ETHIOPIA MALARIA ELIMINATION STRATEGIC PLAN: 2021-2025

AUGUST 2020, ADDIS ABABA

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MINISTRY OF HEALTH - ETHIOPIA
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NATIONAL MALARIA ELIMINATION STRATEGIC PLAN: 2021-2025

TOWARDS A MALARIA FREE ETHIOPIA

AUGUST 2020
ADDIS ABABA

FOREWORD

Ethiopia has scaled up and sustained coverage of key anti-malaria interventions for more than a decade. This scale-up made possible through the firm commitment of the government and sustained support from diverse partners. Consequently, significant reductions in malaria attributed mortality and morbidity were achieved in the country.

This national malaria strategic plan (NMSP), which spans from 2021/22–2025/26 aims to consolidate the gains made so far, sustain and expand impacts. The programme's vision is to see a malaria-free Ethiopia. The country aims to achieve nationwide malaria elimination by 2030. Ensuring national capacity in terms of qualified workforce and improving institutional efficiency as well as strengthening community engagement, empowerment and mobilization will be the bedrock on which the NMSP is to be built and be able to achieve its targets.

The NMSP's top priority is building a robust, timely, and effective surveillance and response system. Such surveillance system will actively detect and respond to outbreaks, test, treat, and track individual cases, and investigate cases or foci with appropriate mitigation actions and monitor overall progress in implementation of planned activities. Additionally, the NMSP strives for significant malaria burden reductions in high and moderate transmission settings, eliminate the disease in low transmission districts and prevent reintroduction of malaria into districts reporting zero indigenous malaria cases. In general, this strategy focuses on national malaria elimination programme, addresses the recommendations of the 2020 malaria programme review and responds to the major implementation gaps identified so far.

I would like to take this opportunity to reaffirm that the Federal Ministry of Health is highly committed to providing the necessary leadership and required support for achieving the ambitious targets of 2021/22 – 2025/26 NMSP. Finally, it is my firm trust that implementation of this strategy will advance the strides towards ending malaria from the country. Therefore, I sincerely call upon all partners to redouble their efforts for strides of the plan, which exceedingly contributes towards the vision of a '*malaria-free Ethiopia*'.



Dr. Dereje Duguma
State Minister of Health

ACKNOWLEDGEMENTS

The National Malaria Strategic Plan (NMSP) of 2021/22–2025/26 was developed through a series consultations and active involvement of all stakeholders. The NMSP's development demonstrated the collaborative efforts of the Federal Ministry of Health (FMOH), Regional Health Bureaus, Programme partners, civil society organizations (CSOs), academia, research institutes, other relevant stakeholders and individuals. The FMOH would like to extend its sincere gratitude to all stakeholders and individuals who contributed tirelessly in the development of the NMSP.

The National Malaria Elimination Programme and Diseases Prevention and Control Directorate deserve special thanks for overall coordination and guidance in the development of the NMSP. Specifically, Hiwot Solomon and Mebrahtom Haile have demonstrated monumental leadership role throughout the development process of the NMSP. Moreover, the technical support given from the technical advisory committee (TAC) was very instrumental in developing of the NMSP. In this regard, the Ministry would like to acknowledge the following institutions for their incredible support: the World Health Organization (WHO), President's Malaria Initiative (PMI), the United States Agency for International Development (USAID), the Malaria Control and Elimination Partnership in Africa (MACEPA)/PATH, Ethiopian Public Health Institute (EPHI), United Nations Children's Fund (UNICEF), Malaria Consortium, the International Center for AIDS Care and Treatment Programmes/Columbia University (ICAP), Addis Continental Institute of Public Health (ACIPH), VectorLink, and the Armauer Hansen Research Institute (AHRI), Ethiopian Pharmaceuticals Supply Agency (EPSA), Global Health Supply Chain - Procurement Supply Management (GHSC-PSM), John Hopkins University (JHU/CCP), Jimma University, Arbamich University, Addis Ababa University (School of Health Sciences, Aklilu Lemma Institute of Pathobioloy and School of Public Health), all Regions' malaria programme managers and technical advisors. In addition, PATH/MACEPA and WHO deserve special thanks for hiring local consultants who supported the write-up of the NMSP.

In conclusion, without the exhibited effective coordination and commitment, it would have been impossible to develop the NMSP in the midst of the covid-19 pandemic. The Ministry therefore acknowledges the direct and indirect contributions of all that has made the development of the NMSP possible.

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ABBREVIATIONS

AAU	Addis Ababa University
ACIPH	Addis Continental Institute of Public Health
ACSM	Advocacy, Communication and Social Mobilization
ACT	Artemisinin-based Combination Therapy
ADA	Agricultural Development Agent
AHRI	Armauer Hansen Research Institute
AL	Artemether-lumefantrine
API	Annual Parasite Incidence
ARM	Annual Review Meeting
AU	African Union
CC	Coordinating Committee
CCM-E	Country Coordinating Mechanism-Ethiopia
cPHEM	Center for Public Health Emergency Management
CSA	Central Statistical Agency
CSC	Community Scorecard
CSO	Civil Society Organization
DALY	Disability-Adjusted Life Year
DDT	Dichloro-Diphenyl-Trichloroethane
DEM	Digital Elevation Model
DHIS	District Health Information System
DPCD	Diseases Prevention and Control Directorate
EA	Enumeration Area
eCHIS	Electronic Community Health Information System
EDHS	Ethiopian Demographic and Health Survey
EFDA	Ethiopian Food and Drug Authority
EFY	Ethiopian Fiscal Year
EHAQ	Ethiopian Hospitals Alliance for Quality
EHCRIGs	Ethiopian Health Centers Reform Implementation Guidelines
ENACTS	Enhancing National Climate Services
ENSO	El Nino Southern Oscillation
EPAQ	Ethiopian Primary Health Care Alliance for Quality
EPHI	Ethiopian Public Health Institute
EPSA	Ethiopian Pharmaceuticals Supply Agency
EQA	External Quality Assessment
FMOH	Federal Ministry of Health
GDP	Gross Domestic Product
GIS	Geographic Information System
GNI	Gross National Income
GTP	Growth and Transformation Plan
GTS	Global Technical Strategy
HDI	Human Development Index
HEP	Health Extension Programme
HEW	Health Extension Worker
HIS	Health Information System

HMIS	Health Management Information System
HPN	Health, Population and Nutrition
HRD	Human Resource Development
HSTP	Health Sector Transformation Plan
ICCM	Integrated Community Case Management
IDP	Internally Displaced People
IRMMS	Insecticides Resistance Monitoring and Management Strategy
IRS	Indoor Residual Spraying
IRT	Integrated Refresher Training
ITN	Insecticide Treated Net
KPI	Key Performance Indicator
LLIN	Long Lasting Insecticidal Net
LMIS	Logistic Management Information System
M&E	Monitoring and Evaluation
MACEPA	Malaria Control and Elimination Partnership in Africa
MCH	Maternal and Child Health
MOF	Ministry of Finance
MOH	Ministry of Health
MPR	Malaria Programme Review
MSP	Malaria Strategic Plan
MTR	Mid-Term Review
NCD	Non-Communicable Disease
NDVI	Normalized Difference Vegetation Index
NGO	Non-Governmental Organization
NMA	National Meteorological Agency
NMEP	National Malaria Control and Elimination Programme
NMSP	National Malaria Strategic Plan
PATH	Partnership for Appropriate Technology in Health
PHCU	Primary Health Care Unit
PMI	President's Malaria Initiative
PPE	Personal Protective Equipment
PPM	Public Private Mix
PPMED	Policy, Planning, Monitoring and Evaluation Directorate
PPP	Purchasing Power Parity
RHB	Regional Health Bureau
SARA	Services Availability and Readiness Assessment
SBCC	Social and Behavior Change Communication
SDGs	Sustainable Development Goals
SMMES	Strengthening Malaria Monitoring and Evaluation System
SP	Sulfadoxine-pyrimethamine
SUFI	Scale Up For Impact
SWOT	Strengths, Weakness, Opportunities and Threats
TAC	Technical Advisory Committee
TOR	Term of Reference
TWG	Technical Working Group
UN	United Nation

UNDP	United Nation Development Programme
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VPN	Virtual Private Network
WHO	World Health Organization
WMR	World Malaria Report
WMS	Woreda Management Standards
WoHO	Woreda Health Office

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EXECUTIVE SUMMARY

The Ethiopian national malaria strategic plan (NMSP), which spans from 2021 to 2025, was developed after conducting malaria programme review (MPR) for the preceding NMSP and through a series consultations and active involvement of all stakeholders. It builds up on achievements made in the last NMSP and addresses gaps encountered during the previous strategic plan. The NMSP is fully aligned with policies, guidance, and evidences at global, regional and national levels and considers recent developments. The purpose of this NMSP is to articulate the national malaria programme's direction and implementation strategies so that efforts by all partners are harmonized towards sustaining universal coverage and putting Ethiopia on track for malaria elimination. It also provides indicative figures on the resources required for the implementation of the planned activities.

Vision: To see malaria free Ethiopia.

Mission: The Malaria Programme will provide quality, equitable and effective anti-malaria services and maintain proven anti-malaria interventions to all at risk populations of Ethiopia through community empowerment, mobilization and ownership, an integrated health system approach, strong partnership and by ensuring technical excellence.

Guiding Principles: The NMSP considers the following guiding principles - shared values and ethical standards:

- Fairness or equity.
- Value for money (efficiency).
- People-centered.
- Evidence-based public health practice.
- Partnership for success.

Goals

1. By 2025, reduce malaria morbidity and mortality by 50 percent from baseline of 2020.
2. By 2025, achieve zero indigenous malaria in districts with annual parasite incidence less than 10 and prevent reintroduction of malaria in districts reporting zero indigenous malaria cases.

Strategic Objectives

1. By 2025, achieve adoption of appropriate behaviour and practices towards antimalarial interventions by 85% households living in malaria endemic areas.

2. By 2021 and beyond, conduct confirmatory testing for 100% of suspected malaria cases and treat all confirmed cases according to the national guidelines.
3. By 2021 and beyond, cover 100% of the population at risk of malaria with one type of globally recommended vector control interventions.
4. By 2021 and beyond, conduct cases or foci investigation, classification and response in districts currently having API less than 10 and prevent reintroduction of malaria into areas reporting zero indigenous malaria cases.
5. By 2021 and beyond, generate 100% evidence that facilitates appropriate decision-making.
6. By 2021 and beyond, build capacity of all levels of the health offices to coordinate and implement malaria elimination interventions.

Implementation Strategies

1. Enhancing community engagement, empowerment and mobilization
2. Ensuring early diagnosis and prompt treatment
3. Strengthening vector control
4. Improving malaria surveillance and response system
5. Improving malaria supply chain and quality of antimalarial commodities
6. Ensuring human rights and gender equality in accessing malaria services
7. Strengthen engagement of all stakeholders, including civil society organizations (CSOs) and private sector
8. Strengthening malaria programme management, operational research and M&E.

Implementation Arrangements

The malaria programme is fully integrated at all levels of the decentralized health system of the country. The national programme provides guidance to all health offices and partners working in all aspects of malaria programme related issues. The programme has been supported by strong partnership and there are well-established system and forums for partnership coordination in the country. The programme works closely with the Ethiopian Pharmaceuticals Supply Agency to facilitate timely forecasting, procurement, clearing, and distribution of quality of antimalarial products; and promote rational use of malaria supplies. In addition to government structures, CSOs and private sectors will engage in implementation of the NMSP.

Monitoring and follow-up of implementation of the core activities and funding will be overseen by the central joint steering committee, which convenes FMOH and health population and nutrition

partners and the FMOH-Regional joint steering committees. Global Fund–specific programming has been overseen by the Country Coordinating Mechanism (CCM), which is chaired by the Minister of Health and co-chaired by a representative of CSOs.

Budget

Activity-based costing was done and the total cost of the NMSP for the five years is USD 532,009,146. The total funding projected to be available, including the GF source (USD 105,344,134 for the first three years) is USD 364,127,971 (68%) thus resulting in a funding gap of USD 167,881,175.

CHAPTER 1: INTRODUCTION

This malaria national strategic plan (NMSP), which spans from 2021 to 2025, was developed after conducting malaria programme review (MPR) for the preceding MSP. Accordingly, it builds upon achievements made in the last NSP and addresses identified gaps. The NMSP is fully aligned with policies, guidance, and evidence at global, regional, and national levels and considers recent developments.

The purpose of this NMSP is to articulate the national malaria programme's direction and implementation strategies so that efforts by all partners are harmonized towards sustaining antimalarial interventions' coverage and putting Ethiopia on track for malaria elimination. It also provides indicative figures on the resources required for the implementation of the planned activities to emphasize the need to hasten resource mobilization efforts. This MSP also serves as a guide for the development of plans of action at various levels. This section particularly describes the overview of policy and programme environment, NMSP and the national planning cycle in relation to malaria elimination programme.

1.1. Policy and Programming Environment

In Ethiopia, malaria remains to be one of the major public health and socioeconomic problems despite its dramatic reduction in the last two decades. Apart from illness and deaths, it paused persistent socio-economic impacts particularly to more than eighty per cent of the country's rural community. For example, overlapping of transmission of the disease with the major harvesting and other agricultural activities contributes to a massive loss of productivity. A survey showed that malaria accounts for loss of 30% of the overall disability adjusted life years (DALYs) as well as imposing a high economic cost[1]. Accordingly, malaria stands to be one of the top priority programmes in the national health and overall socioeconomic development agenda. Malaria prevention, control and elimination have been given due attention by the government and its partners. Moreover, the country launched a malaria elimination programme, which in turn demonstrated the government's commitment in the fight against the disease.

As part of this effort, the national government has allocated necessary resources for malaria elimination. In addition, the government of Ethiopia has been working closely with local, regional

[1] Ethiopian Public Health Institute, 2018. Services availability and readiness assessment (SARA). EPHI, 2018: 1-94.

and global partners and is wholly committed to regional and global malaria prevention, control and elimination agreements, strategies and targets. Ethiopia is an active member state of the African Union (AU), World Health Organization (WHO) and other United Nations (UN) agencies. Its strategies and targets include, among others, African Union Catalytic Framework to End AIDS, TB and Eliminate Malaria in Africa by 2030, the World Health Organization WHO global technical strategy for malaria, 2016-30 (GTS) and the target (target 3.3) of the sustainable development goals (SDGs) of the UN. The GTS 2025 goals and targets are to reduce both malaria mortality and incidence rates globally by at least 40%, 75% and 90% respectively, by 2020, 2025, and 2030 compared with 2015. The framework for implementing the GTS for Malaria 2016–2030 in the African Region is recommended the adoption of programme phasing and transitioning, aimed at facilitating a tailored approach to malaria control/elimination.

To effectively implement the planned interventions and eliminate malaria, necessary strategies have been designed and adopted, scaled-up and sustained over the years. As part of the NMSP 2021-2025 development, strengths, weakness, opportunity and threat (SWOT) analysis of the programme was performed. The SWOT analysis uniquely depicts that the current COVID-19 pandemic posed plausible impacts on the health system through its implication on sapping the limited resources and diverting priority. Consequently, implementing malaria elimination could also face plausible challenges and ought to consider the worst scenario like absence of effective interventions like vaccine to the COVID-19 in the upcoming years, possibly for at least the first two years of the NMSP.

1.2. Malaria Strategic Plan and the National Planning Cycle

The country has recently developed its national growth and transformation plan (GTP) and each sector office contributed its sector-specific plan. This plan has detailed activities with milestones for the coming five years and incorporates some indicative benchmarks for the coming decade. Accordingly, the health sector plan was developed and incorporated into the national transformation plan. Implementation of sector specific activities is handled by respective sector offices/ministries/agencies. Ethiopia has a federal government arrangement, where sub-national levels take a lead part in the planning process and implementation of the planned activities. The central level is oftentimes concerned with the policy, strategies and high-level guidance. Sub-national levels, however, are highly engaged in implementing and monitoring all the planned activities in their respective jurisdictions.

The NMSP is part and parcel of the national health sector plan and the overall national socioeconomic development plan. Accordingly, the NMSP's planning and budgeting cycle is well aligned with the national planning and budgeting cycle, which starts July 8 (Ethiopian Fiscal Year-EFY *Hamle* 1) and ends July 7 (EFY *Sene* 30). The implementation arrangement of the NMSP also aligns with the sector's implementation approach and tools.

Concerning development of the NMSP, the FMOH communicated to all relevant partners and stakeholders the need for a revised strategic plan, which was agreed by all parties. Following this, FMOH in collaboration with its partners conducted malaria programme review – (MPR), prepared terms of reference (TORs) for the task force that engaged in the development process, and set up a central steering/coordinating committee (CC) drawn from different partner organizations, namely FMOH/NMP, WHO, PMI/USAID, PATH/MACEPA, EPHI, CCM-E and a representative of CSOs. The CC was mandated to coordinate the overall development of the NMSP. Moreover, five technical working groups (TWGs) were established to facilitate the write up of different thematic areas and team leads/facilitators were assigned to all TWGs. Members of the TWGs were drawn from diverse organizations, including FMOH, UN organizations, bilateral and multilateral agencies, non-governmental organizations (NGOs), CSOs, CCM-E, academia, research institutes and representatives of regional health bureaus (RHBs). TWGs played very significant roles and demonstrated professionalism in delivering their respective assignments.

Additionally, partners recruited and assigned local consultants who followed the day-to-day development process and provided technical support to the national programme and the CC in coordinating the overall process.

CHAPTER 2: COUNTRY PROFILE

2.1. Overview

Ethiopia is located within 3.30°–15°N, 33°–48°E, in the Horn of Africa, bordering Sudan, South Sudan, Kenya, Eritrea, Djibouti, and Somalia. It has a total area of 1.1 million square kilometers. Ethiopia's topographic features range from peaks as high as 4,550 meters (m) above sea level in the Ras Dashen to 110m below sea level in the Afar Depression. Moreover, the Great East African Rift Valley divides the highlands of Ethiopia into two: the Northwestern and the Southeastern highlands. Due to the above-mentioned geographical features, ecological and climatic variations, the country has a diverse eco-epidemiology that supports heterogeneous malaria transmission.

Ethiopia is one of the most populous countries in Africa with the projected total population of 102.8 million by the year 2020. The country is characterized by rapid population growth rate (2.6%), young age structure and a high dependency ratio with a high rural-urban differential[2].

2.2. Sociopolitical System

The Constitution of the Federal Democratic Republic of Ethiopia establishes a federal parliamentary republic. The Federal Republic comprises of the Federal Government, the ten (10) autonomous Regional States and two City Administrations. Both the federal and regional governments are organized into three branches of government – legislative, executive, and judicial. At the lower administrative level, there are zones, districts (woredas) and villages (*kebeles*)[3]. Woreda is the lower decentralized body of administration, which is managed by an elected council that forms a local government. Woreda health office provides administrative and programmatic support to implement health services at primary health care units. Woreda is further decentralized to *kebeles*, which are the lowest administrative structures in Ethiopia[4].

One of the recent challenges has been internal displacement of people and instability in some areas of the country, which limits free movement of people and has detrimental effects on the implementation of malaria programme interventions leading to increased malaria cases in some woredas. Moreover, the COVID-19 pandemic has a devastating effect in the overall development

[2] Central Statistical Agency, 2016. The 2016 Ethiopian Demographic and Health Survey. CSA; Addis Ababa.
[3] Federal Ministry of Health, 2019. Woreda-based health sector core work plan EFY 2012 (2019/20). FMOH; Addis Ababa
[4] Federal Ministry of Health, 2019. HSTP II – draft doc. FMOH, 2019; Addis Ababa.

endeavor of the country. It also created unprecedented challenges in maintaining essential health services[5], including the anti-malaria interventions.

2.3. Demographic Data

With a population of about 102.8 million in 2020, Ethiopia ranks 2nd in Africa and 12th in the world. The country has a high total fertility rate of 4.6 births per woman (2.3 in urban areas and 5.2 in rural areas) and a corresponding crude birth rate of 32 *per* 1000 in 2016. The average household size is 4.6 persons. The country's population grew from about 18 million in 1950 to 74 million in 2007. If it follows its current rate of growth, the population will reach 125 million by 2025 and 190 million by 2050[6].

On the demographics of the population, children under age 15 accounted for 47% of the population and the age group of 15 and 65 years accounted for 49%, individuals aged 65 and older accounted for only 4% of the total population. While the sex ratio between males and females is almost equal, women of reproductive age constitute about 23% of the population. Furthermore, the proportion of children under five years and pregnant women is estimated to be 14.6 % and 3.3%, respectively[7].

Ethiopia's population is predominantly young. Children U5 accounted for 14.6% of the population and the age group of 15 and 65 years accounted for 49%, individuals aged 65 and older accounted for only 4% of the total population. While the sex ratio between males and females is almost equal, women of reproductive age constitute about 23% of the population. The population is predominantly rural with nearly 80% living in rural areas, mainly based on subsistence agriculture[8].

2.4. Ecosystem, Environment and Climate

The country has the following three broad agro-ecological zones identified based on topography and climate including the:

i. "Kolla" or hot lowlands that are found below an altitude of 1000m.
ii. "Weyna Dega" or midland between 1000m and 1500m, and
iii. "Dega" or cool temperate highlands greater than 1500m above sea level.

[5] Federal Ministry of Health, 2019. HSTP II – draft doc. FMOH, 2019; Addis Ababa.
[6] Ibid.
[7] Central Statistical Agency, accessed at www.CSA.gov.et
[8] CSA. 2016. The 2016 Ethiopia Demographic and Health Survey. Addis Ababa, Ethiopia.

The mean annual temperatures range from 10 to 16^{0}C in the "Dega", 16 to 29^{0}C in the "Weyna Dega" and 23 to 33^{0}C in the "Kolla". In general, the highlands receive more rain than the lowlands, with annual rainfalls ranging from 500mm to over 2000mm for the former and from 300mm to 700mm for the latter[9].

As previous major malaria epidemics overlapped with El Niño years, cognizant of the relevance of climate as a driving force for malaria epidemics the National Malaria Programme has been committed to collaborating with the National Meteorology Agency (NMA) of Ethiopia. The demand for quality climate information for public health action remained a priority issue for policy-makers[10], and thus, the Enhancing the National Climate Services (ENACTS) initiative designed a web-based climate dataset or map-room for the health sector in 2011 and later in 2015 adapted the application to help malaria elimination programme[11]. ENACTS is aimed at attaining the availability, accessibility and utility of quality climate information, particularly for malaria programme operation in planning and monitoring seasonality at lowest planning units such as district level[12]. Thus, district-based climate information such as number of months suitable for malaria transmission can be accessed to inform timing of spray operations for the most impact.

In addition, malaria surveillance suite was built on the existing NMA dataset to improve the understanding of the elevation of a district, presence and number of water sources and normalized difference vegetation index (NDVI). The information is available and healthcare personnel and planners can obtain monthly and seasonal anomalies of rainfall, minimum and maximum temperature climatology as well as monitor cumulative rainfall at various administrative units (region/zone/district) for monitoring malaria incidence in specific epidemic-prone areas. Moreover, using the map-room, planners of malaria programme can assess whether El Niño is relevant in their specific district/zone/region or not[13].

2.5. Socioeconomic Situation

As one of the fastest growing economies in the world, Ethiopia's economy has achieved robust, broad-based growth averaging 10.3% a year since 2006/07. Ethiopia's economy is projected to

[9] Tulu A.N. (1993): Malaria in Ethiopia. In The Ecology of Health and Disease in Ethiopia page 341-351, 1993
[10] Ghebreyesus et al., 2009. Using climate information in the health sector, *Field Actions Science Reports*, Vol. 2
[11] Dinku and Sharoff, 2015. ENACTS: https://climate-services.org/wpcontent/uploads/2015/09/ENACTS_Case_Study.pdf
[12] NMA, accessed at http://www.ethiometmaprooms.gov.et:8082/maproom/.
[13] NMA, accessed at http://www.ethiometmaprooms.gov.et:8082/maproom/

grow by at-least 7-9% in 2020[14,15]. The country's economy depends heavily on the agricultural sector, which contributes over 45% of Gross Domestic Product (GDP) and 80% of exports, and accounts for 83.4% of the labour force. Frequent droughts coupled with poor sustainable farming practices make the economy very vulnerable to climate change[16]. According to the 2019 Human Development report[17], Ethiopia's Human Development Index (HDI) value for 2018 was 0.470, which put the country in the low human development category - positioning it at 173 out of 189 countries and territories. Although Ethiopia's HDI value increased from 0.283 to 0.470, an increase of 65.8 percent between 2000 and 2018, its 2018 HDI of 0.470 is below the average of 0.507 and 0.541 for countries in the low human development group and countries in Sub-Saharan Africa, respectively. Based on 2011 purchasing power parity (PPP) the country's Gross National Income (GNI per capita) in 2018 was US$1,782. People living in multidimensional poverty in Ethiopia is 58.5 percent. The life expectancy at birth has increased from 61.6 in 2010 to 66.2 in 2018.

2.6. Health System Analysis

Ethiopia has a three-tier health care delivery system. The first tier is a primary health care unit (PHCU) comprising a primary hospital (with population coverage of 60,000–100,000 people), health centers (1/15,000–25,000 population) and health posts (1/3,000–5,000 population). Each health center has five satellite health posts. The second level in the tier is a general hospital with population coverage of 1–1.5 million people, and the third a specialized hospital that covers population of 3.5–5 million (Figure 1).

Woreda transformation has been the main method of transforming the health sector, which was initiated during HSTP-I in 2015/16. Several *woreda* transformation related reforms have been implemented, including the Ethiopian primary health care quality for alliance (EPAQ), *Woreda* management standards, and community scorecards. To monitor the performance of the *Woreda* transformation agenda a tracking dashboard is in use in all regions.

[14] International Monetary Fund. African Department. (https://www.imf.org/en/Countries/ETH)
[15] World Bank - Ethiopia Economic Update https://www.worldbank.org/en/country.
[16] WHO-AFRO, 2013. WHO Country Cooperation Strategy: Ethiopia. WHO Regional Office for Africa, 2013.
[17] UNDP. 2019. Human development report 2019 (http://hdr.undp.org/sites/default/files/hdr2019.pdf)

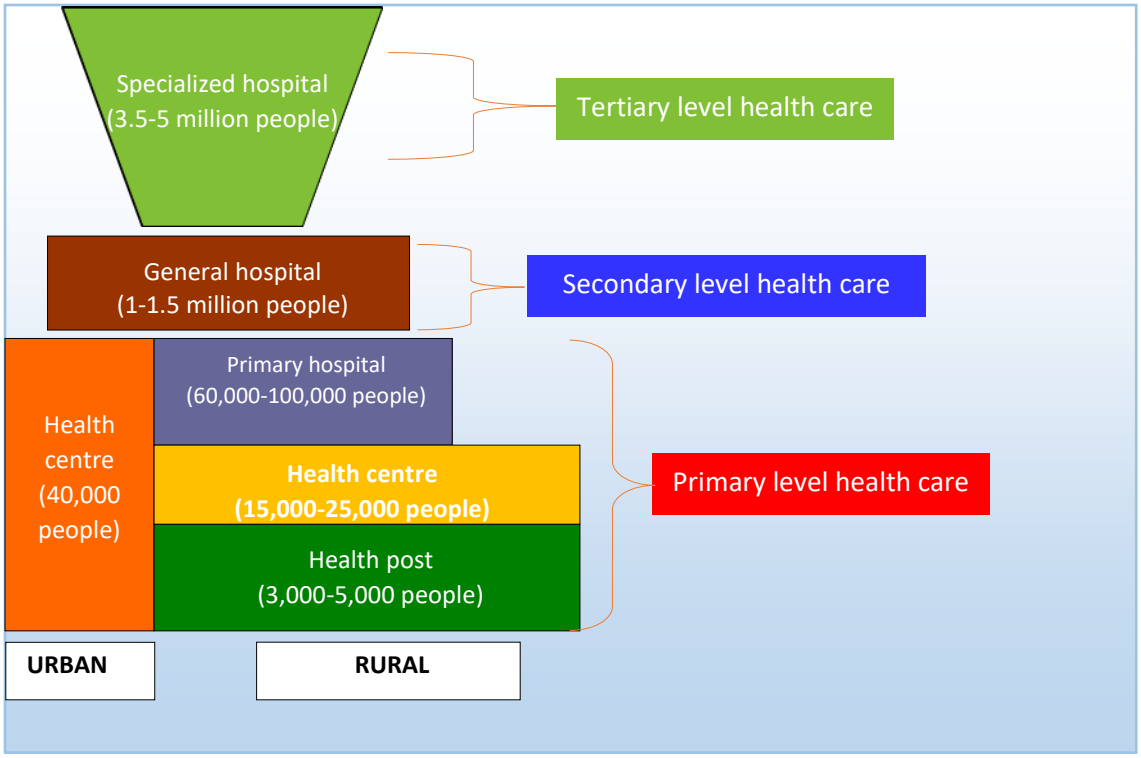


Figure 1. Ethiopia Health Tier System

In addition, progress in key health indicators are measured through demographic and health survey (DHS). DHS reports indicate that the country has been making significant progresses over years (Table 1).

Table 1.Health-related indicators, DHS of 2005, 2011, 2016 and 2019

Indicator	DHS 2005	DHS 2011	DHS 2016	Mini-DHS 2019
Under-five mortality rate	123/1000 live births	88/1000 live births	67/1000 live births	55/1000 live births
Neonatal mortality rate	39/1000 live births	37/1000 live births	29/1000 live births	30/1000 live births
Stunting in children under-five years of age (height-for-age < -2SD)	46% (severely stunted < -3SD: 24%)	44% (severely stunted < -3SD: 21%)	38% (severely stunted < -3SD: 18%)	37% (severely stunted < -3SD: 12%)
Acute malnutrition in children under-five years of age (weight-for-height < -2SD)	11%	10%	10%	7%
Infant Mortality	77/1000 live births	59/1000 live births	48/1000 live births	43/1000 live births
Maternal Mortality Ratio	673/100,000	676/100,000	412/100,000	-
Total fertility rate	5.4	4.8	4.6	-
Delivery with skilled attendant	6%	10%	28%	48%
Children<6 months, exclusively breastfed	49%	52%	58%	59%

The three core components of health services, i.e. quality of health care, equity and utilization of resources are very important aspects for malaria elimination programme and are presented as follows.

Quality of health care: Since 2006, the FMOH started to implement different health service quality initiatives. Following the launch of HSTP I, a national quality strategy was developed focusing on five major health priority areas namely maternal and child health (MCH), nutrition, communicable diseases, non-communicable diseases (NCDs), and clinical and surgical services. The FMOH developed and endorsed administrative and clinical services standards: Woreda management standards (WMS), Ethiopian health centers reform implementation guidelines (EHCRIGs), key performance indicators (KPIs), community scorecards (CSCs), model *kebele*, primary health care clinical guidelines. It also introduced various health service management initiatives, such as Ethiopian primary health care alliance for quality (EPAQ) and Ethiopian hospitals alliance for quality (EHAQ).

Equity: Despite improvements with national level health outcome indicators, the distribution of health outcomes and health services has been uneven across different segments of the population. Health indicators in Ethiopia vary significantly by region, type of place of residence, livelihood, and educational status, gender, and wealth categories. Analyses of regional and sub-regional variations in utilization of health services indicated that bigger regions, urban residents, most educated and the wealthy individuals have better health service utilization rates even for services that are relatively more accessible without user fees e.g. ITNs[18]. Migrant laborers and people in emergencies, including refugees have difficulty of accessing health services provided in the routine health system.

Utilization of resources: Since the adaption of its first healthcare financing strategy in 1998, Ethiopia has successfully initiated various healthcare-financing mechanisms, which were instrumental for health development in the last two decades. The malaria programme receives donor funding through the Global Fund, PMI and other donors augmenting the domestic financial resources, which is mainly covered by the government. On the other hand, significant challenges remain in mobilizing sufficient resources and utilizing them efficiently. Reforming the financing and management structure of the health system as well as transformation of health administration

[18] Federal Ministry of Health, 2019. HSTP II – draft doc. FMOH, 2019; Addis Ababa.

is required. Moreover, there is a need to advocate for more increased government commitment and domestic financial resources to ensure sustainability of the various health interventions.

Health system and the NMEP: NMEP interventions are implemented by the different components of the health system, which are managed by different directorates and agencies. The NMEP has a technical leadership role so that malaria interventions are incorporated into the supply chain system, drug quality regulation, quality of clinical, laboratory and pharmacy services, health extension programme, *woreda* transformation initiative, humanitarian response, epidemic response, etc. Moreover, Ethiopia is revolutionizing its information system by digitization of data, improved data use for decision-making and governance of health information. This is critically important for the overall health programmes in general and for malaria elimination programme particularly as it helps to test, treat and track each malaria case in all epidemiological settings. This in turn facilitates achieving of the elimination endeavor of the country.

On the other hand, the NMEP receives donor funding which can be leveraged to strengthen the building blocks of health system that will also be useful for other disease programmes.

CHAPTER 3: MALARIA SITUATION ANALYSIS

The section describes malaria control and elimination historical perspective, epidemiology and key vulnerable population.

3.1. Historical Perspective of Malaria in Ethiopia

Ethiopia is one of the African countries that adopted formal malaria institutions to fight malaria for more than five decades. Thus, series of evolution of organizational structures that followed the World Health Organization (WHO) recommendations until the integration of the vertical malaria programme with the basic health services in 1993 is worth mentioning. Since 1993, there have been milestones that accounted for improving the capacity of the national malaria programme.

One of the major actions of the Government of Ethiopia in the fight against malaria is its deployment of huge workforce of health extension workers (~40,000) to expand community-based intervention starting during 2004. This period was remarkable as the country introduced effective malaria treatment options: artemisinin-based combination therapy (ACT), artemether-lumefantrine (AL), and rapid diagnostic test (RDT) for diagnosis. This was coupled with effective vector control tools using indoor residual spraying (IRS) and long-lasting insecticidal nets (LLINs).

Overall, scale up for impact (SUFI) approach was employed through expansion of critical care services to the community level, a major breakthrough in the control of malaria and other preventable communicable diseases. Strong national political leadership, community engagement, sustained funding, and a proactive approach to policy adoption and intervention scale-up have all had major impacts on malaria transmission, morbidity, and mortality. Accordingly, significant reductions in malaria mortality and morbidity have been achieved in the country[19,20,21]. Building on that momentum, the country has the ambitious target of eliminating malaria by 2030. However, inadequate investment in the western part of the country, haphazardly organized programme management teams and weak infrastructure especially in regions with special support needs, breakdown of prevention and elimination activities due to the current COVID-19 pandemic are threats for maintaining what was achieved during last two decades.

[19] Taffese et al., 2018. Malaria epidemiology and interventions in Ethiopia from 2001 to 2016. Infectious Diseases of Poverty (2018) 7:103
[20] World Health Organization, 2019. World Malaria Report 2018. Geneva, WHO.
[21] Federal Ministry of Health. The 2020 MPR report. FMOH, 2020; Addis Ababa.

3.2. Malaria Epidemiology

Under this sub-section, the distribution of various malaria parasites and vectors as well as resistance patterns of the principal malaria vectors are considered. In addition, dynamics of malaria transmission and level of endemicity is highlighted.

3.2.1. Malaria parasites

Based on 2015 to 2019 malaria parasite data obtained from 25 malaria sentinel sites, a quarter (25%, n=410,409 of the 1,620,885) of the total suspected cases were malaria positive with *P. falciparum* accounting for about 65% and the rest were mainly due to *P. vivax*. However, the rate for *P. falciparum* (80.1%) was higher in the lowlands while for *P. vivax* (33.2%) was relatively higher in the highlands. Summary of proportion of malaria species reported from sentinel sites from 2016-2019 is shown in *Figure 2*.

Table 2. Percentage of malaria parasite from sentinel sites, 2016-2019, NMEP

Parasite Species	2015/16	2016/17	2017/18	2018/19
P. falciparum	61%	60%	63%	65%
P. vivax	35%	36%	35%	34%
Mixed	4%	4%	2%	1%

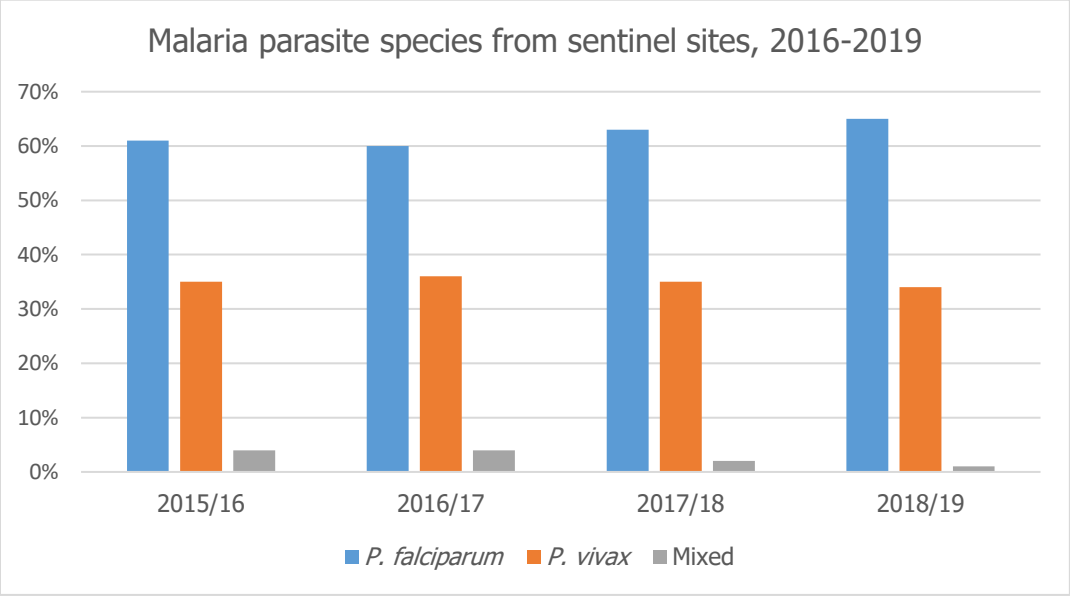


Figure 2. *Percent of malaria parasite species reported from sentinel sites, 2016-2019.*

Based on the HMIS report (*Table 3*), the proportion of *P. falciparum* was 63.7%, 66%, 69%, 89% and 88% for 2015/16, 2016/17, 2017/18, 2018/19 and 2019/20, respectively, which is higher

than the proportion observed from the sentinel sites report (*Figure 2*). The observed difference might be due to difference in quality of malaria microscopy diagnosis and quality of HMIS aggregated data. There is a need to improve quality of diagnosis and thoroughly investigate unusual proportions of species distribution from HMIS data.

Table 3. Percentage of malaria species based on HMIS data, 2015 - 2019

Species	2015/16	2016/17	2017/18	2018/19	2019/20
P. falciparum	63.7%	66%	69%	89%	82%
P. vivax	36.3%	34%	31%	11%	18%

Although there is no study that evaluated the impact of the interventions taken on the relative proportional distribution of the malaria parasite species, the decline in the overall relative proportion of *P. vivax* observed in the last few years could be attributed to the reduction in the transmission of malaria in highland fringe and semi-arid areas of the country over recent years. Thus, it is believed that the observed relatively higher reduction in malaria transmission in the highland areas compared to lowlands, which has been attributed to the scale of interventions made in the country since 2005, could explain the change in the proportional distribution of malaria species over time.

3.2.2. Malaria vectors

Geographic distribution: *Anopheles arabiensis*, a member of the *An. gambiae* complex, is the main malaria vector in Ethiopia with a wide geographical distribution. Other malaria vectors such as *An. funestus*, *An. pharoensis* and *An. nili* are considered as secondary malaria vectors with limited distribution. The density of *An. arabiensis* peaks from June to mid-September during the main rainy season in most parts of the country. However, in some areas of southwestern Ethiopia, it occurs throughout the year to sustain perennial transmission of malaria. A recent study confirmed that *An. stephensi* is widely distributed and established in eastern Ethiopia. Studies are ongoing to evaluate the distribution of *An. stephensi* in other parts of the country[22].

Trends of vector behavior: *An. arabiensis* prefers breeding in small, temporary, and sunlit water collections such as rain pools. However, it can also breed in a wide variety of other types of water bodies. The breeding habitats of *An. pharoensis* and *An. funestus* are usually large,

[22] Balkew, M., Mumba, P., Dengela, D. et al. Geographical distribution of Anopheles stephensi in eastern Ethiopia. Parasites Vectors 13, 35 (2020). https://doi.org/10.1186/s13071-020-3904-y

permanent water bodies with emergent vegetation, such as swamps and the edges of lakes. *An. nili* breeds in brackish water and is much more localized in its distribution. *An. arabiensis* was known to be endophilic and endophagic in most localities in the intermediate highlands, except a few localities in the Rift Valley where an exophilic tendency occurred.[23] A preliminary study in Eastern Ethiopia depicted that *An. stephensi* larvae were found in 64/85 water bodies sampled and most were collected from animal shelters. Blood meal analysis indicates the vector is zoophilic; over 50% had fed on animal blood and another 23% had fed on multiple sources including humans[24].

Entomological inoculation rates over time: Recent studies demonstrated that overall *An. arabiensis* infection rate for *P. falciparum* and *P. vivax* was less than 1%. Sporozoite infections were also detected in *An. funestus* group and *An. pharoensis* with an infection rate of 0.1% each, further confirming the role of the two species in malaria transmission. Membrane feeding experiments with *An. stephensi* and *An. arabiensis* on *P. falciparum, P. vivax* or mixed infected humans indicated that odds ratio of 2 and 4 on *An. stephensi* mosquito getting infected and having sporozoites compared to *An. arabiensis,* respectively[25].

Insecticide resistance and trends: The main malaria vector in Ethiopia has become resistant to DDT, deltamethrin, lambda-cyhalothrin and malathion. Insecticide susceptibility tests carried out from 2017-2019 showed that *An. arabiensis* was resistant to pyrethroid insecticides, but it was susceptible to bendiocarb and propoxur (carbamates) and pirimiphos methyl (organophosphates). In some localities, susceptibility of *An. arabiensis* to new candidate insecticides, Clothianidin (neonicotinoid) and chlorfenapyr (pyrrole) was evaluated. The results of this evaluation showed that *An. arabiensis* was susceptible to both candidate insecticides.[25]

Mechanisms conferring resistance were assessed on the population of *An. arabiensis* from different localities using synergist assay and molecular assays. High frequency of knockdown resistance (Kdr) was detected in populations of *An. arabiensis*. In addition, results on synergist assays indicated that there was partial or full involvement of elevated levels of detoxifying enzymes that mediated metabolic resistance on populations of *An. arabiensis* to pyrethroid insecticides (deltamethrin and permethrin). Glutathione-s-transferase and monooxygenase that

[23] Ameneshewa B. The behaviour and biology of Anopheles arabiensis in relation to the epidemiology and control of malaria in Ethiopia. Liverpool: University of Liverpool; 1995.

[24] Ashine T., Teka H. , Endashaw E. et al.: *An. stephensi* as an emerging malaria vector in the Horn of Africa with high susceptibility to Ethiopian Plasmodium vivax and Plasmodium falciparum. Preprint with bioRxiv, doi: https://doi.org/10.1101/2020.02.22.961284.

[25] Ethiopian Health and Nutrition Research Institute. Ethiopian Malaria Indicator Survey 2011 Addis Ababa: EHNRI; 2012. p. 1-71.

confer resistance to DDT and pyrethroids have been also reported in populations of *An. arabiensis*. Some study findings support that *An. stephensi* is resistant to several classes of insecticides, most notably pyrethroids[26].

3.2.3. Dynamics of malaria transmission

The diverse ecology of the country supports a wide range of transmission intensities, ranging from low-hypo-endemic transmission in the highland fringe areas and semi-arid regions to high-endemic perennial transmission in the lowland regions and valley floors. Generally, malaria transmission in Ethiopia occurs in areas located at altitudes below 2,000m above sea level, which is the target area for antimalarial interventions. However, some studies indicated that malaria infection was detected in areas beyond this cut-off[27,28]. Ecological modification for agricultural activities like extensive deforestation in higher altitudes of Ethiopia in the last three decades[29], which is complexed with anomalous weather conditions that might have favored occasional malaria transmission. An estimated 52% of the population is at risk of malaria infection. Altitude, climate, and proximity of settlement villages to bodies of water such as streams and rivers are the most important determinants of malaria transmission risk.[30] In most parts of the country, transmission is seasonal, major transmission being from September to mid-December, following the main rainy season (June-August), and minor transmission season during March-May. As a result, malaria transmission pattern in Ethiopia is seasonal and unstable[31] often characterized by highly focal and large-scale cyclic epidemics.[32,33]

Transmission of malaria in highland fringe and semi-arid areas of the country is found to be sharply decreasing over recent years, which is believed that the scale of interventions made in the country since 2005 has attributed for the decrease observed over the decade. Despite the

[26] Yared, S., Gebressielasie, A., Damodaran, L. et al. Insecticide resistance in Anopheles stephensi in Somali Region, eastern Ethiopia. Malar J 19, 180 (2020). https://doi.org/10.1186/s12936-020-03252-2.
[27] Tesfaye et al., 2011. Malaria prevalence pattern observed in the highland fringe of Butajira, Southern Ethiopia: a longitudinal study from parasitological and entomological survey. Malar J. 2011, 10: 153-10.
[28] Woyessa et al., 2012. Prevalence of malaria infection in Butajira area, south-central Ethiopia. Malar J 11, 84 (2012)
[29] Himeidan Y, Kweka, 2012. Malaria in East African highlands during the past 30 years: impact of environmental changes. Frontiers on Physiology. 2012;3(315).
[30] Graves PM, Richards FO, Ngondi J, et al. Individual, household, and environmental risk factors for malaria infection in Amhara, Oromia and SNNP regions of Ethiopia. Trans R Soc Trop Med Hyg. 2009; 103: 1211-1220
[31] Adhanom Ghebreyesus T, Deressa W, Witten KH, Getachew A, Seboxa T. Malaria. In: Berhane Y, Haile-Mariam D, Kloos H, eds. Epidemiology and Ecology of Health and Disease in Ethiopia. 1st edition. Addis Ababa, Ethiopia: Shama Books; 2006: 556-576.
[32] Guthmann JP, Bonnet M, Ahoua L, Dantoine F, Balkan S, van Herp M, Tamrat A, Legros D, Brown V, Checchi F. Death rates from malaria epidemics, Burundi and Ethiopia. Emerg Infect Dis. 2007; 13: 140-143.
[33] Negash K, Kebede A, Medhin A, Argaw D, Babaniyi O, Guintran JO, Delacollette C. Malaria epidemics in the highlands of Ethiopia. East Afr Med J. 2005; 82: 186-192

reduction in overall incidence of malaria, malaria transmission has expanded to highland areas due to recent temperature warming in these highlands. An increase in the daily minimum temperature of 0.4°C per decade has been recorded in the highlands of Ethiopia[34].

3.2.4. Malaria stratification and mapping

Considering the diverse ecological risk factors of malaria transmission in the country that supports a wide range of transmission intensity and pattern, it was critical to revise and update the stratification of malaria risk into different operational strata to fit with the ever-evolving strategic direction and priority that the country has embarked on. In particular, to respond to the strategic direction of scaling-up of elimination efforts while preventing reintroduction of malaria to areas currently reporting zero indigenous malaria cases, necessitates a more refined stratification to identify priority areas for evidence-based action. Accordingly, based on annual parasite incidence (API) *per* 1,000 population (per the WHO recommendation) plus altitude and expert opinions, new malaria stratification developed in 2020.

In addition, estimation of population at risk of malaria done using elevation as a parameter. Accordingly, a total of 20,831 *Kebeles* and 154,000 enumeration areas (EAs) used for this purpose. This is done by using ArcGIS and remote sensing software. Digital elevation model (DEM) downloaded from open data sources. Then some image processing activities like geo-rectification, image clipping and projection were performed using ArcGIS software. The minimum, maximum and median elevation points for all EAs from DEM were extracted by integrating the satellite image and GIS shape files. Finally, all EAs classified using the median elevation point for proportional sampling purpose. Accordingly, the new stratification classified risk of malaria in Ethiopia into five distinct malaria strata. The current stratification that assumed the level of malaria burden into account ensures suitability for different strategic objectives and will guide implementation of appropriate interventions across different strata. The five malaria strata are high, medium, low, very low and malaria-free areas as shown in Figure 3 and Table 4. The detailed description of each stratum is presented as follows.

High malaria endemic areas – These are areas of stable and intense malaria transmission with altitudes below 1000 meters located mainly in the western lowlands of the country comprising areas in Gambella, Benishangul Gumuz, Western Oromia, Amhara, some parts of South Nations,

[34] Conway D, Mould C, Bewket W: Over one century of rainfall and temperature observations in Addis Ababa, Ethiopia. Int J Climatol 2004, 24:77-91.

Nationalities and Peoples and Tigray Regions. These areas have hot humid tropical climate with mean annual temperature of 25.4°C (range: 22–28°C) and mean annual rainfall 935mm (range: 503–1,643mm) supporting perennial transmission of malaria. About 4.8% of the population (approximately 4.9 million people) lives in these areas and normally experience year-round transmission.

Moderate malaria endemic areas – These comprise areas in the midland zones between elevations of 1,001 and 1,750m with mean annual temperature ranging between 21°C and 30°C, mean annual rainfall between 503 - 1,643mm. Transmission is moderate with strong seasonality (6–9 months) with a tendency of longer transmission duration and intensity at lower altitudes. Both temperature and rainfall most likely influence the force of transmission and the occurrence of epidemics. Around 13.1% of the total population (13.5 million people) lives in this midland zone and most support their livelihood through agriculture and/or livestock rearing.

Low malaria endemicity - The low risk highland fringe areas are located between 1,751 and 2,000m altitude with mean annual temperature 19°C and mean annual rainfall ranging between 1,100–1,600mm. Transmission is unstable and seasonal (3–6 months), and people in this area used to experience large-scale epidemics that recur at irregular intervals of 5–8 years with localized outbreaks occurring almost every year. Both temperature and rainfall are important limiting factors of transmission. This zone covers most settlements in flat plains around lakeshores or river valleys or hill- bottoms in the highlands and highland plateaus. In most cases, breeding habitats associated with rain-pools or those created along the riverbeds during dry periods are important to enhance transmission. An estimated 5% of the population (5 million) lives in this epidemiologic zone.

Very low malaria endemicity – This stratum comprises the arid and semi-arid areas as well as areas that are located above 2,000 altitude in the country. The arid and semi-arid areas of the eastern and south eastern parts of the country that include Afar and Somali Regions with altitudes below 1,000m are characterized by unstable transmission. These areas experience short periods of intense malaria transmission, which lasts only for about 3–4 months. Temperatures are usually high (on average 27°C) and water pools created during the rainy season, particularly near water bodies provide breeding sites for the malaria vectors. Irrigation schemes, river pooling such as watershed from Awash, Wabi-Shebelle, and Genale-Dawa Rivers and seasonal rain-pools have a stronger influence on the duration and intensity of transmission than temperature. These areas

generally receive less rainfall annually (average of 296mm per year) than the highlands. An increase in surface area of water bodies due to flooding from upland rivers and streams, and expansion of irrigation schemes often limits transmission intensity and its spatial distribution. Most of the people in this area are pastoralists.

On the other hand, the very low risk highland areas comprise areas located between 2,001 and 2,500m altitude with mean annual temperature of 17°C (range: 14–20°C) and mean annual rainfall of 1,222mm (range: 487–2,019mm). It is characterized having little or no malaria transmission. The areas have commonly experienced brief but explosive epidemics, with higher case-fatality rates, due to climate abnormalities (warmer temperature anomalies) linked to the Global ENSO (La Niña/El Niño) events. Around 29.3% of the population (approximately 30.1 million people) lives in the highlands areas as well as the arid and semi-arid areas of the country.

The malaria-free areas: These are areas found in the highlands of the country where climate hinders development and maturation of both vectors and parasites making local malaria transmission impossible. However, because of population movements imported malaria cases can be diagnosed and treated in the health facilities in these areas. About 47.9% of the population (49.2 million) live in these highlands.

Table 4. Malaria stratification with estimated population distribution, NMEP, June 2020.

Malaria endemicity	Classification	Population (2020)	Number of districts
High	API>=50	4,929,814 (4.8%)	68
Moderate	API>=10&<50	13,480,217 (13.1%)	177
Low	API>5 &<10	4,999,818 (4.9%)	80
Very low	AP>0 &<=5	30,168,016 (29.3%)	485
Free	API=0	49,272,928 (47.9%)	236
Total		**102,850,793 (100%)**	**1,046**

Antimalarial interventions are prioritized based on their degree of impacts, availability, cost, suitability to the local context and operational feasibility. Taking these scenarios into consideration, proposed intervention by stratum presented in *Table 5*.

Table 5. Proposed interventions by stratum, July 2020, NMEP.

Malaria strata	Recommended interventions					
	Case Management	ITNs	IRS	LSM	Surveillance	SBCC
High	X	X	X	X*	X	X
Moderate	X	X	-	X*	X	X
Low	X	X	-	X	X	X
Very low	X	x**	-	-	X	X
Free	X	-	-	-	X	X***

*Larviciding if feasible, environmental management in all feasible areas of high, moderate and low strata

**Only 51% living in areas having API 1-5 will be covered by ITNs

*** In areas with a risk of resurgence

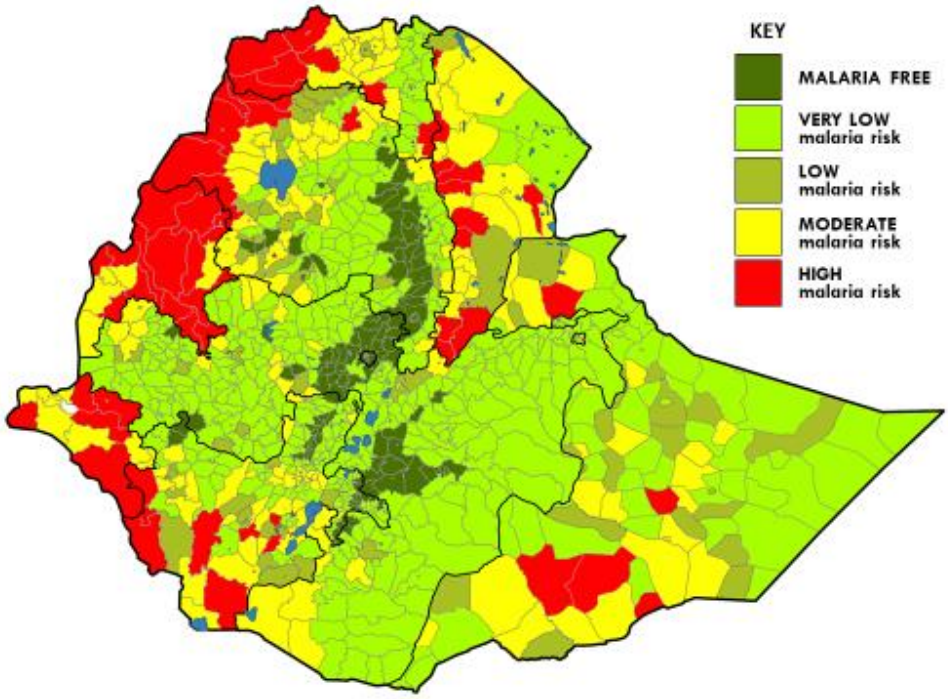


Figure 3. Malaria stratification map, June 2020, NMEP

3.2.5. Malaria epidemics in Ethiopia

Malaria epidemics can occur anywhere in epidemic prone areas of Ethiopia. However, areas where there is low and unstable malaria transmission, and people have low or no immunity are more commonly affected. A devastating malaria epidemic occurred in 1958, involving about three million cases and 150,000 deaths, and covering about 100,000 square miles (259,000 square

kilometers) of highland area[35]. Since 1958, major epidemics of malaria have occurred at approximately 5-8 year intervals. In 1998, a widespread severe malaria epidemic occurred in most highland areas as well as lowland areas in the country. Moreover, in 2002/03, many localized but severe outbreaks of malaria occurred leading to widespread epidemic malaria in highland and highland fringe areas (up to 2,500 meters)[36]. Since 2003, there has not been major malaria epidemic, except smaller-scale outbreaks and seasonal case build-ups. While keeping in mind that epidemic can occur anywhere, it critical to identify epidemic-prone areas for ensuring preparedness plan that help in preventive measures and arrest an epidemic timely if occurred. Numerous studies show that the key malaria risk factors that determine the occurrence and magnitude of malaria epidemics in the country, include meteorological factors (rainfall, temperature, humidity); drought and famine; migration of non-immunes; high incidence of other diseases; failure in efficacy of anti-malarial drugs and insecticides; and environmental changes (such as dams, roads construction, agricultural projects).

3.2.6. Trends in morbidity and mortality

Trend in malaria prevalence rates: The trend in malaria prevalence rates, which has been captured through MIS using comparable and nationally representative samples, showed a reduction in malaria prevalence over time from 0.9 percent in 2007 to 0.5 percent in 2015.[37,38] However, there was an increase in the prevalence of malaria in 2011 (1.3 percent) from the level in 2007 (0.9 percent).[39]

Based on the 2015 MIS, malaria prevalence among children under five years of age differed by age and region, but the variation by gender was not consistent.[38] Children with age category of 9–11 months old (1.5 percent) had the highest level of parasitemia compared with other age groups among children under five. Children under five years of age in Gambella (6.6 percent) and Benishangul Gumuz (3.2 percent) had the highest malaria prevalence followed by those in Amhara (1.1 percent) based on the results from microscopy. The regional difference in malaria prevalence rates has been captured by the malaria risk stratification and targeted with reduction priority interventions.

[35] Fontaine *et al.*, 1961. The 1958 malaria epidemic in Ethiopia. American Journal of Tropical Medicine and Hygiene 10, 795–803, 1961.
[36] Negash *et al., 2005.* Malaria epidemics in the highlands of Ethiopia. East Afr Med J. 2005; 82: 186-192.
[37]Federal Democratic Republic of Ethiopia Ministry of Health. Ethiopia National Malaria Indicator Survey 2007. Addis Ababa: FMOH; 2008: 1-98.
[38] Ethiopian Public Health Institute. Ethiopia National Malaria Indicator Survey 2015. Addis Ababa: EPHI; 2015.
[39]Ethiopian Public Health Institute. Ethiopia National Malaria Indicator Survey 2011. Addis Ababa: EPHI; 2011: 1-75.

Trend in morbidity and mortality: Malaria morbidity has shown significant reduction over time. The number of confirmed malaria cases decreased by 47% between 2016 and 2019. Figure 4 shows the trend of suspected malaria cases and confirmed malaria cases for the years 2016-2019.

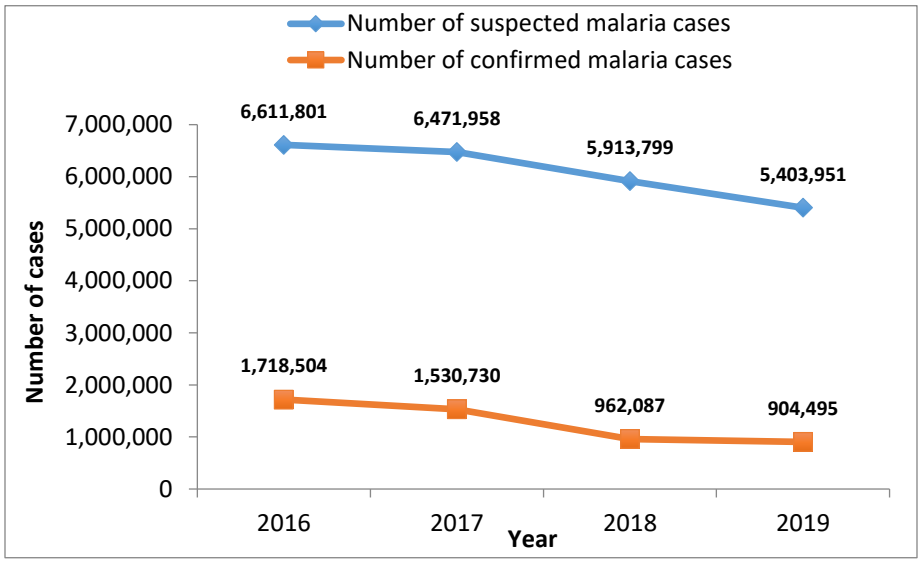


Figure 4. Trend of suspected and confirmed malaria cases, 2016-2019, NMEP, Ethiopia

Based on the HMIS reports (2016-2019), while the number of all-cause admissions over the years showed an upward trend, malaria related admission has significantly decreased over the same period. In particular, the decline has been very drastic in 2019 with 15,307 admissions down from over 30 thousand admissions in 2018. Similarly, all causes of inpatient death have been increasing every year, while malaria attributed death has declined annually. Accordingly, death due to malaria has decreased by 58%, from 510 to 213 between 2016 and 2019.

Table 6. Malaria-specific and all cause admissions and death, NMEP, Ethiopia

Indicators	**2016**	**2017**	**2018**	**2019**
Number of malaria admissions	45,154	32,345	30,783	15,307
Number of non-malaria admissions	1,067,646	1,147,632	1,132,915	1,182,010
Number of malaria deaths	510	356	156	213
Number of non-malaria deaths	23,079	25,008	30,105	41,617
Malaria deaths per 100,000 population at risk	1	0.63	0.27	0.32

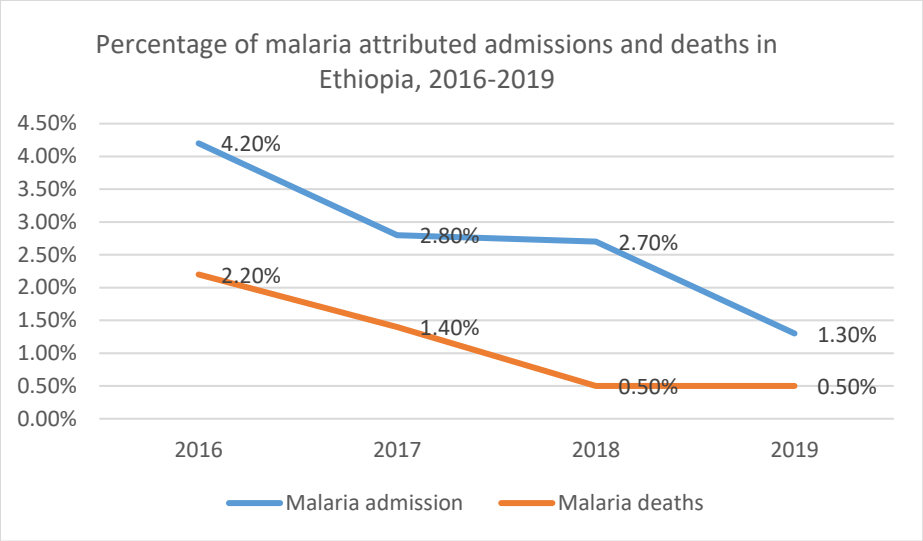


Figure 5. Percentage of malaria attributed admissions and deaths, NMEP, Ethiopia

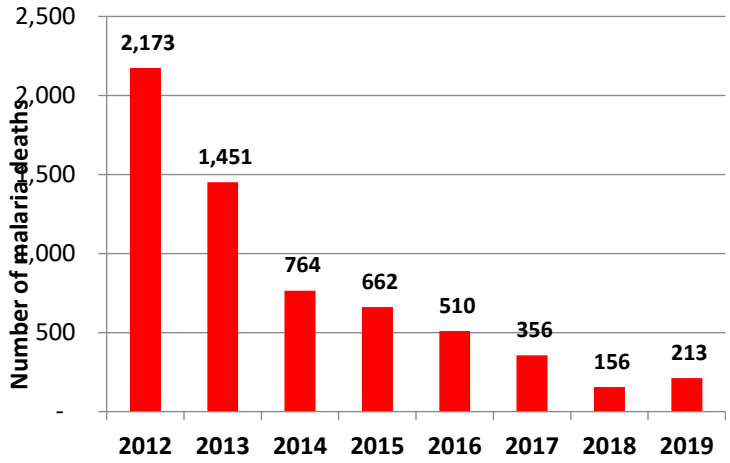


Figure 6. Trend of malaria-attributed deaths in Ethiopia from 2012 to 2019, NMEP, Ethiopia

3.3. Gender, Human Rights and Malaria

In Ethiopia, malaria prevalence and incidence vary significantly by region, type of place of residence, livelihood, educational status, gender, and wealth categories. Cultural factors including restricted mobility of women, gender role in decision-making and access to financial resources can affect access to health care services for malaria. For example, a study found that Ethiopian women were using services for malaria less frequently than men because of their workload left them little time to attend to their own and their children's health needs[40], while another study

[40] Ghebreyesus et al. The community-based malaria control programme in Tigray, northern Ethiopia: A review of programme set-up, activities and impact. Parassitologica, 2000, 42:255-290.

showed that women were reluctant to see male health workers for cultural reasons contributing to underreporting of malaria cases among women[41].

The government has made health equity, gender and human rights are core principles of its effort to achieving universal health coverage through the deployment of HEWs in rural and remote areas ensuring the marginalized communities access health services including malaria. The use of HEWs in the provision of RDT-based malaria diagnosis and treatment at community level has been critical in addressing the challenge on distance from service locations ensuring the responsiveness of the malaria programme to human rights issues. The economic dimension of human rights issue is also addressed through the provision of services free of charge, including the provision of LLINs and IRS. By design, HEWs are women aimed at addressing cultural barriers to service utilization by women and contributing to gender based equality in service utilization as well as addressing gender based economic disparities.

The strategic orientation of the NMSP considers equity approach through targeted interventions based on epidemiological stratification of the country where most affected areas with high prevalence of malaria are prioritized to receive interventions. It is also responsive to human right concerns by targeting high-risk population groups such as migrant laborers who are non-immune and internally displaced people (IDP) and refuges who cannot access routine health services. The NMSP aims to close the gap in regional variability in malaria indicators by addressing potential contributing factors such as language barriers in behavioral change communication activities using multiple languages in the dissemination of audiovisual and printed messages.

Gender and human rights approach is critical to effectively control and eliminate malaria. Thus, more efforts are needed to understand gender and human rights barriers and implement strategies that can address the barriers to facilitate the achievement of the objectives. There is a need to understand whether there are gender related barriers in treatment seeking behavior, use of LLINs, decision-making in seeking treatment, financial allocations, and labour division. The strategy aims to collect sex-disaggregated data in order to analyze and report by gender, which will reveal whether gender inequality exists in malaria service utilization.

[41] Lampietti J et al. Gender and preferences for malaria prevention in Tigray, Ethiopia. Policy and Research Report on Gender and Development. Working paper Series N°3, October 1999.The World Bank Development Research Group/Poverty Reduction and Economic Management Network

CHAPTER 4: REVIEW OF THE 2017-2020 PLAN

Summary of the effectiveness of implementation of the past NMSP, i.e. 2017-2020, extracted from the 2020 MPR report presented below.

4.1. NMSP achievements in line with the MPR findings

MPR was conducted for the 2017-2020 NMSP during the first two quarters of 2020 (which corresponds to the 3rd and 4th quarters of the Ethiopian fiscal year. The method for the review was adopted from the WHO AFRO's P*ractical Manual for MPR and malaria strategic plan mid-term review (MTR), 2019 edition.* The findings of the MPR 2020[42] revealed that significant gains were made in reducing the malaria burden. The MPR also identified challenges, which need to be addressed if the desired objectives are to be achieved. In all, the review identified and summarized achievements, bottlenecks and lessons learned to inform the strategic plan. Summary of major findings are presented below.

- **Epidemiology:** Mortality and morbidity attributed to malaria declined significantly for the review period. Accordingly, death due to malaria has declined by 67% from 0.9/100,000 population to 0.3/100,000 population at risk between 2016 and 2019. Similarly, the annual parasite incidence (API) has declined by 37% from 19/1000 population to 12/1000 population between 2016 and 2019. The number of confirmed malaria cases has reduced by 47% between 2016 and 2019. This reduction is in line with the NMSP target that aims at reducing malaria cases by 40% by the end of 2020 from baseline of 2016.
- **Entomology:** Recent entomological monitoring reports showed that *An. arabiensis* has exhibited two to three-fold more outdoor feeding than indoor. Similar trends were recorded for *An. pharoensis* and *An. funestus* group. Moreover, *An. arabiensis* species was found to feed in early part of the night. A similar trend of biting activity was documented for *An. funestus* and *An. Pharoensis*. Insecticide susceptibility tests carried out from 2017-2019 showed that *An. arabiensis* was resistant to pyrethroid insecticides, but it was susceptible to bendiocarb and propoxur and primiphos methyl.
- **Financing MSP:** Regarding funding, donor assistance contributed more than one third of the total health expenditure, making it an important source of financing health services. While the government per capita health expenditure reached US$10.6 in 2016/17, the total health

[42] Federal Democratic Republic of Ethiopia Ministry of Health. The 2020 MPR report. Addis Ababa: FMOH; 2020: 1-64.

expenditure per capita spending on health increased by 5.3% per year on average, from $28.7 in 2013/14 to $33.2 in 2016/17[43].

- **Vector Control:** The net coverage of HHs with at least one net was found to be 64.8%[44] in 2017 and 67%[45] in 2020, while performance report showed 85% coverage in 2019[46]. Based on performance report, out of 6.8 million unit structures targeted for IRS in 2017, 6.3 million unit structures were sprayed achieving 93.1% coverage. IRS coverage was 93% in 2019.
- **Malaria case management:** National malaria diagnosis and treatment guidance is generally in line with the WHO guidelines. On the other hand, malaria suspected cases, the routine HMIS/DHIS2 or PHEM indicators do not capture malaria in pregnancy and proportion of facilities participating in external quality assurance (EQA) programme. A survey showed lower percentage, 7% (4/56) of hospitals reporting stock outs for tracer drug, AL, which was 14% (4/30) in January 2014[47]. Similarly, the value of commodities wasted (expired, damaged and/or lost) decreased from 2.8% in 2017 to 0.57% in 2018 at EPSA level[48].
- **SBCC:** The review depicts that numerous SBCC activities have been implemented during the NMSP under review and various platforms used to reach out to opinion leaders and public at large. "Zero malaria starts with me" campaign was launched, which renewed the government's commitment in the fight against malaria. In 2019, national malaria week was observed through diverse SBCC activities throughout the country.
- **Surveillance and epidemic preparedness and response:** There has not been a major malaria epidemic except a few local malaria outbreak reports in some parts of the country since 2003. Data availability and completeness of reports has improved in majority of health centers following the implementation of DHIS2. However, there is a low reporting rate from private health facilities.
- **Operational research and monitoring activities:** The review identified 331 research papers were published in relation to malaria in Ethiopia between 2016 and 2019. Monitoring of drug safety and efficacy, sensitivity of vectors to pesticides have been undertaken regularly in close collaboration with research institutes, academia and partners.

[43] FMOH, 2017. National Health Account Report of 2016/17. Ministry of Health, Addis Ababa.
[44] EPHI, 2017. A survey on LLINs ownership and utilization. EPHI; Addis Ababa
[45] EPHI, 2020. LLINs ownership and utilization, and treatment seeking behaviour survey. EPHI; Addis Ababa.
[46] FMOH-PPMED, 2019. Annual HSTP Performance Report. Ministry of Health, Addis Ababa.
[47] EPSA, 2015. Integrated Pharmaceuticals Logistics System (IPLS) survey report 2015.
[48] EPSA, 2019. EPSA's annual performance report of 2019. EPSA, Addis Ababa.

In conclusion, there are policy and guidance documents for the NMEP. The NMCP is better organized and staffed at central level but lacks uniformity at Regional and woreda levels. There is a good coordination mechanism and working relationship with the key malaria programme partners. There are updated MSP, M&E plan and implementation plan for the review period.

4.2. Status of programme financing

Ethiopia receives significant funding from development partners for the health sector including the NMEP. Domestic funding for the health sector are largely allocated for covering recurrent expenditures, such as salaries and human resource development (including, notably, the training and salaries of HEWs), with additional spending on limited commodity procurement. In addition, some districts are allocating funds for IRS chemical procurement. The health insurance coverage is also on increasing trend covering more than 509 *woredas* in 2018/19[49].

Development partners have largely financed fixed costs and commodity inputs (e.g. ITNs, ACTs, RDTs, etc.). Major inputs for malaria control financing can be split into two general categories: 1) Federal level programme and operational expenditures (other than commodity procurement and distribution costs) and 2) Regional and woreda level expenditures. Insecticidal nets and IRS, together make 60% of the regional and woreda budget. In general, Ethiopia's domestic malaria spending has increased considerably over the past 15 years. The cost of the NMSP 2017-2020 is indicated below.

Table 7. Cost of the national strategic plan (2017-2020) by intervention.

Costing by Intervention	Implementation Year				Total (US$)	
	2017	2018	2019	2020		
ACSM	13,154,237	7,822,955	8,029,143	8,283,406	37,289,741	7%
Diagnosis	5,599,889	2,687,620	2,612,367	2,531,384	13,431,260	3%
Treatment	15,813,160	5,178,509	4,748,620	4,254,949	29,995,239	6%
Vector control	78,211,434	61,887,721	104,560,651	55,175,636	299,835,442	58%
Elimination	9,429,520	8,872,866	8,285,676	19,886,849	46,474,911	9%
M&E and surveillance	3,205,058	16,137,095	14,365,934	15,968,227	49,676,314	10%
Programme management	9,254,027	9,576,648	9,768,290	9,688,729	38,287,694	7%
Total in US$	**134,667,325**	**112,163,414**	**152,370,681**	**115,789,181**	**514,990,601**	**100%**

Table 8. Status of Global Fund budget disbursement and utilization (2017-2019)

Year	Amount disbursed (US$)	Utilized amount (US$)	Rate of utilization	Remark
2017	36,325,108	36,926,970	102%	The grant was from implementation period 1.

[49] FMOH. Annual performance report (ARM) 2019. PPMED-FMOH; Addis Ababa.

2018	38,666,385	50,165,527	74%	This is the existing grant / implementation period 2 cumulative
2019	29,346,528			

Table 9. Status of PMI/USAID budget disbursement and utilization (2017-2019)

Year	Amount disbursed (US$)	Utilized amount (US$)	Rate of utilization	Remark
2017	37,000,000	37,000,000	100%	MOP 17 funding is implemented in FY 18
2018	36,000,000	36,000,000	100%	MOP 18 funding is implemented in FY 19
2019	36,000,000	35,756,728	99%	MOP 19 funding is implemented in FY 20

Table 10. Status of government budget utilization (2017-2019)

Year	Amount disbursed (US$)	Utilized amount (US$)	Rate of utilization	Remark
2017	13,500,000.00	13,500,000.00	100%	
2018	14,901,459.85	16,533,929.32	111%	Additional budget used to fill the financial gap
2019	5,434,581.29	5,819,515.13	107%	Additional budget used to fill the financial gap

4.3. Key Challenges and Programmatic Gaps

The 2020 MPR has identified various key challenges and bottlenecks that were faced while implementing the 2017-2020 NMSP. In addition to the MPR, the quarterly and annual review meetings, which were conducted regularly, have been used to identify the challenges and weaknesses. The main challenges include the following.

- Suboptimal quality of microscopic diagnosis of malaria;
- Delay in procurement and intermittent stock outs of antimalarial drugs;
- Low utilization rate of ITNs;
- Low treatment seeking behavior;
- Influx of seasonal migrant workers, IDPs and refugees;
- Unavailability of real-time data- reporting delays, poor quality data, etc.;
- Lack of *kebele*-level mapping and stratification of malaria;
- Inadequate implementation of insecticides resistance monitoring and management strategy (IRMMS).
- Limited EQA for microscopy;

- Lack of entomologic database;
- Insufficient malaria programme organizational structure and its staffing and capacity at all levels are some of key challenges and bottlenecks depicted.

4.4. Lessons Learned and Way Forward

4.4.1. Lessons learned in implementing NMSP

Sustaining high coverage of proven antimalarial interventions, having a grass root healthcare services (HEP) and establishment of strong in-country partnership and coordination mechanisms believed to play significant contributions in the recent decline of malaria cases and deaths in the country. Similarly, an existence of epidemic preparedness and response plan at all levels contributed to the reduction of number of reported malaria outbreaks. Moreover, enhancing the capacity of federal, regions and districts improved performance of the planned activities.

Availability of complete and real-time data, which is very critical for implementing malaria elimination programme, remains a challenge for the programme. National malaria programme organizational structure and its capacity are found to be insufficient for shouldering the elimination activities. Malaria microscopic diagnosis quality is found to be suboptimal, which needs improvement. Moreover, intermittent stock out of anti-malarial drugs and improper use of the existing drugs in some malarious areas have been constraining the programme implementation. Moreover, district-level mapping and stratification of malaria is not sufficient for targeting appropriate vector control interventions.

4.4.2. Way forward

Accelerated implementation of malaria prevention and elimination interventions needed to attain further decline in malaria cases and deaths and achieve the endeavor of eliminating the disease. Some specific issues to be addressed are presented as follows:

- It is utmost important to ensure the availability and access to quality malaria data and establish a surveillance system capable of real-time data reporting, tracking of key indicators; and, case/foci-based investigation, response particularly for elimination targeted districts.
- Mapping of distribution of all malaria vectors and appropriate targeting of vector control interventions.
- Implementation of strong quality assurance (including EQA) of diagnosis and treatment of malaria.

- In collaboration with other stakeholders, implement national strategy for addressing malaria in special groups (migrants, refugees, IDPs, individuals with disability, etc.).
- Improve health facilities' capacity to request proportional and reconciled quantities of antimalarial drugs with number of malaria cases reported; and ensure uninterrupted supply of antimalarial commodities.
- Consider restructuring of national malaria programme so that it can shoulder malaria elimination endeavor through empowering the overall capacity (organization structure, human, finance, logistics and materials) of the national malaria program; and change the existing name into national malaria elimination center/directorate under FMOH.
- Identify research agendas and conduct operational researches, monitoring and evaluation for informed decision-making.
- Design/adopt and implement new strategies/tools for controlling or halting malaria transmission.
- Ensure community ownership and engagement in all malaria related planning and implementation through appropriate community sensitization and mobilization channels.
- Ascertain sustainable funding for the programme through mobilizing additional financial resources, which includes an increase in domestic funding.

CHAPTER 5: MALARIA STRATEGIC PLAN FRAMEWORK

This is a description of the national malaria programme's vision, mission, guiding principles, strategic directions and policy priorities, goals and objectives as well as strategies and interventions. The detail is presented below.

5.1. Vision

The overall vision of the health sector is "To see a healthy, productive, and prosperous society". Malaria programme shares and contributes towards realization of this vision. The vision of malaria programme is, 'To see malaria free Ethiopia'

5.2. Mission

The Malaria Programme will provide quality, equitable and effective anti-malaria services and interventions to all at risk populations of Ethiopia through community engagement, empowerment, mobilization and ownership, through an integrated health system approach, strengthening partnerships and by ensuring technical excellence.

5.3. Guiding Principles

The NMSP considers the following shared values and ethical standards:

- **Fairness or equity**. Provision of quality and equitable services will be emphasized through ensuring that vector control, diagnosis and treatment services reach all populations at risk of malaria, taking into consideration that certain populations and vulnerabilities, including women, IDPs, refugees, prisoners, migrants, etc. may face hardship in accessing services.
- **Value for money or efficiency**. Investment in antimalarial seeks to forge the principle for value for money. Accordingly, high impact interventions with low cost will be prioritized and implemented.
- **People-centered**. Community is a central part in the antimalarial interventions. Therefore, the antimalarial interventions will be implemented taking into consideration the communities' values, social circumstances, including the dynamic of interactions between service provider and client. Moreover, malaria is an acute illness that threatens the lives of individuals and much effort will be vested on the urgency of saving lives through integrity, loyalty, and respectful manners.
- **Partnership for success**. For reaching all segments of population, maximizing successes and avoiding duplication of efforts the existing strong partnership will be valued and sustained.

- **Evidence-based public health practice**. Every antimalarial related actions will be designed or adopted based on proven evidence and implemented in harmony with sound ethical practice and professional excellence.

5.4. Strategic Directions and Policy Priorities

Strategic directions and policy priorities during the NMSP period are summarized below:

a) Alignment with the national health policy, health sector plan and strategy:

Health policy, health sector plan and strategy: The NMEP runs in line with the National Health Policy of 1993, and Health Sector Transformation Plan (HSTP). The policy environment is highly motivated by strong government commitment, which paves a way for smooth running of the planned activities and encourages active involvement and engagement of all stakeholders in the execution of the planned activities. In line with this, the malaria programme is one of the major priority programmes that have received utmost government commitment and considerable attention over the years.

The HSTP was developed for the coming ten years. The first five years HSTP for 2020/21-2024/25 was developed. Malaria elimination has been considered as one of the top priority areas for the HSTP. Moreover, the existence of the health extension programme (HEP), which is a community-based structure for health promotion and disease prevention, has been playing a pivotal role in managing malaria related activities at the grass root. Additionally, there is a platform for the implementation of integrated community case management (iCCM), which is believed useful in sustaining and accelerating progress towards national, regional and global targets, including the SDGs.

Institutional framework and partnership: The Malaria Programme operates within the regular framework of government structure and procedures. Accordingly, there has been a well-established and integrated Malaria Programme within the health system from federal to community levels. The primary health care unit (PHCU), which comprises primary hospital, health centers and health posts, is instrumental in providing malaria related preventive and curative services. Moreover, the HEP has a pivotal role in addressing malaria related issues at the community level, which in turn facilitates community mobilization towards active participation in malaria related undertakings and ensures increased and appropriate use of anti-malaria interventions. Additionally, *woreda* transformation is believed to play an important role in pushing the malaria agenda forward. *Woreda* transformation entails three components: create model

kebele, reach 100% community-based health insurance and make all the health facilities in the woredas high-performing facilities. A model *kebele* will have at least 80% of the families in the *kebele* implement all the health extension packages, including malaria prevention interventions, which in turn ensures community protection against the disease and contributes towards overall reduction in malaria transmission in a given *woreda*. Eighteen (18) key performance indicators, one of which is related to malaria (malaria cases per 1000 population), measure the progress of high performing PHCU.

Furthermore, Ethiopia's malaria programme has been reinforced by a very strong partnership forum—the MCST. The MCST is composed of more than seventy (70) organizations, including UN organizations, bilateral organizations, international and local NGOs, CSOs, government offices, private sectors, academia, and research institutes. The partnership forum has been providing both technical and financial supports to the national malaria programme. Accordingly, there has been a joint planning, budgeting, monitoring and review forums in which all partners including CSOs and private organizations are well represented.

b) Alignment with global technical strategy

The NMSP has been developed in alignment with the Global Technical Strategy (GTS) for Malaria, which set milestones for 2020, 2025 and 2030. Accordingly, strategic directions and targets set by the global level have been taken care of and considered in the development of the NMSP. The NMSP is more ambitious than the GTS and sets for achieving more than 75% reduction in malaria related morbidity and mortality by the year 2025 from the baseline of 2015.

c) Adoption of evidence-based planning

While developing this NMSP, the planning team has considered current information and data collected in the 2020 MPR, annual programme performance reports and various studies or surveys conducted in recent years.

The MPR findings are very useful in guiding the preparation of the NMSP. Similarly, annual performance reports and findings of studies, like monitoring of safety and efficacy of antimalarial drugs, susceptibility of vectors to insecticides, and household survey on coverage of interventions, are found to be very important in informing the existing situation and what ought to be done in the years to come.

d) Instituting burden reduction activities and scaling up elimination efforts

It is evident that malaria transmission in the country is not homogenous, which calls for stratification of areas based on the level of malaria burden and targeting appropriate interventions accordingly. To achieve this, the NMSP gives priority to two broad categories: areas with high transmission and areas with low transmission.

In the high burden areas, additional interventions that facilitate malaria burden reduction will be implemented so that the population who have been encountering massive malaria parasite infection annually would enjoy their right of being protected from the disease, which in turn maximizes their productivity. On the other hand, the ongoing elimination efforts will be scaled up to all low transmission areas to interrupt local transmission of the disease during the planning period. In elimination-targeted areas, much emphasis will be given for case/focus investigation and response so that ongoing transmission is interrupted. In addition, efforts will be maximized for prevention of reintroduction of malaria to areas reporting zero indigenous malaria cases.

e) Ensuring equity in delivering malaria services to all segments of population

This NMSP includes interventions that respond to key and vulnerable population, addresses human rights and gender related barriers, as well as inequalities and vulnerabilities in accessing antimalarial services. To achieve this, the NMEP works in collaboration with all responsible national and international organizations, public and private sectors, CSOs and other community-based organizations.

Mobile or temporary clinics will be set to ensure access to lifesaving services, such as early diagnosis and prompt treatment for refugees, mobile population and seasonal migrant laborers as well as during a complex emergency, which forces people to be internally displaced from their hometown and limits access to the routine health services.

Provision of all antimalarial services free of charge will be strengthened at community level through the HEP and women development army (WDA), which in turn facilitates acquiring basic services in the midst of their residential areas and avoids gender disparity towards antimalarial services. Additionally, this avoids delay in accessing services and financial burden otherwise borne by community members to get the services. To avoid cultural and language barriers in accessing antimalarial services, health education messages and materials on malaria prevention, control and elimination will be customized to local context and communicated by local languages.

Moreover, a public-private mix will be implemented to expand service provision at private health facilities, so that all health facilities provide standard services according to the national guidelines.

5.5. Goals and Objectives

5.5.1. Goals

- By 2025, reduce malaria morbidity and mortality by 50 percent from baseline of 2020.
- By 2025, achieve zero indigenous malaria in districts with API less than 10 and prevent reintroduction of malaria in districts reporting zero indigenous malaria cases.

5.5.2. Strategic Objectives

Objective 1**:** By 2025, achieve adoption of appropriate behaviour and practices towards antimalarial interventions by 85% households living in malaria endemic areas.

Objective 2: By 2021 and beyond, conduct confirmatory testing for 100% of suspected malaria cases and treat all confirmed cases according to the national guidelines.

Objective 3: By 2021 and beyond, cover 100% of the population at risk of malaria with one type of globally recommended vector control interventions.

Objective 4: By 2021 and beyond, conduct cases or foci investigation, classification and response in districts having API less than 10 and prevent reintroduction of malaria into areas reporting zero indigenous malaria cases.

Objective 5**:** By 2021 and beyond, generate 100% evidence that facilitates appropriate decision-making.

Objective 6: By 2021 and beyond, build capacity of all levels of the health offices to coordinate and implement malaria elimination interventions.

5.6. Strategies and Key Interventions

This subsection summaries main strategies and corresponding key interventions.

A. Enhancing community engagement, empowerment and mobilization

Community empowerment and mobilization will be done mainly by the HEWs and WDA. CSOs and other community platforms will be used to empower the community. Community engagement mechanisms at health facilities and at levels of the health management will enable a malaria service delivery that is responsive to community needs.

a) Carry out targeted advocacy, communication, and social mobilization activities to promote desired positive behavior for effective implementation and proper utilization of malaria interventions.
b) Engage, empower and mobilize communities in order to foster ownership of anti-malaria interventions and active participation in planning and implementation of interventions.

B. Ensuring early diagnosis and prompt treatment

Malaria early diagnosis and prompt treatment will be implemented all over the country, at all sectors and at all levels of malaria transmission. Treatment of malaria cases will be based on parasitological diagnosis. RDTs will be used at health posts level and microscopy is to be used in health centers and hospitals. In other words, universal access to confirmatory testing and treatment of malaria cases will be ensured and case management implemented as per the national guidelines.

The following are some of the key interventions used to implement malaria case management.

a) Provide universal access to appropriate and quality malaria parasitological diagnosis to all suspected malaria cases.
b) Sustain universal coverage of effective and efficacious treatment as per the national guidelines.
c) Generate evidence on suitability of chemoprophylaxis or seasonal chemoprevention targeting special population group (seasonal migrant laborers) to protect them from malaria and reduce the risk of carrying parasites to their hometown.
d) Establish a quality assurance system for malaria microscopy and RDTs.
e) Support integrated community malaria case management activities.

C. Strengthening vector control

In Ethiopia, the main malaria vector control measures are those, which help reducing-human-vector contact and controlling adult mosquito. Hence, campaign based distribution of ITNs and targeted IRS are key strategies for malaria prevention, control and elimination in Ethiopia. Larval source management (LSM) is a supplementary strategy. Key interventions include the following:

a) Maintain universal coverage of ITNs among at-risk populations and improve appropriate utilization by identifying and responding to barriers.
b) Deploy quality IRS in selected districts/villages where epidemiological and operational suitability ascertained.
c) Implement targeted LSM (environmental management and larviciding) where appropriate.

D. Improving malaria surveillance and response system

Improving malaria surveillance and response system will focus on increasing the sensitivity and specificity of surveillance to detect, characterize and monitor all cases. Transforming malaria surveillance into a core intervention, which mainly focuses on malaria cases and foci investigation, response, characterization, classification, and follow-up.

a) Strengthen surveillance, monitoring and evaluation activities and undertake routine and periodic data collection analysis, and use of data for decision-making and archiving/proper documentation of data/information.
b) Transform malaria surveillance into a core intervention (conduct cases and foci investigation, classification and response; assess risk of reintroduction and mitigate receptivity and vulnerability of areas).
c) Assess, establish and support functional malaria elimination learning districts or centers at each region. Assess and recognize best performing regions/zones/woredas and cross-fertilize best practices.

E. Improving malaria supply chain and quality of antimalarial commodities

This strategy will ensure participatory, robust logistic planning, procurement and supply of quality antimalarial commodities. It will abolish delay in procurement and commodity stock outs; and ensure continuous supply and availability of quality antimalarial commodities.

a) Improve and sustain uninterrupted supply of antimalarial commodities.
b) Conduct pre- and post-marketing surveillance of antimalarial commodities.

F. Ensuring human rights and gender equality in accessing malaria services

Ethiopia has made impressive progress in improving access to health services in the public sector. Ninety-five (95%) of the population has access to public health service. However, there are barriers to access among different segment of population like mobile and migrant, refugees and people in emergencies. The following are some of the strategies used to address human rights and gender issues in malaria control and elimination.

a) Review the existing equity disparities in delivering antimalarial interventions among seasonal migrant workers, refugees, pastoralists, industrial parks and IDP and across genders.
b) Develop and implement strategy to improve access to malaria prevention, diagnosis and treatment services for refugees, IDPs, pastoralists, mobile and migrant workers.

c) Improve coordination and collaboration with relevant national and international agencies responsible for refuges, prison facilities, industrial parks, seasonal workers, IDPs and universities or other boarding schools.
d) Monitor implementation status of antimalarial interventions among migrant laborers, hard to reach areas, IDPs and refugees and across genders.

G. Strengthen engagement of all stakeholders, including CSOs and private sectors

Ethiopia's malaria programme has been backed up by a very strong partnership forum - the MCST. The NMEP will continue using the existing (and new as well) platforms to work together with health partners as well as non-health sector partners. At Ministry level, the programme will engage with various directorates and agencies that have roles in malaria prevention, control and elimination in order to ensure malaria services are provided as per the national guidelines. Some of the interventions to improve engagement of stakeholders are:

a) Mapping potential malaria affiliated CSOs and other stakeholders, and identify areas of collaboration.
b) Implement malaria public-private mix manual.
c) Monitor and review implementation status of CSOs and other stakeholders' malaria activities.

H. Strengthening malaria programme management, operational research and M&E

The NMEP requires strong programme management at all levels. Among other things, the NMEP provides technical guidance, conducts partner and resource mobilization, and provides policy guides and technical support. For these to happen, the NMEP will be reorganized and reinforced with appropriate mix of technical staff while also pushing the RHBs to take similar strengthening of their management. In addition, operational researches and M&E activities will be implemented to review and update antimalarial strategies or tools.

The following interventions will be undertaken:

a) Review and update malaria programme's organizational structure at national, regional and district levels to suit the envisaged national malaria elimination endeavor.
b) Build capacity of health workers and media outlets on malaria advocacy, communication, and social mobilization to effectively provide accurate and relevant malaria information to leadership, community and patients.
c) Improve the capacity of health workers to provide quality malaria case management, and planning, implementation, monitoring and reporting of vector control activities.

d) Monitoring efficacy of antimalarial drugs and susceptibility of insecticides and assess dynamics and behaviour of vectors through the established sentinel sites.
e) Evaluate new diagnostics, drugs, vector control tools, insecticides and larvicides; and generate strategic information to update malaria epidemiological and entomological profile and facilitate appropriate decision-making.
f) Promote the effectiveness, efficiency and accountability of malaria elimination programme at all levels by strengthening collaboration with all stakeholders (regions, partners and other sectors)
g) Develop comprehensive and costed annual operational plan.

CHAPTER 6: IMPLEMENTATION FRAMEWORK

6.1. NMSP Work Plan

During the operationalization of this NSP, efforts shall be made to ensure community engagement, empowerment and ownership, access to malaria interventions, capacity building, and performance monitoring. The implementation of the NMSP shall be guided and coordinated through the development of annual operational plans. The annual plans will be developed in alignment with and feed into broader annual HSTPs. In addition, NMSP and operational plans will be aligned with plans of partners and stakeholders to avoid duplication of effort and ensure better coordination and efficient use of resources.

The NMSP work plan with key activities is presented in Table 11.

6.2. Implementation Arrangements

6.2.1. Planning and implementation mechanisms

The NMEP is fully integrated at all levels of the health system throughout the country. The role of NMEP is to develop or update and disseminate policy and strategies. The NMEP produces and disseminates malaria related national guidelines and it monitors and evaluates the implementation and impact of interventions. Moreover, NMEP is involved in building the capacity of programme managers at regional, zonal and district levels. NMEP also provides technical guidance to all stakeholders and implementing partners. In order to implement malaria related activities, NMEP works in collaboration with other key units within FMOH. NMEP is one of disease focus units in the Disease Prevention and Control Directorate, thereby providing horizontal integration throughout the system. To extend the its reaches, the programme has collaborative relationships with various agencies such as research institutes, procurement and supply management agency, and regulatory bodies as well as other Directorates in the Ministry. In addition, there are malaria units, teams, or focal persons at regional and district levels, which are charged to handle malaria related matters in their respective jurisdictions and implement strategies and policy guidelines developed by NMEP. The HEP is at the base of the health system structure into which community-based malaria programming is fully integrated. Health posts, health centers and primary hospital representing the PHCU have direct linkage to the District Health Office. The hospital structure provides referral links and feedback mechanisms to lower levels for treatment of severe malaria.

Table 11. Implementation logframe of NMSP 2021/22-2025/26

Strategy	Key Activities	Timeline					Responsible
		2021/22	2022/23	2023/24	2024/25	2025/26	
Objective 1: By 2025, achieve adoption of appropriate behaviour and practices towards antimalarial interventions by 85% households living in malaria endemic areas							
Social mobilization and Behavior Change	Develop malaria communication strategy (2021-2025)	x					NMEP, RHBs, Partners & CSOs
	Disseminate key malaria messages using print, radio, TV, mobile applications, SMS texting, social media and mobile vans in different languages targeting all population, including marginalized population (migrant/IDPs/refugees, etc.)	x	x	x	x	x	NMEP, RHBs, Partners & CSOs
	Commemorate malaria week & world malaria day	x	x	x	x	x	NMEP RHBs & Partners
	Disseminate malaria SBC activities through school, religious institutions and workplaces	x	x	x	x	x	NMEP, RHBs, CSOs & other sector organizations
	Integrate malaria prevention, control and elimination activities into school programmes	x	x	x	x	x	NMEP, RHBs & Partners
	Conduct advocacy on malaria elimination at national, regional, zonal and district levels to gain and sustain commitment from political leaders and other stakeholders	x	x		x		FMOH & RHBs
Objective 2: By 2021 and beyond, conduct confirmatory testing for 100% of suspected malaria cases and treat all confirmed cases according to the national guidelines							
Ensure proper coordination and guidance on case management at national level	Regularly update national case management guidelines including training materials in line with the global recommendations and national context		x			x	NMEP
	Develop and include appropriate case management and supply chain indicators in HMIS and PHEM	x					NMEP
Strengthen provision of malaria case management at community	Provide training of laboratory professionals, instructors, and students on malaria diagnosis and quality assurance	x		x		x	NMEP, EPHI & Partners
	Training of HEWs in malaria laboratory diagnosis and quality assurance as part of ICCM, IRT	x		x		x	FMOH

Strategy	Key Activities	Timeline					Responsible
		2021/22	2022/23	2023/24	2024/25	2025/26	
and public health facilities	Introduce evidence based innovative diagnostic tools like ICCM mobile application for malaria diagnosis and treatment		x				MCH & NMEP
	Equip all health facilities with diagnostic commodities & drugs	x	x	x	x	x	EPSA & NMEP
Support malaria case management at private health facilities	Finalize the public private mix (PPM) implementation manual	x					NMEP
	Provide training to private clinics on malaria case management, data recording and reporting	x		x		x	NMEP & PPME
	Provide regulatory and supervision support to all private health facilities to enable them adhere to the national PPM manual in conducting malaria diagnosis	x	x	x	x	x	NMEP, EPSA
	Provide private health facilities with diagnostic commodities and antimalarial drugs	x	x	x	x	x	NMEP, & EPSA
Provide malaria diagnosis to special population group (migrant workers, refugees, IDPs)	Develop implementation manual on malaria case management for mobile and migrant population	x					NMEP
	Provide case management to migrant workers, IDPs, and refugees that are not served by the routine public or private facilities to ensure their access to malaria diagnosis	x	x	x	x	x	NMEP & Partners
Implement malaria laboratory diagnosis EQA	Implement malaria diagnosis EQA guidelines at different levels	x	x	x	x	x	EPHI, NMEP, Partners
Monitor efficacy of antimalarial drugs.	Conduct antimalarial drug therapeutic efficacy studies in sentinel sites every two years		x		x		EPHI, AHRI, NMEP, PMI
Mitigate effects of emerging and re-emerging	Mitigate the effects of COVID-19 on malaria diagnosis (training, mentoring, PPE availability, etc.)	x	x	x	x	x	EPHI, NMEP, partners
	Generate evidence on chemoprophylaxis for migrant workers	x	x				NMEP, RHBs, Partners

Strategy	Key Activities	Timeline					Responsible
		2021/22	2022/23	2023/24	2024/25	2025/26	
infectious diseases like COVID-19 on malaria diagnosis	Collaborate with programs managing other emerging and re-emerging infectious diseases in prevention, surveillance, case management and control	x	x	x	x	x	NMEP, PPMED & PHEM
Objective 3: By 2021 and beyond, cover 100% of the population at risk of malaria with one type of globally recommended vector control interventions							
Distribute LLINs to achieve and sustain universal coverage in malaria risk areas	Develop *Kebele* level risk mapping to improve better targeting and conducting evidence-based malaria vector control interventions for malaria risk groups including special populations	x				x	NMEP & RHB
	Procurement, storage, and transportation of LLINs to distribution points	x	x		x	x	NMCEP, EPSA, Partners
	LLINs pre- and post-distribution community mobilization	x	x		x	x	
	Conduct LLINs distribution campaign (distribution planning, training, distribution, supervision, SBCC activities)	x	x		x	x	NMEP, RHB, Districts , EPSA & Partners
IRS for targeted kebeles	Map and enumerate households and sprayable structures	x	x	x	x	x	NMEP, RHB & partners
	Coordinate procurement, distribution, and storage of insecticides, spray pumps (with spare parts), and PPE	x	x	x	x	x	EPSA, NMEP, Partners, RHB
	Select insecticide(s) and adjust targeting based on evidence		x				EPHI, Universities &, Partners
	Set up annual planning, coordination and monitoring of the IRS	x	x	x	x	x	NMEP, RHB, WoHOs
	Conduct IRS in targeted kebeles	x	x	x	x	x	RHB, WHOs
	Conduct quality control of IRS operations and evaluate post-IRS operations	x	x	x	x	x	NMEP, RHB, Partners
	Develop and update different national guidelines on vector control considering elimination and emergence of new vector/s	x	x				NMEP, universities & partners
Conduct Larval Source Management in targeted areas	Identification and mapping of important vector larval habitats	x				x	RHB, WoHO, NMEP
	Coordinate procurement, transportation, storage, and distribution of larvicides	x	x	x	x	x	NMEP, EPSA, & RHB

Strategy	Key Activities	Timeline					Responsible
		2021/22	2022/23	2023/24	2024/25	2025/26	
	Conduct LSM in identified larval habitats	x	x	x	x	x	RHB & districts
	Monitor LSM activities	x	x	x	x	x	RHB & districts
	Adapt and implement appropriate larval control methods to invasive vector, *An. stephensi*		x		x		
Objective 4: By 2021 and beyond, conduct cases or foci investigation, classification and response in districts currently having API less than 10 and prevent reintroduction of malaria into areas reporting zero indigenous malaria cases							
Transform malaria surveillance into a core intervention	Adapt data collection tools and customize eCHIS in the context of elimination	x					NMEP, RHB, Partners
	Develop data collection software capable of providing immediate feedback through dashboards	x				x	NMEP, RHB, Partners
	Procure mobile phones/tablets for malaria surveillance data collection	x				x	NMEP, RHB, Partners
	Support connectivity cost including airtime and server fee for eCHIS platform	x	x	x	x	x	NMEP, RHB, Partners
Case notification, classification, investigation and response	Printing of various guidelines and forms for case investigation and classification	x	x	x	x	x	NMEP, RHB, Partners
	Provide medical supplies required to respond to cases/foci	x	x	x	x	x	NMEP, RHB, Partners
	Conduct case investigation following reported index cases	x	x	x	x	x	NMEP, RHB, Partners
	Conduct targeted population parasite clearance like tMDA	x	x	x	x	x	NMEP, RHB, Partners
Foci delimitation, investigation, classification and management/ response	Establish malaria focus database and develop mapping list of foci	x				x	NMEP, RHB, Partners
	Train PHCU health workers on basic entomology skills		x		x		NMEP, RHB, Partners
	Manage foci (through IRS, health education, LSM)	x	x	x	x	x	NMEP, RHB, Partners
	Procure and distribute motorbikes to hard-to-reach areas	x	x	x	x	x	NMEP, RHB, Partners
Reducing and mitigating receptivity	Determination of possible causes for re-establishment of malaria transmission		x			x	NMEP, RHB, Partners
	Provide training on prevention of reintroduction (reduce risk of vulnerability & receptivity)		x			x	NMEP, RHB, Partners
Objective 5: By 2021 and beyond, generate 100% evidence that facilitates appropriate decision-making							

Strategy	Key Activities	Timeline					Responsible
		2021/22	2022/23	2023/24	2024/25	2025/26	
Improve routine surveillance and epidemic response	Conduct regular seasonal assessments on epidemic preparedness before minor and major transmission seasons	x	x	x	x	x	NMEP, RHB, Partners
	Train health professionals at all levels on routine data analysis, interpretation and use for early decision making		x				NMEP, RHB, Partners
	Deploy community surveillance officers at community level to assist HEWs	x	x	x	x	x	NMEP, RHB, Partners
	Re-visit and establish more sensitive epidemic monitoring chart/ tools	x					NMEP, RHB, Partners
	Support deployment of rapid response team	x	x	x	x	x	NMEP, RHB, Partners
	Establish national taskforce/TWG including national disaster and preparedness, and meteorology agency	x	x	x	x	x	NMEP, RHB, Partners
Micro level Stratification	Develop checklist and collect micro level malaria data & develop GIS based mapping	x			x		NMEP, RHB, Partners
Harnessing innovation and expanding research	Conduct cross-sectional sero-epidemiology assessments		x				NMEP, RHB, Partners
	Monitoring distribution of malaria vectors and their susceptibility to insecticides		x		x		NMEP, RHB, Partners
	Conduct household KAP assessment in 2021 and 2025	x				x	NMEP, RHB, Partners
	Conduct operational study on vivax elimination to ensure safe radical cure		x				NMEP, RHB, Partners
	Conduct nationwide hrp2/3 deletion study		x				NMEP, RHB, Partners
Data quality and Management	Prepare data quality management guidelines for malaria	x					NMEP, RHB, Partners
	Revise the data sharing guidelines, including DHIS2 utilization, and implement weekly malaria reporting	x					NMEP, RHB, Partners
Operationalize the sentinel sites	Orientation on parasitological data analysis and interpretation within the context of elimination	x					NMEP, RHB, Partners
	Create database and interface for data sharing for antimalarial drug and insecticide resistance patterns	x	x		x		NMEP, RHB, Partners
	IT support for data cleaning and quality control (EPHI server and web link)	x	x	x	x	x	EPHI
	Training on active surveillance to health personnel from health centers and health posts	x		x		x	EPHI, NMEP, RHB, Partners
	Communication and dissemination of evidence on performance of sentinel sites		x	x	x	x	EPHI, NMEP, RHB, Partners

Strategy	Key Activities	Timeline					Responsible
		2021/22	2022/23	2023/24	2024/25	2025/26	
Modeling the impact of control interventions	Collect and analyze data to model impact of interventions	x				x	NMEP, RHB, Partners
Harnessing climate information for early warning and planning malaria elimination	Training on accessing NMA's map room and enhance collaboration with branch offices	x					NMEP, RHB, Partners
	Evaluation of the performance of seasonal forecasts and climate impacts of malaria and disseminate findings	x	x				NMEP, RHB, Partners
	Scale-up monitoring of seasonal forecasts/ climate variability on incidence of malaria and assess impacts	x	x	x			NMEP, RHB, Partners
	Develop seasonal advisory based on seasonal forecasts for epidemic-prone districts			x	x	x	NMEP, RHB, Partners
	Assessing performance of seasonal forecasts and identify gaps in informing decision				x		NMEP, RHB, Partners
	Communication and dissemination of evidence					x	NMEP, RHB, Partners
Objective 6: By 2021 and beyond, build capacity of all levels of the health offices to coordinate and implement malaria elimination interventions							
Scale up the human resource capacity both in quantity, quality, and performance	Support salary & other expenses of technical assistants at different levels of the health system	x	x	x	x	x	NMEP, RHB, Partners
	Assess the need for structural change pertaining to human resources need for the NMSP period and advocate for improvement	x					NMEP, RHB, Partners
	Recruitment and deployment of technical assistants at NMCP and regional levels, and cover communication expenses	x	x	x	x	x	NMEP, RHB, Partners
	Training of health workers at different levels on different services	x	x			x	NMEP, RHB, Partners
Ensure regular supervision & monitoring at all levels	Conduct regular annual supervisions	x	x	x	x	x	NMEP, RHB, Partners
	Conduct annual review meetings	x	x	x	x	x	NMEP, RHB, Partners
Strengthen the logistics management (PSM) to ensure better outcome	Timely forecasting	x	x	x	x	x	NMEP, RHB, Partners
	Procure, clear, and distribute malaria supplies, and ensure quality	x	x	x	x	x	NMEP, RHB, Partners

Strategy	Key Activities	Timeline					Responsible
		2021/22	2022/23	2023/24	2024/25	2025/26	
across the program							
Ensure effective financial resource management to improve financial performance	Early communication/ reminders sent by telephone, emails and letters to ensure that all funds have been received and utilized on a timely basis by RHBs and Woredas and other recipients	x	x	x	x	x	NMEP, RHB, Partners
Securing commitment from partners & government	Conduct mentoring activities and workshop to strengthen partnership to increase program performance	x	x	x	x	x	NMEP, RHB, Partners

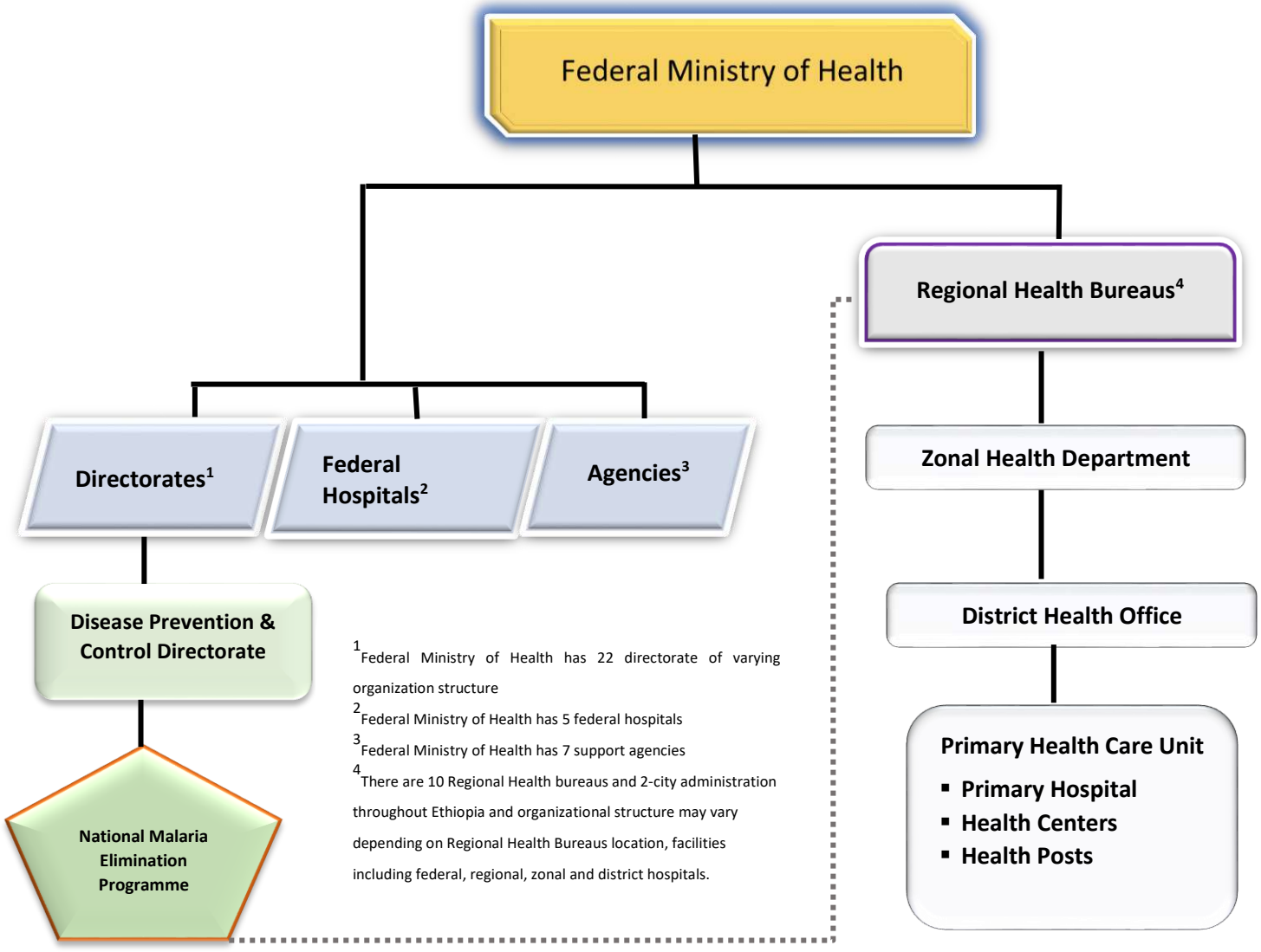


Figure 7. Organizational structure of the Ministry of Health

6.2.2. Coordination of annual planning with subnational levels

The section describes the annual planning cycle including planning with regions, zones and districts. It specifies the role of the responsible officers or focal points for various areas of malaria programme and overall coordination at all levels of the health system. The country's health system follows the decentralized governance and coordination mechanism as indicated below.

Central/Federal Level: The responsibilities of the NMEP include provision of policy and strategic guidance to RHBs and partners in the overall malaria prevention, control and elimination activities. Resource mobilization from the global community (such as from the GFATM) is usually done at federal level by the NMEP.

Regional Level: The main responsibility of the malaria component at this level is to support and guide the lower levels of the health system in planning and execution of plans, disseminating and cascading policies and strategies, resource mobilization and allocation, and M&E of malaria control and elimination activities and programme outcomes.

Zonal Level: Responsible to provide technical support for Woreda malaria staff in planning, follow-up and supporting implementation of planned activities, ensuring the continuous availability of adequate supplies required for the different strategic approaches of malaria programme and M&E of the programme outcomes.

***Woreda* (District) Level**: The *Woreda* Health Office (WoHO) is responsible for planning, implementing, M&E of all health programmes in the *Woreda*, including the malaria programme. The main malaria activities of the *Woreda* are planning, implementing, M&E of all interventions including LLINs distribution, IRS operation, case management, surveillance, IEC/BCC and LSM activities, stratification of the *Kebeles*/villages, providing resources, conducting supportive supervision, and guiding intervention activities. In case of emergencies, the WoHO may collaborate with *Woreda* council and other sector organizations to monitor and contain epidemics, collect and report all relevant information.

Health Facilities (Hospitals, Health Centers and Health Posts): Health facilities have the responsibilities of diagnosing all suspected cases and treating all confirmed malaria cases as per the national guidelines. In addition, they are responsible to participate on malaria programme activities conducted at community level. They will work by using the established PHCU linkage for referral and reporting of relevant data and feedback.

Community level: The health extension worker (HEW) works and lives within or near the community. At the ground level, the HEW in collaboration with the WDA uses the community structures and networks to mobilize the community on malaria programme activities like environmental management, LLINs distribution and utilization and to discuss about service utilization during their regular meeting to influence each other. The participation of community leaders, religious leaders, agricultural development agent (ADA), teachers, students, women and youth associations, community development organizations on malaria activities under the HEWs and networked community is crucial for success of the programme.

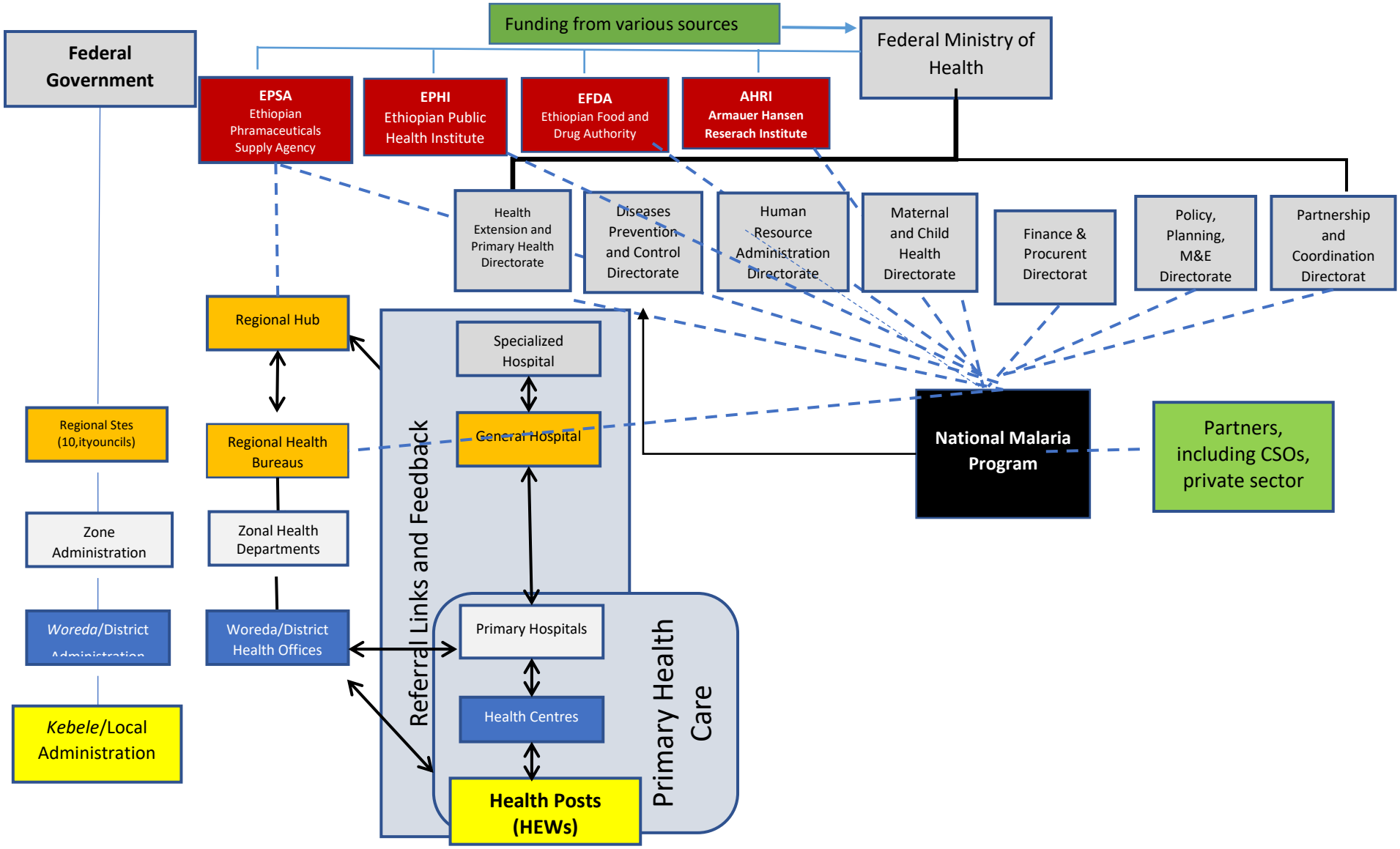


Figure 8. NMSP implementation arrangement map

6.2.3. Partnership coordination system

There are malaria programme partners working with the NMEP in Ethiopia, mainly to bridge the gap unaddressed by the NMEP. The MCST was established in 1999 to strengthen partnership among malaria programme partners. Currently, a TAC, which comprises of key partners, represents the MCST. The TAC meets on a regular basis and provides technical advice to the NMEP regarding various issues related to malaria prevention, control and elimination via technical working groups such as malaria case management working group, entomology and vector control working group, SBCC working group. Other forums where partners and NMEP meet and discuss include country-coordinating mechanism (CCM), the joint FMOH-RHBs meetings, the Health, Population, Nutrition (HPN) forum and the Joint Steering Committees (JSCs) meetings. Malaria control partners provide support in different intervention areas.

6.2.4. Procurement and supply management system

Effective malaria programme activities require continuous and sustainable availability of quality antimalarial drugs and related supplies, which depend on efficient supply chain management. The country's procurement and supply of malaria products are integral to the overall national health programme supply system and are handled by the EPSA. Currently, EPSA has 19 hubs in different regions of the country to ensure accessibility and equitable distribution of health commodities. EPSA has also increased its capacity in terms of supply chain infrastructure and human resources. In this regard, this NMSP is expected to benefit from the expedited development of the agency.

The NMSP aims to ensure that anti-malaria commodities needed for the planning period will be procured, cleared, and distributed to health facilities, This in turn ensure health facilities in malarious areas will not face stock-outs of anti-malaria commodities. Towards this end, this NMSP ascertains timely forecasting, procuring, clearing, and distributing malaria supplies; ensuring the quality of antimalarial products; and promoting rational use of malaria supplies. Over the duration of the last NMSP, there have been improvements related to procurement and supply management (PSM) of malaria commodities in Ethiopia.

The implementation of integrated pharmaceuticals logistics system (IPLS) and the national coordination platforms have contributed to improved performance across the PSM functions. Despite having these improvements in the overall PSM there are still challenges requiring more interventions to reduce the stock outs reported during the review period and supportive supervisions.

6.2.5. Financial resource management

The national budget process reflects the decentralized structure of the country's administrative and fiscal systems. The national budget is processed at federal, regional, zonal (in some regions), district (*woreda*), and municipality levels. The budgeting process officially starts with the issuing of the budget preparation note to the Budgetary Institutions (BIs). Based on the budget manual, the BIs prepare their budgets in line with the budget ceilings and submit these to the Ministry of Finance (MOF) within six weeks following the budget call.

The annual sectoral budgets are first reviewed by MOF and then by the Council of Ministers. The final recommended draft federal budget is submitted to Parliament in early June and is expected to be cleared by the end of the EFY.

For the health sector, domestic revenues are largely allocated to cover recurrent expenditures such as salaries and HRD costs (including, notably, the training and salaries of HEWs), with additional spending on limited commodity procurement (e.g., insecticides). To date, development partners have largely financed fixed costs and commodities, like LLINs, ACTs spray pumps and RDTs.

Major inputs for malaria programme financing can be split into two general categories:

- Federal-level programme expenditures (other than commodity procurement and distribution costs).
- Regional- and woreda-level expenditures.

Financial regulations require that woredas submit monthly financial statements to regions 15 days after the end of each month. Currently, regions submit annual financial statements to MOF for consolidation and programme monitoring. MOF, in turn, produces consolidated quarterly financial reports. Implementation of the NMSP will be led by the FMOH, with management responsibilities shared by the FMOH's Directorate of PPME and the Malaria Programme. Moreover, monitoring and follow-up of implementation of the core activities will continue to be overseen by the central JSC, which convenes FMOH and HPN partners and the Regional JSC at federal and regional levels, respectively.

Global Fund–specific programming has been overseen by the Country Coordinating Mechanism (CCM), which is chaired by the Minister of Health and co-chaired by a representative of CSOs. The FMOH is responsible for ensuring coordination between the CCM and Central and Regional JSCs. Finally, a malaria-specific steering committee (MCST) that is chaired by the MOH and co-

chair from partners oversees overall implementation of malaria related activities. As one of the country's leading health problems (and in line with SDG-3 targets), malaria programme constitutes one of the priority areas of the HSTP and gets some financial support through SDG pooled funds.

6.2.6. Risk management and mitigation

A continued systematic approach to risk identification and management will be employed. This includes capacity assessments, standards setting and promotion of adherence, internal control mechanisms, and external audits. Key operational and implementation risks will be identified on a regular basis, implementation guides will be developed and mitigation measures will be implemented based on the guides and intervention specific contexts. The following table indicates risks anticipated during the implementation and potential mitigation measures.

Table 12. Anticipated risks and mitigation measures

Strategies	Risk	Mitigation measures
Vector control	Accessibility problem for campaign implementation of LLINs and IRS	Use locally means of transportation
		Discuses and agree with communities /beneficiaries
	Insecticide resistance and lack of alternative insecticides	Strengthen IRMM
		Test/pilot new generation insecticides
		Monitor insecticides resistance pattern
	Emergence of new & potent vector/s	Map distribution & behavior of vectors
		Design and implement anti-vector interventions
	Accumulation of obsolete insecticides, nets and other contaminated materials	Design short- and long-term plan to remove obsolete insecticides, nets and other contaminated materials
Entomological monitoring	Local capacity to monitor entomological indices	Assess and build capacity of health workers and health facilities
	Accessibility of sentinel sites	Review and replace with a new sentinel site having similar eco-epidemiology in accessible locations
	Inadequate or stock out of laboratory supplies	Involve stakeholders in forecasting, procurement and distribution of adequate supplies
Case management	Resistance to commonly used antimalarial drugs	Monitor safety and efficacy of the existing and new drugs, review, and update national guidelines accordingly. Improve health worker-client communication to enhance adherence to treatment
	Histidine-rich protein (HRP) gene deletion (RDTs)	Assess and monitor the degree of gene deletion in the country; and replace RDTs with the reported gene deletion with the right type of RDTs
	Suboptimal quality of antimalarial drugs	Conduct post-marketing surveillance of malaria drugs

Strategies	Risk	Mitigation measures
	Inadequate quality in laboratory diagnosis	Build capacity of laboratorians through trainings and mentorship services. In addition, establish lab. quality assurance systems
	Hemolysis induced due to radical cure treatment for vivax malaria	Conduct a study on safety and tolerability of radical cure drugs; monitor hemolysis, and take informed-decision
Surveillance	Importation of malaria	Establish cross-border collaboration and surveillance system.
	Failure to detect sub-microscopic parasites could limit elimination endeavor	Introduce more sensitive diagnostics and PCR as appropriate.
Programme management	Timely budget utilization and liquidation	Preparing and aligning annual plans with implementing stakeholders
		Identifying sub-recipients with higher share of fund and facilitate the liquidation
		Capacity building on grant utilization and reporting
		Conduct consultative meeting of the implementing stakeholders to discuss and agree on effective utilization & liquidating funds.
	Budget shortage	Prioritizing activities and allocating resource for impactful interventions
	Complacence and lack of commitment of health workers	Conduct regular supportive supervision and mentoring services
	Delay in the procurement of supplies and timely availability of logistics	Detailed and reasonable estimation of annual consumption of supplies by each institution in advance for the designated activities
		Submit supplies need 6 months in advance
		Identify local and international suppliers
	Public health emergencies and security problem	Identify/ forecast emergencies
		Conduct assessment on emergency specific logistics and supplies need
		Develop emergency preparedness and management plan

6.3. Budget of the MSP

The NMSP costed for the period 2021 to 2025. The budget has been summarized by both objective and interventions, with the total cost amounting to US$532,009,146 needed for the five years. The budget summary is presented in the following tables.

Table 13. Budget summary by objectives (USD)

Objective	Budget by Year					Total	%
	2021/22	2022/23	2023/24	2024/24	2025/26		
1. By 2025, achieve adoption of appropriate behaviour and practices towards antimalarial interventions by 85% households living in malaria endemic areas	3,934,535	3,627,691	2,120,940	3,624,780	3,441,105	**16,749,049**	3%
2. By 2021 and beyond, conduct confirmatory testing for 100% of suspected malaria cases and treat all confirmed cases according to the national guidelines	13,978,831	12,377,766	12,175,770	10,529,933	11,234,547	**60,296,847**	11%
3. By 2021 and beyond, cover 100% of the population at risk of malaria with one type of globally recommended vector control interventions	52,777,504	59,027,397	32,279,799	56,579,409	63,083,215	**263,747,324**	50%
4. By 2021 and beyond, conduct cases or foci investigation, classification and response in districts having API less than 10 and prevent reintroduction of malaria into areas reporting zero indigenous malaria cases	6,828,224	5,810,692	5,142,696	6,360,577	8,179,898	**32,322,087**	6%
5. By 2021 and beyond, generate 100% evidence that facilitates appropriate decision-making	4,693,232	3,617,976	2,470,405	3,870,182	2,634,666	**17,286,461**	3%
6. By 2021 and beyond, build capacity of all levels of the health offices to coordinate and implement malaria elimination interventions	27,821,820	26,420,159	26,322,431	29,791,695	31,251,273	**141,607,378**	27%
Total	**110,034,146**	**110,881,679**	**80,512,042**	**110,756,575**	**119,824,704**	**532,009,146**	100%

Table 14. Summary of projected cost by major interventions (USD)

Interventions	Budget by Year					Total	Percent
	2021/22	2022/23	2023/24	2024/24	2025/26		
Case Management	21,185,671	19,276,250	18,826,357	17,780,729	18,739,784	**95,808,792**	18%
Vector Control	55,265,223	62,845,416	33,939,347	60,606,461	65,731,212	**278,387,658**	52%
Specific Prevention Interventions	919,955	865,647	848,443	862,736	889,194	**4,385,974**	1%
M&E	6,972,549	3,598,817	2,687,146	3,826,638	5,324,923	**22,410,072**	4%
Programme Management	25,690,748	24,295,550	24,210,749	27,680,013	29,139,591	**131,016,650**	25%
Total - USD	**110,034,146**	**110,881,679**	**80,512,042**	**110,756,575**	**119,824,704**	**532,009,146**	100%

It will be crucial for Ethiopia to ensure that adequate financial resources are available for the duration of the strategy and particularly to ensure sustainability of the elimination efforts. Although Ethiopia is eligible for external funding, the prospects for external financing should be reviewed carefully considering the declining world economy due to the COVID-19 pandemic. Thus, the country must be prepared to increase national investments to achieve the objectives. The achievement and sustainability of malaria elimination will be judged by the extent to which domestic investments are increased, which will also be critical in leveraging the donor support.

Funding Landscape: Projected commitments by source is summarized in Table 15, which amounts US$ 364,127,971 for the five years. The projected budget considered the allocation from the Global Fund (US$ 105,344,135 after deducting US$ 10 million for funding the RSSH based on the decision of the CCM-Ethiopia).

Table 15. Expected financial commitment by source, NMEP, 2020.

Source	2021/22	2022/23	2023/24	2024/25	2025/26	Total
Government	26,856,645	26,775,233	26,776,782	30,604,409	30,586,362	**141,599,431**
GFATM	40,237,340	43,552,092	21,554,701	0	0	**105,344,133**
SDG	5,859,200	5,859,200	5,859,200	5,859,200	5,859,200	**29,296,000**
PMI/USAID	18,253,932	19,432,491	12,932,624	18,379,507	18,589,854	**87,588,408**
WHO	10,000	10,000	10,000	10,000	10,000	**50,000**
Others	50,000	50,000	50,000	50,000	50,000	**250,000**
Total	**91,267,117**	**95,679,016**	**67,183,307**	**54,903,116**	**55,095,416**	**364,127,971**

The financial gap analysis for the period 2021/22–2025/26 showed that there would be an estimated US$ 167,881,175 gap as summarized below.

Table 16. NMSP gap analysis

Category	2021/22	2022/23	2023/24	2024/25	2025/26	Total
A. Total national strategic plan budget	110,034,146	110,881,679	80,512,042	110,756,575	119,824,704	**532,009,146**
B. Current and expected domestic resources	32,715,845	32,634,433	32,635,982	36,463,609	36,445,562	**170,895,431**
C. Current and expected external resources	58,551,272	63,044,582	34,547,325	18,439,507	18,649,854	**193,232,541**
D. Total current and planned resources (B+C)	91,267,117	95,679,016	67,183,307	54,903,116	55,095,416	**364,127,971**
E. Financial gap (A-D)	**18,767,029**	**15,202,664**	**13,328,735**	**55,853,460**	**64,729,287**	**167,881,175**

A resource mobilization strategy will be developed to explore innovative financing mechanisms to fund the anticipated financial gap. Accordingly, the NMEP works closely with its partners to mobilize additional funding to fill the financial gap. In doing so, the NMEP will develop funding proposals to be shared with potential partners and it explores ways to increase domestic resources with special emphasis on increasing budget allocation through public source.

CHAPTER 7: MONITORING AND EVALUATION

M&E framework is an integral part of the NMSP 2021-2025 and will be used as a guide to monitor, evaluate and improve the implementation of the NMSP. Performance framework, data management system and M&E coordination mechanisms are presented below.

7.1. Performance Framework

A performance framework provides a summary of all the core measures used to determine how well the NMEP is functioning in terms of its stated goals and objectives. The performance measures and targets of NMSP are set considering the impacts intended to be achieved at the end of five years. Accordingly, impacts and outcomes indicators for measuring achievements of the goals and objectives are incorporated in the framework. The performance framework for the 2021–2025 NMSP, which includes indicators for measuring progress of the NSP, an implementation timeline, possible data sources, and responsible agencies (Table 17).

Table 17. Performance framework

Goals & Objectives	Indicators	Baseline	Implementation year					Data source	Reporting frequency	Responsible body
			2021/22	2022/23	2023/24	2024/25	2025/26			
Goal 1. By 2025, reduce malaria morbidity and mortality by 50 percent from baseline of 2020										
	Number of facility-based malaria deaths	217 (2019/20)	217	180	150	120	100	HMIS (DHIS-2)	Monthly	PPMED
	Malaria deaths per 100,000 population at risk	0.36 (2019/20)	0.36	0.32	0.25	0.20	0.1	HMIS (DHIS-2)	Annually	PPMED
	Number of reported cases	1.7 million (2019/20)	1.7 million	1.5 million	1.2 million	0.9 million	0.7 million	HMIS (DHIS-2)	Monthly	PPMED
Goal 2. By 2025, achieve zero indigenous malaria in districts with API less than 10 and prevent reintroduction of malaria into districts reporting zero indigenous malaria cases										
	Number of districts reporting API less than 10 and greater than zero per 1000 people	565 (2019/20)	565	465	265	200	0	DHIS-2	Annually	PPMED, NMEP
	Malaria cases per 1000 people per year	16.2 (2019/20)	16.2	14	12	10	8.1	HMIS (DHIS-2)	Annually	PPMED
	Number of districts reporting zero indigenous malaria	236 (2019/20)	236	336	601	801	801	DHIS-2	Annually	PPMED, NMEP
	Number of districts reporting reintroduction of malaria	NA	0	0	0	0	0	DHIS-2	Annually	PPMED, NMEP
Objective 1. By 2025, achieve adoption of appropriate behaviour and practices towards antimalarial interventions by 85% households living in malaria endemic areas.										
	% of people who reported mosquito bites transmit malaria	75% (2015)	-	-	95%	-	100%	Survey	Every 2-3 years	EPHI/AHRI
	Proportion of people who know the main symptom of malaria is fever	NA	-	-	95%	-	100%	HH Survey	Every 2-3 years	EPHI/AHRI
	Proportion of people who believe that the recommended practice or product	77% (2015)	-	-	95%	-	100%	Survey	Every 2-3 years	EPHI/AHRI

Goals & Objectives	Indicators	Baseline	Implementation year					Data source	Reporting frequency	Responsible body
			2021/22	2022/23	2023/24	2024/25	2025/26			
	will reduce their risk									
	Proportion of people with a favorable attitude toward the product, practice, or service	NA	-	-	85%	-	90%	HH Survey	Every 2-3 years	EPHI/AHRI
	Proportion of people who practice the recommended behaviour	NA	-	-	75%	-	85%	HH Survey	Every 2-3 years	EPHI/AHRI
Objective 2. By 2021 and beyond, conduct confirmatory testing for 100% suspected malaria cases and treat all confirmed cases according to the national guidelines.										
	Test positivity rate	24% (2019/20)	24%	20%	18%	16%	15%	HMIS (DHIS-2)	Monthly	PPMED
	Percentage of patients with suspected malaria who received a confirmatory test	98% (2019/20)	100%	100%	100%	100%	100%	HMIS	Monthly	PPMED
	Percentage of health facilities participating in any type of EQA programme	NA	25%	50%	70%	100%	100%	Activity reports	Quarterly	EPHI, partners
	Percentage of health facilities enrolled in EQA scheme with result greater than 80%	NA	100%	100%	100%	100%	100%	activity reports	Quarterly	EPHI, partners
	Percentage of patients with malaria who are treated according to the national guidelines	NA	-	100%	-	100%	-	Health facility survey; or audit	Every 2 years	NMEP, EPHI
	Percent of health facilities with timely RRF reporting rate	NA	100%	100%	100%	100%	100%	Document review	every 2 months	EPSA
	Percent health centers with no	78% (2019)	100%	100%	100%	100%	100%	HMIS	Quarterly	EPSA

Goals & Objectives	Indicators	Baseline	Implementation year					Data source	Reporting frequency	Responsible body
			2021/22	2022/23	2023/24	2024/25	2025/26			
	stock out of tracer antimalarial drugs									
	Percent of antimalarial drugs wastage rate recorded at all levels	2.8% (2019)	2%	2%	2%	2%	2%	Activity report	Annually	EPSA
	Percentage of private health facilities engaged in malaria Dx and Rx as per the PPM manual	5.5% (2018)	25%	50%	100%	100%	100%	Activity report	Annually	PPMED
	Number of key vulnerable people served**	0.7 million (2019/20)	1.5 million	1.5 million	1.5 million	1.5 million	1.5 million	HMIS	Annually	PPMED
	Percentage of people with fever in the previous two weeks who sought advice or treatment	67% (2020)	-	-	80%	-	100%	HH surveys	Every 2-3 years	EPHI, partners
	Percentage of people with fever in the previous two weeks who had a finger or heel prick	17% (2015)	-	-	100%	-	100%	HH surveys	Every 2-3 years	EPHI, partners
	Percentage of health facilities (HP, HC, Hospitals) that are mentored in the previous quarter	NA	10%	20%	30%	50%	50%	Activity report	quarterly	NMCP
Objective 3. By 2021 and beyond, cover 100% of the population at risk of malaria with one type of globally recommended vector control interventions										
	Proportion of households with at least 1 LLIN in malarious areas	67% (2020)	-	-	85%	-	100%	survey	Every 2 -3 years	EPHI/AHRI
	Proportion of households in malarious areas with at least one	32% (MIS 2015)	-	-	65%	-	100%	survey	Every 2 -3 years	EPHI/NMEP

Goals & Objectives	Indicators	Baseline	Implementation year					Data source	Reporting frequency	Responsible body
			2021/22	2022/23	2023/24	2024/25	2025/26			
	LLIN for every two people.									
	Proportion of persons (in a household that owns at least one LLIN) who slept under an LLIN the previous night.	40% (MIS 2015)	-	-	70%	-	80%	survey	Every 2 -3 years	EPHI/NMEP
	Proportion of children <5 years old in malarious areas who slept under an LLIN the previous night	45% (MIS 2015)	-	-	75%	-	85%	survey	Every 2 -3 years	EPHI/NMEP
	Proportion of pregnant women in malarious areas who slept under an LLIN the previous night	44% (MIS 2015)	-	-	75%	-	85%	survey	Every 2 -3 years	EPHI/NMEP
	Proportion of unit structures in IRS-targeted areas that were sprayed in the last 12 months	94% (2019/20)	94%	94%	95%	97%	98%	Performance report	Annually	PPMED
	Percentage of households protected by IRS and/or at least one LLIN	71.7% (MIS 2015)	-	-	90%	-	100%	Survey	Annually	NMEP
Objective 4. By 2021 and beyond, implement cases and foci investigation, classification and response in districts having API less than 10 and prevent reintroduction of malaria into areas currently reporting zero indigenous malaria cases.										
	Proportion of cases investigated and classified	NA	30%	50%	75%	90%	100%	HMIS (DHIS-2)	Annually	PPMED
	Proportion of foci investigated and classified	NA	25%	50%	75%	90%	100%	HMIS (DHIS-2)	Annually	PPMED
	Percent of imported cases	NA	30%	50%	70%	80%	100%	HMIS (DHIS-2)	Annually	PPMED
	Percent of foci cleared/managed	NA	25%	50%	75%	90%	100%	HMIS (DHIS-2)	Annually	PPMED

Goals & Objectives	Indicators	Baseline	Implementation year					Data source	Reporting frequency	Responsible body
			2021/22	2022/23	2023/24	2024/25	2025/26			
Objective 5: By 2021 and beyond, generate 100% evidence that facilitates appropriate decision-making.										
	Reporting completeness rate	95% (2019/20)	100%	100%	100%	100%	100%	HMIS (DHIS2)	Annually	PPMED
	Reporting timeliness rate	90% (2019/20)	100%	100%	100%	100%	100%	HMIS (DHIS2)	Annually	PPMED
	% of epidemic detected and contained within two weeks of onset	NA	100%	100%	100%	100%	100%	Surveillance	Annually	EPHI-PHEM
	% of planned surveys conducted in due time	100% (2019/20)	100%	100%	100%	100%	100%	Survey report	Annually	NMEP
	Insecticide susceptibility monitoring test conducted	1 (2019/20)	1	1	1	1	1	Study report	Annually	EPHI, AHRI, VectorLink
	Number of annual review meetings conducted at central level	1 (2018/19)	1	1	1	1	1	Meeting proceedings	Annually	NMEP
	Number of annual review meetings conducted at regional level	1 (2018/19)	1	1	1	1	1	Meeting proceedings	Annually	RHBs
	Number of therapeutic efficacy tests conducted	1 (2019/20)	1	-	1	-	1	Efficacy test report	Every 2 years	EPHI, AHRI, ICAP
	Proportion of antimalarial commodities distributed, collected and tested as part of post marketing surveillance	NA	25%	25%	25%	25%	25%	survey report	Biannually	EFDA
	Mid-term programme review conducted	1 (MPR, 2019/20)	-	-	1	-	-	MTR report	Once (3rd year)	NMEP, partners
	Mapping malaria vector distribution & behavior conducted	1 (2019/20)	1	-	-	-	1	Assessment report	Twice during NSP	NMEP, partners

Goals & Objectives	Indicators	Baseline	Implementation year					Data source	Reporting frequency	Responsible body
			2021/22	2022/23	2023/24	2024/25	2025/26			
Objective 6: By 2021 and beyond, build capacity of all levels of the health offices to coordinate and implement malaria elimination interventions										
	Percentage of clinicians trained on case management	14% (2018/19)	-	20%	-	20%	-	Training report	Every two years	NMCEP
	Percentage of laboratorians trained on malaria lab. Diagnosis	5% (2018/19)	-	50%	-	50%	-	Training report	Every two years	EPHI/NMCEP
	Percentage of pharmacists trained on malaria supply chain	0.2% (2018/19)	-	50%	-	50%	-	Training report	Every two years	EPSA/NMCEP
	Training on surveillance & data management	1 (2019/20)	1	1	1	1	1	Training report	Annually	NMEP, partners
	Training on entomology & vector control	1 (2019/20)	1	1	1	1	1	Training report	Annually	NMEP, partners
	% of allocated fund utilized in due time	76% (2019/20)	100%	100%	100%	100%	100%	Financial report	Annually	NMEP, partners

7.2. Data Management System

HIS data management system: In pursuit of effective health related data management, the Ministry has developed an information revolution road map. Accordingly, MOH in collaboration with Ethio-Telecom connected 1,588 facilities with copper-wired VPN and 1,806[50] facilities with 3G wireless networks. Similarly, e-health architecture is designed to strengthen data management system, including institutional, population based and point of service record and the shared service for facilitating interoperability. The Ministry has selected Open HIM as a platform for data exchange between different systems. FMOH through use case approach is in the process of developing national health data warehouse to efficiently manage health information[51].

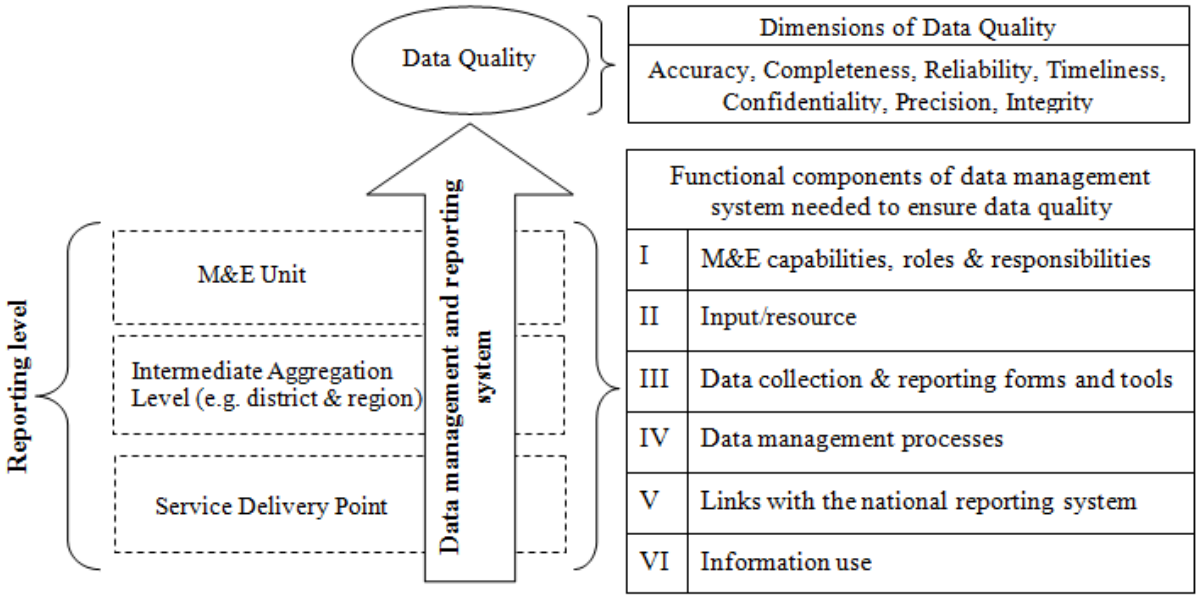


Figure 9. Conceptual framework of data quality assurance

In addition, several efforts have been exerted to improve data quality. As a result, facility report completeness improved from 72% in 2015[52] to 89% in 2019[53]. Data consistency has also improved leading to reduced discrepancy between figures from routine information system and surveys. Although there is remarkable improvement in data quality, there are still areas for improvement especially with the timeliness of data, which is mainly related to poor infrastructure to connect

[50] MOH, Annual Health Sector Performance Report, 2018/19
[51] MOH, HSTP II draft doc
[52] MOH, HSTP-I Baseline finding
[53] MOH, DHIS2 report 2018/19

the health facilities at different levels. As part of effective management of the routine health information system, MOH in close collaboration with its partners adopted, customized and fully scaled up the implementation of DHIS2 platform with user friendly data use features including Scorecard, bottle neck analysis, action tracker, custom reports and others. Other service recording systems, including logistic management information system (LMIS), a web-based dashboard that displays data to guide supply chain performance monitoring, and regulatory information system are also introduced. Moreover, electronic community health information system (eCHIS) application was also developed and its implementation started in 1,250[54] rural HPs.

Regarding public health emergency surveillance information system, under the leadership of EPHI, 23 (15 immediately and 8 weekly, including malaria) reportable diseases are coming through disease surveillance report, public health emergency management (PHEM). In addition, any emergency of health condition to the public is included to the report whenever encountered. A national database center has been created at EPHI/PHEM to handle all public health emergency diseases/health conditions.

Malaria data management System: Several levels of data are being collected using standardized data collection tools as part of the NMEP M&E system: household, community, health facility, and special studies. Generally, malaria data are entered into computer, cleaned and analyzed. Proof and validation of completeness and quality of data entry help ensure captured data are meaningful. To achieve this, regular data quality assessments (DQAs) are done at each step of the reporting process, including for the compiled database. Both regular and random assessments conducted by surveillance focal persons at all levels in order to evaluate quality of data properly and identify where operational or quality gaps may exist. At the PHCU and higher levels, automated system checks, integrated in DHIS-2, will be available to aid in the process, highlighting data discrepancies or missing values.

Information is being stored safely and/ or shared with appropriate levels. All data and information on malaria programme handled, managed and archived with special care. This helps to follow all reported cases, respond to cases and hotspots appropriately, and monitor progress made in the country's endeavour of controlling/eliminating the disease. Moreover, proper handling and management of data and information is crucial for filing a request for certification and having granted a malaria free status by WHO when indigenous transmission is interrupted.

[54] Ministry of Health, 2019. Annual Health Sector Performance Report, 2018/19.

Therefore, all data and information are documented on registers standardized by the national programme. Accordingly, recording all patients tested with patients' demographic data, types of testing and results of testing and other basic clinical data are carried out. Similarly, in elimination settings, data and information on cases and foci investigation and response actions are properly archived/documented. Archiving data and information takes place at all relevant levels of the health system, i.e. from health post to federal ministry of health. All registers and formats properly maintained at all levels. Once both soft and hard copies of malaria programme data and information are filed systematically, they could be accessed for internal verification, studies and preparation of the consolidated country reports.

Regarding flow of data, information collected through HMIS is organized under the following data flow structure for all health related data according to the national HMIS guidelines: health posts and health centers (PHCU) report to the woreda. Primary Hospitals report to the woreda and General Hospitals to the region Health Bureaus in which they are located. Woredas report to the zone or the region. Zones report to regions. Regions report to the FMOH (Figure 10).

Malaria epidemiological sentinel sites will gather malaria morbidity and mortality data directly from communities, as well as from health posts and health centers. Malaria indicator survey (MIS), other household surveys and special studies are used to collect community-level data on various coverage, outcome and impact indicators. These data are analyzed and shared with the malaria programmes at national and regional levels for decision-making. Health facility surveys and other health-system level special studies are important to collect programme-level data, as well as malaria morbidity and mortality data, from various levels of the health system at the level of primary hospitals, health centers and health posts. These data are analyzed and shared with participating health facilities, the malaria programmes at national, regional zonal and Woreda levels for decision-making.

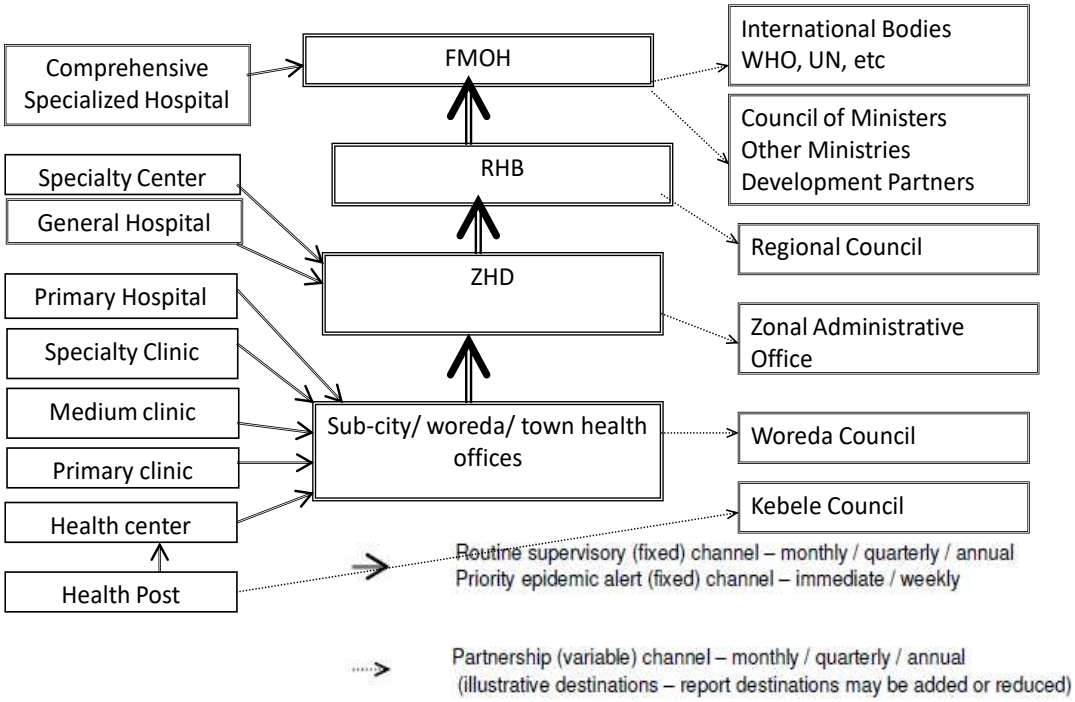


Figure 10. Overview of data source, flow and use in malaria M&E system

Special weekly malaria data collection through the PHEM surveillance system has now expanded the data collection to the health post level and data is collected continuously. These data are mainly for tracking malaria situation and instituting immediate actions as deemed necessary. The PHEM system together with active case surveillance will help to rapidly identify, investigate cases and take appropriate actions in malaria elimination districts. The start of implementation of DHIS2 and eCHIS has been addressing the growing need for a timely, complete and accurate reporting across the health system. It also improves malaria data management throughout the country.

7.3. M&E Coordination Mechanisms

There is a well-established M&E coordination mechanisms at MOH. There is a unit called Policy, Planning, Monitoring and Evaluation Directorate (PPMED) at FMOH. The Directorate is staffed with M&E professionals and backed up by technical assistance provided by partners. Similar units are available at all RHBs. Accordingly, strategies and activities related to M&E are implemented and managed in a coordinated manner at all levels of the health system from federal/central level to community. In addition to having responsible unit and corresponding personnel, there are implementation guidelines/manuals to run day-to-day M&E activities of the health sector.

There is a monthly report, regular joint supportive supervision and annual/semiannual review meetings to monitor progress of the overall M&E efforts and ensure coordination mechanism across the sector. Furthermore, a joint steering committee meeting of FMOH and RHBs takes place every month; a central joint steering committee of the health sector, which includes representatives of all relevant health and nutrition stakeholders, takes place every quarter. Additionally, there is an annual review meeting of the sector to review progress made and ensure coordinated implementation of the M&E activities throughout the country.

Regarding malaria specific M&E coordination, similar to PPMED, there is national malaria programme from central level to district level, which is mandated to effectively coordinate malaria related M&E activities all over the country. Actually, this is done in close collaboration with the PPMED and its subordinates at regional and sub-regional levels.

ANNEXES

Annex 1: Definition of Key Terms and Concepts

Terms	Definitions*
Action plan/ work plan	Detailed annual plan that guides the day-to-day work.
Activities	Actions required to deliver an intervention or service.
Anopheles	A genus of mosquito; some species can transmit human malaria.
Business plan	An approach to presenting the implementation plan as a funding proposal for resource mobilization. It helps situate the implementation plan in a broader context.
Chemoprophylaxis	Taking antimalarial drugs to prevent the disease.
Control	Reduction of disease incidence, prevalence, morbidity or mortality to a locally acceptable level because of deliberate efforts.
Drug resistance	The result of microbes changing in ways that reduce or eliminate the effectiveness of drugs, chemicals, or other agents to cure or prevent infections.
Efficacy	The power or capacity to produce a desired effect.
Efficiency	Better use of resources to achieve results.
Elimination	The interruption of local mosquito-borne malaria transmission in a defined geographical area, creating a zero incidence of locally contracted cases. Imported cases will continue to occur and continued intervention measures are required.
Epidemiology	The study of the distribution and determinants of health-related states or events in specified populations; the application of this study to control health problems.
Equity	The principle of being fair to all, with reference to a defined set of values.
Evaluation	A comprehensive assessment of a programme, which is normally undertaken at discrete points in time and focuses on the longer-term outcomes and impacts of programmes.
Goal	A general objective related to the impact on the main malaria problems in terms of cases, deaths or transmission.
Guiding principle	A rule or ethical standard that guides the work of the programme.
Health Policy	An expression of national strategic directions for improving the health situation, setting priorities and approaches to attaining the national goals.
Immunity	Protection generated by the body's immune system, in response to previous malaria attacks, resulting in the ability to control or lessen a malaria attack.
Implementation plan	A detailed rolling action plan that converts the specific objectives into targets/milestones, details interventions and activities with relevant timeframes and sequences, responsible people and resource allocation.
Indicator	A measurable/tangible variable that helps assess the goals, objectives and targets, and shows changes over time.
Indigenous malaria	A malaria case contracted locally with no evidence of importation and no directly transmission from an imported case.
Intervention	A set of activities to achieve the objectives or targets in terms of performance or outcome. Different interventions will contribute to the achievement of an objective or target.
Mission	A clear and concise statement that represents the malaria programme's purpose for existence.

Terms	Definitions*
Monitoring	A continuous process of gathering and using data on programme implementation. Monitoring often uses administrative data and tracks inputs, processes and outputs, although it can also consider me outcomes and impacts.
Objective	A statement of a desired future related to the expected outcomes the malaria programme hopes to reach. The objective can be related to the main interventions (coverage) or to supportive interventions.
Outbreak	An epidemic limited to a localized increase in disease incidence, e.g. in a village, town or closed institution.
Parasite	Any organism that lives in or on another organism without benefiting the host organism; commonly refers to pathogens, most commonly to protozoans and helminths.
Plasmodium	The name of genus of the parasite that causes malaria.
Situation analysis	The process of analyzing and interpreting all information available from the health systems, including malaria programme. Analysis involves identifying SWOT about the existing health delivery systems and the malaria programme.
Strategic plan	A process of organizing decisions and actions to achieve particular goals and objectives within a policy; it outlines precise priorities and activities as well as the means to achieve.
Strategy	The approach to implementing an intervention or a combination of interventions in order to maximize their impact on malaria cases and death.
Stratification	Malaria stratification is the classification of areas according to the risk of malaria. It is a way to set priorities and target control or elimination efforts to the areas where they are most needed.
Targets	An intermediate result intended to further an objective that a programme seeks to achieve.
Universal coverage	Intervention/s targeted to all community at risk of malaria.
Value for money	Making the best use of the available resources for the provision of services.
Vector	An organism that transmits an infectious agent from one host to the other.
Vision	A statement expressing a picture of a desired better future.

*Mainly adapted from the WHO/AFRO Manual for NMSP Development, 2019

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Annex 3: Strengths, Weakness, Opportunity and Threats Analysis

Strengths and weaknesses are internal to an organization, but opportunities and threats are always external. Accordingly, SWOT analysis of the national malaria programme was conducted and summarized in table below.

The SWOT analysis of the Ethiopian malaria programme, June 2020.

Strength	Weakness
• Availability of established health service structure with malaria prevention and control efforts up to household level • Availability of national malaria strategy, guidelines & various implementation manuals • Availability of national programme with experienced staff • Improved community awareness on malaria diagnosis & treatment • Existence of established malaria sentinel sites for monitoring parasite to drugs and vector resistance to insecticides as well as evaluating programme achievement • Long experience in monitoring efficacy of antimalarial drugs and susceptibility of insecticides • Customization and conduct of a comprehensive malaria training programme for ensuring capacity at subnational and district levels • Establishment and maintenance of strong national partnership among all malaria stakeholders • Having a platform for joint planning, supervision and review with all major programme partners	• Insufficient use of evidence-based and formative assessments in the development and production of SBCC materials • Slowdown of implementation of Health Extension Programme • Inadequate quality and quantity of workforce as well as high attrition, especially at lower levels • Lack of uniform and functional structure for malaria programme at regional and lower levels • Poor access and use of climate information and seasonal forecast for early warning • Inadequate implementation of anti-malaria interventions in development corridor areas (among migrant workers) • Low utilization of antimalarial interventions (e.g. nets) by target communities • Poor application of health technology for real-time surveillance • Intermittent stock out of commodities and poor supply chain system and distribution mechanism and long procurement lead-time for malaria medicines and supplies • Inadequate efforts in setting and sharing of national malaria research agenda; and poor performance of the current Malaria Research Network • Limited engagement of private health facilities in malaria programme implementation • Lack of low (*Kebele)* level stratification for targeting interventions • Lack of well-functioning malaria EQA (Microscopy and RDT) programme

Opportunity	Threat
• Sustained and strong political commitment • Decentralized health system • Improved technology for diagnosis of malaria at community level (e.g. RDTs) • Availability of national technical advisory committee and strong partnership • Funding availability through GF, PMI/USAID & other donors • Presence of public-private partnership platform at central level • Availability of widely distributed higher learning and research institutions (public and private) • Improved internet availability and implementation of digital technology for data recording and reporting.	• Widespread of insecticides resistance • COVID-19 pandemic is a competing priority and disrupting international procurement system • Downscaling of global financial support, and donor fatigue in providing funding for the programme • Climate change and variability • Emergency of new vectors, e.g. *An. stephensi* • Unprecedented movement of seasonal migrant workers to malarious areas • High number of refugees and IDPs • Sense of complacency of health managers, health workers and community in malaria prevention and control activities • Increasing trend of unmanaged development activities that involve creation of mosquito breeding habitats.

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