



**Government of Malawi
Ministry of Health**

MID-TERM REVIEW OF THE NATIONAL MALARIA STRATEGIC PLAN (2017-2022)

DESK REVIEW REPORT

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1.0 INTRODUCTION

1.1 Geography

Malawi is a landlocked country with a land area of approximately 118,485 square kilometers, of which 24,410 square kilometers are covered by Lake Malawi, Lake Malombe and Lake Chilwa. From north to south, the country is 901 kilometers long and varies in width from 80 to 160 kilometers. Malawi borders to the east and South-south-west by Mozambique, to the North north-west by Zambia and to the north by Tanzania.

Malawi is part of the Great Rift Valley of East and Central Africa. The whole country from north to south is traversed by a deep trough running between two parallel faults or cracks in the Earth's crust, most of which is filled by Lake Malawi. The terrain of Malawi comprises of Plateaus, plains, hills and mountains. These include Nyika (over 1066 meters) and Viphya plateaus and Misuku hills to the North, and Dedza and Kirk Range mountains in the central region. In the south, the terrain is equally varied with escarpments, highlands (232 meters), mountains, and low marshy lands along the shire valley, Lake Malawi's outlet in the south. The Mulanje mountain is the highest mountain in central Africa, with the highest point, Sapitwa peak, rising to 3,050 meters above sea level.

Malawi experiences a primarily tropical climate with three distinct seasons: cool-cold and dry (May to mid- August); hot and dry (mid-August to November); and rainy (November to April). The variable altitude of the country provides a wide range in climate. The low-lying lakeshore areas have longer hot seasons with higher humidity levels. The highest temperatures occur in the lower altitudes areas of the Shire Valley, and the rains are more prolonged in the north. Temperature levels are lower and rainfall levels are higher with rising altitude.

1.2 Malaria Transmission

Malaria transmission is highest during the rainy season (January to June) when there is also an increase in malaria vector breeding sites. Low lying areas have hot temperatures which is more favorable for mosquito breeding hence transmission is also highest in these areas. However due to climate change there is an observation that even highlands are experiencing increase in malaria this could be attributed to increased temperature in these areas that also favours malaria vector breeding.

1.3 National Malaria Strategic Plan 2017-2022

1.3.1 Vision

All people in Malawi are free from malaria

1.3.2 Mission

To reduce malaria to a level where it is no longer of public health significance in Malawi

1.3.3 Strategic Goal

To review the current National Malaria Strategic plan 2017-2022, assess progress in the past three years (2017-2019) then update the NMSP for better performance and impact.

The overall strategic goal is reducing malaria incidence by at least 50% from a 2015 baseline of 386 per 1000 population to 193 per 1000 and reduce malaria deaths by at least 50% from 23 per 100,000 population to 12 per 100,000 population by 2022

To reduce malaria incidence by at least 50% from a 2016 baseline of 386 per 1000 population to 193 per 1000 and malaria deaths by at least 50% from 23 per 100,000 population to 12 per 100,000 population by 2022

1.3.4 Strategic Objectives

The **objectives** of the Malaria Strategic Plan 2017-2022 are:

- 1) By 2022, at least 90% of the population use one or more malaria preventative interventions.
- 2) At least 95% of suspected malaria cases will be tested and 100% of confirmed cases treated by 2022.
- 3) To increase uptake of at least three doses of Intermittent Preventive Treatment (IPTp) from 12% to 60% by 2022
- 4) To reduce annual average stock out rate of all LA from 7% in 2016 to 3% by 2022.
- 5) To increase proportion of caregivers of under-five children who take action to seek appropriate malaria treatment within 24 hours of the onset of fever from 31.2% to 50% by 2022
- 6) To improve data quality by increasing accuracy from 7% to 60% by 2022
- 7) To improve programme performance in implementing planned MSP activities from 43% to at least 90% by 2022.

1.4 The Mid Term Review of the Malaria Strategic Plan

The objective of the mid-term review (MTR) was to undertake evidence-based appraisal of the country's malaria situation and programme performance at mid-term to strengthen the programme for better results and impact for the remaining period.

1.5 Methodology of the MTR

The Malawi MTR was adapted from the WHO manual for malaria programme reviews and consisted of the following phases

1.5.1 Phase 1 – Planning

The National Malaria Control Programme on behalf of the Directorate of Preventive Health Services developed a concept note for the MTR, engaged senior MoH management for approval of the MTR and then held stakeholder meeting to build consensus on timelines and processes. In addition, the MTR coordinator was appointed while other members of NMCP were part of the secretariat. Resources were mobilized to facilitate the process from the Global Fund grant and WHO. The Ministry of Health then requested WHO to support the external validation of the findings as part of the next phase of the review.

1.5.2 Phase 2– Thematic Desk Review

The thematic desk reviews were conducted from April to June 2019. The desk review comprised of assembling of information such as: programme implementation reports from both the national and subnational levels, routine malaria surveillance; national health statistics, demographic and health surveys (DHS), and malaria indicator surveys (MIS), among others. A draft MTR report was produced from the thematic reviews and sent to the external reviewers before they came into the country. Preparations for the field review included a logistical requirements and selection of the possible sites for field visits as well as national levels. Due to limited time for external reviewers, nearby districts and facilities were selected.

1.5.3 Phase 3 - Validation

WHO then formed an external review team which prepared for the validation visits in August 2019. The aim of this phase was to validate and build upon the thematic review reports through national level consultations and sub-national field visits. The outcome of this process was used to finalize MTR report. It was conducted from 11-17 August 2019. Field visit teams were formed comprising external reviewers and members of the national review teams. Five teams were formed, one central level team and four teams for district visits.

Central Level Review Teams – Central level teams interviewed top management teams and other departments within the Ministry of Health, line ministries, partner organizations and other key stakeholders.

Districts Review Teams – District teams interviewed District Health Management Team members, Malaria Coordinators and visited selected health centres. In each selected health facility, at least one community was visited and focus group discussion to understand community perspective on malaria and malaria elimination activities. Following the visits, each team prepared feedback presentations on findings and thereafter, teams worked in the thematic areas to finalize the MTR report findings and recommendations.

1.5.4 Phase 4 - Programme Strengthening

This phase follows the MTR and will include the following steps:

Finalization, production and dissemination of the final MTR Report. Review of the malaria strategic plan targets

2.0 EPIDEMIOLOGICAL AND ENTOMOLOGICAL IMPACT

2.1 Progress towards epidemiological impact of MSP

Generally, Malawi has seen changes in its malaria trend over the past five years as a result of the high investment in malaria control and improvement in data collection. Health Management Information System (HMIS) data, demonstrated Malawi has seen a general decrease in the incidence of malaria and mortality since 2014 due to sustained investment in malaria control. However there was a rise in the incidence of malaria in 2018 which was attributed to improved reporting, change of population denominator and to some extent delay in the replacement of LLINs. The incidence of malaria is currently at 191/1000 population against a target of 193/1000 population in 2022.

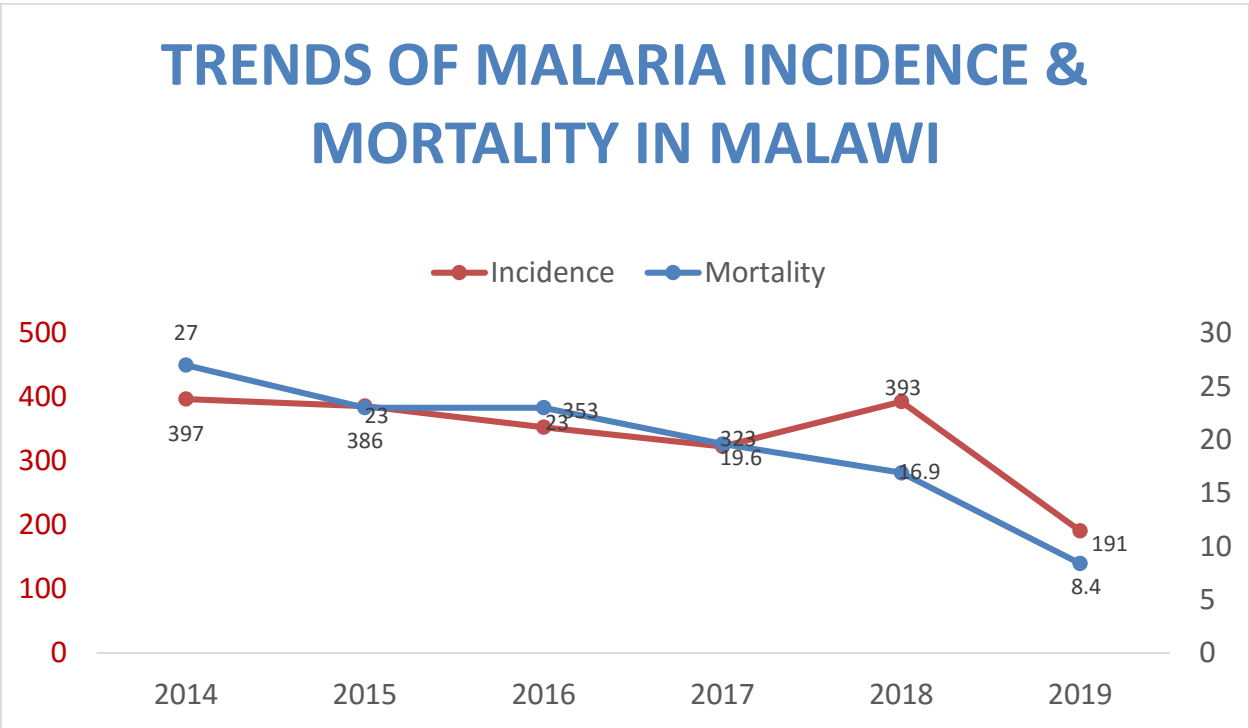


Figure 1: Trends of malaria incidence and Mortality in Malawi from 2014 – 2019 June

2.1.1 Trends in Malaria mortality

Mortality rate is currently at 8.4/100 000 population against a target of 12/100 000 population by 2022. This is a significant progress against a baseline of 27. Although there is a general decline in overall mortality due to malaria deaths among inpatient admissions, the proportion of Case

Fatality Rate (CFR) decline (0.50 in 2017 to 0.44 in 2018) among children under-five, mortality for under-five children due to malaria remains high. The significant decline in all age mortality and slight decline in the case fatality of children under five admitted for malaria may be a reflection of improvement in the case management of malaria. It is however important to keep monitoring and aggressively scale up case management among under five children.

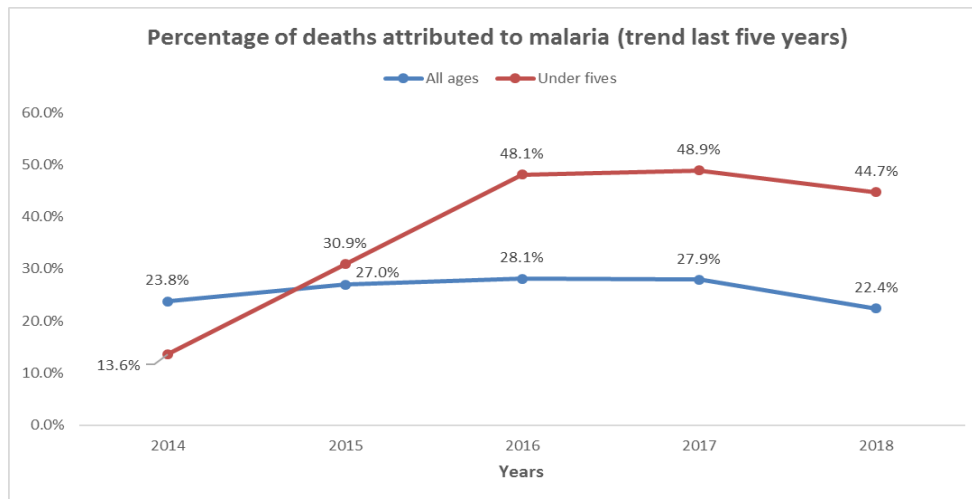


Figure 2: Percentage of deaths attributed to malaria

2.1.2 Appropriateness of epidemiological impact indicators

All the indicators were appropriately phrased per WHO and included baselines for 2016 and annual progress targets until 2022. Details are presented in the annex tables of performance analysis at the end of the report. However, except in a few cases where data for 2019 were not included for midterm evaluation, because analysis was by complete year.

2.1.3 Malaria transmission risk maps and stratification

Malaria is hyper-endemic in Malawi and transmission occurs throughout the year in most places except in the mountainous areas in the north and south. Transmission is greatest during the rainy season and there is variation in intensity from low, medium and high based on season and topography. The predominant malaria species is *Plasmodium falciparum*. There are three major vectors of malaria in Malawi: *Anopheles gambiae s.s.*, *Anopheles funestus* and *Anopheles arabiensis*.

About 80 percent of population live in rural areas with poor access to essential health services and economic activities (NSO, 2018). Every year, there are around 6 million

suspected malaria cases and it is the major cause of morbidity and mortality in Malawi (According to District Health Information Systems (DHIS2) Database). It constitutes 30 percent of all outpatients' visits and 34 percent of all hospitalizations. Nationally, incidence rates range from 172 to 1,000+ per 1000 population with some variability across districts. Currently, it is at 393 per 1000 population way above the desired target of 302 per 1000 population. The districts surrounding Lake Malawi and in the Shire valley have the highest incidence rates.

A malaria stratification map using incidence data from 2015 to 2018 by districts has been produced as depicted in Figure 4.

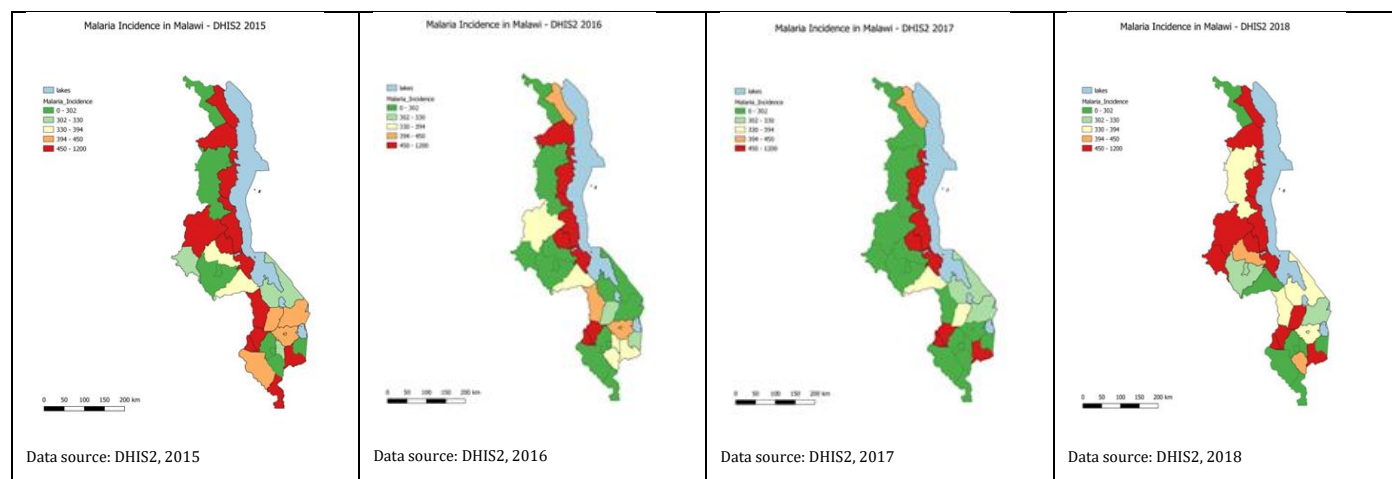


Figure 3: Trend of Malaria incidence per 1000 population from 2015 to 2018 by District

The yearly district incidence maps shown in Figure 4 shows a declining district incidences from 2015 to 2017 that ranged from 330 to 1200 mainly those districts along the lakeshore (Karonga, Rumphi, Nkhata Bay, Nkhotakota, Salima) and Shire River (refer to yellow and reddish colours). Though this decline could be attributed to control intervention efforts being spearheaded by NMCP, but there were some data challenges such as data quality due to low reporting rates and higher denominators (population projection figures from NSO). However, it increased in 2018 most districts due to increased reporting rates and the use of actual population figures (denominators) from 2018 Population and Housing Census (PHC) from NSO. From the turning point of decreased incidences in 2017 where only 8 districts of Karonga, Nkhata Bay, Nkhotakota, Salima, Dedza, Balaka, Mwanza and Thyolo had higher incidences, other districts were affected as well in 2018. Those that seem to have smaller incidences reportedly had increased incidences such as Rumphi, Mzimba, Kasungu, Mangochi, Ntcheu, and Zomba.

As part of malaria control strategies, MoH identified vector control and management as one of the critical intervention with provision of the use of ITNs as one of the core priorities. In partnership with its partners, MoH massively distributed about 10 million Long Lasting

Insecticide Nets (LLINs) in 2018 with an aim of significantly promoting the increased net utilization that would subsequently reduce both health and socio-economic burden of malaria. Figure 5 is a comparison of malaria cases in pre and post LLIN campaign. With data completeness across district facilities above 90 percent, number of OPD malaria cases show that there was a positive effect of LLINs as shown by reduced monthly cases in post LLIN campaign period compared to pre LLIN period.

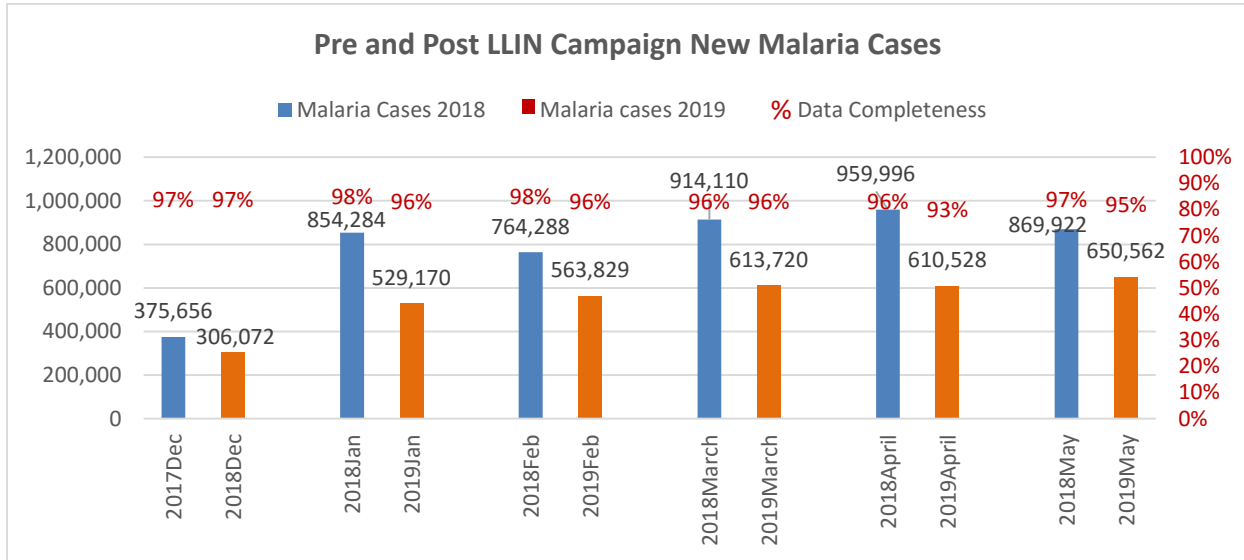


Figure 4: Pre and post LLIN distribution campaign

The effects of LLINs at zonal level also shows a reduction of new malaria cases between the two periods (pre and post LLINs) as shown by zonal bar graphs presented in Figure 6. At Zonal level, as shown by Figure 6, the impact of LLINs was huge in the Central East Zone (Nkhotakota, Kasungu, Ntchisi, Dowa and Salima) with around 45 percent reduction from pre to post LLIN campaign. The least impact of LLINs was seen in the South West Zone (Blantyre, Chiradzulu, Thyolo, Mwanza, Neno, Chikwawa and Nsanje) with around 22 percent from pre-to-post LLIN campaign.

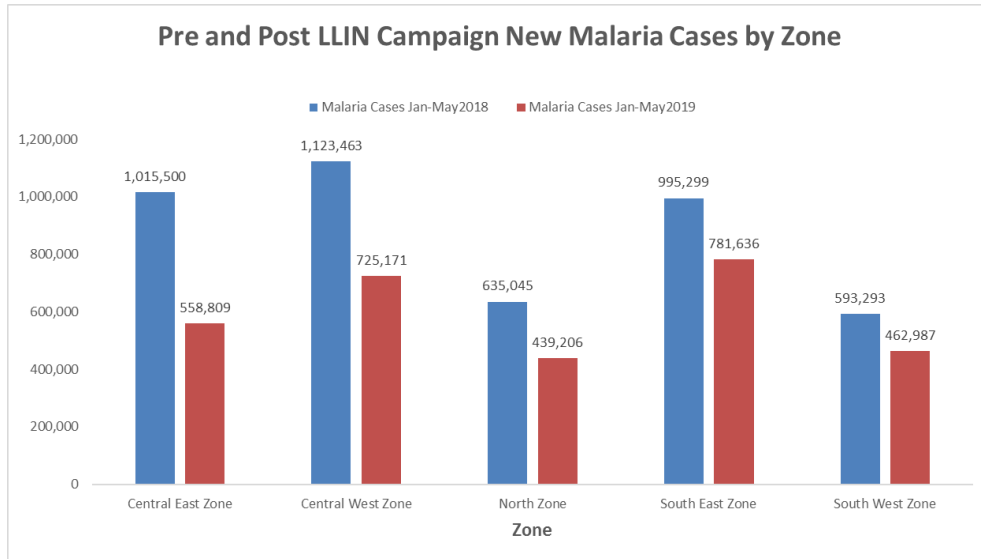


Figure 5: Pre and post LLIN distribution campaign by zone

2.1.4 Distribution of parasite species

Plasmodium falciparum causes 95% of all malaria cases, 9% of malaria is caused by *Plasmodium malariae* and least causative agent *Plasmodium Ovale* causing 1% of all malaria cases.

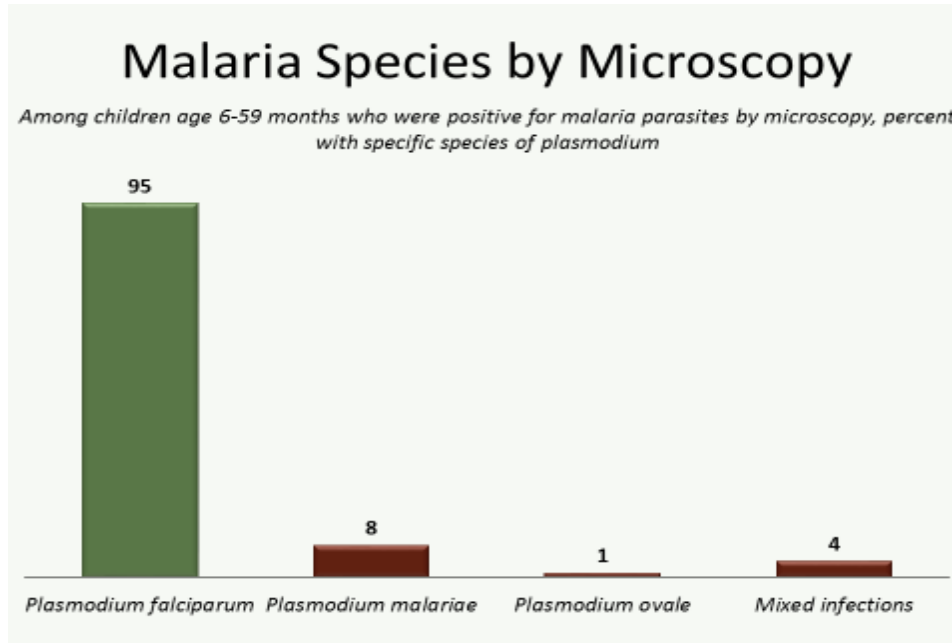


Figure 6: Malaria species by microscope

2.2.1 Progress towards entomological impact of MSP

In Malawi, malaria vector control dates back to 1913 and has included environmental management, through draining and filling, larviciding using oil and insecticides (Malariaol), and indoor residual spraying (IRS) with Gammexane. Since 1997, the NMCP has collaborated with various stakeholders to programmatically scale up implementation of high impact proven vector control interventions (i.e. insecticide-treated bednets (LLINs) and targeted IRS in high malaria transmission areas). **The objective of vector control in the 2017-2022 Malaria Strategic Plan is that by 2022 at least 90% of the population should use one or more malaria preventive interventions.** In order to achieve this objective, the national Malaria control program would focus on universal access to quality Long Lasting Insecticidal Nets (LLINs), implementation of quality IRS in selected and suitable epidemiological areas, Larval Source Management (LSM) in targeted communities, ongoing monitoring of vector control to ensure continuous monitoring of vector bionomics and continuous assessment of effectiveness of new vector control interventions and tools to address resistance.

2.2.2 Appropriateness of entomological impact indicators

Entomological impact indicators were not adequately reflected in the 2017-2022 MSP. Only one appropriate key entomological indicator was included; **number of infective bites per**

person per year. However, the indicator has since not been monitored for the past two years of the MSP. It was noted that other indicators such as vector density, sporozoites rate, insecticide resistance, and vector behavior were being monitored through other planned studies though not listed in the MSP.

Other vector control impact indicators in the MSP include: -

1. % of children under 5 years of age sleep under an ITN
2. % of pregnant women sleep under an ITN
3. Proportion of population at risk protected by IRS within the past 12 months in IRS targeted areas
4. Number of high burden districts implementing IRS
5. % of households owning at least one ITN
6. Proportion of households who slept under an LLIN the night preceding the survey recommended as (**Proportion of population who slept under an ITN the night preceding the survey**)
7. Proportion population sleeping under LLIN and or living in a household sprayed with IRS in the last 12 months
8. Proportion of households with at least one LLIN for two people

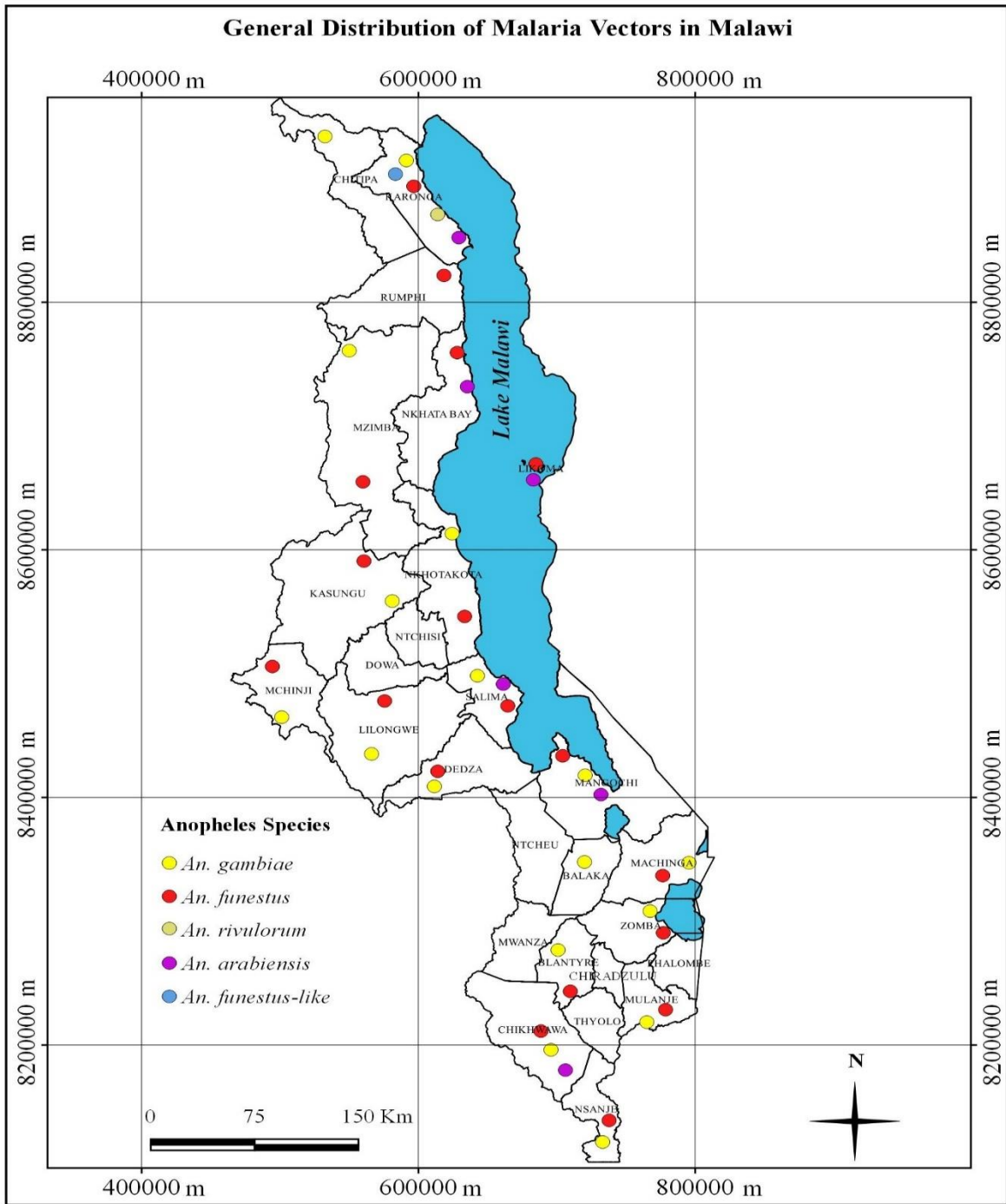
2.2.3 Entomological Profile

The review revealed that Malawi successfully came up with the first malaria entomological profile in 2018 through a collation of data from both published and unpublished entomological study reports and a consultative process of experts and stakeholders in malaria entomological work.

2.2.4 Malaria Vectors

The profile shows that **the principal malaria transmitting vectors in Malawi are *Anopheles gambiae*, *An. arabiensis* and *An. funestus*** while localized malaria vector species include *An. rivulorum* and *An. funestus-like*. Other Anopheline species found in Malawi include: *Anopheles merus* *An. parensis*, *An. Quardrianulatus*, *An. coustani*, *An. maculipalpis*, *An. pharoensis*, *An. pretoriensis*, *An. rufipes*, *An. sinerens*, *An. squamosus* and *An. ziemani*.

Figure 1: General distribution of Malaria Vectors in Malawi



2.2.5 Feeding and Resting Behaviour

Anopheles funestus and *Anopheles gambiae* are the most efficient vectors of *Plasmodium falciparum* in Malawi. *An. funestus* and *An. gambiae* are highly anthropophilic (expresses a tendency to feed on humans) as well as being endophagic (feeding indoors) and endophilic (resting indoors). *Anopheles arabiensis* a member of *An. gambiae* complex has been described as a zoophilic, exophagic and exophilic species. The species has been reported to readily feed on cattle, goats, chickens, dogs and other wild and domestic animals in its vicinity. There is no reported study on *Anopheles gambiae* feeding and resting behaviour in Malawi. However, *Anopheles gambiae* has been reported elsewhere to be less discriminant and more opportunistic in its host selection and that host choice is highly influenced by location, host availability and the genetic make-up of the mosquito population. Females of *An. gambiae* typically feed late at night and are often described as both endophagic and endophilic (Coluzzi et al., 1979). Studies on anopheline biting behaviour in Malawi need to extend to the timing of the bites as well as details on outdoor biting behaviour of other anophelines.

2.2.6 Ecology

Sympatric occurrence of *An. funestus* and *An. gambiae* in Chikhwawa has been reported in Malawi and elsewhere (Kabula et al., 2011; Mzilahowa et al., 2012; Smita et al., 2016). The aquatic stage of both species wherever they existed were found in temporary or permanent puddles, borrow pits, irrigation ditches, vehicle ruts and rice paddies (Spiers et al., 2002). An exceedingly high transmission has been reported when both *An. funestus* and *An. gambiae* are present in a community (Pemba, 2015). This often occurs because these vector species exploit different breeding habitats and stagger their peak densities, which prolongs the transmission season. *Anopheles funestus* breeds in larval habitats that are somewhat different from those of the *An. gambiae* complex. *Anopheles funestus* prefers permanent collections of clean water with vegetation, such as marshes, ponds and the weedy edges of ditches or rice fields (Spiers et al., 2002). *Anopheles funestus* has been reported as a highly adaptable species, thus its able to occupy and maintain a wide distribution and utilize and conform to the many habitat types and climatic conditions (Malaria Atlas Project, 2017). It prefers more permanent breeding sites and its population tend to peak toward the end of the rainy season and into the first part of the dry season.

Members of the *An. gambiae* complex have been documented to adapt to different breeding sites with *An. gambiae s.s.*, *An. arabiensis* and *An. quadriannulatus* preferring fresh-water breeding sites; *An. melas*, *An. merus* adapted to brackish water breeding and *An. bwambae* to mineral water *Anopheles arabiensis* favours arid zones while *An. gambiae s.s* favours humid areas (Lehmann & Diabate, 2008; Gowelo, 2016). *Anopheles gambiae* has shown a tendency to oviposit in temporary breeding sites such as puddles and animal foot prints, which are abundant during the rainy season (Smita et al., 2016).

2.2.7 Abundance and Seasonal Variability

Overall, *An. funestus* catches were high compared to *An. gambiae* across Malawi (Figure 2) (Pemba, JICA Arbovirus Project, 2013). Several studies have reported high predominance of *An. funestus* compared to *An. gambiae* in all the three regions of Malawi: In central region districts (Salima, Nkhatakota, Lilongwe) (Themba et al., 2014, Pemba, JICA Arbovirus Project, 2013), in the northern region districts (Likoma, Nkhatabay, Karonga) (Hunt et al., 2010; Vezenegho et al., 2013; Gowelo, 2016) and in the southern region districts (Machinga, Blantyre, Chikhwawa, Mangochi) (Pemba et al, 2009; Mzilahowa et al., 2014; Lindblade et al., 2015; Mzilahowa et al., 2016). Contrary to these findings, Themba et al., (2012) reported a higher catches of *An. arabiensis* in Chikhwawa. However, details of seasonal abundance of other malaria vectors in Malawi are lacking.

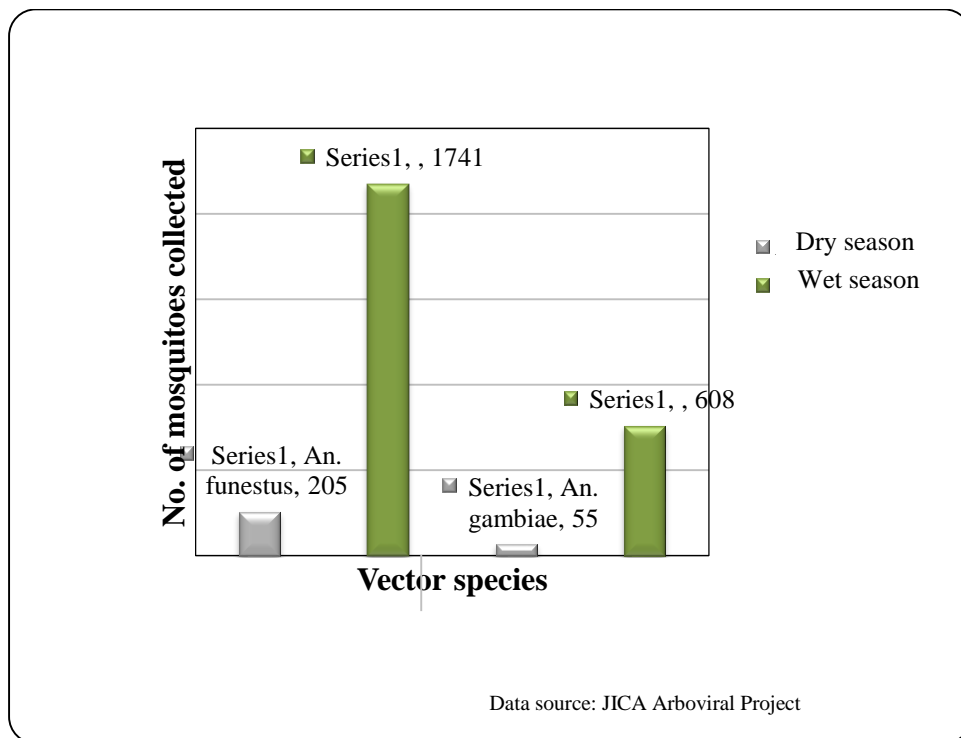


Figure 2: Seasonal abundance of *An. funestus* and *An. gambiae* in Malawi

The abundance of malaria vectors in Malawi varies with season. A similar trend was reported by Chanda et al., (2015). The number of mosquito catches was very high in wet season compared to dry season (Pemba, JICA Arbovirus Project, 2013) (Figure 3). Several studies have also reported a similar trend; nonetheless, on average the *An. funestus* catches were higher than that of *An. gambiae* in both wet and dry seasons (Vezenegho et al., 2013; Pemba, 2015; Lindblade et al., 2015).

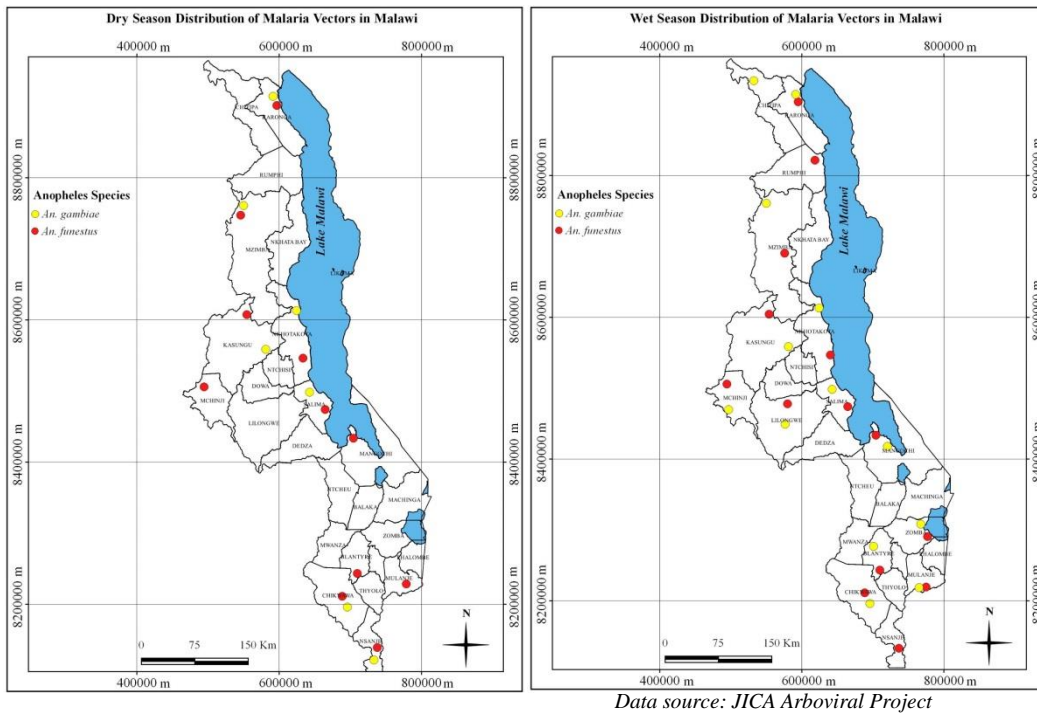
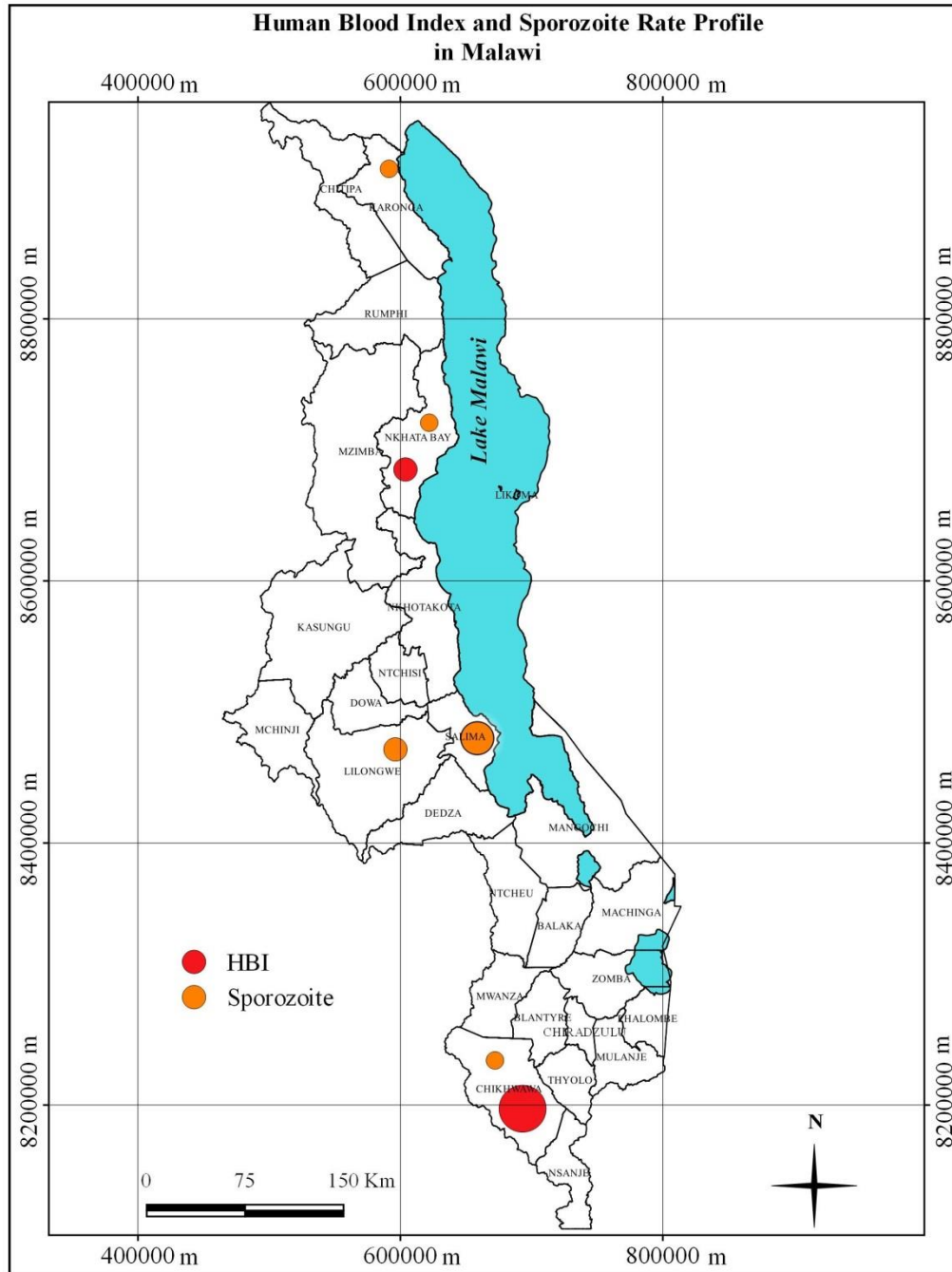


Figure 3: Seasonal Distribution of Malaria Vectors

2.2.8 Malaria Transmission Intensity

Among the entomological studies conducted in the country, only four reported on malaria transmission intensity. Earliest studies on EIR were reported by Chiphwanya (unpublished). The study reported an EIR of 183 in Chikhwawa representing 15 bites per person per month. The reported sporozoite rates from PCR and ELISA analyses confirmed that a majority of the mosquito vectors carry *P. falciparum* except for *An. gambiae* which has been found to harbour *Plasmodium malariae* in some cases (Chiphwanya, unpublished). Recently, Gowelo (2016) reported a high infectivity in *An. funestus* a sporozoite rates of 3.6% in Nkhatabay, comparable to the sporozoite rates of 4% reported in Chikhwawa by Lindblade et al.,(2015). Sporozoite rate of 7% has also been reported in Nkhoma hospital catchment area (Lilongwe–Dedza) (Pemba, 2015).

Mosquitoes do not feed on human hosts only. They have a range of vertebrate hosts from which they derive their meals. Notably, *An. funestus* in Malawi has been reported to feed on other hosts such as cattle, pigs and dogs although in very small percentages compared to humans (Gowelo, 2016.). Similar observations have been reported by (Mzilahowa et al., 2012). Documented human blood indexes (HBI) in Malawi portray tendency of the vectors to feed more on humans than other hosts. Human blood index have been reported to exceed 92% in Chikhwawa (Mzilahowa et al., 2012), 41.6% in Nkhatabay and Karonga (Gowelo, 2016). The reported sporozoite rates in some parts of Malawi are shown in **Figure 4**. Districts with no plots of HBI and sporozoite rates do not imply risk free zones, country wide data on EIR, HBI and SR is lacking.



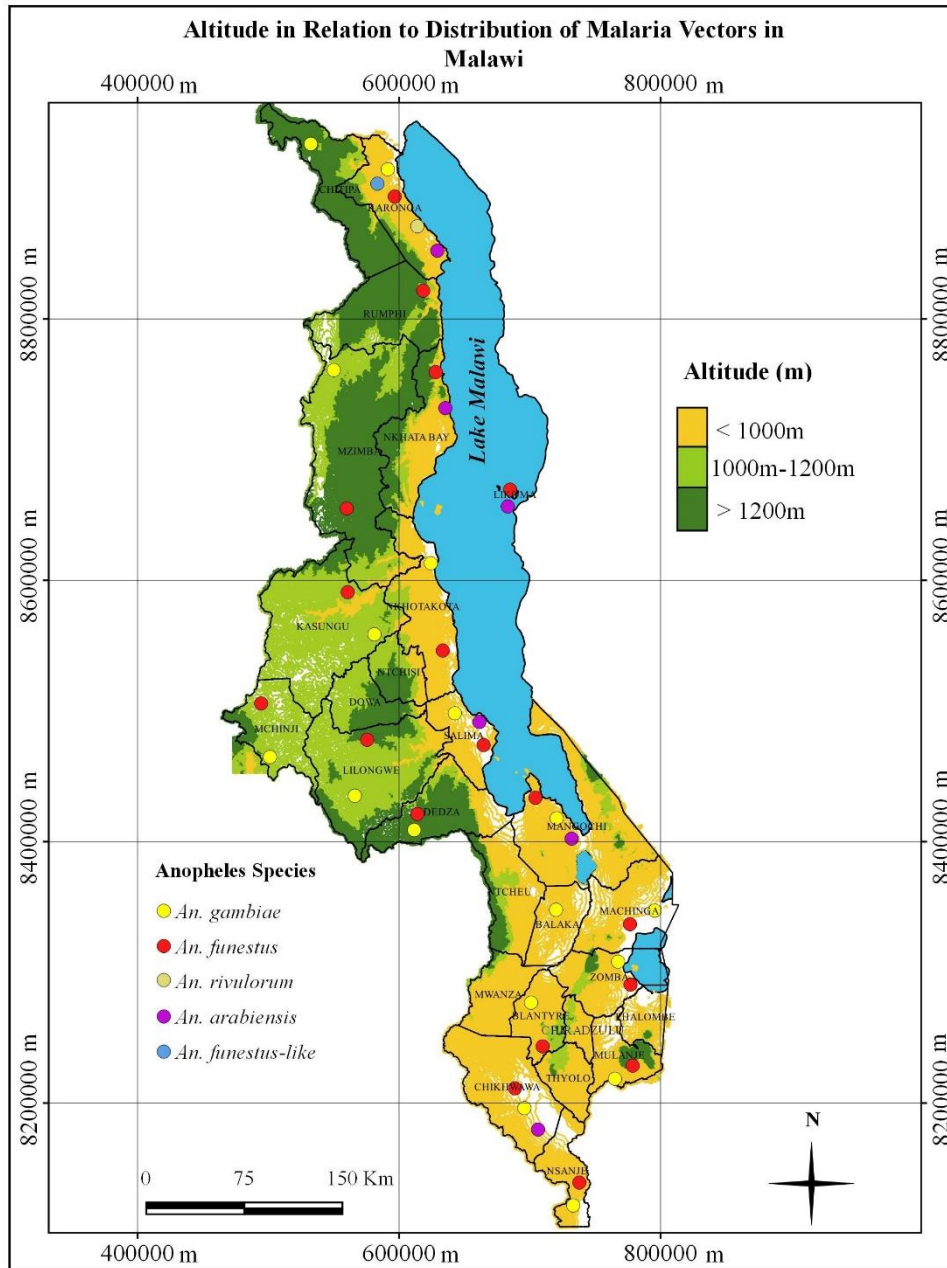
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Figure 4: Sporozoites Rate and Human Blood Indices in some parts of Malawi

Environmental factors influence transmission intensities and sporozoite rates hence, influencing local transmission of malaria. High transmission has been reported in areas low lying areas that tend to have high temperatures during the rainy season (October – April) and along the low-lying areas, particularly the lakeshore and lowland areas of the Shire Valley (NMCP, 2011). Areas like Nkhotakota which lie at an elevation 472m above the sea

level has a higher year round malaria transmission (Skarbinski et al., 2012)(Figure 5). The lowest risk areas are found along the highland areas of Rumphi, Mzimba, Chitipa and Kirk Range (Kazembe, 2006, Kazembe et al.,2007). Similar observations have been reported by (Rehman et al., 2011, Bennett et al., 2013, Pemba, 2015)

Figure 5: Malaria vectors distribution in relation to altitude



Note: Areas with altitude from 1000m-1200m have moderate transmission intensity and areas 1200m above sea level have low transmission intensity

2.2.9 Vector surveillance

The programme continues to conduct entomological studies and has since established a national entomological profile that explores vector ecology and behavior, species composition and distribution and insecticide resistance. It has sentinel sites for the studies and monitoring of the vector bionomics. The programme has also developed insecticide resistance management plan.

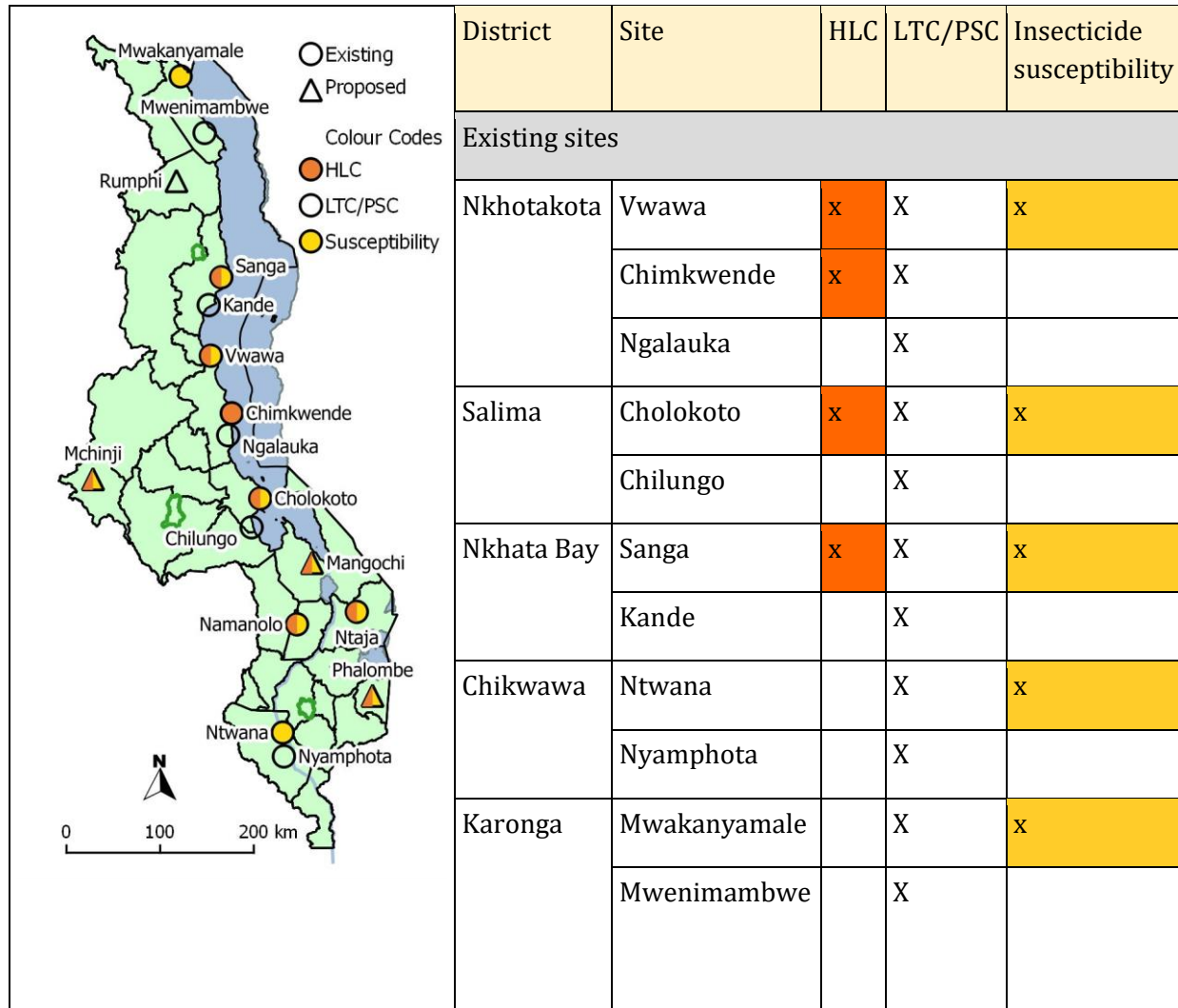


Figure 1: Existing and proposed entomological surveillance sites

2.2.10 Insecticide resistance

Control of malaria transmission in Malawi conventionally relies heavily on two insecticide-based interventions: LLINs and IRS. The scaling up of malaria vector interventions, however, has also seen development and spread of insecticide resistance among *Anopheles* populations in the country. *An. gambiae* s.l. and *An. funestus* remain the major malaria vectors in Malawi. The latter species are predominant across the country sites except Karonga District in the north where *An. arabiensis* was the predominant *Anopheles* mosquito species.

Historically monitoring of insecticide resistance in Malawi has been conducted in three districts of Chikwawa, Nkhotakota and Karonga. In 2018 two district of Salima and Nkhatabay were added with two entomological monitoring sentinel sites in each district. Based on the 2019 available data on the susceptibility status of the major malaria vectors In Chikwawa, *An. funestus* s.l. was completely susceptible to Clothianidin 13.2mg/ml, pirimiphos-methyl 0.25 and chlorfenapyr. On the other hand, *An. funestus* s.l. was highly resistant to pyrethroid insecticides: permethrin (17.7% mortality), deltamethrin (20.2% mortality) and alphacypermethrin (9.5% mortality). Pre-exposing of the same batch of *Anopheles* mosquitoes to PBO then to alphacypermethrin resulted into full restoration of its susceptibility (100% mortality). However, slightly lower mortality rates were recorded to PBO + permethrin (94.6% mortality) and PBO + deltamethrin (97.1% mortality).

In Nkhatabay, *An. funestus* s.l. was susceptible to clothianidin 13.2mg/ml and pirimiphos-methyl 0.25%. On the other hand, *An.funestus* s.l. was highly resistant to pyrethroids (permethrin, deltamethrin and alphacypermethrin) resulting into mortality rates of 28.2%, 5.7% and 12.9% respectively. Pre- exposure to PBO resulted into full restoration of its susceptibility (100% mortality) with permethrin and deltamethrin. But pre-exposure to PBO did not achieve full restoration of its susceptibility with alphacypermethrin; it resulted into 90.4% mortality rate.

In Karonga, *An. gambiae* s.l. was shown to be highly resistant to permethrin and moderately resistant to deltamethrin. On the other hand, this species was susceptible to alphacypermethrin (99.0% mortality). Pre-exposing *An. gambiae* s.l. to PBO followed by testing against permethrin 0.75% and deltamethrin 0.05% resulted in restoration of full susceptibility (100% mortality). In 2019 however Nkhotakota and Salima districts could not yield enough *Anopheles* mosquitoes for susceptibility testing.

2.2.11 Resistance Mechanism

Pyrethroid resistance is driven by metabolic resistance mechanisms in both *An. funestus* and *An. gambiae* s.l. vector populations across the study sites. Table below shows resistance mechanisms and cross resistance patterns of different classes of insecticides. Circle size reflects relative impact of mechanism of resistance.

Biochemical mechanism of resistance				
Metabolic			Target site	
Esterases	Mono-oxygenases	Glutathione S-transferases	<i>Kdr</i>	Altered AChE

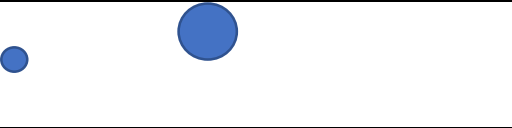



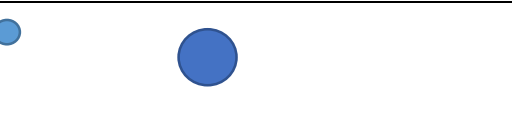

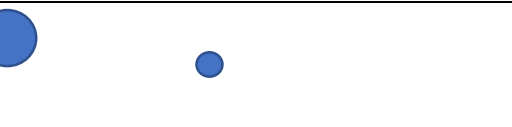

Pyrethroids		
DDT		
Carbamates		
Organophosphates		

Table: Resistance mechanisms and cross resistance patterns of different classes of insecticides. Circle size reflects relative impact of mechanism of resistance.

This shows that Pirimiphos-methyl which is currently being used for IRS is still effective in all the study sites, therefore may still be considered for indoor residual sprays. However, the country has also an option of rotating **Pirimiphos-methyl with Chlorfenapyr and/ clothianidin.**

Rotation of insecticides is the main resistance management strategy for 2019-2022. In 2018, the organophosphate insecticide pirimiphos-methyl (capsule suspension formulation) was used in Nkhotakota District. Although resistance monitoring data shows that the major vectors are still susceptible to this insecticide, beginning in 2020 it will be rotated annually together with neonicotinoids (clothianidin or a clothianidin and deltamethrin combination) to minimize the selective pressure on the local vectors.

3.0 PROGRAMME FINANCING

3.1 Malaria programme funding landscape

The Malawi Government has been allocating funding to the health sector annually. The expected resources from the government go towards remuneration, recurrent cost of health care facilities and capital expenditure. The Capital health allocation has been spent on construction of health facilities, improving health infrastructure and procurement of medical equipment, while funding for drug budget has been spent on procurement of medicines and medical supplies. Remuneration has been spent on Staff salaries and finally the Other Recurrent allocation has been spent on running costs of health facilities and other operations. Salaries of all the key health care Staff responsible for delivering health care services are mostly covered by the government and a small proportion by Global Fund and USAID through PEPFAR.

3.1.1 Findings

The analysis on funding landscape for the National Malaria Control Program, has been done looking first of all at the total health budget as a proportion of the total government budget. This was to assess whether as a country we are able to meet the Abuja Declaration of allocating 15% of the total Government Budget to Health. Then to be more relevant an analysis has been done to see the proportion of the NMCP budget of the central level Health budget. The district health budgets in this component of the analysis were excluded because the known NMCP budgets come from the total central level budgets. It was not possible to determine how much of the District health budgets is allocated to Malaria Control, however, this is an area for future exploration in order to accurately determine how much of the total Malaria allocation is done both at Central and District Levels. The analysis went further to show the enormous contributions from partners and Donors notably the Global Fund and PMI/USAID.

The main aim of the whole financial analysis is to be able to determine if the National Malaria Control Strategic Plan is optimally funded to deliver the planned intervention and achieve the expected impact and targets. Availability of Funding and human resources are very key to the successful delivery of the Malaria Strategic Plan interventions. The costed Malaria Strategic Plan has been used in this analysis, all available resources from Government, Partners and Donors have been pooled as available funding and the financial gaps and percentages determined. The Financial gaps definitely have impact on implementation of planned activities in the Malaria Strategic Plan. As we assessed the capacity of NMCP to implement the MSP planned activities in the first section, we should remember that the availability of funding confounds the capacity of NMCP to implement planned activities and achieve the set targets and impact. However, the NMCP is also expected to mobilize resources and close down the financial gaps.

Table 1: Total Health Budget proportion of the total Government Budget

FINANCIAL YEAR	TOTAL GOV BUDGET	TOTAL HEALTH BUDGET	PERCENTAGE
2016/17	1,171,069,830,000.00	119,100,845,252.00	10.2
2017/18	1,301,227,000,000.00	124,999,333,345.90	9.6
2018/19	1,429,662,447,006.00	142,840,736,020.00	10.0
2019/20	1,359,117,097,525.25	134,552,592,654.99	9.9

*The Total Health Budget includes Both Central and Local Government allocated budget
The 2019/20 Budget is proposed and waiting parliament approval.*

Table 2: NMCP Budget Proportion of the Central Level Health Budget in MWK

FINANCIAL YEAR	MOH Budget	NMCP	PERCENTAGE
2016/17	47,263,641,758.00	252,089,522.00	0.53
2017/18	50,882,492,451.90	211,115,651.00	0.41
2018/19	47,883,361,270.00	204,740,651.00	0.43
2019/20	32,985,468,505.00	305,160,356.00	0.93

*The MOH Budget is exclusive of the Personal Emoluments and district budgets
The 2019/20 budget allocation is proposed and not yet approved.*

While it is very evident that the financial allocations to the NMCP are quite minimal, the other allocations from district budgets could not be determined. Therefore, what is shown is definitely an underestimation. This analysis could also not determine the un costed contributions from government in support of Malaria Control efforts like staff salaries for both central and district staff, infrastructure and plants. There is need for a robust analysis to cost all financial and non-financial contributions from government in order to get a correct picture of the total government contribution towards malaria control in Malawi.

3.1.2 Partners financial contribution to malaria programming

The Global Fund and PMI are the main external funding partner for malaria control in Malawi. They committed enormous financial and technical resources during the period under review as indicated in subsequent tables.

Table 3: GLOBAL FUND BUDGET FOR 2017-2020 IN USD PER KEY INTERVENTION

	Module	2017	2018	2019	2020	Total USD	%
1	Vector control (LLINs)		19,877,379.24	50,255.00	0	19,927,634.24	30%
2	Case management		9,936,751.38	8,263,675.24	7,901,262.74	26,101,689.36	40%
3	RSSH: Community		810,206.00	407,000.00	0	1,217,206.00	2%
4	RSSH: HMIS and M & E		680,991.30	917,801.42	0	1,598,792.72	2%
5	RSSH: PSM (Warehousing)		10,221,412.81	1,714,652.69	1,381,257.13	13,317,322.63	20%
6	Program Management		1,522,648.00	1,044,213.05	993,942.00	3,560,803.05	5%
	Total	16,282,087	33,049,388.73	12,397,597.40	10,276,461.87	65,723,448.00	100%

Table 4: PMI BUDGET ALLOCATION IN USD PER KEY INTERVENTION

INTERVENTION	2017	2018	2019
Vector Monitoring And Control	9,257,765	6,499,000	8,280,000
Malaria in Pregnancy	658,000	658,000	690,000
Case Management	6,740,000	7,349,000	8,510,000
Health System Strengthening / Capacity Building	550,000	500,000	460,000
Social And Behavior Change Communication	1,550,000	1,600,000	1,610,000
Surveillance, Monitoring, And Evaluation	1,089,000	1,460,000	1,150,000
Operational Research	85,235	0	0
In-Country Staffing And Administration	2,070,000	1,934,000	2,300,000
Total Funding	22,000,000	20,000,000	23,000,000

Table 5: MALARIA STRATEGIC PLAN BUDGET GAP ANALYSIS AGAINST TOTAL AVAILABLE BUDGET

BUDGET	2016/17 (2017)	2017/18 (2018)	2018/19 (2019)	2019/20 (2020)
NMCP	252,089,522	211,115,651	204,740,651	305,160,356
PMI	16,654,000,000	15,140,000,000	17,411,000,000	17,441,000,000
GLOBAL FUND	12,325,539,859	25,018,387,268.61	9,384,981,231.80	7,779,281,635.59
TOTAL FUNDING AVAILABLE	29,231,629,381	40,369,502,920	27,000,721,883	25,525,441,992
MSP BUDGET	61,141,064,941	97,978,349,784	68,901,580,333	65,286,640,216
BUDGET GAPS	31,909,435,560	57,608,846,864	41,900,858,450	39,761,198,224
PERCENTAGE GAPS	52%	59%	61%	61%

3.1.3 Conclusions

The Financial analysis of budget allocations for the National Malaria Strategic Plan and proportion of the budget allocated to NMCP, shows low levels of financing the NMSP. The average of about 60% gap in financing the planned interventions is quite substantial. The Funding from government, partners and donors have all flat lined with negligible increases over the period under review (2017-2019). There is need to expand the funding base through lobbying from Parliament, treasury, non-traditional donors, and increases from the

current donors in order to improve and maintain high coverage of malaria control interventions for impact. There is also need to stratify the malaria burden in Malawi and deploy targeted interventions using the limited available resources to move towards malaria elimination.

3.1.4 Recommendations

- NMCP with support from the Ministry, establish the Malaria Elimination Council and Malaria Fund.
- NMCP to develop a business plan for resource mobilization.
- NMCP to stratify the country malaria burden and employ targeted high impact interventions.
- MoH to increase the funding base for malaria control and elimination activities to minimize dependence on donor funding.
- MoH and partners to advocate with Government for increased allocation of funds for malaria to achieve the vision of malaria elimination.
- NMCP to engage the high level politicians, private sector, Partners and the community to make the malaria Elimination agenda high to attract funding.
- NMCP to carry out a Cost benefit analysis to have economic benefit evidence for effective lobbying.

4.0 PROGRAMME IMPLEMENTATION ANALYSIS

According to the malaria strategic plan 2017-2022, the objective of programme management is to improve programme performance in implementing planned MSP activities from 43% to at least 90% by 2022. This review basically assess implementation rate of activities planned for 2017, 2018 and half of 2019.

4.1 Capacity of the NMCP to Implement Planned Activities

The following analysis assesses and describes whether the capacity of the National Malaria Control Program to implement planned activities was optimal during the review period. It also describes how it can further be strengthened at the mid-term of the implementation of the National Malaria Strategic Plan (NMSP).

In general, NMCP performed fairly well in strengthening the program management capacity at the central and district level from 2017 to 2019. The human resources situation has improved from 12 staff in 2016 to 16 in 2019. The Program recruited four officers into the program with support from Global Fund (Program Officer, M&E officer and Data Clerk), and government (Principal Medical Officer). These first three officers are being supported donor funds and we have an extra staff supported by partners (PMI) on contract basis and would leave the Program if funding ceased. While the program needs more staff, there is inadequate office space to accommodate the increasing numbers which has to be dealt with. In an effort to move towards a sustainable human resource situation in the program the NMCP managed to develop and submit the organizational structure for the program to the functional review process commissioned by the Ministry of Health and Population through the Department of Human Resource Management and Development. NMCP has no further influence on the speed of the remaining process.

In the area of training, the Program supported more than eight central level program officers each year and four district malaria coordinators for external capacity building short courses. All health workers (Nurses and Clinicians) were refreshed on case management, Laboratory officers refreshed on quality microscopy, and provided formal training to all task-shifted malaria rapid diagnostic providers in quality malaria rapid diagnosis from all facilities in the country. The program built capacity in all district malaria coordinators and their deputies trained on malariology through a course delivered by Malaria Alert Center, College of Medicine.

For oversight and guidance, the Malaria Technical Advisory Committee met twice in the past two and half years to discuss technical issues requiring their opinion. The Various Thematic Technical working groups meet every quarter to discuss technical issues and support improvements in thematic performance.

There is improved coordination with partners through mapping of partners and conducting of bi-annual meetings. The Program established multi-Sectoral collaboration to take malaria control beyond the ministry of Health. However, there is inadequate engagement and

involvement of private sector and civil society organizations in implementation of Malaria activities.

Cross boarder Collaboration, two cross boarder collaboration meetings were conducted between the neighbouring districts in the north between Malawi and Tanzania in 2017, and in the South between Malawi and Mozambique in 2019. One more benchmarking visit was done between Malawi and Zambia on Mass Drug Administration in 2018. During visits the two teams shared experiences, good practices, challenges and collaboration ways to address cross boarder challenges. In brief, the platform for collaboration was formed and communication network for sharing information established.

4.1.1 Findings

Compared to the 2011-2016 Malaria Strategic Plan overall implementation rate which was at **43%**, the current midway implementation rate of planned activities for 2017-2019 has improved to **65%**. It is important to note that all thematic areas have recorded improvements and none scored below **46%**. This is most likely due to the increased number of committed staff and improved skills from short courses. The review of NMCP’s capacity to implement planned activities shows that 65% of the planned activities have been fully implemented, 7% partially implemented and 28% of MSP activities have not implemented at all. Though we have registered this improvement in the program capacity to implement planned activities, our implementation rate remains low according to WHO rating. (High>90%, moderate 75-90%, low<75%. Our set target is to achieve 90% by 2022.

Amongst thematic areas, the Advocacy, Social Behaviour Change and Communications (SBCC) performed the lowest. One clear reason is the difficulties to secure funding and support the SBCC interventions. It has been difficult to get funding from donors for key interventions under SBCC like community engagement. In the face of lack of commitment from donors to fund SBCC, the NMCP has allocated 80% of the ORT budget towards SBCC.

The other challenges with implementation has been on transport logistics. The vehicles that the program has, are few and not able to effectively support implementation. Borrowing of vehicles has been tried with a lot of difficulties from District Health Offices, other ministry departments like Education, Agriculture and others. We have also always tried to borrow from our sister programs (TB and HIV), but they are also always in the fields. Most cases we have postponed activities, missing their timeliness, in order to wait until when we have vehicles available to support the implementation.

Table 6: Capacity to implement activities

Capacity to Implement					
	Planned	Done	PD	ND	%
SBCC	56	26	7	21	46%
VC	71	43	0	28	61%

CM	44	25	2	17	57%
MIP	19	11	5	3	58%
PSM	58	50	0	8	86%
M & E	336	224	21	95	67%
PM	66	45	12	9	68%
Total	650	424	47	181	65%

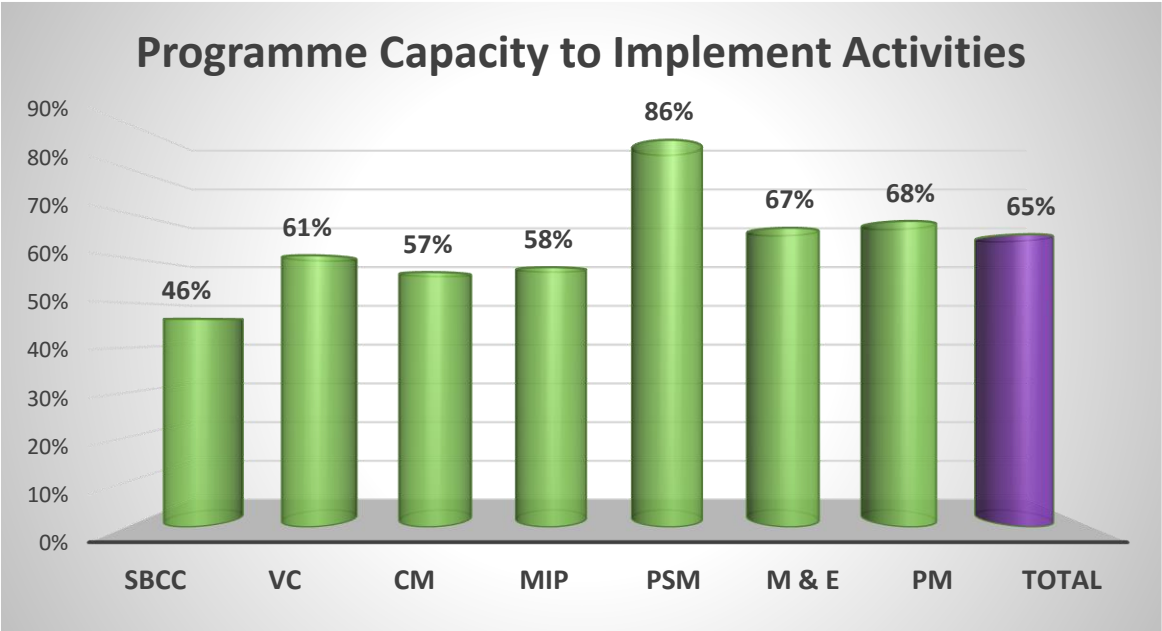


Figure 7: Programme capacity to implement activities

4.1.2 Enablers

- Availability of some consistent funding from the government and donors
- Availability of technical support from partners
- Support from the senior management of MOH
- Improved coordination and team work within the program
- Improved human resource capacity, the number and skills at national and district level
- Strong partnership and coordination with partners
- Collaboration with institutions within and outside government such as training institutions
- Availability of policies to guide implementation

4.1.3 Constrainers

- Lack of established positions and career paths within the program
- Inadequate human resource
- Funding constraints leading to failure to implement key activities
- Flat lining of funding from all sources as we need more resources to move towards malaria elimination
- Unavailability of adequate vehicles to effectively support implementation

4.1.4 Conclusions

The capacity of NMCP to implement planned activities in the Malaria Strategic Plan has improved achieving 65%, against a target of 90%. By WHO rating, this is low. For the program to achieve the target of 90% by 2022, there is need to address the constrainers and support implementation.

4.1.5 Recommendations

- The program should embark on new extra resource mobilization strategies that will drive the implementation.
- There is need to continue building capacity in staff, to improve their skill in activity implementation.
- There is need to intensify the involvement of district staff in implementation so that they attain skills and effectively support NMCP in the implementation.
- There is need to budget for vehicles procurement that would support implementation.
- Explore ways of expanding the infrastructure for more space for extra officers

4.2 Assessment of implementation status of the 2016 MPR recommendations

TBA

Table 7: Detailed Implementation Status of MPR Recommendations

	RECOMMENDATIONS	PROGRESS
1	<i>The epidemiological and entomological impact targets of the MSP</i>	
	<ul style="list-style-type: none">• The NMCP should strengthen epidemiological and entomological vector surveillance to ensure impact of interventions.	<ul style="list-style-type: none">• Annual Epidemiological Data available• Entomological Vector Surveillance being partially done through projects. We need to establish the routine system
2	<i>Strengthen the functionality of programme management support through:</i>	
	<ul style="list-style-type: none">• MoH advocating for a functional review in order for NMCP to have a substantive position in the malaria programme.	<ul style="list-style-type: none">• Done, Proposed NMCP Structure Submitted to DHRMD

3	<i>Develop financing strategy for malaria prevention, control and management in Malawi.</i>	
	<ul style="list-style-type: none"> Develop a financing strategy for malaria prevention, control and management to secure sufficient resources to deliver interventions and address threats relating to sustainability in the medium to long-term. 	<ul style="list-style-type: none"> Not done, will be prioritized in the revised MSP
	<ul style="list-style-type: none"> Engage the corporate sector through Public Private Partnership (PPP) to bridge the funding gaps in the MSP. 	<ul style="list-style-type: none"> Just started, need to do more
4	<i>Strengthen vector control implementation and delivery of other preventive effective strategies through:</i>	
	<ul style="list-style-type: none"> Mobilise resources to implement, scale-up and sustain the IRS strategy. 	<ul style="list-style-type: none"> Done, at least for 2 districts. Still have a gap for 5 districts
	<ul style="list-style-type: none"> Build capacity to implement Integrated Vector Management (IVM) strategy. 	<ul style="list-style-type: none"> Process started, IVM officers will leave for a capacity building course in a week's time.
	<ul style="list-style-type: none"> Develop and implement national insecticide resistance management plan (IRMP). 	<ul style="list-style-type: none"> IRMP Developed, implementation started
	<ul style="list-style-type: none"> Pilot for further scale up the use of DDT for IRS in selected high malaria transmission districts. 	<ul style="list-style-type: none"> No need to Pilot, we will implement funds allowing.
5	<i>Strengthen malaria chemoprevention, diagnosis and treatment and PSM services through</i>	
	<ul style="list-style-type: none"> Enforce and scale-up adherence to treatment guidelines. 	<ul style="list-style-type: none"> Done through Outreach Training and Supportive Supervision (OTSS), Improvements are evident.
	<ul style="list-style-type: none"> Strengthen Procurement and Supply Chain Management System of malaria commodities and supplies 	<ul style="list-style-type: none"> Done, stock-out rates 0.4 % on all LA, and 1.6% on mRDTs
	<ul style="list-style-type: none"> Improve malaria quality of care through continued training, refresher training supervision and mentorship of health workers. 	<ul style="list-style-type: none"> Refresher trainings done in 2017 to all nurses and clinicians, continued mentorship happening through OTSS.
6	<i>Strengthen advocacy, social mobilization and social and behaviour change communication (SBCC) through the following;</i>	
	<ul style="list-style-type: none"> Improve coordination for effective engagement of local, traditional, religious and political leaders to improve knowledge and practice. 	<ul style="list-style-type: none"> Started engagement with traditional leaders, but couldn't secure adequate resources for further engagement.
	<ul style="list-style-type: none"> Broaden target audience for SBCC in line with the communication strategy. 	<ul style="list-style-type: none"> Lacked financial resources
7	<i>Strengthen malaria surveillance and operational research capacities through</i>	
	<ul style="list-style-type: none"> Interface HMIS with other complementary systems to allow interoperability. 	<ul style="list-style-type: none"> Being Championed by Central Monitoring and Evaluation Department (CMED).
	<ul style="list-style-type: none"> Prioritise the malaria research agenda to guide implementation of research priorities of the programme. 	<ul style="list-style-type: none"> Draft Malaria Research Agenda developed, awaiting submission for approval

	<ul style="list-style-type: none"> • Build capacity in data management at all levels. 	<ul style="list-style-type: none"> • Done through data reviews and data analysis and interpretation trainings
	<ul style="list-style-type: none"> • Undertake data quality audits and assessments. 	<ul style="list-style-type: none"> • Done every quarter by M&E Team and district teams

5.0 ATTAINMENT OF PROGRAMME OUTPUT AND OUTCOME TARGETS

5.1 Vector Control

5.1.1 Progress towards MSP Vector control outcome targets

Table 11: Summary of performance of vector control indicators

Indicators	Baseline	Target and	realization of MSP – 2019					
	Value	Year	Target 2017	Attained 2017	Target 2018	Attained 2018	Target 2019	Attained 2019
Proportion of population at risk who slept under an insecticide-treated net the previous night	53%	2014	60%	55%	-	-	70%	-
% of children under 5 years of age who slept under an ITN	67%	2014	75%	68%	-	-	85%	-
% of pregnant women sleep under an ITN	62%	2014	75%	63%	-	-	85%	-
Proportion of population at risk protected by IRS within the past 12 months in IRS targeted areas	36.6%	2015	-	-	-	14.3%	70%	-
Number of infective bites per person per year	183	2015	167	-	151	-	135	-
Number of high burden districts implementing IRS	2	2015	5	-	5	1	7	-
% of households owning at least one ITN	70%	2014	75%	82%	-	-	85%	-
Proportion of household's population who slept under an LLIN the night preceding the survey	33.9	2014	-	55%	-	-	80%	-

Note: cells with a dash show unavailability of data

5.1.2 Long lasting insecticidal nets

The national strategy aims to provide enough LLINs to cover all household members. This indicator is operationalized as one ITN for every two household members. The 2017 MMIS shows that 82% of households in Malawi own at least one ITN. The percentage of households that own at least one ITN increased from 55% in the 2012 MMIS to 70% in the 2014 MMIS and to 82% in the 2017 MMIS exceeding the 2017 target. The majority of these LLINs (72%) were obtained from mass distribution campaigns. Another 9% of LLINs came from routine antenatal care (ANC) visits, 4% of LLINs were distributed to newborns at the time of birth, and 3% were purchased from shops or markets.

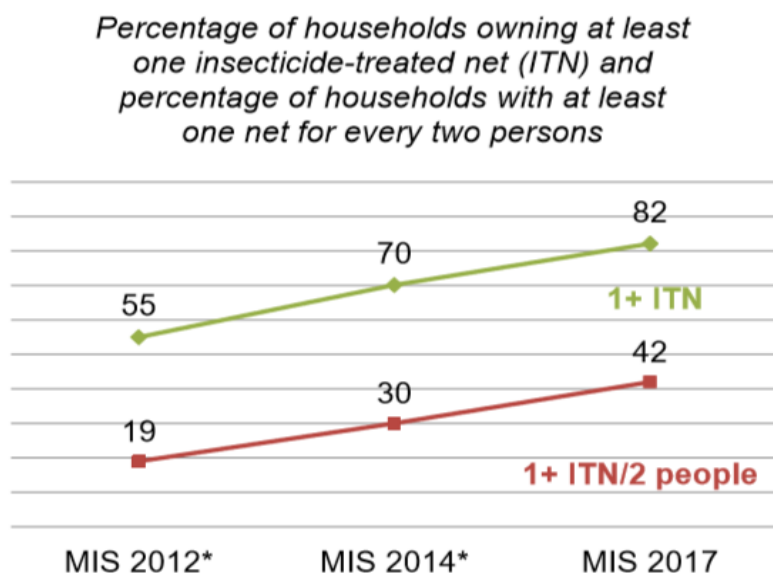


Figure 1: ITN ownership

Furthermore, sixty-three percent of people in Malawi have access to an ITN, whereas 55% reported having slept under an ITN the night before the survey. Comparing these two indicators, it is evident that there exists a gap between ITN access and ITN use at the population level. The percentage of the household population with access to an ITN increased from 52% in the 2014 MMIS and to 63% in the 2017 MMIS. The percentage of the household population that slept under an ITN the night before the survey increased from 53% in the 2014 MMIS and 55% in the 2017 MIS. This 2017 data shows a wider gap in ITN access and use.

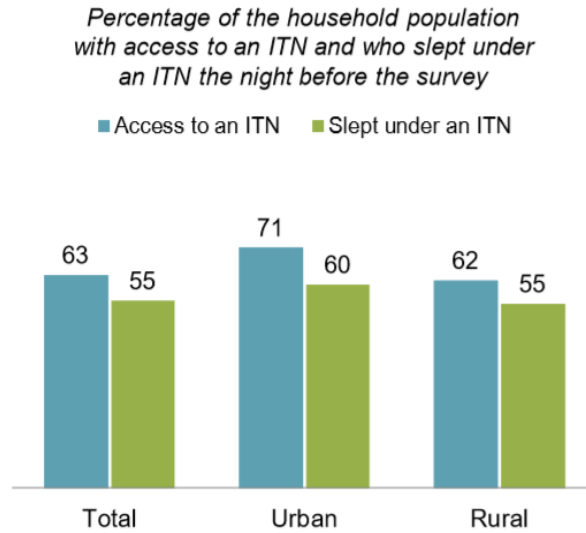


Figure 2: ITN Access and Use

The 2017-2022 Malawi Malaria Control Strategic Plan emphasizes activities that promote the use of LLINs every night to prevent malaria. Strategies for ITN distribution in Malawi are (1) free routine distribution to pregnant women through ANC and to newborns at the time of delivery and (2) mass campaigns every two to three years. The percentage of children under 5 years of age who slept under an ITN and the percentage of pregnant women sleep under an ITN increased from 67% to 68% and 62% to 63% respectively. This increase is insignificant

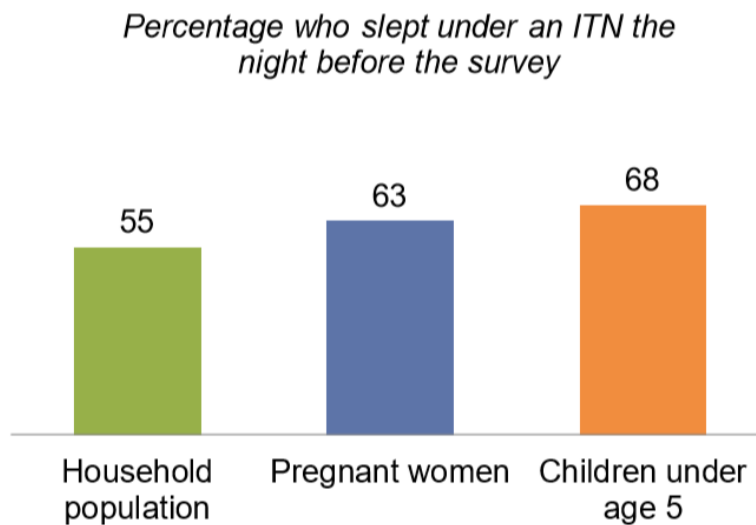


Figure 3: ITN use by population at risk

The available data is based on 2017 MMIS which is outdated. The program does not have current data to assess progress of ITN outcome indicators. There's need to conduct operational research to assess the progress made on these indicators to date.

The MSP did not set targets for other indicators like the Proportion of household population who slept under an LLIN the night preceding the survey which has increased from 33.9% in MMIS 2014 to 55% in MMIS 2017. Since there was not target it is impossible to assess attainment of progress.

5.1.3 Indoor Residual Spraying

In the MSP, implementation of IRS was planned to be expanded into 7 districts and to protect 70 % of the population at risk in IRS targeted areas by 2019. There has been little progress towards achieving this target as in 2017 there was no IRS done and in 2018 IRS was only carried out in one district of Nkhotakota protecting about 14.3% far below the 2019 targets. In 2019 IRS implementation was only limited to 2 districts of Nkhotakota and Mangochi due to funding limitations and most likely that the targets will not be attained.

The following guidelines and manuals are available; Integrated Vector Management (IVM) strategy, Indoor Residual Spraying manuals, Malaria strategic plan (MSP), Malaria indicator survey (MIS), National malaria control policy and different training manuals.

Key recommendations included:

1. MOH to mobilize more resources to implement, scale up and sustain the IRS strategy.
2. Build capacity to implement Integrated Vector Management (IVM) strategy
3. Implement national insecticide resistance management plan (IRMP).

5.1.4 Larval source management

The WHO recommends that individual countries can implement Larval Source Management (LSM), in situations where larval breeding sites are few, fixed, findable, and manageable. LSM aims to supplement the two-core malaria vector control interventions, LLINs and IRS. It entails the application of insecticides on targeted mosquito breeding sites and modification of the environment to deprive the target vector population of its requirements for development and survival. LSM was planned but not implemented due to resource constraints and technical capacity. Note: there is need to include LSM indicator(s) in the MSP.

5.1.5 Enablers

- Availability of LLINs
-
- Intensified SBCC activities
- Partner technical and financial support specifically for LLINs
- Community acceptance of vector control intervention tools

5.1.6 Constrainers

- Inadequate funding to implement other vector control interventions like Indoor residual spraying and Larval source management
- Inadequate coordination for the small scale IRS implemented.
- Misuse of nets

5.1.7 Recommendations

- Inclusion of the following entomological indicators in the MSP;
 1. *Vector densities and abundancy (both aquatic and terrestrial or adult stages)*
 2. *Vector species and distribution*
 3. *Vector susceptibility*
 4. *Vector resting behavior*
- Intensify resource mobilization to implement IRS in the targeted 11 high burden districts
- NMCP to reinforce IRS guidelines that stipulate implementation of IRS targeting >85% of the population in 11 high burden districts areas
- Community leaders to reinforce bye –laws for proper usage of nets

5.2 Case management

5.2.1 Policies and guidelines

5.2.1 Policies and guidelines

National malaria treatment guidelines were revised in 2013, where Malawi adopted use of injectable artesunate as treatment for severe malaria. In addition, use of rectal artesunate as pre-referral treatment for severe malaria cases at community level was also introduced. Currently, the guidelines are being revised and expected to be finalized by December 2019. The changes in the guidelines have been necessitated by the new WHO recommendations such as adjustment of dose for injectable Artesunate in children weighing less than 20 kgs, adoption of a new policy from use of field stains A&B to Giemsa for malaria microscopy, change of malaria microscopy reporting system from plus (+, ++, +++, +++) to parasite density count. Drug efficacy studies are routinely conducted every two years in order to monitor the effectiveness of first and second line treatments.

5.2.2 Diagnosis

There are two methods used for diagnosing malaria namely; Rapid Diagnostic Tests (RDTs) and light microscopy. mRDTs are used to confirm uncomplicated malaria at all levels while. Microscopy is used to confirm severe malaria and all suspected treatment failures. As regards to mRDTs, two brands of Histidine-Rich Protein 2 Ag *Pf*(SD Bioline and Paracheck) were recommended for national use. The selection of two brands was necessary to avoid repeated training of health workers with each new brand coming on the market. All health professionals and support staff (Auxiliary Nurses & Patient Attendants) are trained to perform mRDTs. Currently there is an exercise conducted to select brands of mRDT's to be recommended for use.

Malaria microscopy is preferred option for the management of severe malaria and treatment failures. Currently, only 40% of the eligible public health facilities have the capacity to offer microscopy services. Laboratory Technologists, Technicians and Assistants are eligible to offer malaria microscopy services. Training of microscopists targeting 80 laboratory technicians is conducted every year. There has been major disruption of microscopic serviced due to non-availability of giemsa stain in the facilities. Quality assurance guidelines were developed in 2017 to provide guidance on mRDT and microscopy services. However the QA system is not functional curentrly due to lack of capacity (equipment and human resource)

5.2.3 Treatment

The first line treatment for uncomplicated malaria is artemisinin combination therapy (ACT) of Lumefantrine-Artemether (LA) tablets for three days. Second line treatment for

uncomplicated malaria is Artesunate + Amodiaquine (ASAQ).. For pregnant women in the first trimester, oral quinine + Clindamycin are given as LA and ASAQ are contraindicated. However, in the new guidelines ACTs will no longer be contra-indicated in first trimester.

Suspected cases of severe malaria are treated with injectable artesunate. A minimum of three doses of injectable artesunate is given within 24 hours irrespective of the patient’s ability to tolerate oral medication earlier. At a health centre level, pre-referral treatment for severe malaria cases is injectable artesunate. All children aged less than 6 years **with severe malaria receive a pre-referral treatment of rectal artesunate at community level**. Confirmed treatment failures on first line are treated with ASAQ. Since 2017, about 68.8% (5504) of targeted health workers were given refresher training in malaria case management. In 2019, except for a few health workers trained with support from partners, the programme was unable to undertake planned refresher training because of lack of financial support.

5.2.4 Progress towards case management indicators

The MSP objective for case management states that at least 95% of suspected cases of malaria are tested and 100% of confirmed cases are treated.

For malaria testing rate, the progress in 2017 and 2018 were 98% and 99% respectively against a target of 95%.

Regarding proportion of treatment of confirmed malaria cases receiving artemisinin-based combination therapy (ACTs), the progress in 2017 was 106% and 2018 was 101% against the target of 100%. There were more treatments dispensed than the number of confirmed cases likely due to presumptive treatment and inconsistent use of malaria laboratory register.

Indicators	Baseline	Target and realization of MSP - 2018			Achievement 2018
	Value	Year	Target 2022	Achievement 2017	
Proportion of patients suspected of malaria who were tested	92%	2016	95%	98%	99%
Proportion of test positives that received artemisinin-based combination therapy (ACTs).	100%	2016	100%	106%	101%

Table 1: Performance on case management outcome indicators

Since the introduction of mRDTs, testing rates have steadily been improving. The gap between confirmed and clinical cases has reduced as indicated in fig.1

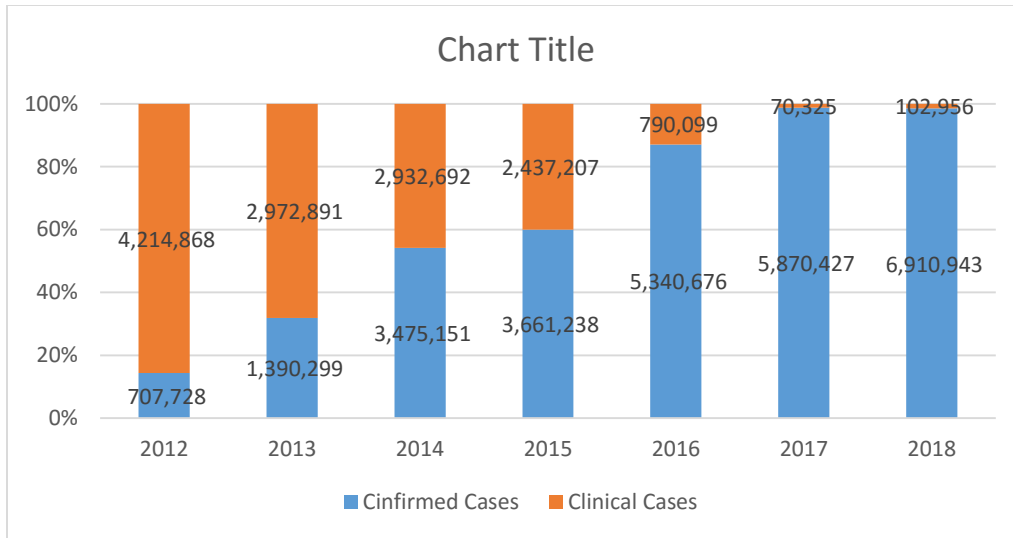


Figure 1: All malaria confirmed cases and Presumed Malaria cases, 2012 – 2018

There is no significant change in the Malaria positivity rate. It ranges between 40 to 70% with variation related to high and low transmission periods. (see figure 2

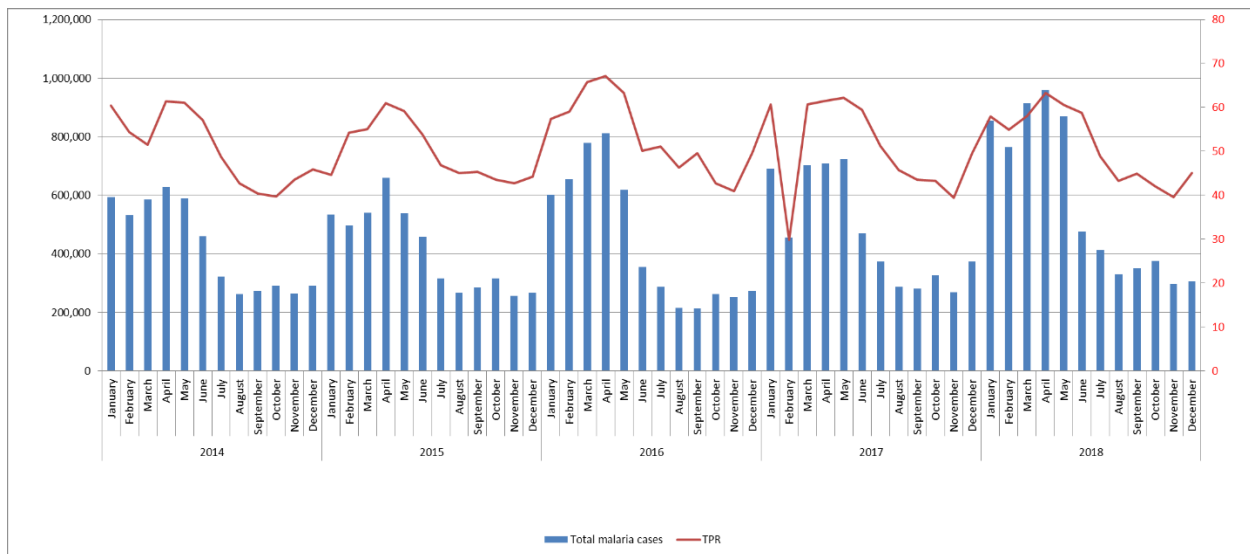


Figure 2: Trends of malaria cases and positivity rate

Since introduction of mRDTs, there has been an increase in the number of patients being tested. The country has a target of testing 95% of all cases suspected of having malaria by 2019. The rate has been raising from the baseline of 61%, 73% and 77% for the Central, North and Southern Regions respectively to 99% for all the Regions

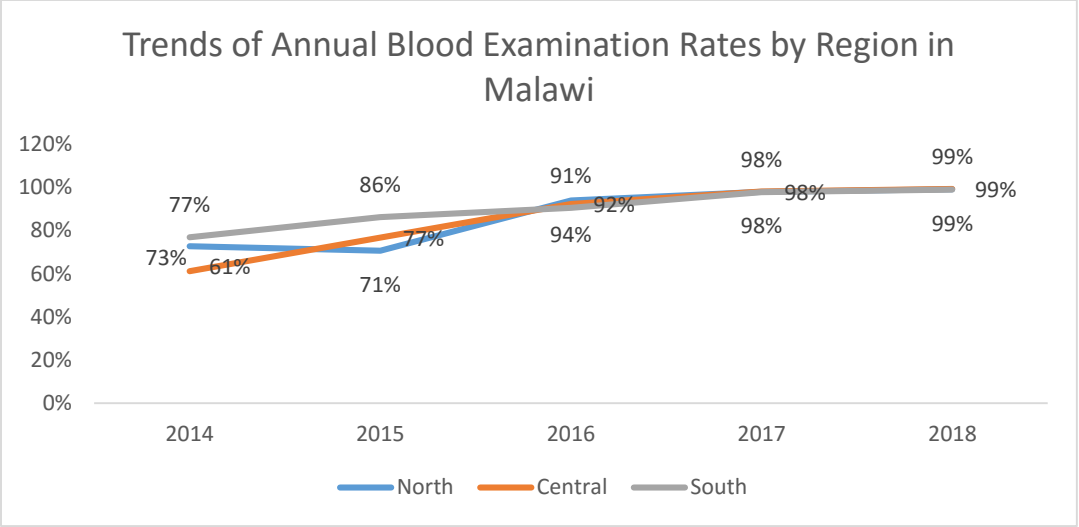


Figure 3: Trends of ABER by Region in Malawi

5.2.5 Quality of care

To ensure continued quality of care the program conducts quarterly outreach training and supportive supervision (OTSS) on malaria case management in all health facilities. One of the modules looks at knowledge of health workers on diagnosis and management of severe malaria according to treatment guidelines. Apparently, knowledge gap was relatively low in 2017 and improved to 92% following series of trainings in the same year. Health workers are also monitored on use of laboratory diagnostics methods to diagnose and monitor patients with severe malaria. Patient monitoring has been a challenge as only 62% of health facilities meet average score. Furthermore, assessment extends to use of injectable Artesunate and how the dosages are prepared and scheduled as well as how complications of severe malaria like convulsions, hypoglycemia, respiratory distress, severe anaemia and hypovolemia are managed.

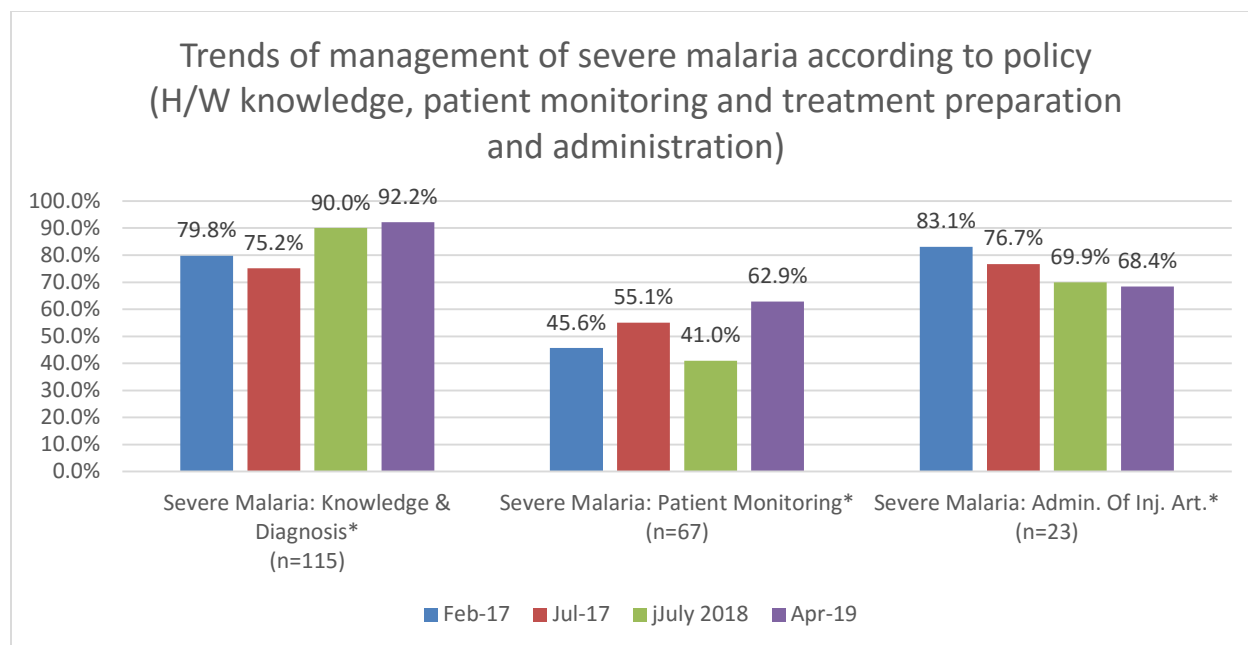


Figure 4: Quality of care on severe malaria t

5.2.6 Therapeutic efficacy studies

Since 2010, Malawi has been conducting routine anti-malarial treatment efficacy studies for artemether-lumefantrine and artesunate-amodiaquine. Studies for 2010, 2012, 2014 and 2016 consistently showed LA and AS+AQ are efficacious with efficacy levels ranging from 95 to 99%. The 2016 TES Polymerase Chain Reaction (PCR) corrected results demonstrated that the efficacy of LA and ASAQ were 98.9% and 99.1% respectively. The PCR uncorrected rates were 84.8% and 98.4% for LA and ASAQ respectively. To date LA and ASAQ remain efficacious anti-malarial medicines for treatment of uncomplicated malaria in Malawi.

5.2.7 Enablers

- Availability of up to date national treatment and diagnostic guidelines that were developed in 2013.
- Training of health workers on malaria case management
- Training of support staff to perform mRDTs.
- Availability of mRDTs and antimalarials (stock status of about 98.7%) over the period under review.
-
- compliance of health workers to treatment guidelines
- Quarterly supportive supervision and mentorship from the central level.
- Data review meetings
- Regular conducting of anti-malaria drug efficacy studies.
- Ongoing on learners treatment kit project supported by Save the Children with

the objective to reduce absenteeism and expand access to early treatment

5.2.8 Constraints

- About 60% of health facilities do not have capacity to conduct malaria microscopy
- Unavailability of Giemsa for malaria microscopy.
- Lack of functional QA system for malaria diagnostics
- .
- Health workers' poor monitoring of severe malaria in-patients.
- Inadequate supportive supervision in malaria case management by DHMT from district to health centres.
- No maintenance of microscopes due to lack of capacity and funds.
- Gap in resources to scale up and maintain effective case management (training needs, QA) Lack of financial and material support to improve case management practices in private sector

5.2.9 Recommendations

Policy and guidance

- Good practices on malaria case management should be maintained.
- Job-aids from updated guidelines should be printed and distributed to all health facilities
- Results from the LTK study to be used to inform policy.

Capacity strengthening

- Strengthen the capacity of the national health laboratory to support malaria diagnosis QA/QC activities.
- Ensure that outstanding refresher training in malaria case management are conducted..
- NMCP to mobilise resources to improve malaria case management practices (including in the private sector) – procurement of microscopes; training of health workers and effective supervision activities
-

Monitoring and evaluation

- Inclusion of indicators like the proportion of confirmed malaria cases that are treated according to guidelines for regular monitoring
- Strengthen capacity of health workers for complete reporting for fever cases

5.3 Malaria in Pregnancy

In July 2019, Malawi's Ministry of Health through National Malaria Control Programme decided to undertake an in-depth review of the national malaria control program. This decision is in compliance to condition set by World Health Organization (WHO), RBM, encouraging all malaria endemic countries implementing country's malaria strategic plan to thoroughly evaluate mid-way during the implementation phase. The Malaria Program Review (MPR) is a periodic joint program management process for reviewing progress and performance of country programmes 'with an aim of improving performance and refining or redefining the strategic direction and focus, as well act for future drive towards achieving universal coverage and the maintenance thereof.

The specific objectives of the review are;

- A) Review progress and performance of the Malaria in Pregnancy component of the malaria control programme
- B) Desk review and evaluation of programmatic evidence to evaluate accomplishments, identify challenges and make recommendations in tandem with period objectives of the MSP on MIP
- C) Aim to improve performance and/or redefining the strategic direction of the malaria programme regarding malaria in pregnancy

5.3.1 Organization of the Malaria in Pregnancy Services

Malaria during pregnancy remains an important public health problem of concern, generally as it poses a special challenge to pregnant women and their unborn baby, they are particularly vulnerable to malaria because their immune system is suppressed. Malaria causes anemia, low birth weight and spontaneous abortions.

In order to combat the problem of malaria during pregnancy, the country will support the delivery of a comprehensive package of interventions to ensure improved pregnancy outcomes and maternal survival. One of the current MIP strategy for the prevention and control of malaria during pregnancy consists uptake of Intermittent Preventive Treatment (IPTp) administered through antenatal clinics (ANC).

Malawi's updated policy on Intermittent Preventive Treatment during pregnancy, recommends the provision of at least three doses of medicine for IPTp to pregnant women beginning early in the second trimester at 13 weeks of gestation. The policy further states that all pregnant women to be given medicine for IPTp but at least one month apart from the initial dose and that it can safely be administered even in labour without safety concerns. The goal of malaria in pregnancy is to maximize reduction of malaria in pregnant women through the use of Intermittent Preventive Treatment (IPTp).

5.3.2 Programme Structure

Implementation of the malaria in pregnancy control strategy was relayed through the existing health care delivery structures from the national level through to the community level allowing easy access to the target groups (pregnant women) and acceptance of the intervention.

At the national level the program is coordinated by the Reproductive Health (RH) division, with technical back up from the National Malaria Control Program (NMCP). Further, program planning, coordination, capacity building, supervision and monitoring are done at regional, district and health sub district levels by the corresponding Maternal and Child Health Coordinators and Focal Point Officers, in collaboration with malaria focal persons at those levels. At facility level, an integrated approach is used to increase synergies.

At community level, malaria in pregnancy services are relayed through community resource persons such as Health Surveillance Assistance (HSAs), religious leaders and other opinion leaders.

5.3.3 Implementation Process of the Malaria in Pregnancy Strategy

The implementation of the MIP strategy marked a turning point with the introduction of IPTp and ITNs interventions in ANC facilities. This followed a strategic plan that was designed in 2017, and reviewed in 2019. Implementation look on activities such as baseline surveys; implementation guidelines formulation and dissemination; partnership building; training of district leaderships; training of health workers; commodity procurement and distribution of medicine SP, supplies LLINs and IPTp-SP DOT equipment; advocacy and social mobilization; monitoring and supervision, as well as quality improvement and operational research.

5.3.4 Malaria in Pregnancy Indicators

Implementation of malaria in pregnancy (MIP) started in 1985 as part of the key intervention of ANC. IPTp and LLINs remains the key prevention interventions. In Fig. 1 ITN Use among pregnant women

Among children age 5 and pregnant women age 15-45 in household with at least one ITN who slept under and ITN the night before survey

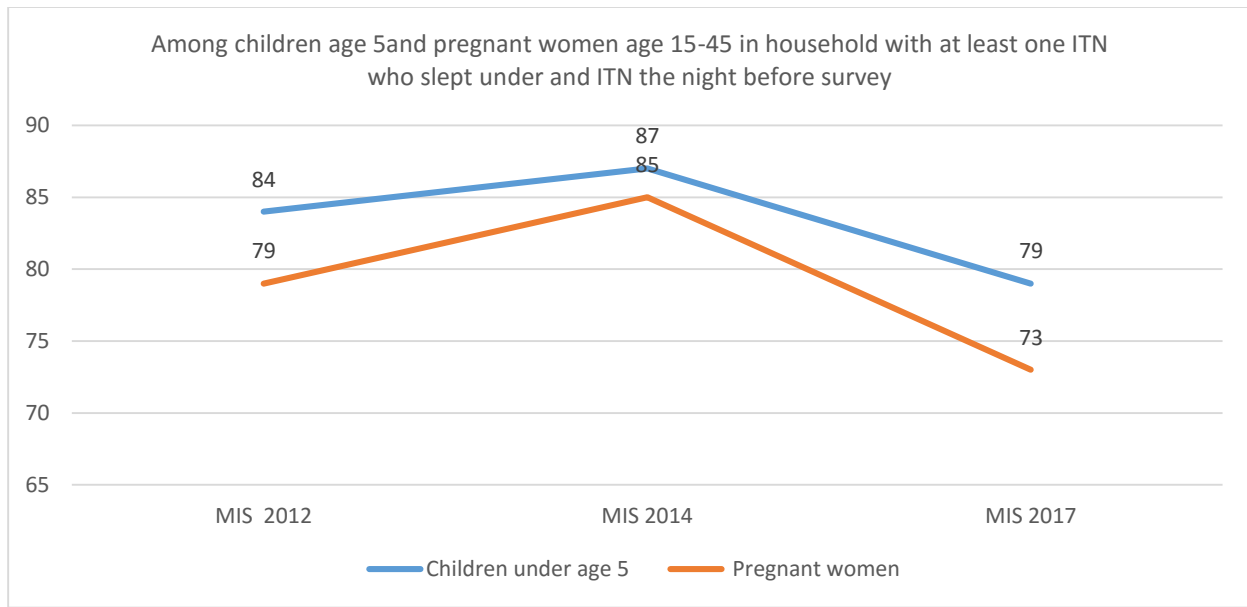


Figure 8: ITN use amongst pregnant women and under five children

Fig.21 Show among children age 5 and pregnant women age 15-45 in household with at least one ITN who slept under and ITN the night before survey registered a decline use both children and pregnant women from 2014 (MIS) baseline of 87% to 79% in 2017 (MIS) This has been attributed to weak BCC activities undertaken at all levels.

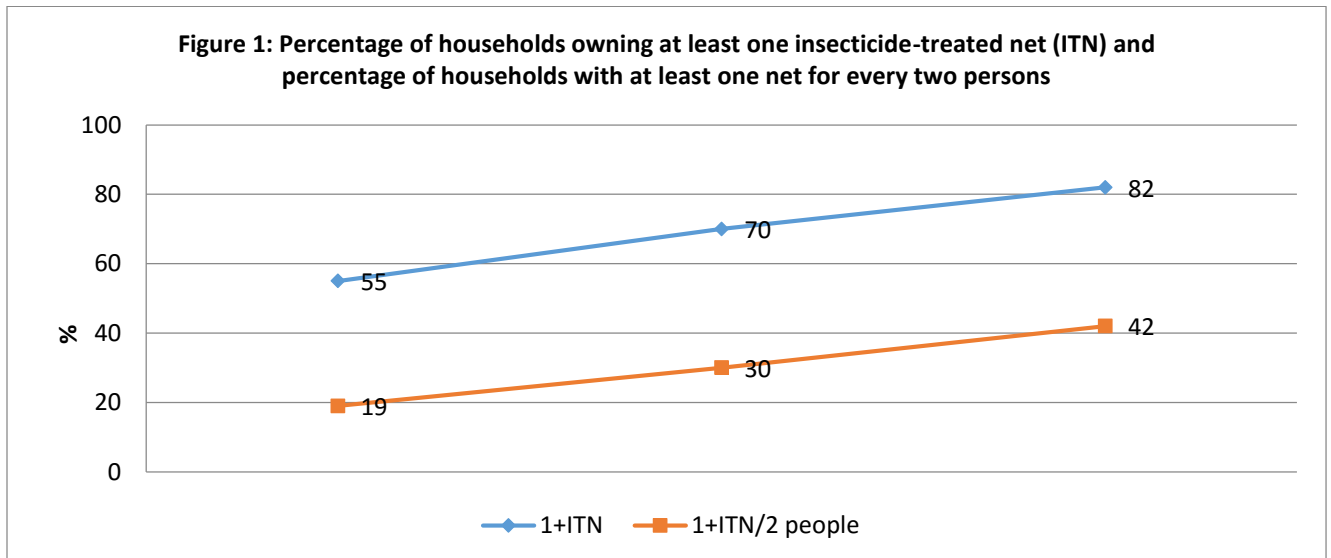


Figure 9: ITN ownership amongst

The reports further show a slight increase in number of households owning at least one insecticide-treated net (ITN) from 55 % in 2014 (MIS) to 63 % in 2014 (MIS), who slept under an LLIN the night before decline survey to 55 % (MIS 2017).

SP uptake at ANC facilities Percentage of women with a live birth in the 2 years before the survey who received at least three doses of IPTp

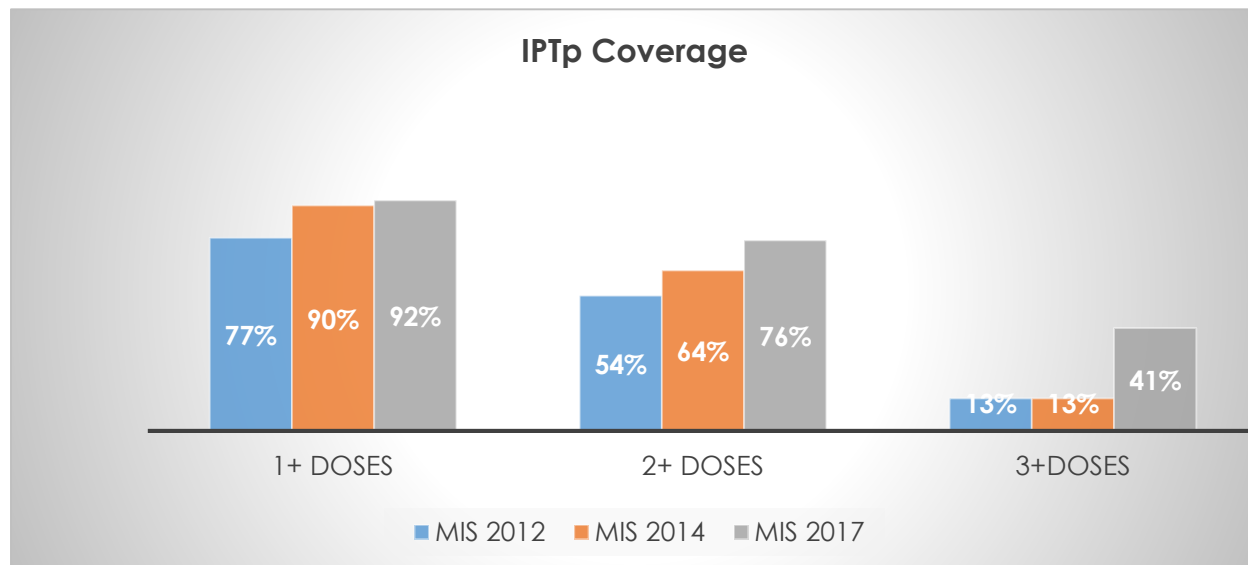


Figure 10: IPTp coverage

In figure 23, show proportion of pregnant women who received at least three doses of IPTp increased from 12 % (MIS 2014) baseline to 41 % in 2017. However, a repeat of MIS in 2019 to measure output has not conducted due to logistical challenges and DHIS does not capture 3+ doses of SP under routing conditions because the indicator is not in the system and ANC reporting form currently is not yet adapted and align to revised IPTp guidelines of 3+ doses. Community misconceptions about adverse reactions due to SP and its effect on the mother unborn baby as well as reluctance by pregnant women to be seen at ANC, slight male involvement for ANC, late attendance for ANC only (18 % in 2017) reported in first trimester, inadequate BCC communication materials on MIP to promote early attendance and uptake of malaria interventions, Slow rate of implementation regard SP-IPTp revised guidelines in due inadequate funding from partners.

5.3.5 Findings and recommendations

There is free ANC service in Government and some Christian Health Association of Malaria (CHAM) funded facilities. There has been no reported major stock outs of medicine (SP) and LLINs for routine distribution. There is existence of malaria in pregnancy treatment and prevention guidelines. Revised ANC data collection tools, and reporting forms in line

with revised IPTp guidelines. There is generally late presentation of pregnant women at ANC clinics which has resulted in persistent low uptake of the 2nd and 3rd dose of SP. Inadequate training of health care workers on SP-IPTp guidelines coupled with absence of job aids in facilities has also contributed to missed doses of SP-IPTp has been observed. Challenges in calculation of SP-IPTp coverage indicator were also observed.

Health Facility Based

Promote malaria in pregnancy prevention through directly observed treatment (DOT) for IPTp. 750 ANC facilities are using SP- DOT administration in presence of health workers however some few facilities experience water shortage at the facility level.

Community IPTp Based

Explore multiple channels for delivery of IPTp at community level. Train HSAs on IPTp distribution at community level. Build capacity of HWs on quality of care on MIP/FANC through training of ANC health service providers. Print and distribute revised IPTp policy guidelines; Print and distribute training manuals for health workers for ANC service providers

Provision of quality IPTp

Conduct quarterly integrated supervision on MIP & Safe motherhood to ANC health service providers and Conduct regular quarterly meetings of MIP Sub-Working Committee and other related coordinating mechanism

5.3.6 Enablers:

- Strong collaboration that exists between NMCP and partners on funding of key interventions
- Availability of health care workers who are willing and dedicated to implement interventions
- District Health Management Team (DHMT) commitment in implementing case management activities
- Free ANC service delivery in both Government and some CHAM facilities
- Existence of supporting relevant departments e.g. Reproductive and health Education unit
- Availability of policies and guidelines
- Timely quantification and distribution of medicine (SP) and supplies LLINs will very minimal stock out experienced
- Revised ANC data collection tools, and reporting forms in line with revised IPTp guidelines
- Existence of malaria in pregnancy treatment and prevention guidelines
- NMCP & PMI & Global fund

- Partner support from PMI through Cemonics and other programs under Reproductive Health

5.3.7 Best practices and lessons learnt

The review identified several best practices including the following:

- Implementation of MIP strategy through existing health care delivery structures does not only ease access to target groups (pregnant women), but promotes rapid expansion of the program, forges structural sustainability intervention as part of the old ANC package.
- Implementation of IPTp-DOTs is possible even in resource constrained situations where staff can improvise without compromising quality of services e.g. use of clean glass bottles, containers in absence of conventional drinking cups.
- Timely quantification and distribution of medicine (SP) and supplies LLINs will very minimal stock out experienced

5.3.8 Constrainers

- There is persistent low MIP program coverage due to limited funding and restricted MIP activities
- Some interventions are not country wide as partner's limitation to portion of districts
- Newly recruited staff are sent direct to health centers without thorough orientation on programs including malaria in pregnancy
- No indicator to measure the burden of Malaria in pregnancy
- Many health workers not trained in new IPTp guidelines
- Late attendance for ANC services
- Inadequate health worker job aids on IPTp administration
- ANC private clinics not submitting ANC monthly reports to DHMT
- Absence of monitoring indicator in DHIS to measure the burden of malaria in pregnancy

5.3.9 Conclusion

The MIP National Malaria Control Programme has made good progress in implementing most malaria control interventions and achieving targets. Data from the routine surveillance systems and other sources indicate that coverage on the set targets are improving.

This review concludes that National Malaria Control Programme needs to strengthen its delivery of interventions in order to achieve targeted coverage of all malaria in pregnancy interventions. In addition, there is need to improve data collection tools and use to inform programme decision making.

5.3.10 Recommendations

- Regular collaboration/Integration between NMCP and Reproductive Health Unit to strengthen MIP programme:
 - Uniformity in use of data collection tools and calculation of coverage indicators
 - Training of health care workers on guidelines and data collection tools
 - Development and printing of SBCC materials encouraging early ANC visits by pregnant women
- NMCP to strengthen implementation of community based MoH services
- Mentorship and supervision
- NMCP & partners to urgently revise ANC reporting form for ANC and the new indicator SP-IPTp be included in DHIS2
- NMCP & partners to train ANC service providers in revised IPTp guidelines
- Communication with community on social behaviour
- NMCP & partners develop & print BCC materials on IPTp to promote early attendance for ANC and uptake of malaria interventions
- NMCP to advocacy for more funds to support implementation of planned malaria in pregnancy interventions
- NMCP & DRHU to jointly review and print data collection tools/ health workers job Aids
- NMCP & partners to engage the profit clinics to implement ANC services and adherence to stipulated SP-IPTp policies and guidelines.
- Conduct quarterly district based MIP and safe motherhood review meeting
- NMCP & CMED to incorporate indicator to measure burden of malaria in pregnancy.
- ANC to constantly encourage to practice SP-DOT during quarterly supervision
- Facilities encouraged to ensure they collect water for clients in advance to avoid water shortage
- Timely funding from partners in line with MSP Plan
- Timely support from MSH to avoid uninterrupted implementation

5.4 Procurement and supply management

The National Malaria Control Program (NMCP) provides direct oversight for all activities relating to the procurement and supply management (PSM) of malaria commodities and supplies in Malawi. The funding of malaria commodities in Malawi is largely anchored by the Ministry of Health (MOH), The Global Fund to Fight AIDS, Tuberculosis, and Malaria (GFATM), and President's Malaria Initiative (PMI). The commodities are procured through the Central Medical Stores Trust (CMST), Pooled Procurement Mechanism (PPM) and the Global Health Supply Chain Procurement and Supply Management (GHSC-PSM) program. Malawi currently operates a Parallel Supply Chain (PSC) for both warehousing and

distribution of malaria commodities using Third Party Logistics (3PL) service providers in addition to the government mechanism through CMST.

The review of the PSM component was based on the various sections of the logistics cycle as applicable within the country context. This entailed reviewing the current practices in relation to available guidelines, policies and systems; examining the appropriateness of the existing mechanisms and identifying any prevalent gaps. Recommendations were then made with the view to improving the functionality of the malaria PSM mechanism in Malawi.

5.5.1 Review of The Malawi malaria PSM Mechanism

Product Selection

The current product selection process for malaria commodities in Malawi is done according to standard treatment guidelines and international best practices. However, it was observed that the present treatment guidelines (Malawi Malaria Treatment Guidelines (MMTG), 2011 and Malawi Standard Treatment guidelines (MSTG), 2015) are due for review. An example is the management of Malaria in pregnancy which has been updated (based on WHO recommendations). The product selection for quantification has since been updated to reflect the change while the existing MMTG is yet to be updated.

Selection guidelines for malaria rapid diagnostic tests (mRDTs) and long lasting insecticidal treated nets (LLINs) are overdue for updates. Guidelines for mRDTs and LLINs were developed in 2011 and 2016 respectively. However, present market realities and donor preferences are requiring the country to purchase mRDTs and LLINs outside the scope of the present guidelines.

Quantification

The national quantification of malaria commodities is conducted annually with bi-annual review and quarterly supply plan review to determine commodity quantity and funding needs for Malawi. The quantification exercise utilizes program morbidity, logistics and demographic data as obtained from the national reporting platforms.

Procurement

Malawi procures malaria commodities through multiple streams. The three main funding partners for malaria procurement are MOH, GFATM, and PMI. There are also parallel funding streams for limited procurements e.g. UNICEF, Save the children etc. Procurement takes place annually. For the bulk of commodities lead time has been good.

Distribution

Malawi uses three different channels for distribution coordinated by NMCP. The distributions are conducted monthly and resupply quantities are determined using the LMIS reports from previous reporting period.

Warehousing

Malaria commodities are stored under three different warehousing service providers; CMST, Bollore and GHSC PSM.

5.5.2 Inventory management

An informed push system is currently in place where decisions for allocating quantities to be distributed to facilities are determined based on the LMIS reported data. Paper based LMIS reports from health facilities are submitted to the district health office and satellite data entry sites on a monthly basis. The data is entered into OpenLMIS which is a web based LMIS platform. The central hospitals operate as independent OpenLMIS satellite data entry sites. Results in LMIS data quality assessment show improvement of data accuracy from 76% in September 2017 to 82% in October 2018.

5.5.3 Serving customers

Currently, dispensing is done by pharmacists, pharmacy technicians, pharmacy assistants and patient attendants in facilities.

5.5.4 Performance of PSM indicator

The program is making good progress with regards to PSM activity implementation with 86% of planned activities carried out as at end June 2019. There has been a general improvement in PSM capacity including availability of funding for procurement, warehousing and distribution, LMIS and PSM officers at district level. There were no reports of major stock outs of malaria commodities in the period under review . There is availability of guidelines on commodity accountability and transparency as well as distribution guidelines at all levels. Regular refresher trainings on Logistics system at district level Currently Malawi has one primary malaria PSM performance indicator which measures availability of first line anti-malarial commodities in health facilities. The results are presented in Table 11 below:

Table 8: Performance of malaria PSM outcome indicator

Indicator	Baseline	Target	Achievement	Data source	Frequency
Percentage of facilities with no stock outs of first line anti-malarials in the last three months.	93%	90%	99.1%	OpenLMIS	Quarterly

There were no baseline and targets established for mRDTs, LLINs and Sulphadoxine Pyrimethamine (SP) in the MSP. However, the program performance for these commodities is presented in table 12 below:

Table 9: PSM Indicators progress

Product Name	Achievement (%)			Data source	Frequency	Comments
	2017	2018	2019 (Jan-Jun)			
mRDTs	94.9	96.4	98.9	OpenLMIS	Annually	
LLINs	N/A	85.0	89.7	OpenLMIS	Annually	No data for 2017 because it was not yet being reported under LMIS platform
SP	67.7	88.8	93.2	OpenLMIS	Annually	

5.5.5 Enablers

- Adequate funding for procurement, warehousing and distribution
- Technical Support
- Presence of an LMIS system
- Installation of 452 prefabricated storages in a box (SIAB) units

5.5.6 Constrainers

- Irregular supportive supervision and mentoring of health facility personnel on PSM due to inadequate personnel, transport and funding for supervisory activities.
- Current LMIS not capturing all required data elements and in some instances unsatisfactory logistic data quality from health facilities.
- Parallel procurement of malaria commodities without the program's visibility and guidance. Some organizations procure and donate to districts directly without informing NMCP as a result there are more drugs in the system resulting to expiry.

5.5.7 Recommendations

- Strengthen PSM training and routine supportive supervision at district level to improve logistic data quality
- To improve the LMIS to enable it to capture all the required data elements
- PMPB should enforce the present donation guidelines.
- HTSS should update the donation guidelines with regards to drugs procured and monitored at national level by the programs i.e. Malaria, TB, HIV, Family Planning.
- HTSS should include the provision for expiry data reporting in the LMIS tools revision.

5.5 Social and behavioral change communication

Malaria interventions depend on human behavior in order to be successful. Progress on the reduction of the country's malaria burden is attributed to the creation of demand for products and services (care-seeking), promoting optimal use of control interventions, and facilitating changes in underlying social norms related to malaria prevention and treatment. The integration of social and behavior change communication (SBCC) into the MSP has been essential in order to reach targets to prevent, treat and control the disease. Effective SBCC approaches have contributed to improved LLINs acquisition behaviors and increased the likelihood of consistent use, optimized uptake of IPTp-SP and adherence to ACTs, and that IRS programmes reach their target coverage levels. In addition, SBCC was vital for improving provider skills in communicating with and counselling patients, creating demand for MRDTs and building trust in results, particularly when patients receive malaria-negative results.

5.5.1 Policies, guidelines and strategies

Besides the MSP, implementation of SBCC activities is informed by the country's policy and guiding documents including the following: health promotion policy; national health communication strategy; malaria communication strategy and community health strategy. Among other strategies, these documents recommend the use of interpersonal communication, social mobilization, community mobilization, advocacy and mass media to address gaps in knowledge, attitudes, practices and social norms that act as barriers to adoption of desirable malaria control behaviors. To achieve this, the NMCP works in collaborating with the Health Education Unit (HEU), other government ministries and agencies, development and implementing partners, researchers and civil service organizations.

The MSP outlines SBCC activities for implementation and during the first half of the MSP cycle, key SBCC activities have been done owing to a somewhat improved partner coordination mechanism at national, district and community level. At national (and district) level, a health promotion TWG exists and is mandated to regulate implementation of SBCC activities for various health programmes. For NMCP specific communication issues, a malaria SBCC WG was established to coordinate and support technical assistance and advocacy for malaria SBCC. At community level, structures are available to facilitate sustainable implementation of (malaria) SBCC programmes e.g. Community Health Action Groups (CHAGs), radio listening clubs and community theatre/drama groups.

Nonetheless, progress of implementation of SBCC programmes remains unimpressive. Major bottlenecks include inadequate resources for SBCC, sporadic implementation of SBCC activities translating into limited coverage, inadequate evidence that SBCC works (lack of baseline and end line data) and low ranking of SBCC activities during prioritization.

5.5.2 Progress towards MSP SBCC outcome targets

The SBCC outcome indicators contained in MSP are aimed at measuring uptake and use of proven malaria control interventions. For baseline, the MSP uses findings from the 2014 MIS 51

while the 2017 MIS findings are used to gauge performance in this MTR. For each outcome indicator, a target for 2019 has been provided.

Indicators

1. Percentage of under-five children with fever in the previous 2 weeks for whom advice or treatment was sought
2. Percentage of under-five children with fever for whom treatment was sought from a facility provider same day or next day
3. Percentage of under-five children who slept under an LLIN the previous night
4. Proportion of pregnant women who slept under an LLIN the previous night
5. Proportion of women who received at least three doses of SP during the last pregnancy
6. Percentage of people who have heard of malaria
7. Percentage of people who recognize fever as malaria symptom
8. Percentage of people who reported mosquito bites as a cause of malaria
9. Percentage of people who reported a mosquito net as a preventive method

Table XXX: Performance of SBCC outcome indicators

Indicator	Type	Baseline	Source	Frequency	Target 2019	Achievement 2019
Percentage of under-five children with fever in the previous 2 weeks for whom advice or treatment was sought	Outcome	58.8%	MIS 2014	2YEAR	65%	54.4%
Percentage of under-five children with fever for whom treatment was sought from a facility provider same day or next day	Outcome	31.2%	MIS 2014	2YEAR	42.5%	30.52%
Percentage of under-five children who slept under an LLIN the previous night	Outcome	67.1%	MIS 2014	2YEAR		67.5%
Percentage of pregnant women who slept under an LLIN the previous night	Outcome	62.4%	MIS 2014	2YEAR		62.5%
Proportion of women who received at least	Outcome	13%	MIS 2014	2YEAR	41%	41%

three doses of SP during the last pregnancy						
Percentage of people who have heard of malaria	Outcome	93%	MIS 2014		100%	96%
Percentage of people who reported mosquito bites as a cause of malaria	Outcome	80%	MIS 2014	2YEAR	90%	85%
Percentage of people who recognize fever as a symptom of malaria	Outcome	72.1%	MIS 2014	2YEAR	80%	71%
Percentage of people who cite an LLIN as a preventive method	Outcome	84%	MIS 2014	2YEAR	95%	87%

5.5.3 Enablers

- Availability of policy and guiding documents that inform the design of SBCC activities
- Use of SBCC reporting tool that captures SBCC data in the DHIS 2 (process indicators)
- Availability of technical and financial support from government and implementing partners
- Multi-sectoral partnership and collaboration between NMCP and implementing partners in the implementation of SBCC interventions (including participation of non-health sector)
- Availability of community health workers (Health Surveillance Assistants) on established posts as a trusted source of information and facilitators of behavior change
- Improved coordination mechanism through established platforms and structures allowing for sharing of best practices and experiences and advancing malaria SBCC (HP TWG, Malaria SBCC working group, CHAGs, schools and religious leaders)
- Dedicated work of the volunteer community health agents for malaria control
- Media engagement at both national and district level (i.e. community radio stations) to shape dialogue around malaria control
- Community level advocacy with local leaders to increase greater engagement and participation in malaria programming to achieve sustainable behavior change

5.5.4 Constrainers

- Non-involvement of District Health Promotion Officers during malaria data review meetings
- Social norms that lead to under-utilization of malaria interventions e.g. delayed care-seeking behavior for fever
- Although support from partners is available, it is not adequate to achieve the desired coverage and impact across the country
- Inadequate technical and financial support for coordination at district level
- Difficulty attributing desired change to SBCC programming because activities are conducted without baseline (evidence)
- Inadequate capacity of community health workers to designing and implementing effective SBCC activities
- Lack of vital equipment for mass communication i.e. LCD projector, camera, megaphone

5.5.5 Recommendations

- Develop/update the malaria communication strategy focusing on advocacy, communication and social mobilization for behavioural impact and aligned with the “Zero Malaria begins with me” campaign
- Engage with decision makers and government to increase resources allocation for regular and sustained implementation of SBCC to improve coverage at all levels
- Integrate SBCC activities with other thematic areas (case management, vector control and SMEOR)
- Strengthen coordination of and partnerships with partners implementing SBCC activities
- Standardise, update and finalise all Information, Education and Communication (IEC) materials and translate into local languages
- Employ channel mix including use of interpersonal, mass media and social media platforms to disseminate malaria prevention and control messages to targeted audience
- Conduct situation analysis and periodic KAP studies to guide the development of messages and materials.

5.6 Epidemic preparedness and response (EPR)

5.6.1 Policies and strategies

The Malawi Ministry of Health doesn't have an Epidemic Preparedness and Response (EPR) policy. However, we have an Integrated Disease Surveillance and Response guidelines under the Epidemiology department. These guidelines help in the disease surveillance and outbreak response. The Epidemiology department takes care of this role at National level and has structures at both national and district levels with focal persons at health facilities. These focal persons are key to mitigate epidemic situations, in collaboration with relevant disease programs. We also have a multi-Sectoral forum that coordinates the response to outbreaks in general, that may include zoonotic diseases with high risk to human infection.

In terms of Disasters of any other nature like floods or earthquakes, that require malaria response, government established the Department of Disaster Management (DoDMA). Under this department, there are several sectoral clusters and Malaria response falls under the Health Cluster through which we provide rapid malaria prevention response to usually displaced populations in temporary camps. However, there is need to establish the Malaria Epidemic Preparedness Response with a ready team and resources in place.

The Ministry of Health does not have Epidemic Preparedness and Response (EPR) policy on malaria. The Ministry has no any EPR activities at all levels (national, zonal, district and health facility) for malaria though there are rapid response teams at national and district levels that can be deployed for EPR purposes. The Ministry has also Integrated Disease Surveillance and Response (IDSR) program as at national and with focal persons at district level. These focal persons are key to mitigate epidemic situations, in collaboration with relevant disease programs such as the Immunization Program (EPI).

5.6.2 Enablers

- Existence of strong IDSR system at all levels
- Existence of rapid response teams that meet regularly to review IDSR data in all level

5.6.3 Constrainers

- EDR was not part of the Malaria Strategic Plan 2017 – 2022.

5.6.4 Recommendations

- EPR should be included in the MSP.

5.7 Surveillance, Monitoring, Evaluation and Operation research (SMEOR)

The main objective of SMEOR in the 2017-2022 MSP is to strengthen systems for surveillance, monitoring, evaluation and operational research to provide timely and quality information necessary to effectively guide programmatic decision-making. The SMEOR builds on the observed challenges from the 2011-2016 MSP, embedding the SMEOR into the ministry of health research agenda. The District Health Information System (DHIS-2) served as the primary source of routine data for decision making.

Addressing key recommendations from the 2011-2016 MSP, the NMCP developed a comprehensive monitoring framework for all components of the MSP including surveillance, monitoring and evaluation. The current SMEOR is focusing on undertaking data quality audits and assessments and build capacity in data

management at all levels; to strengthen collaboration between the NMCP and relevant MoH departments and stakeholders to ensure that there interface between HMIS with other complementary systems to allow for interoperability; for NMCP to collaborate with partners to facilitate development of a website or quarterly bulletin for data use and routine information sharing. A Malaria research agenda was developed to guide implementation of research priorities of the program.

SMEOR within the Malaria Strategic Plan 2017-2022 can be measured by:

- Epidemiological and entomological indicators
- Data quality indicators (data completeness, timeliness and accuracy)

5.7.1 Policies and strategies

The SMEOR plan in the MSP acts as the main guidance document since the M&E plan was not updated for 2017 - 2022 that outlines malaria monitoring and evaluation actions. The NMCP also engages in surveillance for antimalarial efficacy, routine monitoring of insecticide resistance, support for malaria indicator survey, health facility surveys and other surveys that collect malaria data.

5.7.2 Attainment of Targets

Overall substantial progress has been achieved since the start of the MSP in strengthening the routine surveillance system. The used data quality indicators are completeness, timeliness and accuracy of the monthly malaria reports that facilities submit to the DHIS2. Data quality assessment involved a random sample of 100 facilities (from the approximately 700 facilities in country) the exercise is done twice a year, so total sample size of 200.

Table 14: SMEOR indicator performance

Objective To improve data quality by increasing accuracy from 7% to 60% by 2022							
		Baseline	2017	2018	2019	Target	Comments
Data Quality	indicator						
Completeness	Proportion monthly malaria reports submitted of all expected reports	91.7%	92.4%	97.0%			
Timeliness*	% monthly malaria reports submitted by 15 th of next month of all expected reports.	53.9%	55.2%	77.2%		95%	Need for district team to manage linkage of facilities to DHIS2.
Accuracy	% of submitted monthly malaria reports that can be validated 100%	7%	6%	48%		60%	Marginal error rate different in standardised WHO data quality tools. Strict definition of accuracy will unduly cause external concern about and underestimate data quality.
Accuracy (proposed)	2 standard WHO tool as an additional indicator						TBD

While substantial progress has been made the overarching generic SMEOR objective is difficult to monitor, as separate (SMART) high level objectives for surveillance, Monitoring, Evaluation and operational research are missing. A specific identified gap was the lack of an objective on strengthening routine data use through data analyses,

data sharing and review. However, the MSP includes activities to work towards this objective and is making substantial progress through training key staff in data management and data use as well as quarterly district data review meetings. These meetings are attended by the DHMT, coordinators ICMI, facility in-charges and data clerks in 19 GF supported districts. Biannual zonal data review meetings are also conducted. Though these zonal meeting are not program specific, but can involve several topics including malaria.

The reporting of malaria services provided by Central hospitals into the DHIS2 has not yet started and a large proportion of private sector data is not part of the DHIS2 data capture system as only a few private clinics report through nearby public facilities.

The 2018 census lead by the NSO, provided a transition from annual population growth predictions to actual 2018 population figures based on the latest census. With substantial differences between population numbers for 2017 and 2018, as well as head count data from District Health Offices that affects denominators for several outcome indicators. Despite Malaria in Pregnancy being one of the focus areas in this strategic plan, it was established that the MSP does not include a specific indicator to capture the burden of malaria in pregnancy. The review also found out that IRS coverage indicator refers to households, while the IRS program works on the basis of structures sprayed not households.

The main challenge with the data completeness indicator is the inclusion criteria of health facilities in the DHIS2 system. In Malawi, the Medical Council of Malawi (MCM) is responsible for facility licensing, while the inclusion of health facilities into the DHIS2 system is the duty of the DHO office. Facilities that do not provide malaria services are also listed on DHIS2 and they tend to affect completeness of reporting as they add to the denominator and thus affecting the overall performance.

For the purposes of calculating malaria indicators, all facilities that are not providing malaria services should not be added to the denominator. With completeness over 97% an accurate denominator of actively reporting facilities requires an up to date list of health facilities providing malaria services in the DHIS2 system.

In the MSP the used data accuracy indicator is based on a WHO bespoke tool adjusted by the NMCP and partners to minimize time and costs. This allows efficient mentorship and supportive supervision. It is the % of submitted monthly malaria reports with 100% accuracy (successfully validated data fields i.e. no errors in whole monthly report). This was seen as unduly strict, and may underestimate the data quality as the marginal error rate is different (10%) in standardized WHO data quality tools.

The NMCP does not have an electronic data repository where programmatic data can be stored. This essentially would be data on trainings to show coverage as well as

survey data from the respective surveys and distribution campaigns. The only electronic data is that that sits on DHIS2 collected from the various surveillance tools in health facilities.

5.7.3 Enablers

- The presence and use of malaria surveillance tools at all levels of health facilities
- Investment in data management trainings has yielded substantial improvements in the completeness and quality of routine data available for data analyses and use.
- Since the start of the MSP there has been a substantial growth in-country capacity for data analyses, mapping, geospatial modelling and climate data modelling at NMCP and partner level, which can be capitalized on through regular malaria M&E TWG meetings.

5.7.4 Constrainers

- No MIS survey has been conducted in 2019 and it is unclear when the next survey may be conducted. Over the past decade the NMCP has conducted a MIS survey every 2 years. The 2019 MIS survey was initially planned to be combined with the MICS survey in 2019, but the MICS was postponed. The MDHS is planned for 2021. This affects a number of outcome indicators, and has hampered measurement of coverage following the 2018 mass LLIN distribution campaign.
- EIR screening not conducted in 2018
- Data review meetings and trainings are only conducted in 19 of the 29 districts.
- Resource limitations for fuel and transportation hamper implementation of planned activities such as data supportive supervisory visits.
- Internet connectivity at district level for HMIS officers to use DHIS2

5.7.5 Conclusions

The SMEOR is supported with timely information from health facilities and the community with wide coverage across the country. Investment in training in data management has substantially improved the completeness and quality of routine data available for data analyses and use. However, improved staff capacity in data analysis and interpretation for well informed decision making at all levels should be reinforced.

5.7.6 Recommendations

- To roll out DHIS2 reporting to Central hospitals for capturing of all data
- Strengthen data analysis and usage across all districts through regular data review meetings
- Procurement and operationalization of an electronic NMP data repository

5.8 Programme Management and Support

5.8.1 Availability of policies and guidelines

The availability of policies and guidelines in the program, are very critical in guiding and standardizing the implementation of the malaria control interventions. The NMCP has an up to date Strategic Plan and M&E Plan running from 2017 to 2022 which is aligned to the Health Sector Strategic Plan 2017-2022. A number of policy documents are available, although a few are in draft form pending presentation for approval to the Secretary for Health and Population.

Some of the available documents are:

- Health Sector Strategic Plan 2017-2022
- Malaria Strategic Plan 2017-2022.
- Malaria Communication Strategy
- National guidelines for the diagnosis and treatment of malaria (being revised)
- Insecticide Resistance Management Plan
- Net distribution guidelines
- Malaria commodity Transparency and accountability guidelines
- Malaria Rapid Diagnostic guidelines
- Malaria Indicator Survey Report
- Drug Efficacy Monitoring Report
- Malaria Research Agenda (Draft)

5.8.2 Programme structure and management systems

The NMCP at national level is hierarchically two steps from the Minister and is ideally placed within the MoH structure. Fortunately, at that level of Deputy Director, NMCP leader is a member of Senior Management in the Ministry of Health and Population and sits in the Senior Management meetings that are held on Mondays fortnightly. This allows the Program Manager, who is also Deputy Director of Preventive Health Services, to take part in Senior Management decision making. However, the positions for the rest of program staff are non-existent in the NMCP which does not have an approved organogram structure. In an effort to address this, the Program developed and submitted a proposed Organogram structure in the recent functional review as shown below and the NMCP is currently waiting for approval for organogram and position description developed during the functional review. At District level there is a functional program structure with 2 malaria coordinators. At national level the NMCP is supported by the National reference laboratory (trainings, QA/QC), IMCI unit

(community case management), Health education services (SBCC), Central Monitoring and Evaluation Division for data management and monitoring and evaluation.

PROPOSED NMCP STRUCTURE

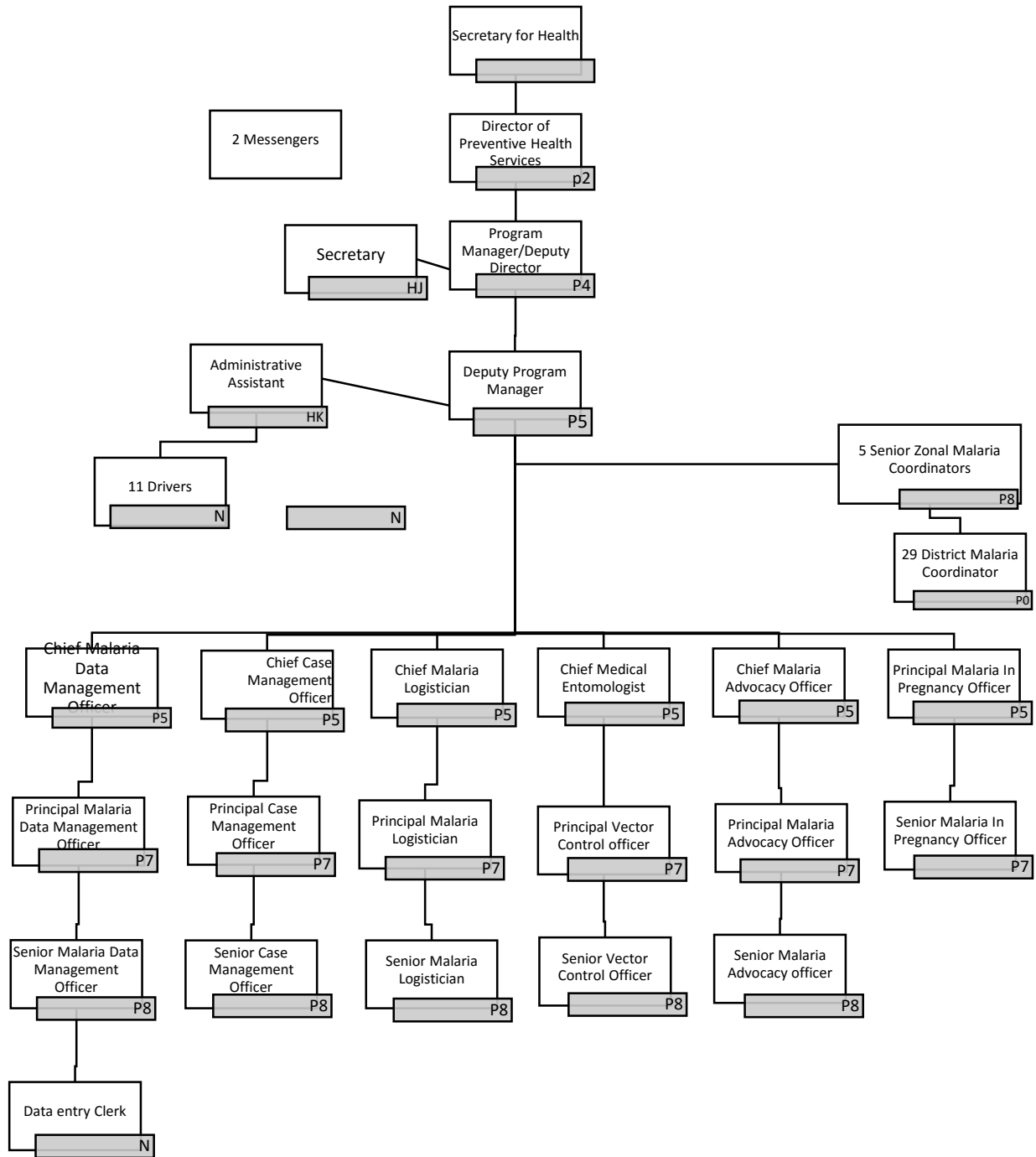


Figure 11: Proposed NMCP Structure

The NMCP national level has a tentative structure/organogram and defined responsibilities for the current staff that include the following: Program Manager (Deputy Director), Deputy Program Manager, 3 M&E and 2 Data Clerks, and 2 Vector control officers, 2 Case Management Officers, 2 SBCC officers, 1 Malaria In Pregnancy Officer, 4 PSM officers, and a few administrative officers (Secretary, Transport officer, 2 messengers and seven drivers). We also have 29 District Malaria Coordinators based in each district and are part of the proposed NMCP structure.

5.8.3 Governance and coordination

5.8.4 Partnerships and Coordination

The NMCP have a strong partnership with other Ministry of Health agencies and non-ministry of health partners to support Programme delivery. The NMCP operates several coordination platforms with Ministry of Health agencies, other line ministries and non-state health partners. Despite regular coordination meetings, there are still isolated reports of sub optimal coordination in the implementation of activities with partners.

5.8.5 Health Systems Capacity to Support Programme Delivery

At national level the NMP is supported by the National reference laboratory (trainings, QA/QC), IMCI unit (community case management), health education services (sbcc), Central Monitoring and Evaluation Division for Data management and monitoring and evaluation. HMIS: DHIS2 is functional in all districts and captures key malaria indicators. LMIS is functional in all districts and captures received stock and consumption. There is a functional PSM system and no major stock outs were reported at national level but there is need to strengthen the LMIS to capture all required data. Malaria Community Case Management – IMCI unit is responsible for training, supervision, supply chain management and data management for health surveillance assistants. Currently IMCI unit is supporting 4592 HSA who do malaria case management. Failure to conduct regular supportive supervision and mentoring visits sighted as the major challenge

5.8.6 Enablers

- Availability various health related policies and strategic plans
- Strong collaboration with sister programs MOH
- Annual review and planning meetings of MOH led by The Minister
- Quarterly CDC review meetings
- Existence of malaria cadres such as public health officers/technicians and community health agents to support malaria activities at subzonal and village levels as well as enhancing linkages with local government
- Existence of coordination committee for Global Fund funding purposes

5.8.7 Constrainers

- Lack of legislation for malaria control and elimination
- Lack of coordination of malaria partners and fora, particularly for discussion and integration on technical/programmatic matters

- Inadequate transportation facilities to support regular supportive supervision, surveillance and surveys/studies

5.8.8 Conclusion

The 2017-2022 MSP has been designed to reduce malaria incidence and malaria deaths by at least 50% from the 2015 baseline and significant progress has been made towards this goal. However, despite this significant progress, investments and concerted efforts are required to maintain and move the country towards malaria elimination. More resources preferably dedicated domestic malaria financing are required to strengthen human resource and provide the tools and capacity to carry out malaria interventions

5.8.9 Recommendations

- Develop and implement resource mobilization strategies/plans
- Strengthen partner coordination
- Strengthen data analysis and usage at all levels through regular training
- Strengthen the LMIS to capture all the required data elements to inform Quantification, Procurement and distribution

ANNEX

Table XXX: Detailed Implementation Status of Planned Activities in the MSP

	ACTIVITIES	RESPONSIBILITY	IMPLEMENTATION TIMELINE			COST CATEGORY	IMPLEMENTATION STATUS	REMARKS
			Y1	Y2	Y3			
OBJECTIVE 5: To increase the proportion of caregivers of under-five children who seek appropriate malaria treatment within 24 hours upon onset of fever from 31.2% to 50% by 2022								
Strategy 5.1: <i>Strengthen National and Community led Advocacy</i>								
Activity 5.1.1	Lobby support from local leaders and identify malaria champions and ambassador.	NMCP & HEU	X	X	X			
Activity 5.1.2	Document malaria success stories through Media visits to different communities	NMCP & HEU	X	X	X			
Activity 5.1.3	Conduct community dialogue with service providers for accountability of service delivery as well as for the protection and promotion of human rights and gender equality.	NMCP & HEU	X	X	X			

Activity 5.1.4	Engage key departments (Fisheries, Tourism, Local Government, and Agriculture) to foster multi-sectoral collaboration on improve utilization of malaria interventions	NMCP & HEU	X	X	X			
Activity 5.1.5	Document malaria success stories and airing of malaria messages and in-depth programs on both radio and TV.	NMCP & HEU	X	X	X			
Activity 5.1.6	Provide Malaria advocacy kits for influential leaders such as political leaders, local leaders	NMCP & HEU	X	X	X			
Strategy 5.2: <i>Social/community mobilization</i>								
Activity 5.2.1	Conduct malaria information dissemination sessions (malaria open days and community dialogues).	NMCP & HEU	X	X	X			
Activity 5.2.2	Develop and produce malaria videos that will be used in community filming sessions.	NMCP & HEU	X	X	X			

Activity 5.2.2	Provide community structures with SBCC materials and messages	NMCP & HEU	X	X	X			
Strategy 5.3: <i>Community-based monitoring</i>								
Activity 5.3.1	Train Community-based organizations and other community groups to independently monitor, document and analyze the performance of health services to provide feedback to service providers and as a basis for accountability and advocacy.	NMCP & HEU	X	X	X			
Activity 5.3.2	Establish and implement mechanisms for ongoing independent monitoring of health policies and performance and quality of all services, activities, interventions and other factors that are relevant to the disease by the CBOs,	NMCP & HEU	X	X	X			

No	Planned activity	2017				2018				2019				Total Expected	Total done (D)	Partially Done (PD)	Not Done (ND)	Comments
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4					
1	Develop quality assurance and performance monitoring activities throughout the Procurement and Supply Chain													(N/A)	N/A			Moved to PMPB (
2	Support districts to ensure that the reported data is reviewed periodically at districts level to ensure quality														N/A			Moved to M and E (Quarterly)
3	Train facility staff on revised data management system and data collection tools																	Moved to M and E
4	Conduct regular supportive supervision to health facilities to ensure adherence to SOPs	ND	ND	ND	ND	D	D	D	ND	D	D			10	5		5	Quarterly
5	Conduct forecasting and quantification exercise annually	D				D				D				3	3			
6	Procure Malaria commodities	D				D				D				3	3			
7	Train health workers and Procurement personnel in forecasting, quantification,				D									1	1			

	procurement, storage and distribution of Malaria commodities																	
8	Train staff on revised logistics management information systems (LMIS)										D			1	1			Include Revisions
9	Conduct Follow up on distribution of Malaria commodities	ND	D	D	D	D	D	D	ND	D	D			10	8		2	Quarterly
10	Conduct TWG meetings	D	D	D	D	D	D	D	D	D	D			10	10			(MCTF Meetings)
11	Conduct quarterly pipeline review and updates	D	D	D	D	D	D	D	D	D	D			10	10			
12	Conduct supervision and validation of reports at all levels													N/A	N/A			Moved to M and E
13	Conduct periodic audits at health facilities on malaria commodities in collaboration with the DTIU and Audit Section of MOH.													N/A	N/A			DTIU
14	Develop transparency and accountability guidelines				D									1	1			
15	Conduct orientation on transparency and accountability guidelines						D				D			2	2			

16	Conduct supervision and mentorship on adherence to transparency and accountability for malaria commodities						D	D	D	ND	D	D			6	5		1	Quarterly
17	Conduct QC and QA for all malaria commodities														N/A				Moved to PMPB
18	Advocate for review and update the PMPB Act														N/A				Moved to PMPB
19	Conduct pharmacovigilance and Post marketing surveillance for malaria commodities														N/A				Moved to PMPB
20	Develop guidelines/SOPs for reverse logistics and commodity re-distribution									D					1	1			
21	Develop template for commodity relocation at central level.	ND																	Not relevant as there is now a redistribution guideline
22	Conduct relocation verification and approval for facility emergency request.																		Not approved in the GF Grant