importance to the use of interpersonal and community level efforts. Priority behaviours targeted were identified based on the NSP: 1) behaviours to achieve outcomes such as increased LLIN ownership and use, acceptance of IRS; and 2) behaviours to achieve early diagnosis and prompt treatment.

As the national malaria programme is now in the prevention of re-establishment phase, a new communication strategy needs to be developed. A new communications strategy for 2021-2025 will be developed in consultation with relevant partners and stakeholders. Messages and modes of delivery will need to be revised according to the targeted special groups. Priority behaviours will include the following:

- a. Maintaining awareness among local leaders, healthcare service providers and community members about malaria prevention and control;
- b. Sustaining a high level of LLIN ownership and use among the target populations;
- c. Immediate consultation of patients with fever and travel history to endemic areas or previous history of malaria;
- d. Increased political commitment and ownership by the local administrative/health leaders of the prevention of re-establishment of malaria programme.

2.8.7.1 Advocacy for the general public

Advocacy for the general public will be based on mass delivery of information, group activities and one on one individual briefings. Mass delivery of information will be based on advertisements and hoardings at critical points such as ports of entry. Group advocacy sessions will be conducted during outreach activities. Individual one on one sessions will be conducted during house visits by Malaria Volunteers, other partners such as Health Net and by health care personnel engaged in the Family Health Programme. Well-designed information leaflets or brochures for distribution to

special risk groups or in areas where there is limited opportunity for interpersonal communication, e.g. border posts, harbours, construction/development project sites, etc., informing the target when and where to seek consultation, how to prevent getting malaria in the areas where they are going. Advocacy will focus on malaria prevention, eliminating mosquito breeding sites, use of LLINs with practical demonstrations, the need to comply with treatment and early testing for malaria especially with a history of travel to a malaria endemic area or having a past history of malaria within the last three years. Advocacy material to be placed at ports of entry will be printed in Tetun, English and Indonesian.

2.8.7.2 Advocacy for travel agents

Advocacy material on chemoprophylaxis for travel agents will be prepared. Group advocacy sessions will be conducted for travel agents. Travel agents will be requested to inform travellers of the risk of acquiring malaria when they visit malaria endemic countries and the availability of chemoprophylaxis. Advocacy material for travellers will be shared with travel agents.

2.8.7.3 Advocacy for healthcare personnel

Advocacy for health care personnel will focus on the revised definition of a suspected malaria case and the need for considering malaria in the differential diagnosis of fever patients especially with a travel history to a malaria endemic country. Regular updates will be given to healthcare providers via regular training programmes. IEC materials for healthcare service providers will be developed to inform them of the need provide advice to patients and to maintain patient's awareness regarding malaria, its prevention and control.

2.8.7.4 Develop partnerships and engage in multi-sectoral activities

Partnerships help to disseminate prevention of re-establishment of malaria interventions to a wide spectrum of the community especially the most vulnerable. With partnerships, there is a sense of ownership of the programme by all partners and sharing of resources thereby enhancing the uptake and effectiveness of interventions.

In the communication strategy, an advocacy plan to enhance partnerships with local authorities and private sectors to mobilize additional resources, especially in areas with development projects such as in Oecusse will be incorporated. Partnerships will be developed within the health sector between departments of the Ministry of Health and between other sectors including the academia, research institutions, industry, NGOs, private sector, and others such as agriculture, irrigation, water supply, forestry, private sector, law enforcing agencies including the armed forces etc. The coordination with the health promotion department and existing collaboration with the Department of Education will be revitalised. Malaria health education sessions will be expanded into vector control and environmental hygiene curriculum of the middle school.

Regular meetings with partners will be held to review activities and see ways as to how the partnership can be enhanced further. Partnerships will also be sought to deliver services to communities in hard-to-reach areas.

In addition, partnerships and collaborative activities will be developed with other sectors such as Finance, Education, Agriculture, the armed forces and the police. The cooperation of the armed forces and the police will be sought for obtaining malaria data and for malaria prevention activities.

The Ministry of Agriculture will be engaged to develop the Pesticide law and its enactment. The integrated pest and vector management programme will be carried with the assistance of farmers in collaboration with the Ministry of Agriculture wherever possible.

2.8.7.5 Strengthening social mobilization skills

Social mobilization skills of health promotion staff of CHC, malaria staff, and other partners involved in IEC activities especially in border areas, Oecusse and Atauro in the delivery of malaria and other relevant health messages in the community during SISCA and mobile clinic activities will be strengthened. Relevant workers will be trained on the communications strategy and will be provided with necessary IEC material.

2.8.9 Monitoring and Evaluation

Quarterly progress review meetings will be carried out at the National Malaria Programme headquarters with the participation of Municipality Malaria Officers, National and Municipality Laboratory Officers and Sub Recipients. In addition to reviewing progress of prevention of re-establishment of malaria activities including reporting of cases and case and foci investigations, data will be cross checked and verified. Quarterly or semi-annual review meetings will be conducted to ensure compliance with the performance framework at Municipality level. These meetings will be conducted at the municipality level with participation of the sub-municipality malaria officers, laboratory analysts, CHC managers, representative clinicians from each CHC and HPs, Community Health Volunteers and SR to review the progress and bottlenecks at the municipality level.

Supervision of prevention of re-establishment activities will be intensified. All case investigations and response will be supervised by municipality and national level officers.

Programme activities will be evaluated annually by municipality and national level authorities at the national level with participation of municipality and sub-municipality malaria officers and national malaria, vector control and entomology officers.

2.8.10 Procurement and Supply Management

An efficient procurement and supply management system has to be in place to prevent stock outs of antimalarial commodities and to minimize wastage in the prevention of re-establishment phase. Most of the vehicles at the municipality level are more than 10 years old and under repair at the national level. The need for early and adequate response requires the availability of vehicles in running condition at hand to meet any emergency. An emergency fund that can be accessed in an emergency will be established.

Based on the revised treatment, diagnostic and vector control guidelines, a malaria commodities list will be prepared by the NMP; the essential medicine list will be modified to include only the selected products. At least 3 personnel at NMP will be trained on forecasting perhaps through a live workshop/exercise in 2021 with the help of external expert(s).

Procurement of antimalarial commodities will be done through WAMBO even after procurement transitions to SAMES, as done currently. NMP will monitor stock levels of all essential antimalarial products irrespective of the source of financing. NMP will provide continued

oversight and support for distribution of antimalarial commodities and physical counting of the stocks at CHC, municipality and SAMES level to ensure no stockouts occur.

MoH will provide training on Good Storage Practices and Good Distribution Practices to SAMES staff as well as pharmacists/logisticians in the municipalities, hospitals, CHCs and health posts. A Training of Trainers with master trainers in Tetun will be organized by MoH. MoH will roll out mSupply to districts at the earliest and later to CHCs and eventually to HPs.

Table 19 gives the proposed stock levels of antimalarial medicines to be maintained at health facilities.

In case of an unexpected outbreak there should be enough stock in the system to meet the needs of at least the initial stage of the outbreak, though local stock levels may need to be propped up. Following immediate actions are recommended in case of an outbreak:

- Additional stock (especially medicines) should be dispatched from the municipal and central stores;
- Where required, stocks from non-risk CHC and municipalities far from the outbreak location should be relocated to the outbreak municipality;
- NMP should place emergency orders to replace the used stock and to meet additional estimated demands for the outbreak based on first assessments.

2.8.11 Restructuring of the National Malaria Programme

As the disease burden due to malaria decreases, the national malaria programme needs to re-structured in a manner that malaria-free status is maintained. The re-structuring should be done after “malaria-free” certification in a phased manner such that the prevention of re-establishment of malaria programme is not jeopardised.

The current administrative structure will be strengthened in this critical phase by the appointment of a Deputy Programme Manager from among one of the personnel already employed at national level.

Table 19. Proposed stock levels of antimalarial medicine to be maintained at health facilities

Max Stock Norms	ACT + Primaquine adult courses with 24 AL tablets	Artesunate + sodium bicarbonate inj box @ 10 vials	Quinine + Clindamycin (Inj+cap adult courses)	Quinine + Clindamycin (Tab+cap adult courses)
SAMES Central Warehouse	100	10	5	5
Municipality	10 (Oecusse: 50)			
Hospital	3	3	1	1
Vila CHC	3 (Atauro: 10)	3	1	1
Other CHC	3	1		1
HP	HPs in Stratum 1: 3			
Approximate National Max Stock	678	145	27	97

2.8.11.1 Proposed plan for re-structuring the NMP

After obtaining “malaria-free” certification, the national malaria programme management team will be consolidated at central level to include following posts:

- National Malaria Programme Manager
- Deputy National Malaria Programme Manager
- M&E Officer
- Data entry officer (2)
- Regional Malaria Officers (3)
- Administrative Officers

All municipality malaria officers (13, already MOH permanent staff) will be retained for prevention of re-establishment activities, but their responsibilities widened to include other Vector Borne Diseases (VBD) control as well. As a trained work force represents a significant asset in terms of public health capability, it is desirable that the Ministry of Health engages their services in various capacities.

The sub-district / Admin. Post CHC malaria officers attached to strata 1 (Oecusse, Bobonaro and Covalima Municipalities and Atauro Island) will be absorbed as government funded MoH staff, but their responsibilities widened to include also other VBDs only. Other sub district/Admin. Post malaria Officers belong to stratum 2 (Other 10 Municipalities except Atauro Island belong to Dili Municipality) will be absorbed as VBD officers starting with VBD control and expand their duties to communicable diseases control. Assistant Municipality Malaria Officers will be absorbed as Municipality Vector Control and Entomology Officers. Hospital Malaria Officers may be employed by the Ministry of Health under the CDC directorate to assist in surveillance, M&E and other functions.

It is recommended that the transitions proposed be implemented gradually over the period 2022-2025.

2.8.11.2 Establishment of a Vector Control and Entomology Unit under CDC

A Vector Control and Entomology (VCE) Unit in the Ministry of Health is proposed under the Communicable Disease Control directorate of the Department of Disease Control. It is essential that this Unit be placed under CDC is because the primary responsibility is to collaborate closely with NMP and other VBD programmes (primarily dengue) on disease prevention and control. As the transmission of vector borne diseases is dynamic, the chain of command should be as short as possible, and work of the VCE unit should be integrated with programmes that emphasize real-time monitoring of outcomes and impact at population level. A national strategic plan for the control of vector borne diseases will be prepared.

In order to maximise the effective use of trained personnel, the following existing staff of the NMP will be absorbed into VCE unit: National Level -Senior entomologists (2); Junior /Regional Entomology Officers (3); Insect Collectors (1); and Vector control officers (3) and at municipality level Municipality Vector control and Entomology Officers (13) under the Municipality Malaria /VBD Officer.

2.8.12 Application for ‘malaria-free’ certification by WHO

The following weaknesses were identified during the external review of the National Malaria Programme in February 2020.

- Incomplete case and focus investigations;
- Poor quality of microscopy based on the external review team’s observations;
- Not all private providers report to the NMP;
- The malaria programme including salaries of the majority of human resources is mainly financed externally which raises issues regarding the sustainability of the prevention of re-establishment programme;
- There is no national independent commission overseeing elimination.

The NMP will take the following corrective actions:

- 1) Improve case and foci investigation through re-training of national and municipality staff on revised formats, implementation, complete recording and reporting and more supervisory visits from the center;
- 2) Obtain the services of consultant to improve microscopy and QA for microscopy and RDT; and
- 3) Strengthened the private sector by training and collaborate with private sector providers (who test for malaria) to provide surveillance data.

The Ministry of Health will take the following actions:

- 1) Establish an independent commission to oversee prevention of re-establishment of malaria; and
- 2) Absorb staff of the NMP to the permanent cadre of the Ministry of Health in a phased manner and financially contribute more to the financing of the prevention of re-establishment activities.

Once corrective actions are taken, the Ministry of Health will apply for ‘malaria-free’ certification in 2021/2022.

3 SITUATION ANALYSIS

There are many strengths of the current prevention of re-introduction/re-establishment of malaria programme. Keeping Timor Leste free of indigenous malaria since June 2017 provides evidence that the programme is functioning efficiently. Presence of trained staff and availability of SOPs and guidelines for practically all aspects of the programme is a major strength of the programme. The programme has also received extensive funding from the Global Fund which, while being a strength, is also a major threat. Currently the government has employed only 16 officers on a permanent basis and 119 staff are employed on a temporary basis funded by the GF.

Furthermore, the government has not complied with clauses included in the grant agreement with regard to recruiting staff on a permanent basis which has implications on future sustainability of the programme.

The porous land border between East and West Timor continues to be the biggest threat for the prevention of re-establishment of malaria in the country. The too early restructuring of the National Malaria Programme with integration of activities in to general public health services of the country can have disastrous effects.

Another issue that is frequently raised is the administrative delays which hamper the smooth functioning of the programme. In the past, there is evidence that these delays have had an adverse impact on programme implementation and outcome.

The issues that have been raised questions the sustainability of National Malaria Programme. Unless there is more commitment from the government, the vast strides gained over the years with sustained investments may be lost very quickly.

A summary of the situational analysis is given in Table 20.

Table 20. Summary of SWOT analysis

Strengths	Weaknesses	Opportunities	Threats
Functional programme with trained staff in place	Administrative delays	Support from development partners	Political changes
Wide distribution of diagnostic and treatment services	Non-absorption of staff to permanent cadre	Provision of free health services increase utilization of health facilities providing an opportunity for screening for malaria.	Policy changes
Policy, guidelines and SOPs for prevention of re-introduction/re-establishment activities available.	Not fulfilling co-financing commitments	Cross border collaboration agreement with West Timor in place	Non-immune population
Universal access to quality assured malaria diagnosis and treatment at point of care	Equipment and vehicles old and needs replacement	Eligible for 'malaria-free' certification in 2021	Porous land border with West Timor where malaria is prevalent
Universal access to malaria prevention of at risk populations	SAMES not procuring WHO pre-qualified products		Malaria not being considered a priority
Practice of evidence based interventions			Donor withdrawal
Maintaining quality of services in all activities			Termination of services of long term international consultant (Technical Adviser and Quality Control officer for diagnosis)
Funding available from Global Fund			Too early integration of the National Malaria Programme in to the general public health services
Technical guidance available from WHO			

Table 21. Performance Framework 2021 - 2025

	Baseline			Target 2021			Target 2022			Target 2023			Target 2024			Target 2025		
	N	D	%	Year	N	D	%	N	D	%	N	D	%	N	D	%		
IMPACT INDICATORS																		
Malaria I-1 ^{IM} Reported malaria cases (presumed and confirmed)	30			2017	50			40			30			30				
Malaria I-3.1 ^{IM} Inpatient malaria deaths per year: rate per 100,000 persons per year	0			2019	0			0			0			0				
Malaria I-9 ^{IM} Number of active foci of malaria	12			2017	0			0			0			0				
Malaria I-10 ^{IM} Annual parasite incidence: Confirmed malaria cases (microscopy or RDT): rate per 1000 persons per year (Elimination settings)	0.024			2017	0.038			0.030			0.022			0.022				
OUTCOME INDICATORS																		
Malaria O-1a Proportion of population that slept under an insecticide-treated net the previous night			97%	2013							97%							
Malaria O-9 ^{IM} Annual blood examination rate: per 100 population per year (Elimination settings)	217,168	1,271,694	17.08%	2019	107,500	1,318,146	8.16%	89,000	1,342,004	6.63%	75,000	1,366,294	5.49%	65,000	1,391,024	4.67%		
COVERAGE INDICATORS																		
VC-1 ^{IM} Number of long-lasting insecticidal nets distributed to at-risk populations through mass campaigns	65,351	65,512	99.75%	2019	22,474			33,513			31,292			23,717				
VC-3 ^{IM} Number of long-lasting insecticidal nets distributed to targeted risk groups through continuous distribution	27,941	26,128	106.94%	2018	12,221			10,257			9,828			9,903				
VC-5 Proportion of households in targeted areas that received Indoor Residual Spraying during the reporting period	19,701	18,894	104.27%	2019	17,719	17,719	100%	14,454	14,454	100%	14,715	14,715	100%	14,982	14,982	100%		
CM-1a ^{IM} Proportion of suspected malaria cases that receive a parasitological test at public sector health facilities	89,858	89,858	100%	2019			100%			100%			100%			100%		
CM-1b ^{IM} Proportion of suspected malaria cases that receive a parasitological test in the community	34,526	34,526	100%	2019			100%			100%			100%			100%		
CM-1c ^{IM} Proportion of suspected malaria cases that receive a parasitological test at private sector sites	6,250	6,250	100%	2019			100%			100%			100%			100%		
CM-2a ^{IM} Proportion of confirmed malaria cases that received first-line antimalarial treatment at public sector health facilities	9	9	100%	2019			100%			100%			100%			100%		
CM-2b ^{IM} Proportion of confirmed malaria cases that received first-line antimalarial treatment in the community	0			2019			100%			100%			100%			100%		
CM-2c ^{IM} Proportion of confirmed malaria cases that received first-line antimalarial treatment at private sector sites	0			2019			100%			100%			100%			100%		
CM-5 ^{IM} Percentage of confirmed cases fully investigated and classified	9	9	100%	2019			100%			100%			100%			100%		
CM-6 ^{IM} Percentage of malaria foci fully investigated and classified	3	3	100%	2019			100%			100%			100%			100%		

Bibliography

National Statistics Directorate (2014). TimorLeste in Figures. <http://www.statistics.gov.tl/wp-content/uploads/2016/06/Timor-Leste-In-Figures-2014.pdf>

National Statistics Directorate (2016a). TimorLeste Population and Housing Census – Data Sheet. <http://www.statistics.gov.tl/wp-content/uploads/2016/11/Wall-Chart-Poster-Landscape-Final-English-rev.pdf>

National Statistics Directorate (2016b). At-A-Glance: Poverty in Timor-Leste in 2014. http://www.statistics.gov.tl/wp-content/uploads/2016/11/16009_TL_Broch_R02.pdf

WHO (2012). Disease surveillance for malaria elimination: an operational manual. Geneva: World Health Organization.

WHO (2016). Global Technical Strategy for Malaria 2016-2030. Geneva, World Health Organization.

Desk Review 2020 (January 2020).

External Review Report (March 2020).

Yapabandara AMGM, Sarmiento R, do Rosario de Fatima Mota M, don Bosco J, Martins N, Wickremasinghe AR (2015). Evidence-based malaria control in Timor Leste from 2006 to 2012. *Malaria Journal* 2014, 14:109

Yapabandara AMGM, do Rosario de Fatima Mota M, Sarmiento R, don Bosco J, Wickremasinghe R (2020). From malaria control to elimination within a decade: lessons learned from Timor Leste, a newly independent country. *Malar J* 19:104 <https://doi.org/10.1186/s12936-020-03162-3>

Documents reviewed

- Manual for Malaria Microscopy
- SOPs for Quality Assurance and quality control of Malaria Microscopy
- Bench aids for malaria microscopy
- Checklist for supervision of laboratory analysts
- National Malaria Treatment Protocol
- Guidelines for diagnosis, case notification, recording, reporting and sending blood smears for quality control of malaria patients by private sector
- Manual for Entomology Field and Laboratory Techniques
- Guidelines for Malaria Vector Control
- Guidelines on Indoor Residual Spraying for Malaria Control
- Keys to identify Anopheline mosquitoes in Timor Leste
- Guidelines for LLINs distribution
- Guidelines on Bioassay tests to evaluate bio-efficacy and persistence of insecticides on treated surfaces

- Guidelines for determination of the susceptibility of adult mosquitoes to insecticides
- Guidelines for determination of the susceptibility of mosquito larvae to larvicides
- Guidelines on the use of larvivorous fish
- SOP for Entomology trend and foci surveillance
- LLINs distribution plan 2016-2018
- IRS plan 2017-2021
- Monitoring and Evaluation Plan 2017-2020
- National Policy and Strategy on the Use of Pesticides in Public Health
- Manual of Judicious Use of Insecticides for Vector control
- Guidelines for Integrated Pest and Vector Management
- National Insecticide Resistance Management Plan 2017-2021
- HR and Capacity Development Plan, NMP 2018-2021
- Communication Strategy 2015-2020
- Guidelines for cross-border collaboration 2019-2020
- Flip chart for training of farmers on IPVM
- Guidelines on malaria preparedness and outbreak response
- Guidelines on malaria control and prevention for Community Health Volunteers