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# National Strategic Plan for Malaria Elimination

**2021-2025**

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2021-2025**

**Department of Public Health  
Ministry of Health and Sports  
Republic of the Union of Myanmar**

**December 2019**

## **Acknowledgements**

The 'National Strategic Plan for Malaria Elimination 2021-2025' (NSPME) was developed under the leadership of National Malaria Control Programme (NMCP) with technical support from WHO. The document is the final product of extensive National consultations with national staff working at various levels, Technical and Strategy Group (TSG) members, WHO, implementing partners, Ethnic Health Organizations and international experts. The document was finalized through a series of workshops and Malaria TSG meetings.

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The valuable comments and suggestions received from the members of Malaria TSG and all stakeholders have been extremely helpful for finalization of the NSPME and NMCP is thankful for all their contributions.

## **Foreword by H.E. Dr. Myint Htwe Union Minister for Health and Sports**

I am extremely delighted to come to know that 'National Malaria Strategic Plan for Malaria Elimination 2021-2025' has been developed and finalized under the leadership of National Malaria Control Programme (NMCP) with the technical support and coordination by WHO. The NSPME represents the important strategy to eliminate *Plasmodium falciparum* elimination by 2025 that will put Myanmar into the path of achieving malaria elimination by 2030. This is in line with the UN Sustainable Development Goal 3 (target 3.3), Myanmar Sustainable Development Framework 2018-2030 and National Health Plan 2017-2021.

A significant progress has been made in Myanmar in reducing malaria morbidity and mortality. The targets of malaria related MDG has been achieved in the year 2004 well before the target year of 2015. The goal of the National Strategic Plan 2017-2020 to reduce malaria morbidity and mortality by 85% by 2020 relative to 2015 figures has already been achieved. The incidence of reported malaria has dropped by 85% since 2012 (from 9.94 in 2012 to 1.46 per 1,000 population in 2018). Targets set so far in the National Strategic Plan (2016-2020) have been achieved. The target to achieve API by 2018 based on National Strategic Plan (2016-2020) was 2.04 whereas the achievement was 1.46 per 1,000 population. The 2016-2020 NSP target for malaria deaths was 20, while the reported death in 2018 was 19.

I like to thank NMCP under Department of Public Health to develop such a timely 'National Strategic Plan for Malaria Elimination 2021-2025'. Thanks to the members of the malaria technical and strategy group, partners and other stakeholder who contributed a lot in providing their valuable comments and inputs. I want to give special thanks to WHO for their technical assistance and coordination to develop this plan.

I hope the plan will act as a guide to support planning and implementation and be an advocacy tool to secure funding, both domestic and external. I also expect that all partners and stakeholders will use this plan for programme planning and implementation.

Lastly, I would like to extend my best wishes to the programme to implement the plan in the country and to achieve target of malaria elimination by 2030.

**Dr Myint Htwe**  
HE Union Minister for Health and Sports Ministry of  
Health and Sports

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## ii. Acronyms and abbreviations

ABER	annual blood examination rate
ACD	active case detection
ACT	artemisinin-based combination therapy
ADB	Asian Development Bank
AMTR	Artemisinin Monotherapy Replacement
ANC	antenatal care
API	annual parasite incidence
APLMA	Asia Pacific Leaders Malaria Alliance
ASEAN	Association of South East Asian Nations
BCC	behaviour-change communication
BCC-TWG	BCC technical working group
BHS	Basic Health Staff
CBO	Community Based Organizations
CHW	community health worker
DHIS2	<i>District Health Information System 2</i>
DMR	Department of Medical Research
EHO	Ethic Health Organization
eLMIS	electronic logistics management information system
EMG	Ethnic Minority Group
EWARS	Early Warning, Alert and Response System
FDA	Food and Drug Administration
G6PD	glucose-6-phosphate dehydrogenase
GDP	gross domestic product
GIS	geographic information systems
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
GMS	Greater Mekong Subregion
GTS	<i>WHO Global Technical Strategy for Malaria 2016–2030</i>
HR	human resources
ICMV	Integrated Community Malaria Volunteer
IDP	Internally displaced persons
IEC	information, education, communication
INGO	international non-governmental organization
IP	<i>implementing partner</i>
IPC	inter-personal communication
IRS	indoor residual spraying
ITN	insecticide-treated net
JICA	Japan International Cooperation Agency
LLIN	long-lasting insecticidal net
LSM	larval source management
M-HSCC	Myanmar Health Sector Coordinating Committee
M&E	monitoring and evaluation
MCBR	Malaria Case-Based Reporting
MCBS	Malaria Case-Based Surveillance
MMFO	Management of Malaria Field Operations

### iii. Strategy at a glance

#### Vision

A Malaria Free Myanmar by 2030

#### Mission

The National Malaria Control Programme (NMCP) of the Ministry of Health and Sports (MoHS) of the government of Myanmar aims to achieve malaria elimination by 2030 ensuring equitable and universal access to effective preventive, diagnostic and curative services to all 'at risk populations' including those living in hard to reach areas (forest goers, mobile populations and migrants), and through surveillance in collaboration with the efforts of communities, Defense Services and other ministries, national and international non-governmental organizations including Ethnic Health Organizations (EHO), private sectors, United Nations agencies and financial partners.

#### Goal

To eliminate the indigenous transmission of *Plasmodium falciparum* malaria by 2025 and put Myanmar on the path to eliminate all human malaria by 2030.

#### Objectives

1. Achieve zero indigenous *P. falciparum* malaria cases by 2025.
2. Reduce all species malaria morbidity by 95% relative to the 2018 baseline figure and reduce mortality associated with indigenous malaria to zero by 2025.
3. Prevent the re-establishment of indigenous transmission of *P. falciparum*/all species malaria in Townships where transmission has been interrupted.
4. Prevent the emergence/introduction and spread of artemisinin-based combination therapy (ACT) resistant *P. falciparum* malaria in Myanmar.

#### Key interventions and supporting elements

##### Key interventions

1. Early and effective malaria case management.
2. Universal coverage of high-risk populations with appropriate malaria prevention measures.
3. Case-based surveillance for elimination and prevention of re-establishment.

##### Supporting elements

1. Expanding research for innovation to accelerate malaria elimination and improve delivery of services.
2. Strengthening the enabling environment.

#### Principles

- Progress towards elimination will be accelerated through the targeted and effective deployment of proven interventions to at risk populations, and utilization of promising new interventions tailored to the needs of specific high-risk communities.
- Progress towards the development of a sustainable elimination effort will be accelerated and strengthened by building country ownership and leadership and mobilizing multisectoral partnership action with the participation of communities, the Defense Services and other ministries, implementing partners including EHOs, technical agencies, financial partners and the private sector.
- An adequate malaria case-based surveillance system will be in place nationally to support the identification of transmission foci and provide a system whereby sub-national and



eventually national elimination can be verified.

- Improved epidemiology-led entomological surveillance and investigation is required to support evidence-based vector control operations and accelerate elimination.
- In addition to the information system associated with case-based surveillance (case investigation, focus investigation, classification and response) information systems that facilitate logistics management and routine monitoring and evaluation at operational unit-level are required to optimize implementation of malaria interventions.
- Equity in access to services irrespective of gender, reach, ethnicity and affiliation is essential, especially for the most vulnerable and hard-to-reach populations.
- Innovation in tools and implementation approaches specific to risk groups and epidemiological situations will help to maximize progress.

## **Milestones**

### *By 2021*

- Incidence <1 per 1,000 population attained in all States/Regions.
- At least four States/Regions free from falciparum malaria transmission (Yangon, Bago, Nay Pyi Taw and Magway).

### *By 2022*

- Incidence <1 per 1,000 population attained in all Townships.
- At least an additional four States/Regions free of falciparum malaria transmission (Mon, Eastern Shan, Southern Shan and Mandalay).

### *By 2023*

- At least an additional three States/Regions free of falciparum malaria transmission (Northern Shan, Kayah, Ayeyarwaddy).

### *By 2024*

- At least an additional three States/Regions free of falciparum malaria transmission (Chin, Rakhine, Kachin, Tanintharyi).
- Malaria-free status maintained in Townships where malaria transmission has been interrupted.

### *By 2025*

- At least an additional two States/Regions free of falciparum malaria transmission (Sagaing, Kayin).
- Malaria morbidity reduced by 95% relative to 2018 baseline.
- Myanmar free of falciparum malaria.
- Zero indigenous malaria deaths.

### *By 2027*

- Malaria case-based reporting for prevention of re-establishment maintained in all receptive Townships and at State/Region level nationwide.
- Strategies to prevent the re-establishment of malaria transmission in place.

### *By 2029*

- Interruption of transmission of all human species of malaria.

### *By 2032*

- Myanmar certified free of malaria by the World Health Organization (WHO).

# 1. BACKGROUND

## 1.1. Introduction

In the past decade, Myanmar has made significant progress in reducing malaria morbidity and mortality. The number of reported malaria deaths has dropped steadily year by year from 1,707 in 2005 to just 19 in 2018 (a 99% reduction over 10 years) reflecting major improvements in access to early diagnosis and appropriate treatment. Prior to 2012 trends in reported incidence are difficult to interpret due to significant changes in case management approaches and service coverage. Due to funding support from the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund) and other financial partners, data from 2012 is relatively robust and demonstrates a stable reduction in caseload year by year. The incidence of reported malaria has dropped by 85% since 2012 (from 9.94 per 1,000 population in 2012 to 1.46 per 1,000 population in 2018). Targets set in the National Strategic Plan (NSP) (2016-2020) have been exceeded:

	Target	Achievement
<b>Annual Parasite Incidence (API)</b>	2.04	1.46
<b>Malaria deaths</b>	20	19

Despite these recent advances, malaria remains a leading cause of morbidity and a cause of mortality in Myanmar, and in 2018 the country's malaria burden still accounted for 47% of reported cases in the Greater Mekong Sub-region<sup>1</sup> (GMS). Compounding this issue and threatening recent progress is the potential for independent development of multi-drug resistant falciparum malaria within Myanmar and/or geographical spread of multi-drug resistant falciparum malaria from other parts of the GMS, there is thus an urgent need to eliminate malaria, particularly falciparum malaria, from Myanmar.

Recent evidence suggests that elimination of *P. falciparum* from the GMS is likely to be the only way to halt the spread of multi-drug resistance and prevent the emergence of untreatable malaria. The WHO Malaria Policy Advisory Group has recommended that the elimination of *P. falciparum* malaria in the GMS by 2030 is technically, operationally and financially feasible and at the 9<sup>th</sup> East Asia Summit in November 2014 all Asia Pacific leaders committed to a region free of Malaria by 2030. WHO South East Asia Regional Office (SEARO) countries signed a 'Ministerial Declaration on Accelerating and Sustaining Malaria Elimination in South-East Asia Region by 2030' in November 2017 and GMS countries signed a 'Call for Action to Eliminate Malaria in the Greater Mekong Sub-region before 2030' at the World Health Assembly in May 2018. With high-level political commitment now in place, Myanmar is well positioned to pursue an elimination agenda.

The *National Strategic Plan for Malaria Elimination (2021-2025)* (NSPME) aims to eliminate *P. falciparum* malaria progressively by States and Regions while ultimately eliminating *P. falciparum* malaria by 2025 and all species of human malaria by 2030. The timelines and geographic targets for elimination are presented in the milestones and in Figure 8.

This NSPME was developed by the NMCP in consultation with WHO and other technical and implementing partners. The development process included extensive country dialogue with stakeholders and experts. The document will serve as reference for all institutions working on malaria elimination in order to ensure that their efforts are aligned with those of the NMCP. The

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<sup>1</sup>The GMS includes Cambodia, Lao PDR, Myanmar, PR China (Yunnan Province), Thailand and Viet Nam

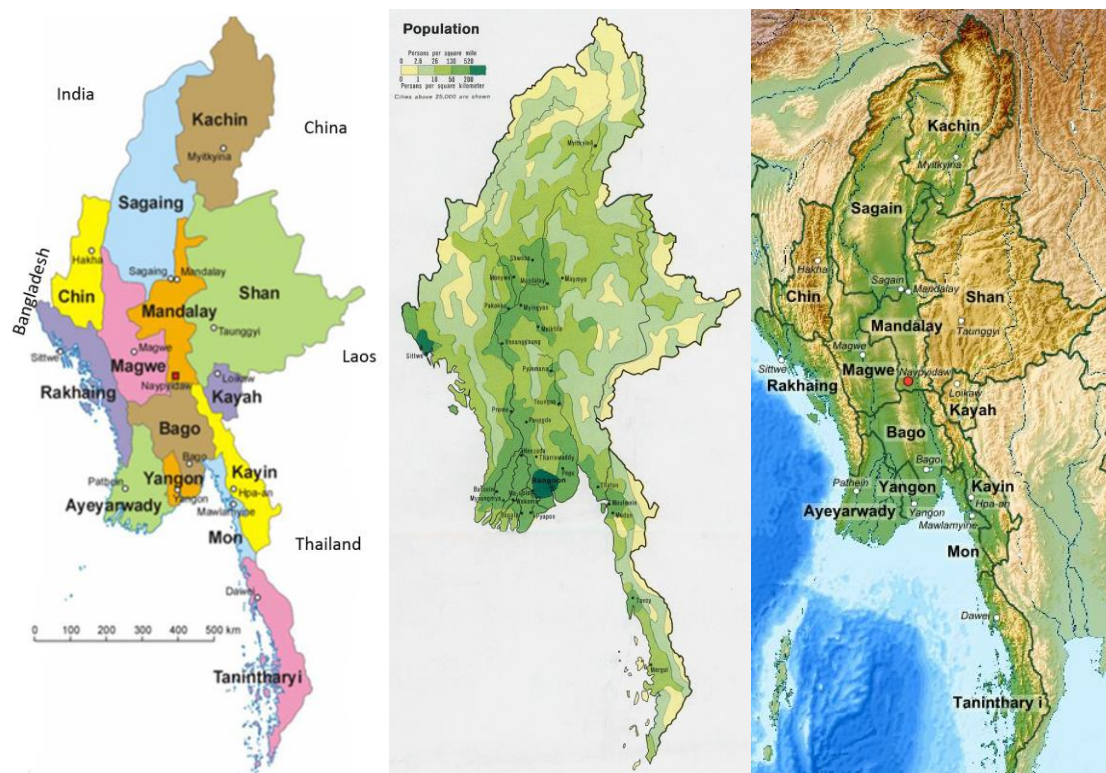
strategy is in-line with the *Strategy for Malaria Elimination in the Greater Mekong Sub-region (2015-2030)*, the *Global Technical Strategy for Malaria 2016-2030*, WHO's 2017 'A framework for Malaria Elimination' and takes into account lessons learned from successful implementation of malaria control/elimination efforts in Myanmar during the past decade.

To implement the strategies described in this document, the enabling environment for elimination must be strengthened. To achieve the objectives of this strategy, it will be necessary to continue to foster support from the highest level of government to ensure effective multi-sectoral engagement for malaria elimination and to secure necessary resources to support full strategy implementation.

## 1.2. Country profile

Myanmar, previously known as Burma, is the largest country in mainland South-East Asia with a total land area of 676,578 square kilometers. It stretches 2,200 kilometers from north to south and 925 kilometers from east to west at its widest point. It is bounded on the north and north-east by the People's Republic of China, on the east and south-east by the Lao People's Democratic Republic and the Kingdom of Thailand, on the west and south by the Bay of Bengal and Andaman Sea, on the west by the People's Republic of Bangladesh and the Republic of India (figure 1). Myanmar's capital city is Nay Pyi Taw and its largest commercial city is Yangon.

**Figure 1: Republic of the Union of Myanmar: administrative regions, population density and topography.**



The country is divided administratively into Nay Pyi Taw Territory and 14 States and Regions, and comprises 74 Districts, 330 Townships, 398 towns, 32 Sub-Townships, 3,065 Wards, 13,619 Village Tracts and 64,134 Villages. Below national level, the first level of administration is Region in the central parts of the country, and State in the periphery. The Townships and Villages are the core planning and implementation units for health interventions, including malaria.

Myanmar falls into three well marked natural divisions: the western hills, the central belt and the Shan plateau on the east, with a continuation of this high land in Tanintharyi to the south. Three

parallel chains of mountain ranges from north to south divide the country into three river systems: the Ayeyarwady, Sittaung and Thanlwin.

Myanmar has a tropical climate with three distinct seasons: rainy, cold and hot. The rainy season comes with the southwest monsoon, lasting from mid-May to mid-October, followed by the cold season from mid-October to mid-February. The hot season precedes the rainy season and lasts from mid-February to mid-May.

Myanmar has undergone a remarkable political transformation in the last 8 years, with its leadership voluntarily transitioning from an isolated military regime to a quasi-civilian government intent on re-engaging with the international community.

### 1.3. Malaria epidemiology

The epidemiology of malaria in Myanmar is highly complex. All four species of human plasmodia are present in the country and cases of *P. knowlesi*<sup>2</sup> have also been documented<sup>3</sup>. The vast majority of malaria cases are caused by *P. falciparum* and *P. vivax*. The epidemiology of the disease varies greatly from location to location and from one population group, or individual, or situation to another. In many cases the different situations and contexts require different malaria control strategies, adapted to suit specific risk groups and vector behaviours, and adjusted to take into consideration local infrastructure and health service coverage. Furthermore, the situation in any given area is prone to change rapidly as a result of factors such as developing drug resistance, changing ecologies, marked deforestation and large-scale population movements associated with seasonal labour, large-scale development projects, etc.

Intense malaria transmission is largely restricted to hilly, forested areas. The most efficient vectors, members of the *Anopheles dirus* species complex, cannot survive without dense shade and high humidity. Deforestation therefore generally leads to substantially reduced malaria transmission, although *An. dirus* can maintain transmission by breeding in wells. Reforestation projects and the establishment of palm oil and rubber plantations following deforestation can sometimes provide suitable habitats for vectors resulting in resurgence in malaria transmission. The next most efficient vector is *Anopheles minimus (sensu lato)*. It is more widespread than *An. dirus* and therefore probably also more important in terms of transmission. *An. minimus*, is primarily forest-based but can survive in less densely shaded forest, forest fringes and in the patchy bamboo thickets that commonly persist post-deforestation. Secondary vectors such as *Anopheles culicifacies*, *Anopheles philippinensis* and *Anopheles annularis* occur in areas of irrigated open farmland and in flooded rice fields and sporadic secondary transmission can take place in these areas as a result of imported cases. *Anopheles maculatus*, *An. sinensis*, *An. aconitus* and *An. jeyporiensis* have also been implicated as vectors of limited capacity. *An. sudaicus* can support significant transmission in coastal areas, particularly in areas where aquaculture projects have been abandoned resulting in accumulations of brackish water.

The behaviour of malaria vectors in Myanmar varies depending on climatic and other environmental factors. Both indoor and outdoor biting takes place, but primary vectors are characterised, at least seasonally, by their early evening outdoor biting habit. This is a key feature of the epidemiology of malaria throughout the GMS, which limits to some extent the effectiveness of key interventions for vector control and personal protection.

Altitude plays an important role in determining the level of endemicity in any given area because, as temperature decreases with increase in altitude, the development of parasites in the mosquito

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<sup>2</sup>*Plasmodium knowlesi*: a zoonosis associated with macaques but sometimes transmitted to humans in deep forest areas.

<sup>3</sup>Jiang N, Chang Q, Sun X, Lu H, Yin J, Zhang Z, et al. Co-infections with *Plasmodium knowlesi* and other malaria parasites, Myanmar. Emerg Infect Dis [serial on the Internet]. 2010 Sep [date cited]. <http://dx.doi.org/10.3201/eid1609.100339>

stage of the malaria lifecycle slows and vectorial capacity falls. Transmission can occur at higher altitudes (as in the 2010 outbreak in Chin State 4,000 feet in above sea level), but it does become increasingly seasonal.

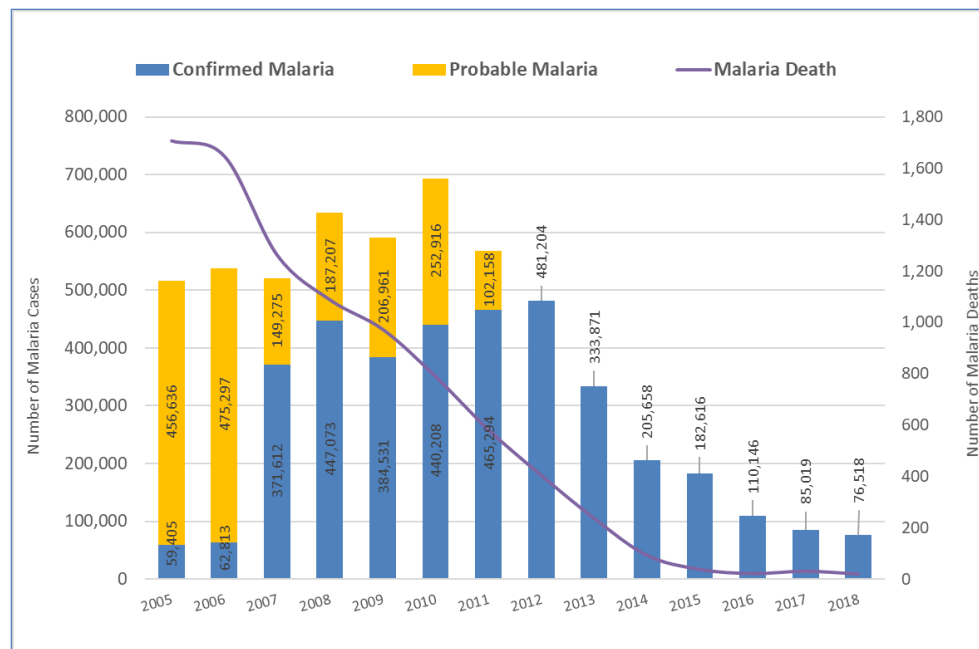
There is no evidence of insecticide resistance among the primary malaria vectors in Myanmar at present, however monitoring has been limited.

#### 1.4. Malaria burden

The NMCP figures presented below are based on data from public sector health services including from community level provided by Integrated Community Malaria Volunteer (ICMV) (both NMCP and partners). Some vulnerable groups living in endemic communities are not currently served by public sector community-based case management services. NMCP figures include limited data from the private sector at present, and the private sector plays a very significant role in malaria case management in Myanmar. Although initiatives managed by NMCP partners are now promoting parasitological diagnosis in the private sector, coverage is currently limited but growing. The reported malaria statistics therefore underestimate the true burden of disease. Nevertheless, they do give the most robust measure available of progress towards malaria control/elimination goals over time.

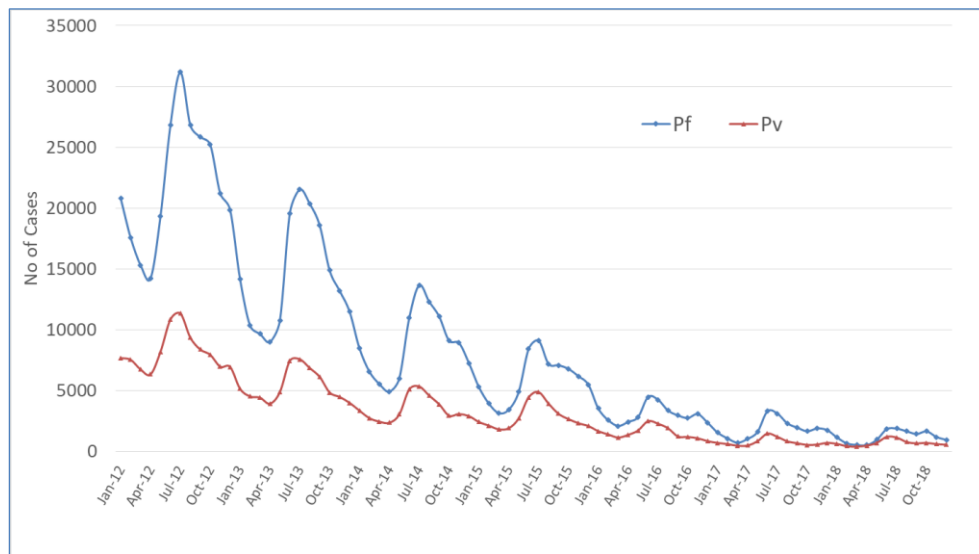
There has been a steady reduction in malaria burden in Myanmar since 2010 (figure 2). The reported caseload fell from approximately 700,000 probable and confirmed cases in 2010 during the later stages of roll-out of rapid diagnostic test (RDT)-based diagnosis to 76,518 confirmed cases in 2018.

**Figure 2. Trend of annual malaria cases (confirmed and probable cases up to 2011) and deaths in Myanmar 2005-2018 (Source: NMCP, 2018).**



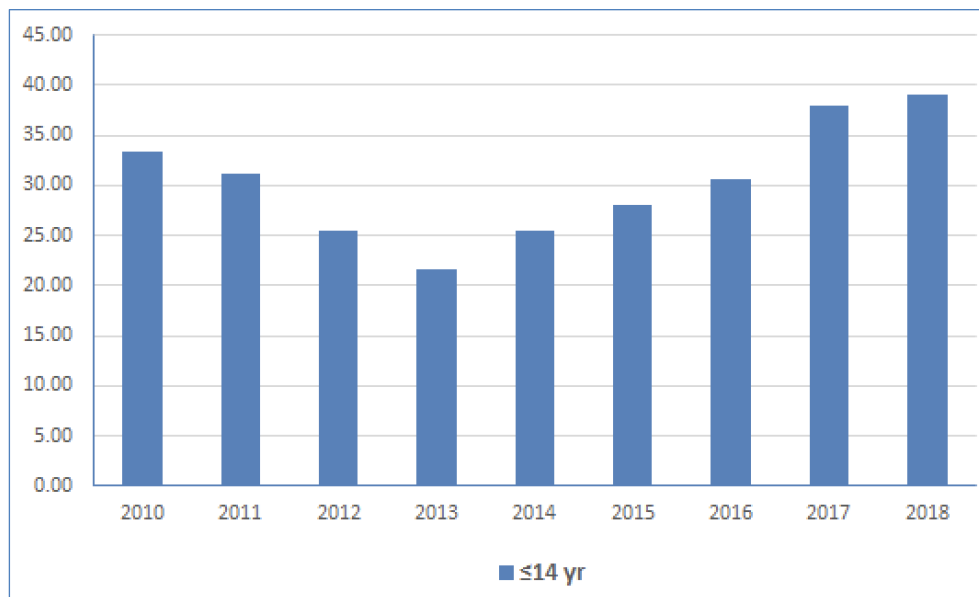
Malaria deaths have decreased very dramatically over the last decade or so, falling from 1,261 in 2007 to 19 in 2018 (a reduction of over 98%) reflecting major improvements in access to early diagnosis and appropriate treatment (these cases and deaths do not include those who crossed the border and sought treatment in Thailand). The proportion of cases caused by *P. falciparum* has fallen from 71% in 2010 to 52% in 2018. The rate of decline in malaria burden has however reduced progressively during the last 3 years (year on year reductions of 40%, 23% and 10% in 2016, 2017 and 2018 respectively).

**Figure 3. Monthly *P. falciparum* and *P. vivax* case reports in Myanmar, 2012-2018 (Source: NMCP, 2018).**



Interestingly, after a steady fall, the proportion of cases occurring in children under the age of 15 appears to have been rising steadily for the last five years (figure 4). This picture is unique to Myanmar in the GMS where elsewhere the proportion of cases occurring in children under the age of 15 has fallen steadily to reach very low levels. The picture in Myanmar may reflect the gradual roll-out of community-based services to highly endemic communities in the forest or on the forest fringes.

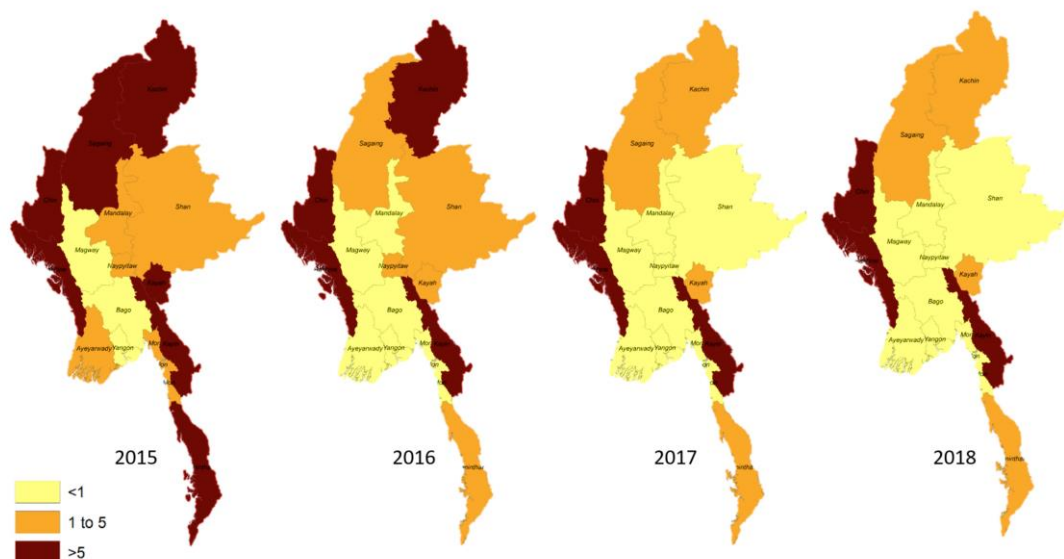
**Figure 4. Changes in proportion of malaria cases by age-group from 2010 to 2018 (Source: NMCP, 2018).**



Malaria is becoming an increasingly focal disease (figure 5). In 2018, twelve Townships in five states/regions accounted for 64% of Myanmar’s malaria burden.

**Figure 5. Changes in API by state/region from 2015 to 2018 (Source: NMCP, 2018).**





Although very significant progress has been made in Myanmar in recent years, the national malaria elimination effort is now facing ‘the law of diminishing returns’ (as clearly shown in the figures 2-4 above) and, as elsewhere in the region, the risk of spread of artemisinin resistance and difficulties addressing forest-based transmission remain serious challenges to the achievement of national elimination goals.

### 1.5. Drug resistance

The presence of artemisinin resistance in Myanmar was confirmed in 2008, primarily along the border between Myanmar and Thailand. Since 2009, available data have consistently shown prolonged parasite clearance times in a significant proportion of patients treated with the three different artemisinin-based combination therapies (ACTs): artemether-lumefantrine, artesunate-mefloquine and dihydroartemisinin-piperaquine. Likewise, many different *PfKelch* (K13) point mutations have been detected in different parts of Myanmar. Importantly, however, unlike in several other GMS countries, all three ACTs used in Myanmar so far remain efficacious with high cure rates.<sup>4, 5, 6</sup> Myanmar has for several years worked proactively to prevent the emergence/spread of ACT resistance, and this effort remains critical and will need continued support and resources in the years to come (see section 3.1.13).

### 1.6. Populations at risk

The wide variety of population groups at risk of malaria in Myanmar is summarized in Box 1 and described in more detail below. The level of malaria risk for each of these groups is dependent on a number of location-dependent factors including degree of endemicity, accessibility to and strength of health system services, and behaviours that increase risk of exposure. Poverty is another key issue that can limit access to malaria related services and hence increase risk.

<sup>4</sup> Artemisinin resistance and artemisinin-based combination therapy efficacy. Status Report, August 2018. Global Malaria Programme, World Health Organization, Geneva.

<sup>5</sup> Malaria threats map – Parasite drug resistance. World Health Organization, Geneva (<http://apps.who.int/malaria/maps/threats/>).

<sup>6</sup> Therapeutic efficacy and artemisinin resistance in northern Myanmar: Evidence from in vivo and molecular marker studies. MK Myint et al. *Malaria Journal*, 2017; 16: 143.

### **Box 1. Population groups at risk of malaria in endemic areas of Myanmar.**

#### *Static populations*

- Established villages (ethnic minority groups [EMGs] and ethnic majority)
- New settlements
- Camps associated with large scale construction projects (dams, bridges, mines, etc.)
- Settlements associated with plantations (rubber, oil palm, food)
- Prisons.

#### *Mobile and migrant populations*

- Traditional slash-and-burn and paddy field farming communities visiting their forest farms (commonly EMGs)
- Seasonal agricultural labourers
- Defence services
- Non-State combatants
- Internally displaced persons (IDP).
- Forest workers in the formal sector (police, border guards, forest/wildlife protection services)
- Forest workers in the informal sector (hunters, small-scale gem/gold miners, people gathering forest products [precious timber, construction timber, rattan/bamboo])
- Transient or mobile camps associated with commercial projects (road/pipeline construction, large-scale logging, deep seaport projects)
- Formal and informal cross-border migrant workers (Legal and illegal workforces).

#### **1.6.1. Static populations**

*Traditional farming communities* (see also mobile populations below). Traditional farming communities belong to many different ethnic groups. Most have their own distinct language and often only a small proportion of group members (predominantly men) speak the national language, making communication of health messages extremely problematic. Poverty in these communities is often extreme. Minority groups tend to be concentrated in remote areas (commonly along borders) where access to healthcare services (both public and private sector) is relatively limited. All age groups tend to be exposed seasonally to long periods of transmission, which can be intense. Adults are usually partially immune but children and pregnant women are extremely vulnerable.

*Forest fringe communities.* Many ethnic majority populations live in rice growing communities close to the forest. Villagers, predominantly young men, make frequent overnight visits to the forest to hunt and to collect construction wood and other natural products. These visits increase exposure to malaria vectors and increase risk of malaria infection. People returning to the village carrying malaria parasites can infect anopheles mosquitoes breeding in and around the rice fields and although these species are less efficient vectors than the ones found in the forest, limited local transmission can occur. All age groups are therefore at risk but the majority of cases are found in adult males.

*Inhabitants of new forest or forest fringe settlements.* Families who, for economic or political reasons, relocate to forested areas to establish farms are initially at high risk of contracting malaria. These groups are amongst the poorest and most marginalized in the country. Their immunity to malaria is usually low. Malaria transmission in these settings typically diminishes year by year with continued development and deforestation of settled areas.

*Workers in development projects.* Private companies involved in large-scale construction programmes (dams, bridges), plantation development (rubber, palm oil, fruit, nut, coffee etc.) and other commercial projects (road construction, large-scale logging etc.) may employ large numbers of staff and house them (or expect them to house themselves), often together with their families, in highly endemic areas where no



or limited public sector health care services exist. Some of these companies do provide good quality health care for their employees and dependents, but many do not.

*Rubber plantation workers.* Rubber plantations such as those common in Tanintharyi can provide suitable habitats for Myanmar's primary malaria vectors. Rubber tappers work at night and very early in the morning when it is cool (in order to maximize latex yield). This greatly increases their potential for contact with vector mosquitoes. Typically, latex is collected for ten months of the year from late April to February when the trees are in full leaf. The workforce is therefore permanent and in large plantations can be sizeable. Typically, whole families are involved and are housed in company owned settlements in or close to the trees. The men tend to start work first leaving women to tend to their children before joining them in the plantation soon after dawn. All age groups are therefore at risk of malaria, but exposure is highest amongst adult males.

As a result of falling global rubber prices many tappers have been forced to seek supplementary or alternative work and many have become involved in collecting forest products, another high-risk activity.

*Communities near current or former prawn farms.* In the late 1990s and early 2000s, prawn farming expanded in Myanmar, particularly in Rakhine State. However, the technology used was outdated and within a few years yields started to decline. Damage caused by recurrent cyclones and the high cost of dyke maintenance meant that by 2011-2012 in some Townships more than 50% of prawn ponds had been abandoned. These abandoned farms provide ideal breeding sites for *An. sundaicus* (a secondary vector of malaria in Myanmar), placing people living nearby at increased risk of infection.

### **1.6.2. Mobile populations**

*Traditional farming communities.* Many ethnic minority groups have large communal villages that are left all but empty for much of the year as families spend months away tending their crops in small farms scattered through the nearby forest. In addition, individuals (usually young men) may spend short periods away from their homes or forest farms, hunting or collecting forest products. Access to healthcare is often made even more difficult as a result.

*Forest goers and seasonal workers.* People involved in forest-based activities in both the formal and informal sectors are at high risk of contracting malaria. Key risk groups include defence services, forest and wildlife protection services, workers involved in timber extraction (including illegal loggers and sandal wood collectors and groups digging out timber stumps for the production of carved ornaments), workers involved in infrastructure development projects (such as building roads and dams), workers involved in agricultural development projects (establishing rubber, cashew and coffee plantations), gem and gold miners (e.g. in Mandalay), and increasingly tourists.

Seasonal workers harvesting fruit from orchards and rice close to the forest are also at high risk. While the forest goers described above are mostly men, the seasonal workers include many women. In each case, workers may come from villages near the forest but many also come from other regions when seasonal demand for labour in those areas is low. Often, these groups have little or no immunity to malaria.

*Defence services.* The defence services form a sizable and particularly mobile high-risk group. They are often deployed in hard to reach areas, based in camps located in the forest or forest fringes. While on night patrol duties they are at particularly high risk of contracting malaria. The fact that they are often redeployed long distances to new malaria endemic areas means that they have the potential to introduce parasite strains that are new to these areas. This is a particular concern given the possibility of multi-ACT resistant *P. falciparum* being introduced to Myanmar from elsewhere in the region by returning migrants. Reaching these mobile populations with appropriate prevention and case management services is crucial to the success of malaria control and elimination efforts in Myanmar.

*Internally displaced populations (IDP).* Due to ongoing clashes between the defence services and non-State combatants in Kachin, Rakhine and Northern Shan States, IDPs remain a significant challenge in Myanmar. These populations generally have less access to the services and hence are less well protected from malaria than other populations in the same areas. Malaria prevention and management services including long-lasting insecticidal nets (LLIN) and occasionally Indoor Residual Spraying (IRS) are provided by implementing partners to non-combatants in Kachin State according to NMCP guidance. However, non-State combatants, who constitute one of the main risk-groups in these areas, are not supported in any way.

*Cross-border workers.* These are a diverse mobile population who cross the border for work, both legal and illegal. Some are long term or permanent migrants, while others cross the border often or even daily. According to the International Organization for Migration there were an estimated 3 million Myanmar nationals based in Thailand in 2016. While many of these spend their time abroad in urban or other non-endemic areas, others, particularly seasonal agricultural workers (see above), are based in areas where transmission does occur. There is a possibility that cross-border workers returning from parts of the GMS could introduce multi-ACT resistant *P. falciparum* to receptive areas of Myanmar.

*Migrants.* Migrants may be found in most of the situations described above, working for large private companies, living in unauthorized housing developments, working as seasonal agricultural labourers or as informal forest workers. Migrants, both national and international, are a particular concern in that they could potentially contribute to the spread of artemisinin resistant malaria parasites.

Providing a comprehensive package of services to these high-risk mobile population groups is an important focus of the strategy described below.

All of the populations at risk described above, except those in permanent settlements close to a community health centre, can be considered to have disproportionately low access to treatment services and all of the mobile and migrant populations described above can also be considered to have disproportionately low access to prevention services. Key factors contributing to this inequality include: language (often only a small proportion of people from ethnic minority groups speak the national language making communication of health messages problematic); remoteness (malaria transmission tends to be most intense in remote areas, commonly along borders, where access to both public and private sector healthcare services is relatively limited); poverty (the populations living in or passing through these remote areas are generally some of the poorest in the country); marginalization (ethnic minority groups and migrants are amongst the most marginalized groups in the country); and mobility (the high mobility of some individuals means that they may have moved to non-endemic areas, where health workers are less likely to be familiar with malaria, when symptoms first appear).

Providing malaria related services to high-risk static populations is relatively straightforward, at least theoretically. The location of settlements, plantations, construction sites and development projects can be mapped, populations can be quantified and plans for delivering interventions can be formulated. Furthermore, post-delivery checks can be made to validate coverage. However, in reality so far it has only generally been the 'established villages' that have been well served by routine prevention operations. Providing a comprehensive package of services to the remaining static population groups is one important focus of the strategy described below.

The challenges to service delivery among mobile populations are more complex. Mapping is often not possible, there may not be any actual houses or other structures in which to suspend an LLIN, the population size may vary from day to day making quantification of needs difficult, and in the case of illegal migrants and individuals involved in illegal activities, fear of punishment often prevents any contact with official groups or groups that are perceived to be official. Added to this, many people in these groups are driven primarily by the need to make money and so getting accurate information for health action from them is a sensitive and complex multi-sector task.

While forest goers in the formal sector, such as police, border guards and forest/wildlife protection services, may receive some level of protection in the form of insecticide-treated nets (ITN) and access to standby treatment, informal forest workers are commonly completely unprotected.

When ill, most of the seasonal workers described above who attend health facilities, attend health facilities close to the forest where they work, but some also seek treatment when they return to their homes in non-endemic areas where malaria may not immediately be suspected. In this way these individuals also effectively have disproportionately low access to treatment services. Malaria related mortality in this group can be relatively high as a result.

Providing a comprehensive package of services to these high-risk mobile population groups is an important focus of the strategy described below.

Malaria in Myanmar is closely associated with poverty. Marginalized mobile and migrant populations and ethnic minority groups working or living in the forest and on the forest fringes often carry the greatest

burden of poverty and disease. Well-targeted malaria control efforts by their nature therefore cater to the needs of some of the least privileged.

### **1.7. Gender equality and women's empowerment**

Myanmar continues to face significant humanitarian challenges related to crisis in Rakhine State, armed conflicts in Kachin and northern Shan States. Ensuring effective humanitarian support in these areas remains a priority for the NMCP and its partners. PMI/Global Fund supported RDTs, antimalarials and LLINs are given to EHOs in Rakhine, Kachin and northern Shan States. Health cluster coordination meetings are held regularly by WHO at Sittwe, Myitkyina, Yangon and Naypyidaw with the active participation of MoHS and partner organizations.

In the 2014 gender inequality index, Myanmar ranked as 148th of 187 countries<sup>7</sup>. The Myanmar government is a signatory to the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW), the Beijing Platform for Action, the International Conference on Population and Development and the Millennium Declaration.

Nevertheless, there are gender inequalities in legislation, access to economic opportunities and political representation in Myanmar. In addition, the knowledge and involvement of men in family planning, safe motherhood and HIV prevention is limited. A shortage of gender statistics and research, a lack of awareness, and limited institutional capacity hinder the development and implementation of effective policies and programmes for the empowerment of women.

The National Strategic Plan for the Advancement of Women 2013-2022 outlines an integrated approach to improving the situation of women and girls in Myanmar. The plan provides an overarching framework, and details interventions and targets. The plan aims to create enabling systems, structures and practices for the advancement of women, gender equality, and the realization of women's rights.

The Gender Equality Network (GEN) currently operating in Myanmar is an active inter-agency network, comprising approximately 60 national and international non-governmental organizations (NGO), United Nations agencies, civil society networks and technical resource persons as approved by the membership. The GEN works collaboratively with key stakeholders to promote gender equality and women's rights throughout Myanmar. It contributes to the development of laws, policies, systems, structures and practices to achieve women's rights and participation at every level.

Gender norms and values that influence the division of labour, work, leisure patterns and sleeping arrangements may lead to different patterns of exposure to mosquitoes for men and women<sup>8</sup>. There are also gender dimensions in the accessing of treatment and care for malaria, and in the use of preventative measures such as bednets. A thorough understanding of the gender-related dynamics of treatment-seeking behaviour, as well as of decision-making, resource allocation and financial authority within households is important in order to maximize the effectiveness of malaria control and elimination efforts. Research on these gender related issues will be conducted in a broadly representative selection of epidemiological settings in Myanmar in order to fine-tune operations and maximize their effectiveness.

A community-based household survey was carried out in 2017 in Myanmar<sup>9</sup> using a quantitative and qualitative cross-sectional study designed to identify and quantify gender-related issues relating to malaria risk, level of knowledge, attitudes towards and practices relating to malaria prevention, and treatment (and diagnosis) seeking in the community. It was found that more men were working in the forest (26.1% vs. 18.5%,  $P < 0.001$ ) or farm (50.2% vs. 45.0%,  $P$  value 0.01) than women. Men and women were aware of malaria (92.7% vs. 91.6%) and mosquito bite as a cause of malaria (81.0% vs. 79.1%). The history of travel into the forest and sleeping in the forest overnight in the past 3 months was significantly higher among men than women (19.8% vs. 12.7%,

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<sup>7</sup> Human Development Index 2017 - <http://hdr.undp.org/en/countries/profiles/MMR#>.

<sup>8</sup> [https://www.who.int/gender/documents/gender\\_health\\_malaria.pdf](https://www.who.int/gender/documents/gender_health_malaria.pdf)

<sup>9</sup> Cross sectional survey on Gender and Malaria in Y, 2017

P<0.001). Males are more vulnerable to malaria infection for travelling or going into the forest, not sleeping under LLIN for non-ownership or insufficient LLIN ownership, and potential for delay in seeking treatment and less involvement in health education sessions at the village level although their level of knowledge about malaria was similar to females.

### 1.8. Malaria stratification

Malaria is a focal and sometimes sporadic disease and it is thus essential in malaria control/elimination to identify the areas and populations at high risk, which must be prioritized for targeted interventions and mobilization of limited resources. While the current stratification is based on API at township level, initiatives are underway to adopt village level stratification based on number of cases rather than API.

**Table 1: Population breakdown by stratum as of 2018 stratification of malaria risk.**

Stratum	Risk	Criteria	Population
<b>3a</b>	High	API >5	3.2M (5.9%)
<b>3b</b>	Moderate	API 1-5	3.2M (5.9%)
<b>3c</b>	Low	API <1	3.0M (5.5%)
<b>2</b>	Potential	API=0; possibility of vectors, receptive & vulnerable	13.4M (24.9%)
<b>1</b>	Malaria free	API=0; No transmission	31.2M (57.9%)
<b>Total</b>			<b>53.9M (100%)</b>

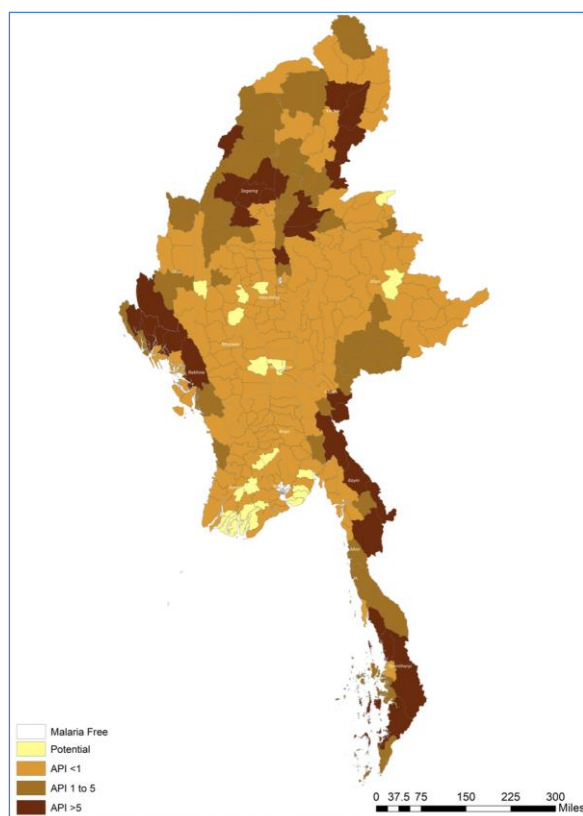
In areas with highly mobile populations, even moderate or high API in a village does not necessarily imply that local transmission is occurring directly in that village, and improved surveillance methods that distinguish between locally transmitted and imported malaria are needed to guide the choice of interventions. Until these new surveillance methods are available, measuring API in the human population is considered to offer a more reliable indicator of local transmission than ecological risk factors or risk factors that pertain only to the mosquito vector.

The stratification approach is now scheduled to be reviewed in light of the rapid reduction in malaria burden in elimination Townships. In future stratification will increasingly be based on 'malariogenic potential' - the risk of re-establishment as defined by receptivity and likelihood of importation.<sup>10</sup>

The stratification will continue to be updated by the NMCP and its technical partners annually immediately prior to the annual review meeting and activities will be targeted/retargeted accordingly. Continued flexibility on the part of funding partners will be required to accommodate this retargeting.

**Figure 6. Township level malaria risk stratification map for Myanmar (2018).**

<sup>10</sup>World Health Organization, 'A Framework for Malaria Elimination,' (Geneva2017).



### 1.9. Health systems and community systems context

While recent decades of underinvestment have weakened Myanmar’s public health system, significant improvements have been made during the last 5 years. Government Total Health Expenditure (THE) is increasing year by year and rose steadily from 86 billion kyats (US\$70M) in 2010-11 to 753 billion kyats (US\$610M) in 2015-2016 (fiscal years) – almost a nine-fold increase over four years. Government support allocated for the NMCP in 2018 was about US\$7 million<sup>11</sup> (which primarily covered public sector human resources (HR) costs, infrastructure and facilities for malaria). Government health services provide key medicines and diagnostics (including ACTs and RDTs) and some simple routine investigations (including RDTs) free of charge down to the village level.

Despite recent improvements most outpatient care is still obtained from private sector providers. Although out of pocket expenditure (OPE) for health care fell from 80% in 2011 to 73.7%<sup>12</sup> in 2015, Myanmar still has the seventh highest OPE in the world resulting in high levels of catastrophic financial payments and subsequent impoverishment. Health outcomes are improving but remain poor. In 2017 the under-5 mortality rate was 49 per 1,000 and life expectancy at birth was 66.6 (2015).

The public healthcare system in Myanmar is highly structured, following the Central-State/Region-District-Township government hierarchy and based on the principles of primary health care, with medical officers overseeing all health-related activities in their designated areas. There is also an active national network of auxiliary midwives, community health workers (Basic Health Staff), and community volunteers, operating in collaboration with village health committees, providing prevention and outpatient care. Healthcare services at the local level are, however, under-resourced, and although some areas are supported by international NGOs (iNGO), most lack the resources to provide effective care.

<sup>11</sup> World Malaria Report 2018

<sup>12</sup> Strategic Directions for Financing Universal Health Coverage in Myanmar, 2019

Strategies are in place to make limited and inadequate resources stretch as far as possible. However, the need to review the extent to which the population at high risk, especially ethnic minorities and the hardest to reach, have access to the health care delivery system is important for further improvements in health outcomes.

Recent aid-based interventions have primarily been vertical programmes running independently of the public health system. However, funding for aid interventions has increased very significantly in the last few years, a number of new funding partners have engaged with the country and key implementing partners are taking an increasingly holistic approach to healthcare support.

### **1.10. Social security**

A social security scheme is being implemented by the Ministry of Labour, which requires enterprises (whether state owned, private or foreign) with over 5 employees to provide employee insurance. The contribution is tri-partite with 2.5% being provided by the employer, 1.5% by the employee and a government contribution in the form of capital investment (workers' hospitals, dispensaries, mobile medical units and branch offices have been established nation-wide). Insured workers under the scheme are provided free medical treatment plus various benefits in-line with international best practice. There are plans to develop stronger social support including an 'Essential Health Care Package' and universal health insurance coverage with protection from catastrophic healthcare costs but detailed discussions have not yet taken place.

### **1.11. Peripheral Health System**

A brief description of Myanmar's overall health system is provided in Annex 2. This section focuses on the peripheral health system, which is more directly related to the implementation of malaria control and elimination efforts.

The Township Public Health Department is headed by the Township Public Health Officer (TPHO), who functions at the Assistant Director level. Under the TPHO there are two medical officers (one for Disease Control and one for Public Health) and one Administrative officer. Generally, each TPHO is responsible for four to five Rural Health Centers (RHCs) and a station hospital (each managed by a health assistant with a lady health visitor and at least one midwife) and four to five sub-RHCs (each managed by a midwife with a public health supervisor - level II). Microscopy services are available at Township hospitals, some station hospitals and some NGO run clinics. Microscopists are multi-skilled rather than malaria specific.

The Myanmar health system currently faces many challenges. These relate to the availability and distribution of inputs (e.g. HR, physical infrastructure, supply chain, financial resources) and to weaknesses in key functions such as supportive supervision, referral, health management information system and public financial management. Sub-optimal oversight and issues relating to leadership and accountability further exacerbate these challenges. This situation undermines the effectiveness of malaria interventions in many parts of Myanmar.

### **1.12. Human resources for health**

There has been a steady growth in the number of basic health facilities and HR for health in recent years. The hospitals in States/Regions and Districts are reasonably well staffed. The number of midwives has almost doubled over a 20-year period and midwives are the key providers of basic health services in rural areas.

An HR development plan was developed in 2018 but has not been actioned yet as it has not been possible to recruit staff. Budget for staff is available but NMCP cannot attract candidates as public sector salaries are much lower than those available in the United Nations, iNGO/NGO and private sectors. The NMCP is planning to conduct a new HR review to properly assess real needs based on forthcoming challenges. The NMCP will then develop an approach to attract, incentivise and retain key skilled staff to fill vacant positions across the board.

In some cases, people are in posts, but they lack motivation and the right environment to function effectively in a situation where the focus is shifting from control to elimination. At central, State/Region and Township level key functions need to be reinforced. The key to moving forward is to empower State/Region level VBDC teams , TMOs and Township Health Assistants to proactively engage in inclusive Township health planning.

Of the 31,542 doctors in 2013-14, 18,443 (58%) worked as private practitioners and the rest in the public sector. Many doctors and other staff in the public health service are engaged in private practice after official working hours to supplement their income.

ICMVs are a recent innovation in Myanmar and now form the foundation of malaria control activities at village level. The plan now is to transition these ICMVs into fully qualified Community Health Workers (CHW). MoHS is now in the process of developing a CHW policy framework.

At present, volunteers are provided with two-day modular training on malaria diagnosis, treatment, prevention and surveillance. They provide malaria diagnosis and treatment at community level using RDTs and ACT. Some are also engaged in preventive work such as LLIN distribution and health education depending on the organization (government, NGOs, iNGOs) that supports and supervises them. Of the 76,518 malaria cases diagnosed in 2018, 59,832 (78%) were diagnosed and treated by ICMVs. The quality of supervision provided for ICMV varies considerably from one agency to another and this is likely reflected in the quality of both the care provided and the data submitted. The completeness of the malaria register is improving but remains sub-optimal (the proportion of reporting units reporting was 87% in 2018). Efforts are now underway to increase testing among this cadre, standardize data capture, improve timely reporting and strengthen training, supervision, and supply chain, to ensure that ICMVs are effectively deployed at village-level. There are still approximately 2,000 endemic villages with high-risk populations in hard to reach areas of the country that do not readily have access to health services. To extend access these 'unreached' areas there is a need to expand the network of ICMVs/CHWs.

### **1.13. Procurement and supply management**

The NMCP procurement and supply management system is vertical in nature and largely relies upon funding and implementing partners to help it meet the needs of the program. Although access to quality diagnosis and treatment has significantly improved (through partner's support, improvement in supply chain management and engagement of volunteers in hard to reach areas), a Health Facility Survey conducted by NMCP in 2018 revealed that only 67% (153/230) of health facilities reported having no stock-out at any time in the past three months, and a large proportion of health facilities had no measures in place to avoid stock-outs. These findings raised concerns about the quality and coverage of the national supply chain system, which the NMCP will address through this new NSPME 2021-25.

The program is currently accessing quality, safe and effective pharmaceuticals, supplies and other program commodities through the procurement mechanisms of its various partners (UNOPS, the Global Fund and GHSC-PSM), but in future more emphasis will be placed on analyzing and strengthening the public sector procurement and supply system including planning, coordination and acquisition.

A recent malaria-specific assessment of storage capacity and inventory management practices at central and regional warehouses highlighted the need to improve infrastructure, increase the availability and capacity of staff, strengthen information management and use, and enhance commodity management and quality assurance. More than 30% of storage facilities at regional level were designated 'not fit for purpose' while others required optimization. The reporting rate from central and regional warehouses into the electronic logistics management information system (eLMIS) was also disappointing, at around 70% (eLMIS does not yet cover lower levels).

There are no dedicated supply chain staff at different levels of the malaria supply chain system, and the roles and responsibilities of staff who are involved are not well defined.

Efforts to strengthen national capacity for procurement and supply management and promote rational use of pharmaceuticals generally will significantly contribute to the management of anti-microbial resistance.

#### **1.14. The roles of implementing partners**

The NMCP is expanding malaria services in-line with the *Right to Health* initiative irrespective of geography through the support of public, private and community systems. Malaria services have been provided to the risk population in hard to reach and conflict areas with the support of over 30 implementing partners (EHOs, INGOs/NGOs and Community Based Organizations (CBO)). Partners' roles are to support WHO's 'T3' initiative (test-treat-track) and malaria prevention services. In elimination areas, partners are supporting malaria services including malaria elimination-specific case-based surveillance. Partner coordination has been strengthened in recent years. As part of this enhanced coordination an ICMV coverage map has been produced and this has effectively removed overlaps and identified gaps in coverage.

The partnership mechanisms are being supported by the various funding partners and bilateral agencies including the Global Fund, United States Agency for International Development, Access to Health Fund, the Bill and Melinda Gates Foundation and Japan International Cooperation Agency (JICA).

#### **1.15. Health system oversight in relation to malaria**

The National Health Committee (NHC) is a high level inter-ministerial body responsible for health. It takes a leadership role and gives guidance in implementing health programmes systematically and efficiently with emphasis on sectoral collaboration and community participation.

The 'Myanmar Health Sector Coordinating Committee' (M-HSCC) (an expansion of the Global Fund specific 'Myanmar-Country Coordinating Mechanism') was established in 2013 and takes a leading role in coordination of both governmental and non-governmental sectors. In 2019, an Executive Working Group for Communicable Diseases was formed to provide oversight of Global Fund specific activities. The M-HSCC has a Technical and Strategy Group (TSG) for malaria, which is led by the Department of Disease Control, with WHO serving as technical secretariat. The mandate of the TSG-Malaria is to provide technical guidance in the development of national strategies, to provide coordination among partners, and to provide clarity on major technical and policy issues. The TSG meets periodically to discuss, review and endorse certain proposals, reports and other documents and carry out the assignments given to them. It also provides broad oversight of the implementation of grants and projects as required. The TSG-Malaria appoints a working group (the Core Group for TSG-Malaria) to deal with specific tasks as necessary.

The NMCP is a part of the VBDC Programme, but the majority of staff and resources of the VBDC throughout the country, with the exception of bigger cities, are focused on malaria. The organogram of VBDC is annexed (figure 3, annex 2). In order to implement key activities the NMCP works particularly closely with the following government departments:

- The Department of Medical Services (which is responsible for medical supplies and management of hospital services) to collect hospital data on malaria morbidity and mortality.
- The National Health Laboratory (NHL) to support NMCP validators and strengthen the quality assurance system for hospital and facility based malaria microscopy.
- The Food and Drug Administration (FDA) for registration of antimalarials, quality control of antimalarials, control of counterfeit, sub-standard and unregistered antimalarials and implementing the ban on oral artemisinin monotherapy (in collaboration with the INGO, Population Services International (PSI)).

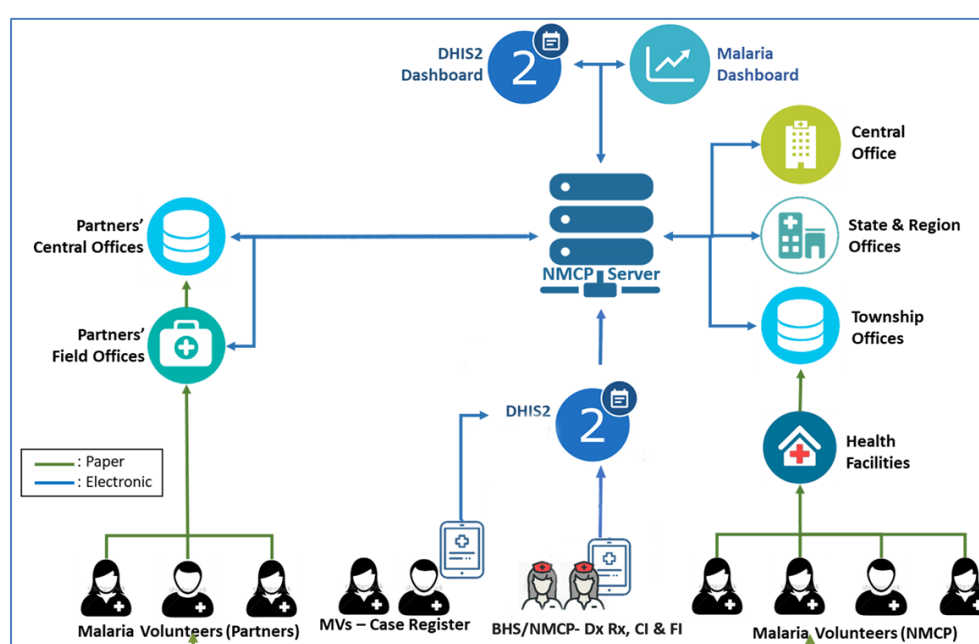


This new NSPME 2021-25 is in-line with the current Myanmar National Health Plan 2017-21 and will inform the development of the new Myanmar National Health Plan 2022-26.

### 1.16. The national malaria information system

There has been significant investment in health information systems by the Global Fund in Myanmar recently (US\$16m was budgeted for health information systems and monitoring and evaluation (M&E) in the 2016-2017 grant). WHO, United States President’s Malaria Initiative (PMI) and the Asian Development Bank (ADB) have also all been supporting the development of case-based surveillance. The GF is supporting the roll-out of an array of health information platforms with a view to soon having a complete and interoperable network of systems to ensure seamless data management for health.

**Figure 7. The proposed data flow for case-based reporting (source: NMCP).**



NMCP’s main database (the ‘Access® database’) was set-up before the internet was widely available in Myanmar to serve as a central repository for case-based malaria data collected from the malaria case register. Copies of the carbonless register have been given to township malaria focal points. They encode their data in the Access® database, export a copy and upload it in a Google Drive® folder. The central level NMCP downloads these data from Google Drive® and imports it into the central Access® database. Until the Access® database was modified in early 2018 it contained only data from NMCP. Now it also contains data from implementing partners. Partners report in the same way, though they are given the option to arrange data in a specific Excel® template rather than using a local copy of the Access® database (as many of them had existing databases). NMCP has now developed a simplified web-based reporting system for malaria case-based reporting. Piloting in three States/Regions was completed in 2019 and the system will be rolled out country-wide from January 2020. The proposed data flow is presented in figure 7 above.

In the last quarter of 2017, NMCP piloted case-base surveillance (case investigation, focus investigation and focus response) linked to DHIS2<sup>13</sup> through health facilities supported by WHO in

<sup>13</sup> District Health Information System 2.

one township of Mon State. This pilot was subsequently expanded to cover another 5 townships covering 159 health facilities. At the same time Save the Children International (SCI) has been rolling-out case-based reporting linked to DHIS2 through their volunteer networks. So far they have implemented this in 83 townships. The two systems (health facility-based and volunteer network-based) are now being integrated and will be gradually expanded to cover Townships implementing elimination/prevention of reestablishment.

### **1.17. Reaching underserved ethnic minorities and marginalized populations in conflict and non-government control areas**

The NMCP still faces challenges in tackling the malaria situation in non-government controlled areas where there is limited access to quality public health services. The ethnic minorities in these areas are particularly at risk of malaria for a number of reasons including conflict, population movements, ecology, vulnerability and difficulties associated with transportation. In addition, efforts to address health system weakness and the limited capacity of EHOs in these areas are only progressing slowly and require more support. Although the Karen Department of Health and Welfare and the Kachin Independence Organization have some basic structure and capacity for implementation, other EHOs such as the Mon National Health Committee and the Wa and Kokang EHOs have no proper structure and system for public health.

Currently the NMCP is expanding *Rights to Health* in non-government controlled areas by supporting the implementation of malaria prevention and control activities in non-government controlled areas by supporting direct implementation by development partners. Although some progress has been made in getting services to vulnerable ethnic minority populations, further improvements and a great deal of additional effort will be needed to enhance disease burden reduction in these areas and bring progress in-line with that elsewhere in the country.

## 2. STRATEGIC FRAMEWORK (2021–2025)

### Vision

A Malaria Free Myanmar by 2030

### Mission

The National Malaria Control Programme of the Ministry of Health and Sports of the Government of Myanmar aims to achieve malaria elimination by 2030 ensuring equitable and universal access to effective preventive, diagnostic and curative services to all ‘at risk populations’ including those living in hard to reach areas (forest goers, mobile populations and migrants), and through surveillance in collaboration with the efforts of communities, Defense Services and other ministries, EHOs, national and international non-governmental organizations, the private sector, United Nations agencies and financial partners.

### Goal

To eliminate the indigenous transmission of *P. falciparum* malaria by 2025 and put Myanmar on the path to eliminate all human malaria by 2030.

### Objectives

1. Achieve zero indigenous *P. falciparum* malaria cases by 2025.
2. Reduce all species malaria morbidity by 95% relative to the 2018 baseline figure and reduce mortality associated with indigenous malaria to zero by 2025.
3. Prevent the re-establishment of indigenous transmission of *P. falciparum*/all species malaria in Townships where transmission has been interrupted.
4. Prevent the emergence/introduction and spread of ACT resistant *P. falciparum* malaria in Myanmar.

### Key interventions and supporting elements

#### *Key interventions*

1. Early and effective malaria case management.
2. Universal coverage of high-risk<sup>14</sup> populations with appropriate malaria prevention measures.
3. Case-based surveillance for elimination and prevention of re-establishment.

#### *Supporting elements*

1. Expanding research for innovation to accelerate malaria elimination and improve delivery of services.
2. Strengthening the enabling environment.

### Approach

#### Principles

- Progress towards elimination will be accelerated through the targeted and effective deployment of proven interventions to at risk populations, and utilization of promising new interventions tailored to the needs of specific high-risk communities.
- Progress towards the development of a sustainable elimination effort will be accelerated and strengthened by building country ownership and leadership and mobilizing

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<sup>14</sup> Stratum 3.

multisectoral partnership action with the participation of communities, the Defense Services and other ministries, EHOs and implementing partners including technical agencies, financial partners and the private sector.

- An adequate malaria case-based surveillance system will be in place nationally to support the identification of transmission foci and provide a system whereby sub-national and eventually national elimination can be verified.
- Improved epidemiology-led entomological surveillance and investigation is required to support evidence-based vector control operations and accelerate elimination.
- In addition to the information system associated with case-based surveillance (case investigation, focus investigation, classification and response) information systems that facilitate logistics management and routine monitoring and evaluation at operational unit-level are required to optimize implementation of malaria interventions.
- Equity in access to services irrespective of gender, reach, ethnicity and affiliation is essential, especially for the most vulnerable and hard-to-reach populations.
- Innovation in tools and implementation approaches specific to risk groups and epidemiological situations will help to maximize progress.

### **Prioritization**

- i. Immediately augment intensive prevention and treatment services<sup>15</sup> and introduce innovative approaches in the highest burden Townships<sup>16</sup> targeting underserved ethnic minorities and marginalized populations in conflict and non-government controlled areas.
- ii. Subsequently augment intensive prevention and treatment services and introduce innovative approaches in the remaining high burden Townships<sup>17</sup>.
- iii. Work in collaboration with formal and informal sector forest-goers to deploy proven and promising new tools (using incentivization where necessary) to protect all of those at risk and eliminate malaria in high transmission forest reservoirs.
- iv. Continue strengthening the malaria case-based surveillance system (including the capacity of health care providers and programme staff at all levels) for Townships entering into elimination and prevention of re-establishment.
- v. Implement a radical shift in entomological focus from control mode to elimination mode and move from routine entomology in favour of epidemiology-led entomology for problem solving.
- vi. Ensure safe radical cure of *P. vivax* from all service providers.

### **Programme phasing**

This strategy aims to ensure appropriate interventions in all endemic areas, tailored to the local epidemiology with the objectives of achieving *P. falciparum* elimination by 2025 (zero indigenous cases of falciparum malaria in 2025) and overall elimination of malaria by 2030 (zero indigenous cases of human malaria in 2030). As per the National Malaria Strategy 2016-2020, the implementation unit will be the Township and planning will be at State/Region level.

As a general rule, endemic/receptive Townships will be targeted for burden reduction, elimination or prevention of re-establishment based on API:

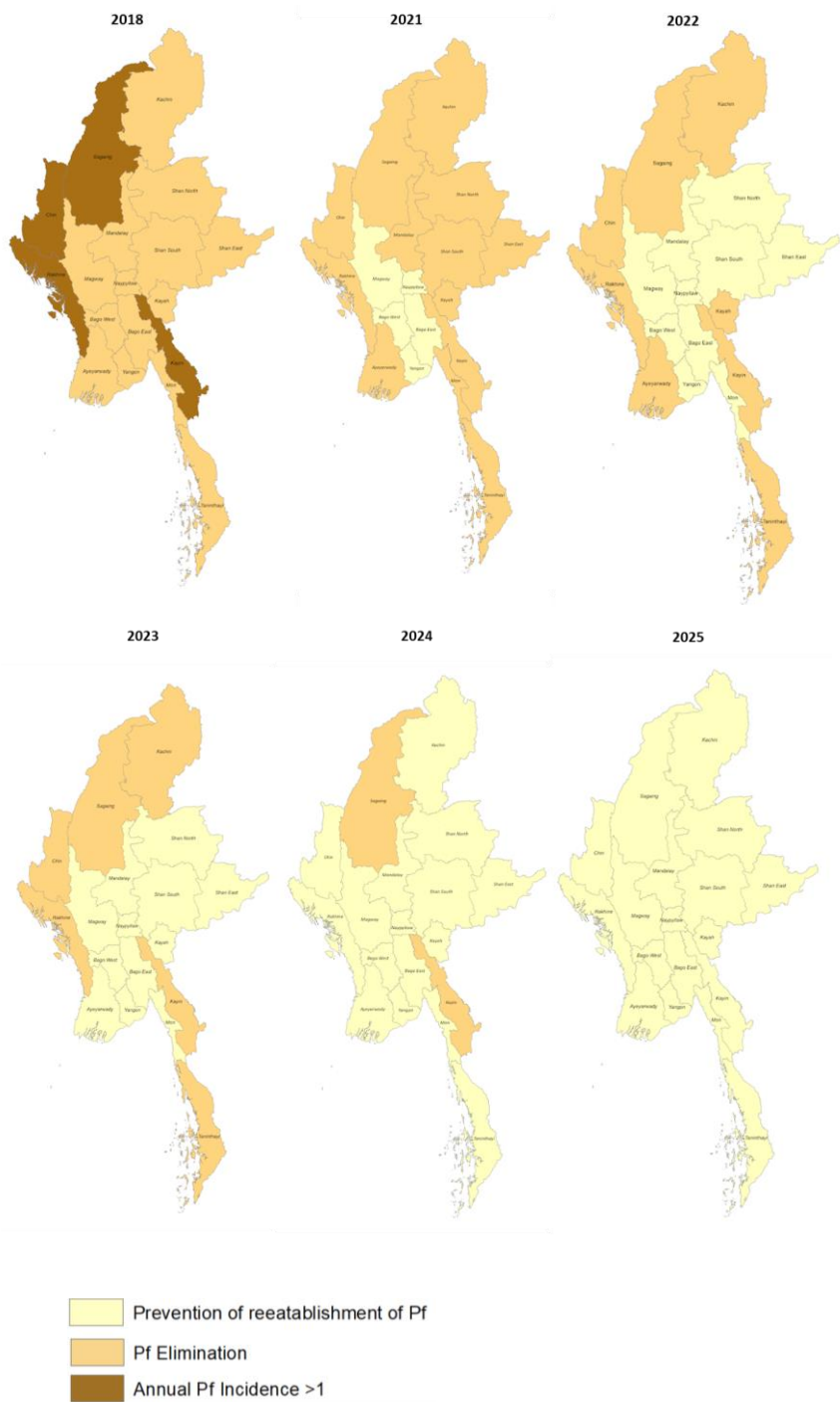
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<sup>15</sup>In cooperation with the defence services where appropriate.

<sup>16</sup> Caseload greater than 1,000 in 2020.

<sup>17</sup> Caseload greater than 500 in 2020.

**Figure 8. Geographical presentation of timelines for *P. falciparum* elimination in Myanmar by State/Region, 2021-2030**



- API  $\geq 1$  - Burden reduction. This involves aggressive scaling-up of effective preventive and curative interventions to achieve universal coverage.
- API < 1<sup>18</sup> – Elimination and prevention of re-establishment. Malaria case-based surveillance becomes the core intervention – every case is investigated and managed to avoid onward transmission.

<sup>18</sup> Depending on the epidemiological situation of the Township, availability and capacity of human and financial resources, the classification of transmission settings could be different. For example, a Township having adequate HR and financial resources may consider conducting elimination activities in a setting with API < 5.

### 3. KEY INTERVENTIONS AND SUPPORTING ELEMENTS

Section 3 describes the key interventions and supporting elements that will ensure that the national malaria elimination effort achieves its goal. The specific activities that will be implemented in any given area will vary according to endemicity and whether the aim of the programme in that particular setting is burden reduction, malaria elimination or prevention of reestablishment. Table 2 summarizes which of the programme's key activities (identified in section 3 below) are likely to be emphasised in each of these three settings.

<b>Endemicity:</b>	<b>High/Moderate API<math>\geq</math>1</b>	<b>Low/Very Low API<math>&lt;</math>1</b>	<b>Maintaining zero API=0</b>
<b>Programme emphasis:</b>	<b>Burden reduction</b>	<b>Elimination</b>	<b>Prevention of reestablishment</b>
<b>1. Early and effective malaria case management.</b>			
1.1 Strengthen and maintain existing microscopy-based diagnostic services.	✓	✓	✓
1.2 Expand and maintain RDT-based diagnostic services	✓	✓	✓
1.3. Provide training support for case management, including the management of severe malaria, in public sector health facilities.	✓	✓	✓
1.4. Provide community-based diagnosis and treatment for malaria.	✓	✓	✓
1.5. Provide special diagnostic and treatment services in remote areas and at selected border crossing points.	✓	✓	✗
1.6. Implement intensified case detection by mobile teams in special situations and in areas currently underserved.	✓	✓	✗
1.7. Provide diagnosis and case management within the defence services.	✓	✓	✓
1.8. Screen members of the defence service pre- and post-deployment to endemic areas.	✓	✓	✓
1.9. Provide standby treatments in special circumstances.	✓	✗	✗
1.10. Screen pregnant women in high transmission communities.	✓	✗	✗
1.11. Provide follow-up testing for falciparum malaria cases where feasible.	✓	✓	✓

Endemicity:	High/Moderate API $\geq$ 1	Low/Very Low API $<$ 1	Maintaining zero API=0
Programme emphasis:	Burden reduction	Elimination	Prevention of reestablishment
1.12. Strengthen and monitor private sector case management services.	✓	✓	✗
1.13. Monitor drug resistance.			
Conduct regular therapeutic efficacy studies of first- and second-line antimalarials.	✓	✗	✗
Introduce routine patient follow-up to monitor drug resistance in areas where caseload is too low to support TES.	✗	✓	✗
Map molecular markers for drug resistance.	✓	✓	✗
1.14. Address the issue of sub-standard and falsified antimalarials.			
1.14.1. Enforce MoHS decision banning distribution and sale of sub-standard and falsified antimalarials.	✓	✓	✓
1.14.2. Replacement of oral Artemisinin-based Monotherapy.	✓	✗	✗
1.14.3. Drug outlet survey.	✓	✗	✗
1.14.4. Monitor quality of antimalarial drugs and RDTs in the field.	✓	✓	✓
1.15. Strengthen the pharmacovigilance system.	✓	✓	✗
1.16. Provide comprehensive quality assurance/quality control.			
1.16.1. Provide quality assurance for microscopy.	✓	✓	✓
1.16.2. Quality assurance for case management.	✓	✓	✓
<b>2. Universal coverage of high-risk populations with appropriate malaria prevention measures.</b>			
2.1. Provide free LLINs for all populations at risk of contracting malaria.			
2.1.1. Mass LLIN distributions:			
<i>Provide LLINs for established communities.</i>	✓	✓	✗
<i>Ad hoc mass LLIN distributions to protect people in the event of disasters and in response to outbreaks and confirmed transmission foci.</i>	✓	✓	✓
<i>Ad hoc mass LLIN distributions to protect people in new settlements.</i>	✓	✓	✗
<i>LLINs for employers to provide to their workers (including seasonal workers).</i>	✓	✗	✗

<b>Endemicity:</b>	<b>High/Moderate API≥1</b>	<b>Low/Very Low API&lt;1</b>	<b>Maintaining zero API=0</b>
<b>Programme emphasis:</b>	<b>Burden reduction</b>	<b>Elimination</b>	<b>Prevention of reestablishment</b>
2.1.2. Continuous LLINs distributions:			
<i>LLINs for pregnant women.</i>	✓	✓	✗
<i>LLIN to address attrition in-between mass distributions.</i>	✓	✓	✗
<i>LLINs for mobile forest workers in the informal sector.</i>	✓	✓	✗
2.1.3. Provide annual insecticidal treatment for those who prefer to use their own conventional bednets rather than LLINs.	✓	✓	✗
2.1.4. Provide annual insecticidal treatment for bednets used by defence, police and other uniformed service personnel.	✓	✓	✗
2.1.5. Provide insecticide treated hammock nets.	✓	✓	✗
2.2. Conduct focal responsive IRS as appropriate.	✓	✓	✓
2.3 Conduct larval source management (LSM).	✓	✗	✗
2.4 Implement novel vector control tools and personal protection measures as appropriate among at-risk, high-exposure populations.	✓	✓	✗
2.5. Promote insecticide treated uniforms for the defence services.	✓	✓	✗
2.6. Conduct entomological surveillance in areas of ongoing transmission.	✓	✓	✗
<b>3. Case-based surveillance for elimination and prevention of re-establishment.</b>			
3.1 Expand, modernize and strengthen the national malaria information system.	✓	✓	✓
3.2. Strengthen and continue the roll-out of case-based surveillance for elimination and prevention of re-establishment.	✗	✓	✓
3.3. Maintain outbreak detection and response activities in burden reduction areas.	✓	✗	✗
3.4. Strengthen national capacity for epidemiological analysis for policy and decision making.	✓	✓	✗
<b>4. Expanding research for innovation to accelerate malaria elimination and improve delivery of services.</b>			
4.1. Conduct operational research and surveys.	✓	✓	✗
4.2. Conduct annual review of research.	✓	✓	✗
<b>5. Strengthening the enabling environment.</b>			
5.1. Support the National Malaria Elimination Committee (NMEC).	✗	✓	✓



<b>Endemicity:</b>	<b>High/Moderate API≥1</b>	<b>Low/Very Low API&lt;1</b>	<b>Maintaining zero API=0</b>
<b>Programme emphasis:</b>	<b>Burden reduction</b>	<b>Elimination</b>	<b>Prevention of reestablishment</b>
5.2. Policy review, strategy development and programme planning.	✓	✓	✓
5.3. Financial management.	✓	✓	✓
5.4. Advocacy.	✓	✓	✓
5.5. Multi-sectoral collaboration.	✓	✓	✓
5.6. Monitor climate change.	✓	✓	✓
5.7. International cooperation.	✓	✓	✓
5.8. Technical assistance.	✓	✓	✓
5.9. Human resources (HR).	✓	✓	✓
5.10. Infrastructure development, maintenance and running costs.	✓	✓	✓
5.11. Procurement and related quality assurance (QA).	✓	✓	✓
5.12. Supply (ensuring optimal levels of supply of diagnostics/drugs/commodities).	✓	✓	✓
5.13. Community involvement (empowering communities and maximizing utilization of services).			
Empower at-risk populations by ensuring they understand the disease through culturally appropriate and gender sensitive communication.	✓	✓	✗
Involve communities in the planning and assessment of elimination activities.	✗	✓	✗
Maintain integrated (multisectoral) community sensitization and engagement to ensure the participation of at-risk communities and population groups in identification of imported cases.	✗	✗	✓
Improve preventive practices among travellers through the provision of pre-travel health advice.	✗	✗	✓
5.14. Reaching underserved ethnic minorities and marginalized populations in conflict and non-government control areas.	✓	✓	✓
5.15. Carry out programmatic supervision and monitoring and evaluation.	✓	✓	✓

### **3.1. INTERVENTION 1. Early and effective malaria case management.**

Ensuring universal diagnostic testing will reduce the over-use of ACTs and reduce drug resistance selection pressure on parasites. The detection of malaria infections will be based primarily on blood examination by RDTs or microscopy. Diagnostic methods with a higher sensitivity than RDTs and microscopy, such as polymerase chain reaction (PCR) or other molecular-based techniques may be used in specific settings (for example to resolve discordant results from microscopy quality assurance (QA), for distinguishing recrudescence versus reinfection during therapeutic efficacy studies (TES), and to identify villages in elimination settings with a high proportion of asymptomatic cases) but not for routine case management. The annual blood examination rate (ABER) for the population at risk will be increased from 6.08% (2018) to at least 10% in endemic/receptive villages. In order to achieve this, the importance of testing every symptomatic case will be stressed during training and during routine supervision of health-workers and volunteers both in endemic and in receptive areas.

Treatment for falciparum and non-falciparum malaria will be according to National Malaria Treatment Guidelines (NMTGs), which are in-line with WHO guidance. Currently, all medicines recommended for the treatment of uncomplicated falciparum malaria are ACTs. Treatment will include primaquine with the first dose of ACT to eliminate gametocytes<sup>19</sup>. Radical treatment for vivax malaria requires treatment with chloroquine for 3 days plus primaquine for 14 days (the latter to kill hypnozoites<sup>20</sup>) and this will be provided both at facility level and at community level (by volunteers). Supervised treatment will be used to support patient adherence to the long treatment regimen for vivax malaria. This will entail follow-up by a health worker or volunteer on days 7 and 14. Supervised treatment for ACT, which has a 3-day regimen, may be applied, but only in the final stages of elimination when the number of cases falls to a point at which supervised treatment becomes manageable. Until then, efforts will be made to maximize patients' adherence to their full treatment regimen through advocacy delivered by healthcare providers (inter-personal communication (IPC)). The importance of this 'adherence advocacy' will be emphasized in all clinical training sessions in future.

Achieving universal coverage with case management requires three channels of service delivery: public, community-based and private. Diagnosis and treatment in the public sector and through community-based channels will be free of charge. Prioritization of a particular service delivery channel by transmission setting may need to be introduced to support resource prioritization and allocation. While malaria incidence remains high, the NMCP will maximize coverage through all three channels while making efforts to improve quality. In order to ensure optimal case management, surveillance and reporting in elimination settings, private sector providers selected on the basis of their registration status, qualifications and locality will be allowed to test and treat patients according to the NMTGs but will be required to notify all positive cases to the local health authorities within 24 hours of diagnosis. Treatment by unverified private sector providers will likely be prohibited in Townships engaged in elimination or prevention of re-establishment, although some may be engaged where there are no viable alternatives.

#### **3.1.1 Strengthen and maintain existing microscopy-based diagnostic services.**

Microscopy based diagnosis will form a key tool in the move towards elimination. Quality-assured microscopy will be made available at Township hospital in-patient departments in endemic areas and at State/Region levels nationwide, as well as in some NGO run health facility in-patient departments. Microscopy has advantages for management of severe malaria, follow-up of patients, detection of gametocytes and determination of parasite density. New microscopists

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<sup>19</sup> Gametocytes are the parasite stage in an infected person's blood that is responsible for infecting mosquitoes with malaria and for continuing the transmission cycle.

<sup>20</sup> Liver stage malaria parasites responsible for the regular relapses that characterize *P. vivax* (and *P. ovale*) infections.

(multi-skilled) will be trained and existing microscopists will receive refresher training based on needs identified through QA.

Additional microscopy slides will be collected from the RDT tested patients in elimination areas (where possible) to screen for parasites<sup>21</sup> that are not detected by the current Pv/Pf RDTs used by the NMCP. ICMVs and Basic Health Staff (BHS) will be trained in slide preparation.

### **3.1.2 Expand and maintain RDT-based diagnostic services**

RDTs for detection of falciparum and/or non-falciparum infections will be made available at all public sector and NGO run health facilities as well as at community-level. Free RDTs will also be made available through various private sector initiatives. Where quality assured microscopy services are present RDTs will only be used in the event of microscopy being temporarily unavailable, for example as a result of power failure or staff absenteeism.

### **3.1.3. Provide training support for case management, including the management of severe malaria, in public sector health facilities.**

Case management training and refresher training will be provided for all public sector health staff covering differential diagnosis, management of uncomplicated, severe and complicated malaria and malaria case reporting. There will be special emphasis on safe radical treatment of relapsing malarias (*P. vivax* and *P. ovale*). The training will also incorporate a module on IPC aimed at providing malaria knowledge on symptoms, free diagnosis and free treatment, improving patient compliance with malaria treatment regimens and improving other malaria related risk behaviour such as personal protection and prompt treatment seeking. IPC materials will be developed for this purpose. Special training will be provided to State/Regional and Township level doctors on the treatment of severe and complicated malaria.

The NMCP will work with health care providers to reinforce the importance of testing potential malaria cases based on suspected malaria case definition.

### **3.1.4. Provide community-based diagnosis and treatment for malaria.**

Myanmar has a well-established free community-based case management service for malaria delivered by ICMV. These ICMVs were recently transitioned from village health volunteers (VHVs), work site volunteers and backpacked (mobile) volunteers and are now taking responsibility for five additional diseases, including tuberculosis, sexually transmitted infections/AIDS, dengue haemorrhagic fever, filariasis and leprosy in addition to malaria. The plan now is for them to transition further into fully qualified CHWs. Technically these community-based service providers are a part of the public sector's health services, but each of the ICMVs depend on the support of either an NGO or the NMCP. They substantially complement and extend the reach of public health services, particularly in rural and remote areas, where health infrastructure tends to be weak or absent and malaria transmission tends to be highest.

Coverage of ICMVs is still however sub-optimal. A detailed mapping has been carried out to identify all communities still in need of ICMVs/CHWs and the strategy will be rolled-out to achieve universal coverage in all endemic communities beyond reasonable reach (2 hours walk) of a functioning health facility in 2021. Priority will be given to the most remote and inaccessible communities.

Services for acute respiratory tract infections and diarrhea may be included in the remit of ICMVs in specific situations according to MoHS policy. In terms of malaria, this is especially important for communities progressing towards elimination where these additional services ensure febrile patients continue to use community-based case management services and thereby support the

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<sup>21</sup> *P. ovale*, *P. malaria* and *P. knowlesi*.

ICMV's/CHW's essential surveillance role for malaria elimination. Priority for the inclusion of these add-on interventions will be given to the most remote communities.

The ICMVs/CHWs will follow-up patients to ensure compliance with the full drug regimen in-line with WHO's 'T3' initiative ('test-treat-track'). In certain circumstances they may be provided with incentives to conduct household visits to provide health messages and to detect fever cases. The ICMVs/CHWs will also help to monitor population movements and support referral for severely ill patients. In areas in the elimination phase they will be required to support real time reporting wherever feasible and assist case investigation and focus response teams as necessary.

Strengthened needs-based training as per the ICMV/CHW guidelines will be provided and this will be followed-up by supervisors with on-the-job training. The volunteers will meet regularly with supervisors for resupply, data crosschecking and reporting. The NMCP and its implementing partners will support costs related to travel for report submission and meetings. A harmonized quarterly cash incentive will be provided to retain and motivate the ICMVs/CHWs.

Providing services for mobile populations and migrant populations spending time in endemic settings is essential. Elimination will not be achieved unless these population groups have access to free malaria protection measures and early diagnosis and treatment. A large proportion of the mobile population lives in the vicinity of remote villages and these populations will be catered for primarily through the static ICMVs/CHWs based in these villages. Where appropriate these ICMVs/CHWs will be given incentives to conduct outreach visits to nearby mobile risk populations. If the mobile population is a large group far away from the nearest static ICMV/CHW, an individual among the mobile population will be trained as an ICMV/CHW and supplied for malaria case management on site.

The NMCP and its partners will establish a Facebook page for volunteers so that they can communicate amongst themselves and communicate with higher levels about their experiences and any challenges they meet in their daily work.

### **3.1.5. Provide special diagnostic and treatment services in remote areas and at selected border crossing points.**

Special screening and case management services will continue to be provided through malaria clinics in high risk areas and at key migration transit points, including formal and informal international border crossings.

### **3.1.6. Implement intensified case detection by mobile teams in special situations and in areas currently underserved.**

While the NMCP aims to have ICMVs/CHWs in all high burden communities, there may be some communities where this is not feasible, at least in the short-term. In these special situations the Township health teams and NGO partners will conduct intensified case detection in high burden villages and in new settlements (e.g. IDP camps, prisons etc.) and migrant work sites in endemic areas as necessary. Mobile teams will travel to wherever mobile populations spend time. They will also work with groups or individuals recruiting migrants. Wherever possible these activities will be integrated into those of mobile teams (e.g. TB Programme mobile teams).

The teams will test all fever cases with RDTs. Treatment (together with LLINs) will be provided as appropriate.

A number of NGO partners already have mobile outreach teams for managing malaria in mobile, migrant and remote populations through the provision of case management services and forest-packages for forest goers (including LLINs and/or hammock nets, repellent and information on the benefits of using bednets and repellents consistently). This approach will be expanded by NGOs and NMCP to cover all areas where populations are currently underserved, and the approach will be maintained until all communities in need have ICMVs/CHWs.

**3.1.7. Provide diagnosis and case management within the defence services.**

NMCP will continue to support malaria case management services within the defence services (and other Ministries as appropriate) in-line with national norms. RDTs, antimalarial drugs and commodities will be provided and medical personnel will receive regular training. All case management data generated will be incorporated into national malaria database including DHIS2.

**3.1.8. Screen members of the defence service pre- and post-deployment to endemic areas.**

Microscopy-based malaria screening and treatment will be introduced for all defence service personnel before and after deployment/redeployment to endemic areas. More sensitive screening methods may be utilized if funding permits.

**3.1.9. Provide standby treatments in special circumstances.**

Standby treatment (a full course of ACT) along with appropriate information will be provided to individuals/groups that are travelling to areas that are so isolated that this approach offers the only means of ensuring prompt treatment. Where appropriate, delivery of standby treatment will be integrated with delivery of LLINs as well as with delivery of any other personal protection measures that might become available over time. Uptake of standby treatments will be closely monitored and evidence of inappropriate application by healthcare providers will be investigated. Action will be taken as necessary to minimize misuse.

**3.1.10. Screen pregnant women in high transmission communities.**

In stratum 3a communities the NMCP will continue to support RDT-based malaria screening for pregnant women during routine antenatal care (ANC) visits.

**3.1.11. Provide follow-up testing for falciparum malaria cases where feasible.**

RDT and microscopy-based follow-up of patients on day 28 or day 42 (depending on the ACT's partner drug) will be carried-out to detect potential recrudescence (and ACT resistant) cases. RDT tests will be carried-out and if positive a blood smear and blood spot will be taken and sent to the nearest microscopy point for confirmatory testing. Confirmed blood smear positive cases will be contacted by phone and referred to hospital for supervised second-line treatment. Blood spots associated with negative blood smears may be sent for confirmatory PCR if available. As with microscopy, confirmed PCR positive cases will be contacted by phone and referred to hospital for supervised second-line treatment. A transport allowance and a financial incentive will be provided to maximize referral compliance. No-show cases will be followed-up by the local ICMVs/CHWs.

Follow-up testing will focus on Townships engaged in elimination initially but may expand to Townships engaged in burden reduction where feasible. The service will be implemented by BHS staff in collaboration with ICMVs/CHWs.

**3.1.12. Strengthen and monitor private sector case management services.**

The private health sector in Myanmar is vast and includes 18,443 (2014) medical practitioners as well as licensed and unlicensed pharmacies and authorized services belonging to private companies catering for their employees. The NMCP and its implementing partners will maintain their engagement with private medical practitioners for delivery of malaria curative services through private medical practitioners, pharmacies, private companies and selected vendors. Training, supportive supervision and monitoring and evaluation will be strengthened in order to improve and sustain the quality of services. A key message will be that the purpose of treatment is not only patient centred but also for transmission reduction leading to elimination. Private sector partners will be provided with RDTs and antimalarials. This supply will be linked to timely and accurate reporting, which will feed into the DHIS2 and into the case-based surveillance system (case investigation, focus investigation and focus response) in elimination settings.

Maintaining the motivation of private sector partners tends to become increasingly difficult as malaria burden falls, particularly in urban/peri-urban areas. In order to maintain the role private

providers can play in supporting surveillance for elimination, implementing partners will increase efforts to address provider interest through various means including placing more emphasis on RDTs as a tool supporting robust differential diagnosis.

### **3.1.13. Monitor drug resistance.**

The Department of Medical Research, the defence services Medical Research Centre, and NMCP will work together with State/Regional level VBDC to monitor antimalarial drug resistance in-line with the latest WHO guidelines with technical support of WHO. Timing of TES will be optimized to coincide with the peak transmission season. First-line treatment efficacy will be monitored through TES annually. In addition to the 11 sentinel sites currently under surveillance, more new sites will be established as necessary to ensure that TES results provide a representative overview of the situation nationally. Staff will be hired and trained, and equipment procured as necessary.

Blood samples will be collected from hospitals nationwide for molecular monitoring of parasite populations (genetic epidemiology). Monitoring drug resistance in *P. vivax* will be carried out in parallel where feasible.

The NMCP will also carry out special clinical fieldwork in outbreak areas and in areas where treatment failure is suspected. As the number of patients decline, extra resources will be needed to support effective implementation of TES. The TES implementation period will need to be extended to increase sample size. The standard WHO TES manual<sup>22</sup> provides several protocol amendment options for maximizing successful TES implementation, such as accepting lower parasite densities in enrolled patients and including older age groups etc. Such options will be exhausted and maximized to complete planned TES studies, before considering alternative options such as 'integrated drug efficacy surveillance' (iDES), which presents its own challenges such as high patient loss to follow-up. If resources are limited, in order to maximize cost effectiveness, the NMCP will opt to implement a few large TES studies rather than more numerous small studies.

Three ACTs are currently registered in Myanmar and so, in the event that a change in first-line treatment is required, the NMCP is well placed to quickly manage the transition.

### **3.1.14. Address the issue of sub-standard and falsified antimalarials.**

A number of activities designed to minimize the use of sub-standard and falsified antimalarials will be supported. Special emphasis will be placed on border areas.

*3.1.14.1. Enforce MoHS decision banning distribution and sale of sub-standard and falsified antimalarials.* The ban on import, manufacture, export, registration, re-registration, distribution and sale of artemisinin monotherapy will be reinforced by the FDA through communication with importers, manufacturers, exporters, wholesalers/distributors, pharmacies and drug sellers. The NMCP will support the police to enforce the ban. Facilities identified during quality monitoring visits will have stocks confiscated and if appropriate licences to practice will be revoked.

*3.1.14.2. Replacement of oral Artemisinin-based Monotherapy.* As a result of the Artemisinin Monotherapy Replacement (AMTR) Project, implemented by the NMCP with strong support from PSI, the ACTWatch Group and other partners, the availability of oAMT in private pharmacies and shops was brought down from 67% in 2012 to just 3% in 2018.

The AMTR activity remains important given the permanent risk of new influx of oral artemisinin-based monotherapy (oAMT) from markets in neighboring countries, especially in conflict zones and hard-to-reach areas, where patient access to affordable quality malaria treatment may be limited. The NMCP will continue to advocate for strong support from all partners for this activity.

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<sup>22</sup> WHO Manual: Methods for Surveillance of Antimalarial Drug Efficacy (WHO, 2009)

*3.1.14.3. Drug outlet survey.* In order to develop a more in-depth understanding of the role of the private sector in Myanmar the NMCP will support a drug outlet survey similar to those conducted recently in some other Mekong countries. This survey will be outsourced to a suitably qualified agency.

*3.1.14.4. Monitor quality of antimalarial drugs and RDTs in the field.* For case management, it is critical that medicines are of good quality and that supplies are adequate. Efforts to eliminate substandard and falsified medicines carried-out over many years must be continued and enhanced. Monitoring the quality of antimalarial drugs will continue in all endemic States/Regions. Drug quality test kits (Minilab®) and consumables will be procured, and staff trained. Monitoring missions will be carried out every 6 months, both in sentinel sites and in additional spot-check sites. Confirmatory tests of selected samples will be carried out at Central level.

The QA/quality control (QC) of random samples of RDTs from the field will be carried out in collaboration with Myanmar's Department of Medical Research (DMR) and WHO. The standard operational procedure for checking of QA/QC of RDT will be endorsed to ensure that the QA/QC procedure is appropriate.

#### **3.1.15. Strengthen the pharmacovigilance system.**

Considering the risk of adverse events arising from substandard or falsified antimalarials, and also the risk of adverse events following primaquine (PQ) treatment in patients with G6PD<sup>23</sup> deficiency, NMCP will advocate at the national level for establishing some minimum PV monitoring standards and functions in Myanmar, not only for antimalarials but for all pharmaceuticals.

#### **3.1.16. Provide comprehensive quality assurance/quality control.**

Quality assurance of diagnosis, treatment, patient care and surveillance is important in both transmission-reduction and elimination settings.

*3.1.16.1. Provide quality assurance for microscopy.* QA/QC of microscopy is particularly crucial during elimination when microscopists see fewer and fewer positive slides and it becomes progressively more difficult for them to maintain their skills. The NMCP will invest special effort to strengthen microscopy QA in support of elimination. There will be strong collaboration between the NMCP (under Department of Public Health), the National Health Laboratory (under Department of Medical Services) and the State level Reference Laboratories (in Kachin, Northern Shan and Eastern Shan supported by the Bilateral Project) to revitalize and strengthen Township and State level health departments and Regional VBDC laboratories to perform rigorous laboratory QA/QC. A core group of technical staff from NMCP will conduct periodic maintenance and repair of microscopes, provide supportive supervision and QA/QC according to standard operating procedures (SOP), carry out (re)training of microscopists and laboratory technicians, and oversee procurement and distribution of quality microscopes, slides and reagents. The existing VBDC Gyogone laboratory has been upgraded as a national malaria reference laboratory to conduct quality assurance and capacity building for malaria microscopy including supervision and monitoring. Staff are now being mobilized to operationalize this facility. Every three years the NMCP will support an External Competency Assessment (ECA) for senior microscopists at Central and State/Regional levels

As malaria incidence falls, access to positive slides will become increasingly important for maintaining microscopists' skills. A mechanism for maintaining microscopists' skills in malaria elimination settings, including use of a slide bank or a web-based equivalent, will be established.

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<sup>23</sup> Glucose-6-phosphate dehydrogenase.

*3.1.16.2. Quality assurance for case management.* Robust supervision is the key to QA of patient care and will be applied with clear protocols in accordance with the national malaria treatment guidelines and monitoring systems for both public and private sectors. Full details of supervision activities are described in the NMCP's Monitoring and Evaluation Plan 2021-25. Clinical reviews will be carried out in facilities suspected of underperforming (based on reports or data analysis) and remedial measures will be put in place where appropriate (including special needs-based training for clinical staff).

## **3.2. INTERVENTION 2. Universal coverage of high-risk populations with appropriate malaria prevention measures.**

The selection of vector control interventions has been guided by an epidemiological stratification informed by ecology where epidemiological data is lacking. Implementation will be within the framework of integrated vector management to ensure optimal use of resources. Use of insecticidal interventions will follow technical recommendations provided in WHO's Global plan for insecticide resistance management in malaria vectors.

### **3.2.1. Provide free LLINs for all populations at risk of contracting malaria.**

LLINs treated with synthetic pyrethroids have been shown to reduce malaria incidence by around 30% in forested areas in the GMS, despite the local malaria vectors in some areas being characterized by early outdoor biting. LLINs are a core malaria prevention measure in Myanmar, widely used to reduce transmission and provide personal protection.

The NMCP will use multiple LLIN delivery strategies to maximize coverage of insecticide treated bednets in all stratum 3 villages nationwide. Urban areas will be excluded. While at the national level, for planning purposes, the target coverage rate for large sized LLINs will be 1.8 people per net (in-line with WHO standards), at household level LLINs will be targeted at a rate to ensure that all sleeping spaces are covered. Full coverage with LLIN will be provided in stratum 3a-c areas and in new stratum 2 areas (considered to be receptive). Targeting will be based on the most up-to-date stratification of malaria risk available. As the quality of surveillance improves, the stratification will evolve to distinguish between endemic villages and villages where all cases are imported. Endemic villages will continue to receive periodic mass distributions but in villages where all cases are imported, LLINs will be provided only to forest goers. The NMCP will thus move away from blanket LLIN coverage and move towards increased focus to maximize cost effectiveness and sustainability. Distribution of LLINs will be coupled with locally appropriate and gender sensitive information, education and communication (IEC)/behaviour change communication (BCC) to ensure community mobilization and high and correct LLIN usage.

#### *3.2.1.1. Mass LLIN distributions:*

*Provide LLINs for established communities.* Free LLINs will be provided to cover the entire population residing in established settlements (villages, IDP camps etc.) in target communities. Where appropriate additional LLINs will be provided for use in forest/forest farms. All of these LLINs will be delivered through regular nationwide mass distributions. The periodicity of these mass distributions will depend on the expected lifespan of the LLINs procured (based on the most recent polyester LLINs distributed in Myanmar, mass distributions will take place every 3 years).

Township officials will conduct microplanning for bednet distribution as part of their routine duties. This micro-planning will take into consideration which members of a household share a sleeping space in order to ensure 100% coverage without wastage.

*Ad hoc mass LLIN distributions to protect people in the event of disasters and in response to outbreaks and confirmed transmission foci.* In the event of disasters, outbreaks and confirmed transmission foci in target areas, LLINs will be provided to anyone who has not already been covered.



*Ad hoc mass LLIN distributions to protect people in new settlements.* LLINs will be provided to people in new settlements in target sub-centres e.g. IDPs, roadside economic migrants, settlements adjacent to construction projects. ICMVs/CHWs will monitor and report on unusual population movements to allow programmes to react in a timely manner to low LLIN coverage levels caused by the arrival of mobile population groups in risk areas.

*LLINs for employers to provide to their workers (including seasonal workers).* LLINs will be provided to employers in endemic areas of stratum 3a and 3b Townships on an annual basis for them to provide to their workers. At the same time efforts will be made to encourage employers to provide this service to their employees in future at their own cost. This intervention will target: construction project settlements (e.g. dams, bridges and mines); plantations (e.g. rubber, oil palm); large commercial farms; forest workers in the formal sector (e.g. forest/wildlife protection services); and, camps associated with commercial projects (e.g. road/railway construction, large-scale logging).

#### *3.2.1.2. Continuous LLINs distributions:*

*LLINs for pregnant women.* Additional LLINs will be given to pregnant women in communities targeted for mass LLIN distribution. These nets will be delivered through routine ANC services. This approach maximizes LLIN coverage for infants and has a positive impact on ANC attendance.

*LLIN to address attrition in-between mass distributions.* LLINs will be provided through the ICMV/CHW network in order to address any LLIN attrition in-between mass distributions. LLIN stores for this will be held at BHS and Township level.

*LLINs for mobile forest workers in the informal sector.* LLINs will be supplied to mobile forest workers in the informal sector who have not already been covered by any of the mechanisms described above e.g. small-scale gem/gold miners and people gathering forest products. These LLINs will be supplied through special malaria clinics and volunteers at forest entry points.

*3.2.1.3. Provide annual insecticidal treatment for those who prefer to use their own conventional bednets rather than LLINs.* For those people who prefer to use conventional bednets, the NMCP will adopt a policy of 6 monthly treatment of these bednets with one of the several standard (not long-lasting) prequalified insecticidal net treatment products available at present. This policy should be upgraded to a policy of annual treatment with long-lasting insecticidal formulations if and when these long-lasting formulations become available again. This service will be restricted to communities where conventional bednet ownership exceeds 20% (80% coverage is required to achieve 'community effect' whereby those without LLINs are protected by those with LLINs).

*3.2.1.4. Provide annual insecticidal treatment for bednets used by defence, police and other uniformed service personnel.* Service personnel operating in target areas will be protected from malaria by treating their conventional bednets with insecticide. This activity will be implemented by the services themselves. Oversight and technical assistance will be provided by the NMCP.

*3.2.1.5. Provide insecticide treated hammock nets.* The NMCP will also introduce treated hammock nets for forest goers in areas where these are determined to be acceptable.<sup>24</sup> Delivery mechanisms will be developed to target specific risk groups.

#### **3.2.2. Conduct focal responsive IRS as appropriate.**

As with LLINs, the effectiveness of spraying the walls and ceilings of houses and animal sheds with residual insecticides ('Indoor Residual Spraying' - IRS) is somewhat constrained by the early outdoor biting habit of key local vectors. Nevertheless, IRS can have a significant impact on

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<sup>24</sup> A recent report from PMI recommends providing treated hammock nets for forest goers and this was supported by the 2019 MTR team.

malaria transmission in the region provided that the construction of houses is sufficiently solid to provide enough sprayable surfaces.

The NMCP will conduct focal responsive IRS in the event of outbreaks/confirmed transmission foci when appropriate, i.e. when resistance to the insecticides used in LLINs is found or if LLIN coverage is high but LLIN use is low. This intervention will not be used in EHO areas where the provision of adequate IRS management is likely to be too challenging.

In order to minimize selection pressure for pyrethroid resistant vector mosquitoes, only non-pyrethroid insecticides will be used for IRS. In accordance with the national policy the choice of insecticide will take into account safety, efficacy, cost, availability and susceptibility of vectors.

To be effective IRS requires a well-organized operation with skilled spray-men and very strong field supervision. As with LLINs, IRS operations require careful planning at both the macro- and the micro-levels (including geographic reconnaissance to ensure the suitability of construction in target areas). Community mobilization and behaviour change communication will be key to ensuring access to homes in order to achieve the high level of coverage (>80%) required to maximize impact. Emphasis will be placed on strengthening logistics in order to ensure timely and adequate supplies of consumables, equipment and transport. Attention will also be given to strengthening coverage assessments and related documentation.

### **3.2.3 Conduct larval source management (LSM).**

LSM will be implemented as a form of community mobilization by the volunteer networks and CBOs and used where vectors' larval habitats are 'few, fixed and findable' as per WHO guidance, both in response to outbreaks and foci and for reduction of receptivity. The focus will be on streams during the dry season (dry season *An. minimus* habitats are like 'beads on string' and easy to access), wells in villages where wells are identified as a significant source of *An. dirus* and in disused shrimp farms and coastal lagoons where these are generating high densities of *An. sudaicus* associated with significant transmission of malaria.

### **3.2.4 Implement novel vector control tools and personal protection measures as appropriate among at-risk, high-exposure populations.**

A number of promising tools are available to tackle the transmission that persists amongst forest-goers. These include: mobile volunteers providing malaria diagnostic and radical treatment services; chemoprophylaxis for defence services and other formal sector forest goers; hammocks with integral nets treated with long-lasting insecticide; topical repellents; insecticide treated clothing e.g. longyi<sup>25</sup>; insecticide treated blankets; screening of forest huts with long-lasting insecticide treated netting; and, the treatment of cattle and/or humans with ivermectin as an endectocide. Pilot studies with these promising tools bundled together to address the specific requirements of particular risk groups will start immediately, and on a scale necessary to achieve programmatic impact.

These interventions will be implemented in collaboration with formal sector forest-goers (the military, forest rangers, border guards, and wildlife and forest protection agencies). They will be fully protected by a range of the interventions described, and their support will be leveraged to access forest-goers in the informal sector (woodcutters, charcoal makers, foragers, miners, slash and burn farmers from ethnic minority groups etc). Use will also be made of volunteers drawn from within the different informal sector forest-goer groups. The support of all of these groups will be properly incentivized to maximize impact.

### **3.2.5. Promote insecticide treated uniforms for the defence services.**

The latest insecticide treated materials for clothing (recently approved for use in Myanmar by DFDA) retain more than 80% efficacy after 70 washes, so the insecticide effectively outlives the

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<sup>25</sup> Traditional wraps worn by Burmese men and women.

garment. Myanmar's defence services make all of their uniforms from scratch at a state-of-the-art facility. The NMCP will lobby them to incorporate a fabric treatment facility into their production line, so that all uniforms can be treated at source.

### **3.2.6. Conduct entomological surveillance in areas of ongoing transmission.**

The focus of entomological surveillance for malaria now needs to shift radically from control mode to elimination mode. 'Traditional' entomological activities such as regular vector and insecticide resistance monitoring and incrimination of vector species in sentinel sites are no longer relevant. Instead of continuing with 'entomology for the sake of entomology', entomologists will focus on 'epidemiology-led entomology for problem solving'. Epidemiological events such as outbreaks and persistent transmission foci will trigger entomological investigations, the nature and scale of which will be adjusted according to initial findings. These investigations may include vector incrimination, studies of vector bionomics and/or insecticide resistance profiling as appropriate. Resistance monitoring will be explicitly linked to outbreaks and active transmission foci and will involve screening of only the insecticidal compounds used now, and those that could be potentially used (e.g. Piperonyl butoxide (PBO) + pyrethroids as used on next generation LLINs).

Where capacity exists, entomologists may also be involved in vulnerability assessments in communities entering into prevention of re-establishment where vulnerability cannot be easily estimated based on recent epidemiological data and ecological indicators.

Entomologists will also be responsible for evidence-based coordination and monitoring of vector control efforts. They will monitor the coverage and quality of interventions, including the 'within village' and 'within house' coverage of IRS, the physical condition of LLINs, and the residual efficacy of insecticides on LLINs (both factory and field treated) on walls and ceilings with time. LLIN utilization and perceived usefulness will also be assessed.

The Entomology Unit will be restructured accordingly, and staff will be retrained to provide them with the new skillsets needed to accelerate progress towards elimination and to ensure that malaria does not become re-established in areas where transmission has ceased. Efforts to expand entomology related HR at National and State/Regional levels will continue. Where entomological expertise is lacking, Township VBDC staff or others may be trained-up as entomology leads to support epidemiology led entomology for problem solving.

### **3.3. INTERVENTION 3. Case-based surveillance for elimination and prevention of re-establishment.**

The basic web-based system of surveillance currently used in States/Regions engaged in malaria burden reduction, which involves monthly reporting supplemented by outbreak monitoring, will progressively be replaced everywhere with the elimination-specific 'case-based' surveillance system currently being used in States/Regions engaged in elimination, whereby effectively every case is treated as an outbreak, and emphasis is placed on identifying the time and place of transmission. Essentially similar strategies will be used to investigate suspected transmission foci and suspected outbreaks.

In-line with guidance from the ASEAN Communicable Disease Working Group, NMCP will collaborate with Myanmar's 'Emergency Operating Centre' to progressively integrate malaria-related surveillance into the broader health sector surveillance approach, which includes the Early Warning, Alert and Response System (EWARS) - a web-based system and mobile application for outbreak detection in emergency settings. Malaria outbreak/focus response efforts will also be progressively merged into the existing emergency mechanisms implemented by the multi-task detection and response teams associated with other epidemic-prone diseases.

In support of elimination efforts, urgent steps will be taken by NMCP and MoHS to make malaria a notifiable disease in all elimination and prevention of re-establishment Townships (those that

are receptive and have a Township level API<1). Notification will be mandatory for all sectors including the defence services. As in the case of tuberculosis, malaria notification will be to the TMO at Township level.

The modalities to be used in implementation of malaria case-based surveillance for elimination in non-government-controlled areas will be developed in consultation with each of the EHOs concerned. Hands on support from development partners, including HR, will be needed to support the roll-out of these surveillance activities.

### **3.3.1 Expand, modernize and strengthen the national malaria information system.**

NMCP will work to streamline its multiple systems for collecting electronic case-based data (see 1.16 above) in order to ensure national data is housed in a single database, as well as to eliminate duplicate data entry and reduce the burden of reporting to multiple administrative levels. The new mobile application will continue under the name of Malaria Case-Based Surveillance (MCBS) (the name coined by the WHO supported system developed for health facility level), combining functionalities and sending all data to a single DHIS2. NMCP will also send case-based data from its web-based 'Access® database' to this new MCBS database, allowing public and private sector stakeholders at National, State/Regional, Township and local levels to access real-time data for program monitoring and evaluation as well as malaria surveillance.

In future, data quality audits will be built-in to routine supportive supervision to ensure that data entry standards are strengthened and maintained. All of these efforts will remain in-line with the principles supported in the 'Myanmar eHealth Architecture Blueprint (draft version 2.0)' developed by M-HSCC, MoHS, WHO and the *Principal Recipient* (PR) and co-PR with the support of the Global Fund Secretariat in 2018.

### **3.3.2. Strengthen and continue the roll-out of case-based surveillance for elimination and prevention of re-establishment.**

The transmission focus detection system currently employed in elimination/prevention of re-establishment Townships will be rolled-out progressively to new Townships as they transition from stratum 3b to stratum 3c. This will be achieved through training and supportive supervision for staff at State/Region, Township, District and BHS levels. If feasible, case-based surveillance may be conducted in health facility catchment areas with an API <1/1,000 population even if the overall API at township level is greater than 1/1,000 population. This will help to accelerate the roll-out of case-based surveillance, which is important given the ambitious elimination timeline.

The timeliness of the response is key, and so Myanmar is adopting a '1-7 initiative' whereby 'case investigation, classification and response' and 'focus investigation, classification and response' will be merged into a single package of interventions ('case and focus investigation, classification and response'). This will require malaria cases to be reported within one day and full case investigation and response actions to be taken as early as possible, but within seven days. Performance will be monitored against this 1-7 benchmark.

Where feasible follow-up will be carried out by ICMVs/CHWs or BHS to detect any secondary cases on day 28.

The NMCP will explore ways of increasing case detection as a result of reactive active case detection (ACD) and proactive ACD. This will include teams overnighting at investigation sites and making enhanced efforts to locate patient's co-travellers. Focus investigations will be extended to include forest farms and forest campsites and the necessary incentives or additional manpower required for this will be provided.

### **3.3.3. Maintain outbreak detection and response activities in burden reduction areas.**

Outbreak preparedness will be maintained in strata 3a and 3b through training (integrated) and through the provision of equipment and supplies. A 5% buffer stock of LLINs, insecticide, RDTs

and drugs will be maintained at State/Regional level to deal with outbreaks and natural disasters (stock rotation will be applied with routine supplies to minimize expiry).

Where appropriate the existing outbreak detection system (currently based on the threshold system of 'mean weekly caseload for the last 3 years plus 2 standard deviations') will be revised to improve sensitivity in light of recent steady reductions in caseload.

As with case-based surveillance in elimination/prevention of re-establishment settings, the timeliness of the response is key, and so again a '1-7' approach is being adopted. This will require malaria outbreaks to be reported within one day and full outbreak investigation and response actions to be taken as early as possible, but within seven days.

#### **3.3.4. Strengthen national capacity for epidemiological analysis for policy and decision making.**

Technical partners will support the strengthening of national capacity for epidemiological analysis for policy and decision making. NMCP staff and other departmental staff at central and sub-national level (e.g. Field Epidemiology Training Programme) will be trained. Epidemiological situation analyses will be carried-out on a monthly basis<sup>26</sup> to ensure appropriate responses to any situations that might develop. Analyses will be parasite species-specific and will take age and gender of cases into consideration. The NMCP will thereby make better use of information collected to design improvements in interventions and increase impact.

### **3.4. INTERVENTION 4 (SUPPORTING ELEMENT 1). Expanding research for innovation to accelerate malaria elimination and improve delivery of services.**

A comprehensive package of needs-based operational research will be supported as far as funding permits. NMCP will work in collaboration with national and international experts and institutes to develop research capacity and improve the quality and relevance of research outputs. Research will aim to address bottlenecks in operations and find innovative ways to address residual malaria transmission (RMT) and effectively deliver services to hard-to-reach populations. All research by NMCP partners will be declared to NMCP and carried out in collaboration with NMCP counterparts following the approval of the Myanmar Ethics Review Committee.

#### **3.4.1. Conduct operational research and surveys.**

From the outset, implementation of the various interventions described in 3.4 above will go hand in hand with observational field studies assessing utilization of the various tools amongst each of the different forest-goer and other high-risk groups so that the approach can be fine-tuned as necessary. Given the elimination timelines, research must focus on 'learning by doing' rather than 'learning then doing'.

Research priorities will be reviewed annually and revised as necessary but initially at least, as well as all of the interventions listed under 3.3.4 above, topics are likely to include: Innovative vector control measures; Community and facility based malaria surveys; Mobile and migrant malaria surveys; Decision-making, resource allocation and financial authority within households; Remote sensing to assess risk for difficult to reach populations; Tools to address residual malaria transmission; Microepidemiology of malaria in forest transmission foci; Anthropological studies on forest goers; the impact of Ivermectin specifically for forest goers; Barriers to access for high risk groups; Locally appropriate tools for mobility assessment; New drugs (Tafenoquine); New treatment regimens (e.g. PQ for 7 days); New diagnostic tools (including quantitative point-of-care RDTs for G6PD deficiency); and, Innovative mHealth applications (mobile apps for health).

#### **3.4.2. Conduct annual review of research.**

A Surveillance, M&E and Research Technical Working Group will conduct six-monthly technical reviews of research findings to strengthen coordination amongst the many partners currently

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<sup>26</sup> This is in addition to the real-time analysis that will be part of case-based surveillance for elimination.

involved in malaria related research in Myanmar. This is a sub-group of the 'Malaria Technical and Strategy Group' or of the 'Malaria Scientific Working Group' (coordinated by the DMR and WHO as Secretariat). Regular TWG meetings will be held to identify and address research priorities and to ensure a coordinated national approach.

A committee will be established within MoHS (with DMR as Secretariat) to place special emphasis on moving proven new interventions and approaches quickly towards operational adoption. An open access research registry website will be established by DMR to allow interested institutions/researchers to access topics of interest including submission procedures, ethical regulations, potential funding sources, informal results, publications, QA forums, etc.

### **3.5. INTERVENTION 5 (SUPPORTING ELEMENT 2). Strengthening the enabling environment.**

The adoption of the elimination strategy increases the need for leadership and management in the NMCP. The MoHS will ensure that leadership of the malaria elimination agenda remains a high priority within the National Health Plan to ensure strong political commitment and adequate financial support for elimination. Operations will need to be managed with rigor and flexibility, supported by robust monitoring and quality control. The NMCP will need to be responsive to the evolving needs of the elimination effort in order to accelerate programmatic impact. Partners will provide support covering a broad range of NMCP areas and will work with the NMCP and WHO to strengthen the leadership and management capacity of the NMCP. The NMCP will provide effective management and coordination to enable rapid and high-quality implementation of the elimination strategy.

#### **3.5.1. Support the National Malaria Elimination Committee (NMEC).**

The NMCP will continue to support the high-level multi-sectoral NMEC. The NMEC includes representatives from NMCP, MoHS and INGOs/NGOs. The NMEC has working and executive groups. A key priority for this committee will be to ensure that the leadership of the malaria elimination agenda remains vivid throughout, until WHO certification has been achieved. The NMEC will also ensure that essential malaria elimination activities remain in the *Universal Health Care's Essential Package of Services*. The NMEC will also develop policy to ensure engagement of all sectors (private, public, community, defense services and EHOs) in malaria elimination activities.

The NMCP will also support Township Malaria Elimination Committees (TMEC). The TMECs will include representatives from VBDC, BHS, NGOs, Township administrators, security services, drug sellers, private practitioners and community representatives. A key priority for this group will be to ensure engagement of all sectors in malaria elimination activities at the Township level.

#### **3.5.2. Policy review, strategy development and programme planning.**

There will be regular sessions of policy review, strategy development and programme planning. A strong participatory approach with clear roles and responsibilities of all partners concerned, annual plans from partners and quarterly meetings to exchange information and consultations between WHO, partners and the NMCP will be encouraged and promoted to better coordinate malaria elimination efforts and facilitate resource mobilization.

*3.5.2.1. Progress review and strategy development.* There will be a biannual review of progress. Strategies, guidelines and SOPs will be reviewed periodically in light of surveillance data and research findings (from both Myanmar and beyond) and taking into consideration any changes in normative guidance. Documents will be revised as appropriate. Diagnostic and treatment guidelines will be revised as necessary. Epidemiological surveillance regulations (and related SOPs for supervision and M&E) and SOPs for elimination will be revised as required. The NMCP will support an annual entomological review workshop. The insecticide resistance status of malaria vectors (derived from 'epidemiology-led entomology for problem solving') will be reviewed and

action plans developed as appropriate. Where appropriate, components of other public health programmes will be integrated into malaria control/elimination, maximizing synergies where possible (e.g. through ICMVs/CHWs). Special emphasis will be placed on ensuring effective implementation of programme activities in conflict areas through collaboration with defence services and EHOs.

*3.5.2.2. Update malaria risk stratification annually.* The stratification of malaria risk will be updated on an annual basis (each village will be identified by its MIMU<sup>27</sup> code). The movement patterns of migrant groups will be monitored by NMCP and partners using specially developed mapping tools that will be designed to assist with the targeting of appropriate interventions based on each group's source of vulnerability. Where appropriate, interventions targeting mobile populations will focus on the populations while settled rather than while in transit.

*3.5.2.3. Malaria programme review.* WHO and NMCP will support an external/joint malaria programme review (MPR) every 3 years.

*3.5.2.4. Malaria risk management.* The NMCP will work with other government departments (Ministry of Agriculture, Ministry of Defence, etc.) both at Central and State/Regional levels to ensure that it is fully informed regarding actual or expected population movements (including larger scale international travel) and on major construction/development projects likely to impact on the malaria situation.

NMCP will advise government bodies reviewing impact assessments for major projects in endemic areas. National contingency plans will be drawn-up in accordance with the most likely risk scenarios. These will specify the channels to be used to transfer emergency funding to ensure speedy mobilization of the necessary resources.

*3.5.2.5. Develop NSPME 2026-2030.* In 2025 the next NSPME (2026-2030) will be developed by NMCP in consultation with a broad range of stakeholders.

### **3.5.3. Financial management.**

The MoHS, in consultation with a broad range of stakeholders, is developing a health financing strategy in order to implement the NHP and expand service coverage and service delivery capacity towards attaining Universal Health Care (UHC) by 2030. A National Health Financing Task Force has been established and the NHP 2017-2021 has been developed. This aims to pave the way for universal provision of the essential package of health services, as well as implementation of a coherent health financing strategy. The NMCP will take steps to ensure that malaria elimination is factored into this to ensure that the finances required to 'finish the job' are available over the coming ten years. Efforts will be made to clarify the domestic contribution to malaria in terms of direct allocation per budget line (HR, infrastructure, commodities, etc.) to assist with gap analyses and mobilization of financial resources.

The NMCP will explore ways to mobilize resources for malaria elimination beyond just relying on increased domestic resources, including sustainable regional financing options. It will aim for reduced donor dependency by 2025. The NMCP will develop an engaging 'Malaria Road Map' as an advocacy tool for mobilization of domestic and international funding partners. The NMCP will also join forces with members of the corporate sector to tap resources from corporate social responsibility funds and new initiatives like M2030<sup>28</sup>.

Implementing partners, directly financed by donors, will start earmarking their funding allocation to be spent at State/Region and Township levels in order to pave the way for handing over managerial tasks to Central and State/Region level staff and thereby increase ownership and accountability.

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<sup>27</sup> Myanmar Information Management Unit.

<sup>28</sup> <https://m2030.org>

With the support of WHO, and in an effort to strengthen the managerial and financial capacity of Central, State/Region and Township health teams, NMCP will work with the Global Fund to explore ways to move from cash on delivery to direct funding.

The NMCP and its partners will continue to provide sound financial management in-line with National guidelines (and in-line with internationally recognised best practice).

#### **3.5.4. Advocacy.**

A broad-based advocacy package targeting decision makers and community leaders at Central, State/Regional and Township level will be developed in close consultation with the TSG and the M-HSCC to foster inter-sectoral collaboration, continuous monitoring and timely collective action. NMCP experiences, best practices, successes and lessons learnt will be documented and consolidated and disseminated amongst stakeholders. NMCP representatives will provide regular briefings to government ministers and opinion leaders.

The NMCP will investigate sustainable regional financing options and adopt innovative mechanisms to mobilize resources for elimination.

A 'Malaria Road Map' will be developed as an advocacy tool. The aim will be to maintain political support and leverage funding, both domestic and international

#### **3.5.5. Multi-sectoral collaboration.**

This NSPME 2021-25 has been developed in-line with Roll Back Malaria's Multisectoral Action Framework for Malaria, which calls for the defeat of malaria through holistic inter-organizational and inter-agency efforts that promote participation of affected communities, as well as action across inter- and intra-national boundaries, and at all levels in multiple sectors. The NMCP will work with partners to demonstrate to senior members of Government (including Ministers of non-health sectors), business partners and other key stakeholders that less malaria translates into healthier and more productive workforces, creates the conditions that attract investment and trade, and results in economic growth and development. The NMCP and its partners will work with the Ministry of Agriculture, Livestock and Irrigation, the Ministry of Planning and Finance, the Ministry of Transport and Communication, the Ministry of Forestry, the Ministry of Natural Resources and Environmental Conservation, the Ministry of Electricity and Energy, the Ministry of Labour, Immigration and Population, the Ministry of Construction, the Ministry of Defence, the Ministry of Home affairs, the Ministry of Education, and the Department of Meteorology. The NMCP will also work to optimise intra-sectoral collaboration within MoHS (the Department of Medical Research, the Department of Food and Drug Administration, the Department of Occupational and Environmental Health, the Health Literacy Promotion Unit and the National Health Laboratory), exploring possibilities and maximizing synergies to accelerate progress towards elimination wherever possible.

Efforts will be made to mainstream malaria wherever possible, addressing both the causes and effects of malaria in an effective and sustained manner – that is, within the context of the normal functions of a sector, organization or community. Receptive stakeholders from the non-health sectors will be invited to join actors with expertise in malaria to jointly examine the determinants of the disease from a societal, environmental, population and household perspective, and to explore how their sector may be affected by, or could influence, these determinants. These stakeholders are often well placed to address the malaria needs of their own staff and their families, as well as of their clients (e.g. students or farmers) or business partners. They will be supported to examine whether their operations, practices, procedures or production systems may be contributing to, sustaining, or increasing vector abundance, parasite transmission, insecticide or drug resistance. If they are, then mitigation strategies that can be readily integrated in the routine activities and budgets of the sector concerned will be agreed and implemented.



### 3.5.6. Climate change.

Myanmar is already vulnerable to extreme weather events, such as cyclones and floods, and is highly vulnerable to climate change, particularly in the southern lowlands. Climate change will likely result in significant variation in rainfall pattern which will affect the burden of vector-borne diseases. Burden is likely to rise in some areas and fall in others. The NMCP will monitor the situation and consider developing an early warning system for climate change related malaria outbreaks if appropriate.

### 3.5.7. International cooperation.

*3.5.7.1. Regional cooperation.* The Global Fund supported Regional Artemisinin Initiative (RAI) was launched in 2013 in response to the emergence of artemisinin resistant malaria in the GMS. Funded by the Global Fund, the first RAI round (2014-2017) was a US\$100 million grant covering Cambodia, Laos, Myanmar, Thailand, and Viet Nam. A follow-on investment was made for 2018-2020 as an expansion of the RAI as the RAI2E (elimination) grant, with a total value of US\$243 million over a three-year period. A further investment in the form of the next RAI grant (RAI3E) is expected for 2021-23. 15% of the current RAI2E is allocated to a regional initiative and this approach may continue in the new grant. This regional component of the grant, which functions under the leadership of the Regional Steering Committee (RSC),<sup>29</sup> covers six work 'packages':

1. Extending access to malaria services among migrant, mobile, ethnic and vulnerable populations
2. Stimulating operational research and innovation to guide policy
3. Pharma component to ensure availability of quality health commodities across the GMS
4. Strengthening regional surveillance via WHO's Mekong Malaria Elimination Programme
5. Monitoring anti-malaria drug efficacy and treatment policy by WHO (TES)
6. Multi-sectorial collaboration.

Myanmar's health sector governance mechanism, the M-HSCC, will work closely with the RSC to ensure that, as country priorities evolve, the RSC also evolves and continues adding value.

*3.5.7.2. Cross-border elimination initiatives.* A bilateral China-Myanmar border malaria elimination project is being implemented in 23 Townships of Kachin State, Shan State (East) and Shan State (North). The project covers all of the interventions and supporting elements identified in this NSPME. The total budget for 2020-22 was about US\$12.5 million. The aim from China's perspective is to eliminate malaria in States/Regions of Myanmar that border China, and thereby minimize the number of cases being imported from Myanmar and prevent reestablishment of transmission in Chinese counties that are now malaria free.

Since 2014 there has been a high-profile collaboration between Myanmar and Thailand in Tanintharyi Region, where twin-city initiatives are implemented. Activities include border screening, bilingual messaging, border meetings, and IRS. IRS is carried-out along both sides of the river border to maintain a *cordon sanitaire* (covering a population of about 6,000 people on the Myanmar side).

Similar cross-border collaboration with India and Bangladesh is also ongoing as part of WHO-SEARO's Cross Border Collaboration Framework to reduce disease burden and prevent the emergence/spread of drug resistance from western Myanmar (Sagaing Region and Chin State) to northeast India. The NMCP will establish a special taskforce to deal with the situation in Paletwa Township in Chin State, which has the highest malaria burden of any Township in Myanmar, and several unofficial crossing points into Bangladesh and India.

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<sup>29</sup> The RAI RSC, a multi-stakeholder governance body, provides strategic guidance, selects recipient implementers, and oversees grant implementation, tracks progress against programme objectives and ensures funding is used in accordance with agreed strategic priorities.

Significant access restrictions remain in some areas and this has hampered the implementation of malaria elimination efforts especially in Rakhine State. The NMCP will continue to flag this and other issues undermining its efforts, using all relevant regional platforms (including the *Asia Pacific Leader's Malaria Alliance* and the RSC).

If appropriate the NMCP will engage with NGOs specialized in working in complex emergency situations in order to better access these underserved populations.

#### **3.5.8. Technical assistance.**

Myanmar benefits from the support of a number of technical and implementing partners across the country, and this support, including long-term advisors and short-term consultants to deal with specific issues, will continue as required. All partners realize the importance of building NMCP capacity to undertake technically demanding surveillance for malaria elimination.

WHO has been instrumental in strengthening the overall surveillance and response/data management system and increase the capacity of nationals to perform accurate and regular data analysis and reporting. WHO is also providing support in developing guidelines, SOPs, strategic plans, M&E plans, funding applications for resource mobilization from donors including the Global Fund, training materials etc. WHO is also supporting the piloting and expansion of the DHIS2.

JICA launched a malaria elimination technical assistance project in 2016. The project aims to strengthen technical capacity and supports large-scale intervention studies, surveillance, information management systems, geographical information systems (GIS), and HR development from central to community level. The project works in 36 Townships in Bago Region, Magway Region, Mandalay Region and Nay Pyi Taw.

The support provided by PMI is mainly through the 'Defeat Malaria Project' which provides comprehensive prevention and case management services for more than 2,900 villages and worksites in 36 Townships of Rakhine and Kayin States and Tanintharyi and Sagaing Regions. Technical assistance is focused on strengthening entomological and epidemiological capacity in partnership with the United States Centers for Disease Control and Prevention and supporting the DFDA to achieve international standards in drug quality assurance. Through its partners PMI also provides technical assistance on policy-level advocacy, capacity building, training at different levels, monitoring the physical and insecticidal durability of LLINs and capacity development for operational research.

#### **3.5.9. Human resources (HR).**

Technical capacity within the NMCP has declined in recent years due to a number of factors, including an ageing workforce, limited opportunities for high-level training and increased staff attrition due to recruitment by partner agencies. Urgent steps need to be taken to strengthen capacity at all levels of the health system in-line with the demanding requirements for elimination. The NMCP will develop and implement an approach to attract, incentivize and retain key skilled staff to fill all essential vacant positions.

*3.5.9.1. Develop HR development plan.* The NMCP will conduct a comprehensive review of existing human resources and identify gaps in relation to changing requirements as the focus of the programme evolves from transmission reduction to elimination. Due to the need for strong surveillance systems and high-quality operations, human resources will need to be increased at all levels. There is a particular need already identified at Township level. Although the required staff increases may appear disproportionate to the disease burden it can be justified by overall programme goals.

For existing NMCP staff a training needs assessment will be carried out.

The NMCP's HR development plan will be updated on an annual basis. The resulting HR plans will ensure that the focus on malaria specific expertise remains as elimination approaches.

**3.5.9.2. Training.** A comprehensive programme of training and needs-based refresher training will be implemented to strengthen service provision in all programmatic areas. This training will be integrated wherever practical to maximize cost effectiveness and minimize transaction costs for participants. Training will include everything from the elimination-specific 'Management of Malaria Field Operations' (MMFO) course (organized by national and international experts) to in-house training for ICMVs/CHWs in the periphery. Access to higher level training courses will be competitive and merit based. In the immediate future, staff at all levels will receive reorientation training to support the move from a control focus to an elimination focus. Training at Township level will aim to empower and motivate VBDC and Township staff to proactively engage in inclusive health planning and coordinate integrated community responses.

Training will aim to:

- Ensure the focus on malaria specific expertise remains as elimination approaches: Empower and motivate VBDC and Township staff, including partner's staff, to proactively engage in inclusive health planning, coordinate integrated community responses and ensure relevant malaria elimination activities remain in the integrated package of services.
- Build the capacity of TMOs on malaria elimination and epidemiological concepts to utilize in programme management.
- Strengthen capacity for forecasting, procurement and supply chain management.

**3.5.9.3. Support specialized training for senior technical staff.** Specialized training will be supported for senior technical staff at Central, State/Regional and Township levels (entomologists, epidemiologists, M&E specialists, sociologists, BCC specialists etc.). Technical and managerial capabilities will be strengthened at Central and State/Regional levels through international exchange visits.

#### **3.5.10. Infrastructure development, maintenance and running costs.**

Infrastructure strengthening and maintenance will be supported. Buildings, vehicles and equipment will be insured and maintained and their running costs at Central level and in the periphery will be supported. Opportunities for integration will be sought wherever possible.

#### **3.5.11. Procurement and related quality assurance (QA).**

**3.5.11.1. Procurement.** Vehicles, equipment, commodities and consumables will be procured as required. All procurement will be carried out in strict accordance with national guidelines. A nationwide integrated procurement management system, incorporating details regarding all procurements irrespective of funding source, will be developed to allow managers to review procurement status of all products. National stock review meetings will be held on a monthly basis.

**3.5.11.2. Quality assurance (QA) for programme commodities.** Quality assurance will be managed according to SOPs. Samples will be taken from all batches of insecticide and insecticide treated materials both post-production and on receipt. Bioassays will be carried out in-house and samples will be sent for chemical testing at WHO collaborating centres prior to deployment to ensure that they are within the specifications set-out in the manufacturer's product documentation. Sub-standard products will be rejected and returned to the supplier.

'On receipt batch testing' for RDTs and antimalarials will be carried out. The samples will be sent for testing at WHO collaborating centres prior to deployment to ensure that they are within the specifications set-out in the manufacturer's product documentation. Sub-standard products will be rejected and returned to the supplier.

### **3.5.12. Supply.**

As malaria cases continue to decline rapidly in many areas in Myanmar, forecasting of antimalarial supply needs will require careful monitoring and adjustment to avoid over-supply and waste. The NMCP will adopt a pro-active approach at local level to re-distribute stocks of antimalarials between health facilities as necessary to minimize waste.

The NMCP will also build human capacity and systems at national and subnational levels in good time to take over full responsibility for forecasting, procurement and supply chain management as the GF phases out its support in the coming years. Supply systems will be strengthened through training, supervision and system updates. Logistics strengthening workshops will be held periodically. The NMCP will provide strong supportive supervision from Central and State/Regional level to ensure efficient programme logistics in-line with national SOPs. The NMCP will also develop and introduce an SMS based supply management system in collaboration with MoHS, which will ensure data visibility in the supply chain. The eLMIS will gradually be expanded to Township level.

A system for the collection and proper disposal of expired antimalarials will be established, wastage will be monitored and mitigation measures put in place.

### **3.5.13. Community involvement.**

Malaria prevention must go hand in hand with community participation. Unless individuals in communities see the merits of preventing the illness, even the best-designed prevention strategies might not be used. The NMCP will provide support for elimination of malaria through comprehensive behaviour change communication (BCC), community mobilization and advocacy. The NMCP's BCC technical working group (BCC-TWG) will work with health authorities and implementing partners to educate the various target populations on malaria and its prevention.

The BCC-TWG will review advances in IEC/BCC approaches elsewhere in the region and beyond and work towards developing a more holistic and intersectoral approach to strengthening the impact of malaria elimination efforts through the synergies that can be achieved by combining IEC/BCC with integrated vector management, community development and income generation schemes.

Where appropriate attendance at BCC sessions will be maximized through the use of non-monetary incentives.

*3.5.13.1. Provide expert management of BCC effort.* The IEC/BCC technical working group will hold two meetings per year (integrated into routine NMCP review meetings) and *ad hoc* meetings as necessary. BCC activities will be coordinated with other health programmes.

*3.5.13.2. Update BCC methodology periodically.* Every three years the NMCP will conduct an assessment of BCC methodology and approaches and revise as appropriate.

*3.5.13.3. Develop IEC/BCC materials.* The NMCP will work to develop target group specific, multilingual and locally appropriate IEC/BCC materials and methodologies. Materials are likely to include tablet-based tools, IPC aids, audio and video sketches/presentations, billboard, posters brochures, articles and pamphlets. The approach will be tailored to the specific requirements of the target groups and to the specific requirements of elimination. Products will be developed using a bottom-up approach whereby the program's target groups are themselves engaged in the process of problem solving through IEC/BCC. The NMCP will advocate to align the message with the Standard Health Literacy Promotion Booklet published by Ministry of Health and Sports. Key messages are likely to cover: Care of LLINs and washing practices; The importance of sleeping under an LLIN; The importance of LLINs; The benefits of a range of promising new interventions for the prevention of forest-based transmission; The dangers of sub-standard and falsified antimalarials; The importance of compliance with the full course of standby treatment; Availability of services (advertising the location of and services provided by ICMVs/CHWs, BHSs

etc.); The importance to the community of all cases being tested and receiving appropriate treatment in an elimination setting. Where appropriate work will be carried out in partnership with a commercial advertising agency.

*3.5.13.4. Produce IEC materials.* Produce key IEC materials (outsourced to a commercial designing and printing agency).

*3.5.13.5. Implement inter-personal communication (IPC).* An IPC-based BCC programme will be delivered by Township hospital and BHS Health Staff, midwives, Traditional Birth Attendants (TBA), ICMVs/CHW and selected communicators (e.g. community leaders, forest going collaborators etc.). Health practitioners and communicators in stratum 3 will be trained on malaria specific IPC skills (integrated into clinical training).

*3.5.13.6. Implement village-based BCC.* Township and BHS staff, and ICMVs/CHWs will work together to implement village-based BCC campaigns during mass LLIN distribution. In addition, in selected villages ICMVs/CHWs will deliver monthly BCC messages through public announcements (PA) systems.

*3.5.13.7 Implement mobile phone-based BCC.* A mobile phone-based BCC programme will be implemented targeting migrants and mobile populations. BCC messages will target phone users in specific geographical areas that have been designated as high risk. Messages will include details of services available and the program will investigate the feasibility of introducing a fixed number for all ICMV/CHW for which calls would be routed automatically to the nearest ICMV/CHW.

*3.5.13.8. Manage 'World Malaria Day' event.* Every year a large-scale community mobilization event will be held on World Malaria Day (25 April). This is an important opportunity for high level advocacy.

*3.5.13.9. Implement mass media-based BCC.* Mass media-based communications will be employed both at national and sub-national levels, taking full advantage of free opportunities where possible. Activities will include public service announcements on television and radio, participation in chat shows, articles in newspapers etc.

*3.5.13.10. Support socialization of malaria.* Socialization of malaria will be supported by encouraging religious, civil-social, charitable organizations, NGOs and village leaders to be fully involved in malaria elimination. A focal person for malaria socialization will be appointed in each State/Region entering the elimination phase. In association with community leaders at each level, presentations will be made annually to key community groups (during their own scheduled meetings) to update them on malaria related issues and gain their support for programme activities where necessary. The NMCP will work similarly to encourage the private sector, private enterprises and professional associations to actively participate. Coordination will be through quarterly teleconferencing between focal points at adjacent levels (Township to State/Region and State/Region to Central).

#### **3.5.14. Reaching underserved ethnic minorities and marginalized populations in conflict and non-government control areas**

The NMCP will continue with its current modalities of implementing the malaria prevention and control effort through development partners, but more effort will be put into building the capacity and systems of EHOs to ensure that they are able to manage and implement activities by themselves in future. Development partners working in these settings will focus increasingly on EHO's system strengthening rather than direct implementation.

#### **3.5.15. Carry out programmatic supervision and monitoring and evaluation.**

The NMCP will monitor progress and provide robust supportive supervision for public and private sector health care providers including ICMVs/CHWs (see M&E Plan for details).

Regular meetings of the M&E Technical Working Group will be supported.

Malaria Indicator Surveys are no longer appropriate given recent reductions in disease burden. Instead, small well-designed surveys (following protocols standardized across all partners) will be carried-out on an *ad hoc* basis to answer specific questions as required.

## 4. MEASURING PROGRESS AND IMPACT

### 4.1. Monitoring and evaluation

The NMCP will monitor progress and provide supportive supervision for public sector health care providers (including community-based volunteers). It will also support regular meetings of the M&E Technical Working Group. A drug outlet survey will be conducted every 3 years. An external/joint malaria programme review (MPR) will be conducted in 2023.

M&E will focus on four key issues:

- Monitoring the operational aspects of the NMCP, and measuring impact, outcome and process indicators to ensure that the activities are yielding desired results and moving the NMCP towards achieving its operational targets and objectives;
- Monitoring changes in epidemiological indicators resulting from the activities implemented;
- Appropriately interpreting results and informing revisions in policies or strategies, when needed, to help ensure progress; and
- Documenting progress towards malaria elimination.

Information on coverage and quality of interventions, mapping out residual and new active foci of malaria, relevant eco-epidemiological data and first-line treatment efficacy will be a key focus. The details are reflected in the M&E plan 2021-2025.

The NMCP will establish a malaria elimination database for Townships in the elimination phase. This will serve as the national repository for all information related to malaria elimination, and will include the following:

- National malaria case register: a single database of all individual case information from identified sources in the entire country, allowing detailed analysis and synthesis of epidemiological information and trends, which can help to guide the elimination programme over time.
- Laboratory register: a single database, linked to the patient register, which contains all pertinent information regarding the malaria diagnosis of the patient. Comparison of the laboratory and malaria patient registers allows cross-checking for completeness of case data.
- Entomological monitoring and vector-control records: a central repository of information related to entomological monitoring and application of chosen vector-control interventions.

Oversight of the malaria elimination database will be the responsibility of the NMEC, which is independent of the NMCP. Progress will be measured using multiple data sources, including routine information systems, household and health facility surveys, and longitudinal studies. Indicators have been drawn from a set of indicators recommended by WHO.

## 4.2. Milestones and targets

**Table 3: Milestones on the road to the elimination of falciparum malaria.**

	2021	2022	2023	2024	2025
<b>Number of States/Regions free from falciparum malaria</b>	At least 4	At least 8	At least 11	At least 16	17
<b>States/Regions free from falciparum malaria transmission</b>	Yangon Bago Nay Pyi Taw Magway	Mon Eastern Shan Southern Shan Mandalay	Northern Shan Kayah Ayeyarwady	Chin Rakhine Kachin Tanintharyi	Sagaing Kayin

**Table 4: Achievement (●) and maintenance (○) targets for NSPME (2021-2025).**

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Malaria-free status maintained in Townships where malaria transmission has been interrupted (species specific target).	○	○	○	○	○	○	○	○	○	○	○	○
Malaria case-based reporting system for elimination established and maintained in all elimination and prevention of re-establishment Townships.	●	●	●	○	○	○	○	○	○	○	○	○
Incidence <1 per 1,000 population attained and maintained in all States/Regions.	●	○	○	○	○	○	○	○	○	○	○	○
Incidence <1 per 1,000 population attained and maintained in all Townships.		●	○	○	○	○	○	○	○	○	○	○
Interruption of transmission of falciparum malaria.				●								
Malaria morbidity reduced by 95% relative to 2018 baseline.					●							
Zero indigenous malaria deaths achieved and maintained.					●	○	○	○	○	○	○	○
Strategies to prevent the re-establishment of malaria transmission put in place and maintained.							●	○	○	○	○	○
Interruption of transmission of all human species of malaria.									●			
Myanmar certified free of malaria by WHO.												●

## 5. COST OF IMPLEMENTING THE STRATEGY

A significant effort will be required to implement this comprehensive malaria NSPME to keep up the momentum for malaria elimination. An estimated total of USD 545,447,008 will be required for implementation of the planned interventions as elaborated in this NSPME to achieve the target set in the performance framework. The total summary budgets for each intervention by year are as follows in table 5:

**Table 5: National Strategic Plan for Malaria Elimination 2021-25.**

Intervention	2021	2022	2023	2024	2025	Total
1. Early and effective malaria case management.	24,754,265	27,620,201	27,961,568	29,358,123	27,350,851	<b>137,045,008</b>
2. Universal coverage of high-risk populations with appropriate malaria prevention measures.	7,057,815	23,060,076	12,488,532	12,551,142	29,159,073	<b>84,316,638</b>
3. Case-based surveillance for elimination and prevention of re-establishment.	5,876,027	5,483,997	3,473,764	3,530,436	3,700,322	<b>22,064,545</b>
4. Expanding research for innovation to accelerate malaria elimination and improve delivery of services.	486,324	457,108	443,862	439,823	441,506	<b>2,268,623</b>
5. Strengthening the enabling environment.	59,345,258	57,794,579	59,053,416	60,737,173	62,821,767	<b>299,752,194</b>
<b>TOTAL</b>	<b>97,519,689</b>	<b>114,415,962</b>	<b>103,421,141</b>	<b>106,616,697</b>	<b>123,473,519</b>	<b>545,447,008</b>

The current funding landscape is shown in table 5. The Global Fund RAI2E grant (both country and regional components) will end on 31 December 2020. The majority of programme implementation during 2018-20 has been financed through this grant.

**Table 5: Funding landscape as of December 2019.**

	2018	2019	2020	2021	2022	2023	Total
MoHS	9,269,900	11,123,879	13,348,655	22,401,000	20,244,512	20,733,901	<b>97,121,847</b>
GF country	21,045,294	40,110,516	23,733,513				<b>84,889,323</b>
GF regional	1,197,013	2,097,603	2,161,338				<b>5,455,954</b>
PMI	10,000,000	10,000,000	10,000,000	9,000,000	9,000,000	9,000,000	<b>57,000,000</b>
SMRU	1,155,907	1,040,340	1,029,532				<b>3,225,779</b>
ADB	435,000	194,000	434,020				<b>1,063,020</b>
MAM	288,000	375,000	375,000	375,000	375,000	375,000	<b>2,163,000</b>
JICA	416,000	416,000	412,000				<b>1,244,000</b>
WHO	50,000	50,000	50,000	50,000	50,000	50,000	<b>300,000</b>
Access to Health	4,555,662	1,100,000	1,100,000	1,008,247	1,008,247	1,008,247	<b>9,780,402</b>
SCI-SR	8,371	16,932	16,932				<b>42,235</b>
<b>Total</b>	<b>48,421,147</b>	<b>66,524,270</b>	<b>52,660,990</b>	<b>32,834,247</b>	<b>30,677,759</b>	<b>31,167,148</b>	<b>262,285,561</b>

Key to agencies: MoHS, Ministry of Health and Sports; GF, the Global Fund; PMI, President's Malaria Initiative; SMRU, Shoklo Medical Research Unit; ADB, Asian Development Bank; MAM, Medical Action Myanmar; JICA, Japan International Cooperation Agency; WHO, World Health Organization; A2H, Access to Health Fund; SCI, Save the Children International.



The NMCP and other stakeholders are in the process of negotiating with ADB for funding and working with APLMA to identify funding mechanisms for the coming years. The NMCP also plans to apply for a Global Fund grant for the period 2021-2023. Receiving additional funds from funding partners will be crucial to the success of Myanmar's malaria elimination strategy as for the foreseeable future it will be difficult for the government to substantially increase its budget allocation for the NMCP from current levels.

PMI initiated its assistance in 2011 with a five-year programme (2011-16) and a second five-year programme (2016-2021) started in August 2016. It is expected that PMI support will continue for at least a third term. PMI provides technical and financial support, in coordination with the NMCP and in collaboration with various implementing partners. Key areas of intervention are: prevention and vector control; community-based case management; capacity building and training, particularly in entomology and epidemiology; procurement of commodities (LLINs, RDTs, antimalarial drugs) and supply chain management strengthening; drug quality assurance; and, monitoring and evaluation. The Shoklo Medical Research Unit, Medical Action Myanmar, JICA, WHO and SCI also provide valuable technical support as well as financial assistance.

## **6. GOVERNANCE, COORDINATION AND LEADERSHIP**

### **6.1. Political commitment, programme oversight, governance and coordination**

The Myanmar Sustainable Development Plan (MSDP) is the expression of the National development vision – a vision that finds resonance in the global sustainable development agenda. Strategy 4.2 clearly reflects the strengthening of health services systems enabling the provision of Universal Health Care using a path that is explicitly pro-poor. Intervention 4.2.8 focuses to control and combat epidemics such as AIDS, tuberculosis, malaria and neglected tropical diseases, hepatitis, water-borne diseases and other communicable diseases in line with Sustainable Development Goal 3 and target 3.3.

In-line with the Government of Myanmar's prioritization of health, MoHS has taken an active role in providing leadership on Myanmar's malaria elimination activities. As the leader for malaria, NMCP has not only recognized the need for multi-sectoral responses in the context of drug resistance but has also actively engaged and coordinated with stakeholders in search of sustainable and innovative responses, while building country ownership and leadership of activities.<sup>30</sup>

There is very strong political commitment to eliminating malaria in Myanmar. In 2014 the country signed the APLMA declaration to eliminate malaria by 2030. Subsequently, it endorsed the APLMA 'Leaders Malaria Elimination Roadmap'. Then in 2017 the Minister for Health and Sports signed the 'WHO SEARO Countries' declaration to end malaria by 2030<sup>31</sup>. In 2018, the Ministers of GMS signed 'GMS countries declaration to eliminate malaria by 2030' which was led by Myanmar. This unified approach complements and strengthens the work of international and regional organizations such as WHO, the Global Fund and ADB.

The M-HSCC (an expansion of the GF specific Myanmar-Country Coordinating Mechanism) was established in 2013 and takes a leading role in coordination of both governmental and non-governmental sectors. The M-HSCC has a TSG, which is led by the Department of Disease Control, with WHO serving as technical secretariat. Myanmar is one of the few Global Fund supported countries that uses a national governance platform (M-HSCC) that oversees broader health issues

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<sup>30</sup> MOHS. National Strategic Plan for Intensifying malaria control and accelerating progress towards malaria elimination 2016-2020. 2016. p. 29

<sup>31</sup>[http://www.searo.who.int/entity/malaria/sea\\_declaration\\_malaria\\_elimination.pdf?ua=1](http://www.searo.who.int/entity/malaria/sea_declaration_malaria_elimination.pdf?ua=1)

beyond HIV, TB and malaria. In the context of high financial dependency on the Global Fund, this approach places the country in a privileged position to address issues related to integration of malaria into the broader health system strengthening, co-financing and sustainability.

Myanmar has established the NMEC which is responsible for monitoring progress and coordination of elimination activities. The NMEC has the Vice President as Patron and the Minister for Health and Sport as Chairperson. Altogether there are 35 members in the committee.

The TSG is recognized as being a strong and inclusive technical platform for malaria. As the malaria burden falls compared to other diseases, a key focus for the TSG will be to ensure that leadership of the malaria elimination agenda remains vivid all the way along the chain from central to local level. There is already strong political commitment at national and international levels, but commitment at State/Region and Township levels needs to be strengthened. The NMCP and its partners will develop a mechanism to keep the elimination agenda on the map at peripheral level both from a technical perspective and from a broader population centred perspective through awareness campaigns and high level advocacy.

## **6.2. Partnership and coordination**

The Global Fund is the largest contributor of malaria funding in Myanmar at present, providing funding for one half to three quarters of the NMCP since the inception of the Regional Artemisinin Initiative (RAI). It channels its funding through UNOPS as Principal Recipient (PR) which sub-contracts *implementing partners* (IP). NGOs are directly contracted by UNOPS, while INGOs receive their funding via SCI (as sub-PR of UNOPS). For NMCP activities, payments are made on a cash on delivery basis directly by UNOPS. The other IPs include INGOs/NGOs named as SRs. There are numerous SRs under the RAI2E grant, most of which are involved in implementing the NSPME, either technically or in their respective geographical areas.

PMI is the second most important external financier and supports a broad range of malaria elimination related activities including strengthening the entomological monitoring component of focus investigations and strengthening insecticide resistance monitoring and management (with emphasis on capacity development through training). PMI has also been procuring LLINs to cover at-risk-populations in areas not supported under RAI2E (with emphasis on reaching internally displaced people and migrants and mobile populations).

NMCP is managing the programme well with the support of a large number of IPs as well as funders for malaria elimination.

The project style approach that developed in Myanmar in recent years resulted initially in fragmentation and duplication of effort between different IPs. More recently however, there has been a significant improvement in inter-partner coordination. Duplication of activities at Township level is now more of an exception than a rule. NMCP now has a much clearer picture of the overall mapping of interventions across the country.

Coordination at Township Health Committee level has started but remains challenging due to limited HR capacity and competing health priorities. Some IPs are working in the same Township, which makes coordination for local authorities challenging. In future the NMCP will restrict the number of IPs to just 1 per Township.

A Malaria Elimination Task Force will be established in each Township to support advocacy for elimination, ensure political engagement, keep the approach alive as the disease become less visible and act as liaison between Townships and the NMCP. The NMCP will enhance multisectoral partnership and collaboration by engaging with other government sectors such as education, forestry, mining and agriculture in order to mobilize their support.

## **iv. Annexes**

### **Annex 1. Development of the Strategy**

This National Strategic Plan for Malaria Elimination (2021-2025) has been developed in-line with the *WHO Global Technical Strategy (2016-2030)* and the *Strategy for malaria elimination in the Greater Mekong Subregion (2015-2030)*.

The development of this NSPME started with a first consultation meeting among the ‘Technical Strategic Group for Malaria’ (TSG-Malaria) on 28 June 2019 to agree on the framework of the NSPE. This was followed by a second ‘National Consultation Workshop’ on 22-23 October 2019, which was attended by over 70 participants representing government officials, civil society organizations, private sectors, donors and WHO Country Office Staff and international consultants.

The first draft of the overall NSPME document was prepared by NMCP in partnership with WHO and in close consultation with the Director (Disease Control) and Deputy Director General (Disease Control). The draft was circulated amongst stakeholders in September 2019. Consultation with Ethnic and Community Based Health Organization (ECBHO) was held on 7-8 November 2019 in Mawlamyine to hear the voices of ethnic health organization on the overall health situation including TB, HIV and malaria and priority activities to be included in the NSP as well as in Concept Note. The country dialogue for the NSPME with national authorities, civil society organizations, private sector health and non-health, corporate sectors and human rights and gender groups was done on 14 and 15 November 2019. The feedback and comments from these dialogues were fed into the NSPME. The revised final version was circulated on 30 November 2019 to all stakeholders. This NSPME was endorsed by TSG-Malaria on 4 December 2019.

The strategic planning process has thus been broad based and inclusive of all relevant stakeholders. The strategy fully supports Sustainable Development Goal (SDG) 3, to ‘Ensure healthy lives and promote well-being of all at all ages’ and the National Health Plan (2017-2021) which focuses on Universal Health Coverage. This will also be a guiding document to develop the National Health Plan (2022-2026). As well as serving to guide to support planning and implementation, this strategy provides a tool with which to apply for funding, both domestic and external.

## **Annex 2. Health care system in Myanmar**

The Ministry of Health and Sports (MOHS) is responsible for improving the health status of the people through provision of comprehensive health services, covering promotive, preventive, curative and rehabilitative services. The MoHS is under the Union Minister of Health who is assisted by two Deputy Ministers. The Ministry has six functioning Departments, each under a Director General: Department of Medical Services, Department of Public Health, Department of Medical Research, Department of Food and Drug Administration, Department of Health Professional Resource Development and Management and Department of Traditional Medicine. All these Departments are further divided according to their functions and responsibilities. Collaboration with related Departments and social organizations is promoted by the Ministry and maximum community participation in health activities is also encouraged.

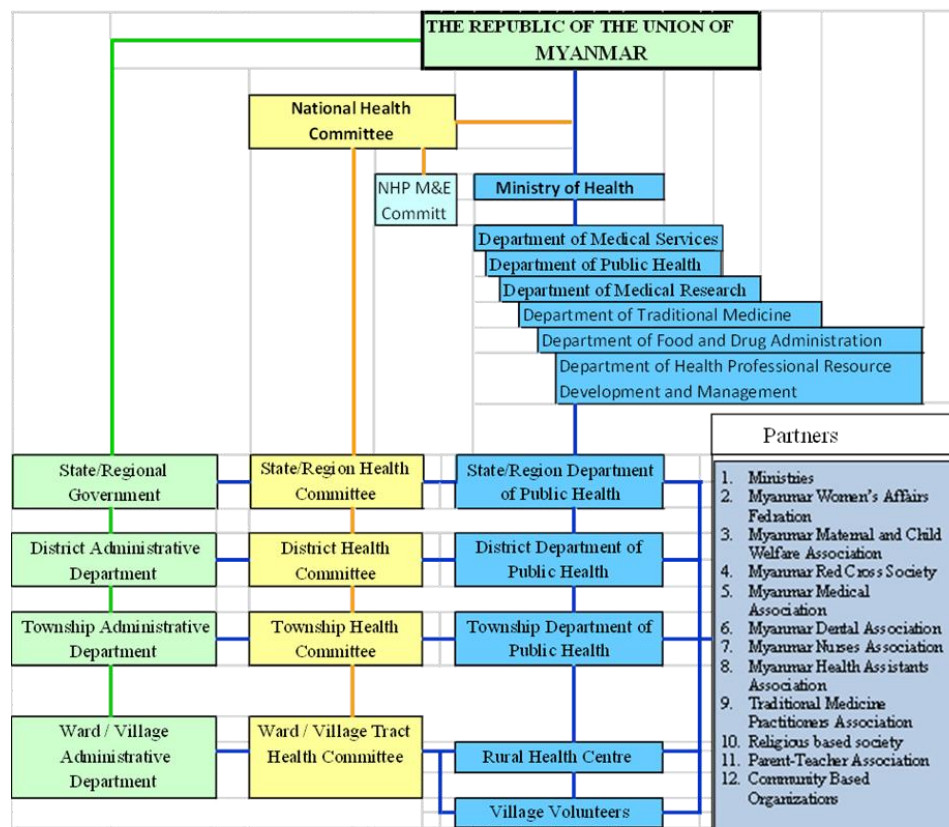
The MoHS remains the major provider of comprehensive health care as well as the main organization for health care provision in Myanmar. It has a pluralistic mix of public and private sectors both in financing and provision. Health care is organized and provided both by public and private providers. The Department of Public Health plays a major role in providing comprehensive health care throughout the country including remote and hard to reach border areas. Since 1978, health services have been integrated with vertical programmes streamlining into Basic Health Services through the Primary Health Care approach. Some Ministries also provide health care, mainly curative, for their employees and families.

The private for profit sector mainly provides ambulatory care though some, in recent years, also provide institutional care. Funding and provision of care is fragmented. They are regulated in conformity with the provisions of the law relating to Private Health Care Services. One unique and important feature of the Myanmar health system is the existence of traditional medicine along with allopathic medicine. Traditional medicine is well accepted and utilized by the people.

In line with the National Health Policy, NGOs also contribute to provision of services. Their roles are becoming important as the needs for collaboration in health become more prominent. Sectoral collaboration and community participation is strong in the Myanmar health system, a result of the establishment of the NHC in 1989.

It is a high level inter-ministerial and policy-making body concerning health matters. It takes the leadership role and gives guidance in implementing health programmes systematically and efficiently. Under the guidance of the NHC, various health committees are established at each administrative level (figure 1).

**Figure 1: Organization of health services in Myanmar.**



(Adapted from Health in Myanmar 2014)

The Ministry of Health and Sports has organized 3 task forces and 12 working groups, including a working group on communicable diseases, for formulation of short term and long term plans and to foresee and address emerging health issues.

The 'Myanmar Health Sector Coordinating Committee' (M-HSCC) (an expansion of the GF specific 'Myanmar-Country Coordinating Mechanism') was established in 2013 to govern with increased transparency on health matters. Its creation ensured broad consultation of both government and non-government sectors.

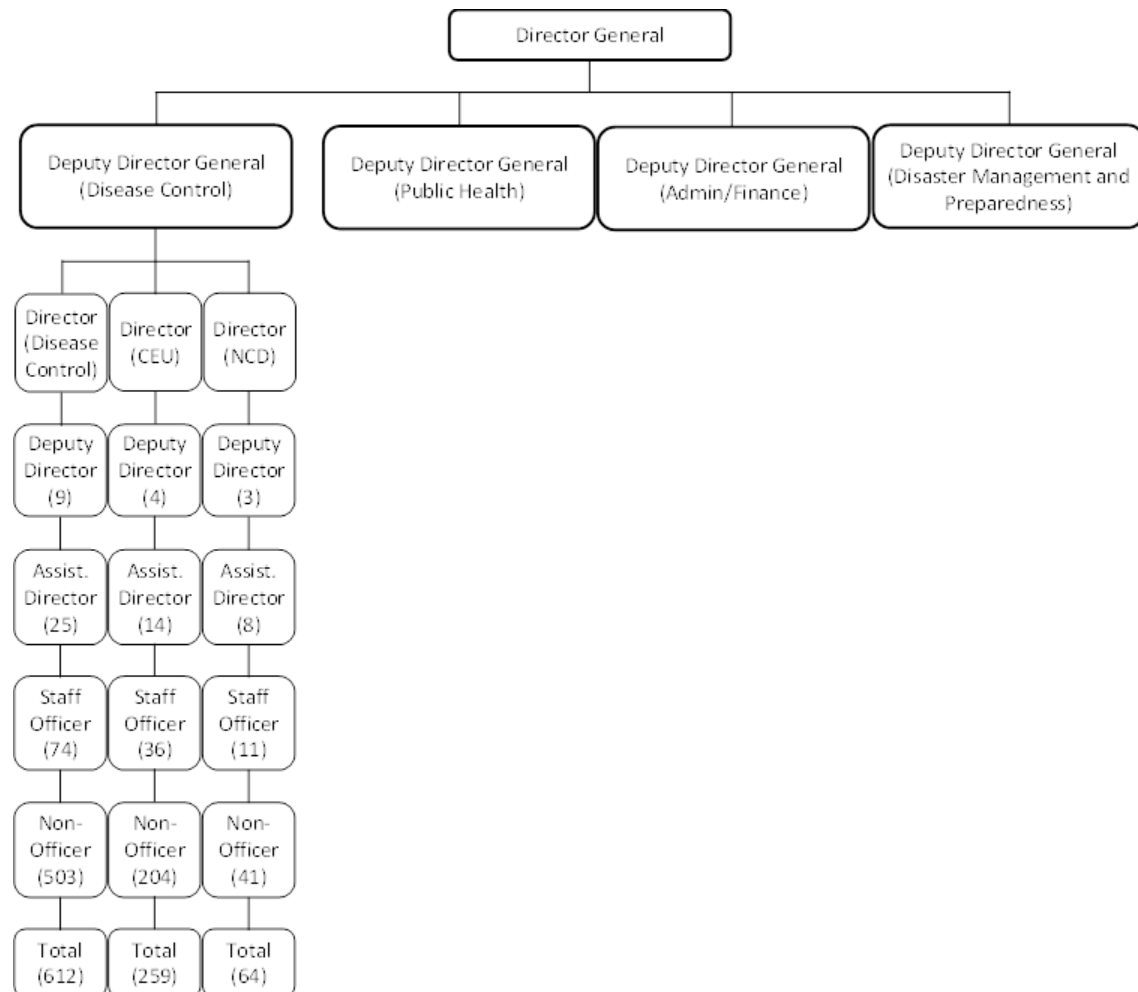
In line with the National Health Plan and its supporting strategies, the M-HSCC has 7 TSGs including one for malaria. TSGs support the M-HSCC in its oversight of the National Health Plan and its supporting strategies. The Malaria TSG is led by the Department of Disease Control with the Deputy Director General as patron, Director Disease Control as chair, the Deputy Director Malaria (Central VBDC) as vice-chair. Secretarial support is provided by WHO. Their mandate is to provide technical guidance in the development of national strategies, to provide coordination among partners, and to provide clarity on major technical and policy issues. The TSG meets periodically to discuss, review and endorse certain proposals, reports and other documents and carry out the assignments given to them and provide broad oversight of the implementation of grants and projects as required. All formal activities/meetings are documented and reported to the M-HSCC Secretariat.

The TSG-Malaria appoints a working (the Core Group for TSG-Malaria) to deal with specific tasks. This Core Group is made up of a mix of M-HSCC members and non-M-HSCC members from the TSG selected based on the area of work in question and the expertise of the candidates. The TSG

works closely with the M-HSCC Executive Working Group to provide the best support to the M-HSCC to perform its oversight function. Membership of the TSG is open to those engaged in programmatic and technical issues.

The Department of Public Health (DOPH) (figure 2) is responsible for providing health care services including malaria prevention and control under the supervision of the Director General (DG) and four Deputy Director Generals (Deputy DGs).

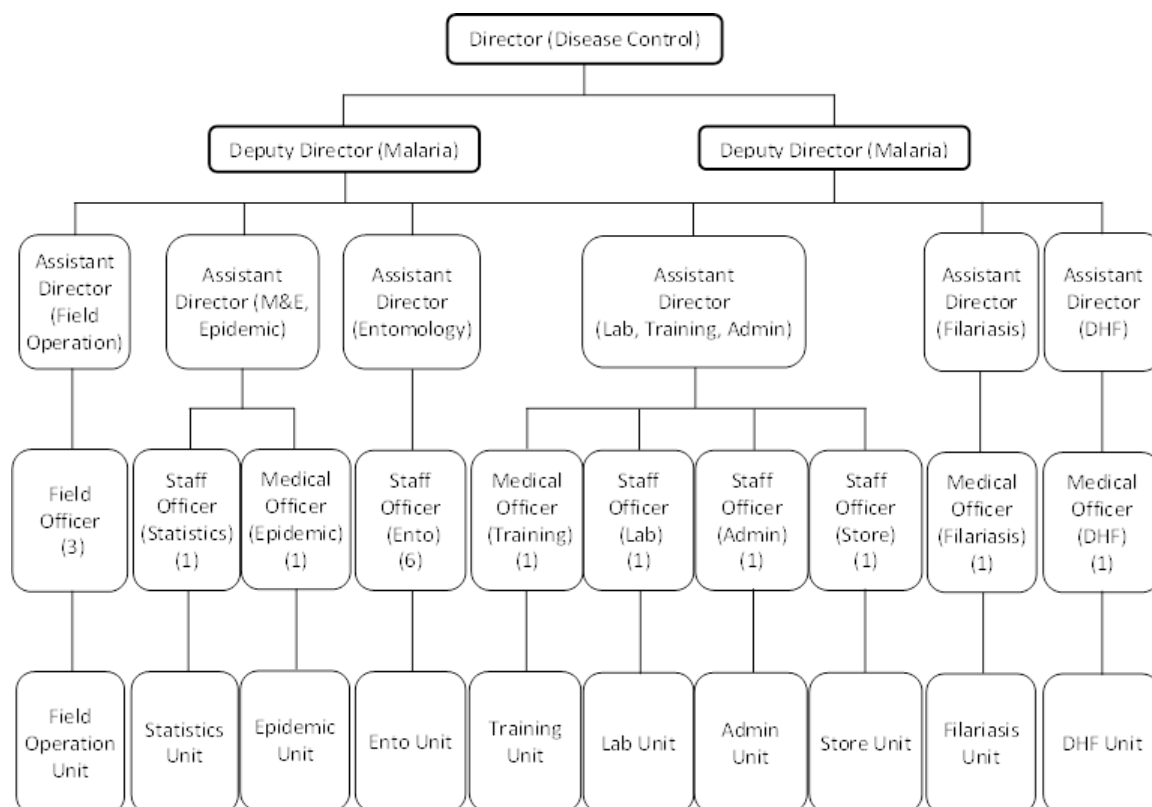
**Figure 2: Organogram of DOPH (Emphasis on Disease Control section).**



Source: NMCP, DOPH, 2015

The Department of Public Health consists of a Public Health Section and a Disease Control section; the latter headed by Director (Disease Control) covers prevention and control of Malaria, TB, HIV/AIDS, Leprosy and Trachoma and Prevention of Blindness programmes. This section is responsible for the prevention and control of respective diseases including disease surveillance, outbreak investigation and response, and capacity building and operational research.

**Figure 3: Organogram of Central VBDC.**



Source: NMCP, DOPH, 2015

The National Malaria Control Programme (NMCP) is under the VBDC Programme headed by two Deputy Directors; one for Malaria and one for DHF, filariasis and other vector borne diseases (figure 3). Since 1978, the VBDC Programme has been responsible for control of malaria, dengue, lymphatic filariasis, chikungunya and Japanese encephalitis. Most of the staff and resources of VBDC at all levels, except in the bigger cities are focused on malaria.

The NMCP works particularly closely with the following government departments in order to implement key activities:

- The Department of Medical Services (which is responsible for medical supplies and management of hospital services) to collect hospital data on malaria morbidity and mortality.
- The National Health Laboratory (NHL) to implement quality assurance of hospital based malaria microscopy.
- The Food and Drug Administration Department for registration of antimalarials, quality control of antimalarials, control of counterfeit, sub-standard and unregistered antimalarials and implementing the ban on oral artemisinin monotherapy (in collaboration with PSI).

### Township level

The Township Public Health Department is headed by the Township Public Health Officer, who functions at the Assistant Director level. There are two medical officers (one for Disease Control and one for Public Health) and one Administrative officer under him. Four to five rural health centers (RHCs) (managed by a health assistant with a lady health visitor and a midwife), and four

to five sub-RHCs (managed by a midwife with a public health supervisor II) come under the control of the Township Public Health Department.

**Table 1: Health facilities development in Myanmar.**

<b>Health Facilities</b>	<b>2013-14</b>
<b>Total No. of Hospitals (Public Sector)</b>	1,056
<b>No. of Hospital under Ministry of Health</b>	988
<b>No. of Hospital under other Ministries</b>	68
<b>Total No. of Hospital Beds</b>	56,748
<b>No. of Primary and Secondary Health Centres</b>	87
<b>No. of Maternal and Child Health Centres</b>	348
<b>No. of Rural Health Centres</b>	1,684
<b>No. of School Health Teams</b>	80
<b>No. of Traditional Medicine Hospitals</b>	16
<b>No. of Traditional Medicine Clinics</b>	243

*Source: Health in Myanmar 2014*

### **Human resources**

There has been a steady growth in the number of basic health facilities and human resources for health in recent years. The hospitals in Regions, States, and Districts are reasonably well staffed. The number of midwives has almost doubled over a 20 year period; midwives are the key providers of basic health services in rural areas.

Of the 31,542 doctors in 2013-2014, 18,443 worked as private practitioners and the rest in the public sector. Many doctors and other staff in the public health service are engaged in private practice after official working hours to supplement their income.

During the last two decades about 40,000 community health workers CHWs have been trained, and it is estimated that 50% of these are still active. They are volunteers who are neither employed by the Government nor paid any salary, which accounts for their relatively high attrition rate. The CHWs are trained to provide health education, treat minor illnesses and assist in the control of infectious diseases. Amongst the voluntary workers are auxiliary midwives who are trained for deliveries at home.



**Table 2. Human resources for health development.**

<b>Health Manpower</b>	<b>2013-14</b>
<b>Total No. of Doctors</b>	31,542
- <b>Public</b>	13,099
- <b>Cooperative &amp; private</b>	18,443
<b>Nurses</b>	29,532
<b>Health Assistants</b>	2,062
<b>Lady Health Visitors</b>	3,467
<b>Midwives</b>	21,435
<b>Health Supervisors (1)</b>	652
<b>Health Supervisors (2)</b>	4,998
<b>Traditional Medicine Practitioners</b>	
- <b>Public</b>	1,048
- <b>Cooperative &amp; private</b>	5,915

*Source: Health in Myanmar 2014*

Another group of volunteers, the 'Integrated Community Malaria Volunteers/ Community Health Workers' (ICMV/CHWs) are the mainstay of malaria control activities at village level. ICMVs/CHWs are provided 2 to 5 days training (depending on needs) on malaria diagnosis and treatment. Some are also engaged in preventive work such as LLIN distribution and health education depending on the organization (NGOs, INGOs) that supports them. The quality of supervision provided for ICMVs/CHWs varies considerably from one agency to another (and this is likely reflected in data quality) and so efforts are now underway to standardize the approach and make improvements where necessary.