DRAFT 22 Nov 2013

THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF HEALTH AND SOCIAL WELFARE

National Malaria Strategic Plan 2014–2020

NATIONAL MALARIA CONTROL PROGRAMME

January 2014

FOREWORD

Despite the significant decrease in prevalence, malaria remains a major public health problem in Mainland Tanzania. It is a leading cause of morbidity and mortality, especially in children under five years of age and pregnant women. However, there is now better understanding about the variation in malaria risk throughout the country, which will enable the Government of Tanzania (GoT) through the Ministry of Health and Social Welfare (MoHSW) and its implementing partners to scale up efforts where most needed and maintain the gains that have been achieved so far. Tanzania is entering a new era of malaria control, with a realistic possibility to reduce malaria prevalence to less than 1% by 2020.

This new National Malaria Strategic Plan outlines the key technical and supporting strategies in the ongoing fight against malaria in the period 2014–2020. The strategies build on the lessons learned during the previous strategic planning period and new data on malaria risk. As Tanzania gradually will move from a malaria control phase to a malaria pre-elimination phase, surveillance will be more important than ever.

The plan has been developed to guide the implementation, coordination and monitoring of malaria activities of the GoT, regional and local government authorities, development partners, implementing organisation, academic institutions and the private sector, in line with the "Three Ones" principle: one strategic plan, one coordinating mechanism and one monitoring and evaluation plan.

The MoHSW puts great value on a strong and well-coordinated partnership to achieve the goals and objectives of this strategic plan. I would like to thank all of our partners in the ongoing fight against malaria. It is my sincere hope that partners will consider this National Malaria Strategic Plan for the period 2014-2016 as a beginning to renewed commitment to partnership, its coordination and efficient and effective use of resources at our disposal.

_____

Dr Hussein A. Mwinyi (MP)

MINISTER FOR HEALTH AND SOCIAL WELFARE

ACKNOWLEDGEMENT

The Ministry of Health and Social Welfare (MoHSW) wishes to express its sincere and deep appreciation to the various partners, stakeholders and individuals who contributed to the development and finalization of this National Malaria Strategic Plan. On behalf of the MoHSW, I would like to acknowledge the contribution of all the following organisations and programmes: the MoHSW Department of Preventive Services, all the staff of National Malaria Control Programme, US Agency for Aid and Development (USAID), US Centers for Disease Control and Prevention (CDC), Department for International Development (DFID), Swiss Agency for Development and Cooperation (SDC), the World Health Organisation (WHO), the Swiss Tropical and Public Health Institute (SwissTPH), Muhimbili University of Health and Allied Sciences, University of Dar es Salaam (UDSM) , Johns Hopkins University-COMMIT, Population Services International (PSI), Mennonite Development Associates (MEDA), Clinton Health Access Initiative (CHAI), RTI International (RTI), John Snow Inc (JSI), Tanzania National Malaria Movement (TANAM), and National Institute for Medical Research (NIMR).

The MoHSW is grateful for the individual contribution of Robert Snow (KEMRI-Welcome Trust) for his enormous contribution in the development of the encyclopaedic *Epidemiological profile of Malaria and its Control in Tanzania* that has been used to shape some important sections of this document such as 100 years of malaria control in Tanzania (*Chapter 1*), Epidemiology of malaria in Tanzania (Chapter 2) and for the maps and bases for strata calculation (*Chapter 5*); Rosemary Lusinde (RTI) for her help in producing operational strata maps (*Chapter 5*); and Deus Ishenghoma (NIMR) for his inputs in the malaria parasite section (*Chapter 2*).

The MoHSW would also like to extend its gratitude to USAID, SDC, and the WHO Tanzania Country office for co-financing the process of developing this plan.

Finally, the MoHSW would like to recognise the dedication and hard work of the members of regional and local government authorities, health facilities, civil society, private companies, and communities in translating the strategy into concrete actions to fight malaria.

Charles Pallangyo

PERMANENT SECRETARY, MoHSW

ACRONYMS

ACT	Artemisinin Combination Therapy
ADDOs	Accredited Dispensing Drug Outlets
ALu	Artemether Lumefantrine
ALMA	African Leaders Malaria Alliance
AMFm	Affordable Medicine Facility for Malaria
BCC	Behaviour Change Communication
Bs	*Bacillus sphaericus*
Bti	*Bacillus thuringiensis israelensis*
CCA	Community Change Agent
CCHP	Comprehensive Council Health Plan
CHAI	Clinton Health Access Initiative
CHMT	Council Health Information System
CNO	Chief Nursing Officer
COMMIT	Communication and Malaria Initiative in Tanzania
CSO	Civil Society Organisation
CSR	Corporate Social Responsibility
DFID	Department for International Development
DHIS	District Health Information System
DMO	District Medical Officer
DMT	District Management Team
DPS	Director Preventive Services
DSS	Demographic Sentinel Surveillance
EDS	Early Detection System
EM	Entomological Monitoring
FANC	Focused Antenatal Care
GFATM	Global Fund AIDS Tuberculosis and Malaria
GPIRM	Global Plan for Insecticide Resistance Management
HFBSS	Health Facilities Based Sentinel Surveillance
HFNT	Health Focus Network Tanzania
HH	House Holds
HMIS	Health Management Information System
HMM	Home Malaria Management
ICCM	Integrated Community Case Management
IDSR	Integrated Disease Surveillance and Response
IEC	Information Education Communication
IHI	Ifakara Health Institute
IMCI	Integrated Management for Childhood Illnesses
IMVC	Integrated Malaria Vector Control
IPTp	Intermittent Preventive Treatment in Pregnancy
IRM	Insecticide Resistance Management
IRMP	Insecticide resistance management plan
IRS	Indoor Residual Spraying
ITN	Insecticide Treated Net
IVM	Integrated Vector Management
KEMRI	Kenya Medical Research Institute
LF	Lymphatic Filariasis
LGAs	Local Government Administration
LLIN	Long Lasting Insecticide Treated Net
LSM	Larval Source Management
M&E	Monitoring and Evaluation
MACEPA	Malaria Control and Evaluation Partnership in Africa
MCP	Malaria Communication Plan
MDAs	Ministries Department and Agents
MDGs	Millennium Development Goals
MEEDS	Malaria Epidemic Early Detection System
MEEWS	Malaria Epidemic Early Warning System
MERG	Monitoring and Evaluation Reference Group
METW	Monitoring and Evaluation Technical Woking Group
MKUKUTA	Mkakati wa Kuinua Uchumi na Kupunguza Umasikini Tanzania
MMAM	*Mpango wa Maendeleo Afya ya Msingi*
MMTSP	Malaria Medium Term Strategic Plan
MoF	Ministry of Finance
MoHSW	Ministry of Health and Social Welfare
MOP	Malaria Operational Plan
MPR	Malaria Programme Review
mRDT	malaria rapid diagnostic test
MSD	Medical Store Departments
NATNETS	National Insecticide Treated Nets
NBS	National Bureau of Statistics
NEMC	National Environmental Management Council
NGO	Non-Governmental Organisation
NHLQATC	National Health Laboratory and Quality Assurance Training Centre
NIMR	National Institute for Medical Research
NMCP	National Malaria Control Programme
NMSC	National Malaria Steering Committee
NSGRP	National Strategy for Growth and Reduction of Poverty
OPD	Out Patient Department
PAMVEREC	Pan African Malaria Vector Research Consortium
PA*Pf*PR$_{2\text{-}10}$	Predicted adjusted *Plasmodium falciparum* Parasite Rate in children 2-10 years
P*f*PR$_{(2\text{-}10)}$	*Plasmodium falciparum* Parasite Rate in children 2-10 years of age

PHLB	Private Health Laboratory Board
PMCTC	Prevention of Mother to Child Transmission
PMI	United States of America President's Malaria Initiative
PORALG	President Office Regional Administration and Local Government
PPP	Private Public Partnership
PSS	Pharmaceutical Service Section
QA	Quality Assurance
QAACTs	Quality Assured ACT
QC	Quality Control
RAS	Regional Administration Secretary
RBM	Roll Back Malaria
RCC	Rolling Continuation Channel
RDT	Rapid Diagnostic Test
RHMT	Regional Health Management Team
RMO	Regional Medical Officer
RTI	Research Triangle Institute
SCA	Sickle Cell Anaemia
SDC	Swiss Development Cooperation
SMC	Seasonal Malaria Chemoprevention
SME	Surveillance, monitoring and evaluation
SNP	School Net Programme
SOPs	Standard Operation Procedure
SP	Sulphadoxine Pyrimethamine
SSF	Single Stream Funding
SUFI	scale-up for impact
TANAM	Tanzania National Malaria Movement
TBS	Tanzania Bureau of Standards
TDHS	Tanzania Demographic Health Survey
TFDA	Tanzania Food and Drug Authority
THMIS	Tanzania HIV/AIDS Malaria Indicator Survey
T-MARC	Tanzania Marketing and Communications
TNA	Training Needs Assessment
TNVS	Tanzania National Voucher Scheme
TPRI	Tropical Pesticides Research Institute
TSPA	Tanzania Service Provision Assessment
TTB	Tanzania Tourist Board
TWG	Technical Working Group
UN	United Nations
UNAIDS	United Nations AIDS Organization
URT	United Republic of Tanzania
WBC	White Blood Cells
WHO	World Health Organisation
WHOPES	World Health Organisation Pesticides Evaluation Scheme

TABLE OF CONTENTS

FOREWORD iii
ACKNOWLEDGEMENT iv
ACRONYMS v
TABLE OF CONTENTS vii
LIST OF BOXES x
LIST OF FIGURES x
EXECUTIVE SUMMARY xii
Background xii
Epidemiology of Malaria xii
Malaria Control Achievements 2008–2013 xiii
National Malaria Strategic Plan 2013–2020 xiii
Objectives and Strategies for Core Interventions xiii
Stratification and Malaria Control Strategic Options xiv
Implementation Arrangements xv
CHAPTER 1: BACKGROUND 1
Country Profile 1
Socio-political System 1
Main Housing Characteristics and Household Population Indicators 3
Organization of Health Services 4
Looking Back: 100 years of Malaria Control in Tanzania 5
Malaria Control under the German Medical Administration: 1890–1914 5
British Colonial Malaria Control: Between the Wars 5
Malaria Control Post-World War II to Independence: 1946–1961 6
Post-Independence Malaria Control to the Launch of Roll Back Malaria: Assembling the Evidence 6
The Roll Back Malaria Decade: 2000–2010 8
Global Policy Documents and Initiatives 11
Millennium Development Goals 11
Abuja Declaration 11
The Roll Back Malaria Partnership 11
National Policy Documents 12
National Health Policy 12
Vision 2025 12

The National Strategy for Growth and Reduction of Poverty 13
The Health Sector Strategic Plan III 13
Health Sector Reform 13
Local Government Reform Policy Paper 13
CHAPTER 2: EPIDEMIOLOGY OF MALARIA 14
Epidemiological Profile of Malaria in Tanzania 14
Malaria Parasites and Vectors in Tanzania 14
Malaria Epidemiological Transition 2000–2010 16
Malaria Epidemiological Dynamics and Population at Risk 18
CHAPTER 3: MALARIA CONTROL ACHIEVEMENTS 2008–2013 20
Summary Findings from Malaria Indicators Surveys, 2008 and 2012 20
Malaria prevalence 20
Malaria Prevention 21
Management of Fever in Children 22
Malaria knowledge and communication 23
Medium-Term Strategic Plan 2008–2013 Main Achievements 24
CHAPTER 4: NATIONAL MALARIA STRATEGIC PLAN 2013–2020 27
Vision 27
Mission 27
Goal and Objectives 27
Goal 27
Strategic Objectives 27
Strategic Malaria Control Phases 28
Objectives and Strategies for Core Interventions 28
Component 1: Integrated Malaria Vector Control 29
Component 2: Malaria Diagnosis, Treatment, Preventive Therapies and Vaccine 37
Component 3: Behaviour Change Communication and Advocacy 46
Component 4: Surveillance, Monitoring and Evaluation 52
Component 5: NMCP Programme Management, Partnership Development, and Resource Mobilization 59
CHAPTER 5: STRATIFICATION AND MALARIA CONTROL STRATEGIC OPTIONS 64
Malaria Stratification 64
Strategic Options in Malaria Epidemiological Transmission Strata 65
Malaria Control in Malaria Free, Unstable and Very Low Transmission Areas 65
Malaria Control in Low and Moderate Transmission Areas 66
Malaria Control in High Transmission Areas 68
Strategic Options in Malaria Control Operational Strata 68

Malaria Control in Urban Areas 68
Malaria Control in Districts in Advanced Sustained Control Phase 70
Malaria Control in Seasonal Transmission 72
Malaria Control in Epidemic-Prone Districts 74
Malaria Control in Areas Resilient to Malaria Transmission Changes 76
Malaria Control in Areas with Insecticide Resistance 77
Malaria Control in Economic and Development Projects Areas 78
Malaria Control in Areas with Limited Access to Healthcare Services (Hard to Reach Areas) 79
Strategic Options in Vulnerable Population Strata 80
Malaria Control for Infants and Children 80
Malaria Control for Pregnant Women 81
Malaria Control for People living with HIV/AIDS 81
Malaria Control for Non-immune Travellers 81
Malaria Control for School Children (5–15 years) 81
Malaria Control for People with Sickle Cell Disease 82
Malaria Control for Population Below Poverty Level 82
Malaria Control for Nomadic Populations and Mobile Populations 83
Malaria Control for Refugees and Displaced Populations 83
CHAPTER 6: IMPLEMENTATION ARRANGEMENTS 84
Administration and Management of NMCP 84
Roles, Responsibilities and Functions 84
NMCP Governance and Coordinating Mechanisms 87
The National Malaria Steering Committee 88
Malaria Vector Control Sub-Committee 89
Malaria Diagnosis, Treatment and Preventive Therapies Sub-Committee 90
Technical Working Groups 91
Quarterly, Biannual and Annual Progress Review Meetings 92
Implementation Mechanisms 92
Regional and Council Authorities 92
District Primary Healthcare Committee 93
Council Health Management Team 93
Community-Level Committes 93
Guiding Technical Documents 93

LIST OF BOXES

Box 1. Key MDGs and Malaria 11

Box 2. The RBM Partnership Targets in Its Global Strategic Plan 2005–2015 11

Box 3. Technical NMCP Document 93

LIST OF FIGURES

Figure 1. Tanzania: Administrative Setup 2

Figure 2. Administrative and Functional Level and Type of Facilities 5

Figure 3. Loess Regression Line of 2193 Survey Data Points Assembled Between 1980 and 2012 17

Figure 4. Percentage of Tanzania's Population at Various Classes of P. falciparum Endemic Risk in 2000 and 2010 .18

Figure 5. Rainfall Probability (%) Within 3 Months.....19

Figure 6. Malaria Prevalence Indicators (THMIS 2008, 2012) Among Children 6–59 Months of Age 20

by (a) Setting (b) Region, (c) Zone, (d) Age, (e) Wealth Quintile, and (f) Mother's Education Level 20

Figure 7. Malaria prevention indicators (THMIS 2008, 2012):.....21

(a) Household with at Least One ITN/LLIN by Zone, (b) ITN/LLIN Use, (c) Wealth Quintile, (d) Source of Nets, (e) Proportion of Households Sprayed by Strata, (f) IRS Coverage by District, and (g) IPTp coverage 21

Figure 8. Malaria Treatment Indicators (THMIS 2008, 2012): (a) 23

Children 6-59 Months with Recent History of Fever, (b) Children Who Took ACT, (c) ACT and Other Types of Antimalarial, and (d) By Area 23

Figure 9. Malaria Knowledge and Communication Indicators (THMIS 2012).....23

Figure 10. Malaria Control Phases and Timelines in Tanzania.....28

Figure 11. Overview of Malaria Strategies 29

Figure 12. Malaria Information Systems and DHIS 54

Figure 13. Malaria Stratification Categories 64

Figure 14. Malaria Free, Unstable, and Very Low Transmission Areas.....65

Figure 15. Malaria Low and Moderate Transmission Areas 67

Figure 16. Malaria High Transmission Areas.....68

Figure 17. Urban Areas 69

Figure 18. Predicted 2010 Population Weighted Parasite Rate for P. falciparum in Children 2-10 years of Age ($PfPR_{2-10}$) by District 71

Figure 19. Districts in Advanced Sustained Control Phase 71

Figure 20. Areas with malaria seasonal transmission.....73

Figure 21. Districts Prone to Malaria Epidemics.....75

Figure 22. Areas resilient to malaria transmission changes 76

Figure 23. Areas with Insecticide Resistance 77
Figure 24. Economic and Infrastructural Development Projects 78
Figure 25. (a) Modeled Population Density Projected to 2010 and (b) Distribution of Geo-Coded Hospitals, health Centres and Dispensaries 80
Figure 26. NMCP Organogram 84
Figure 27. NMCP Governance Structure 88

LIST OF TABLES

Table 1. Health Facilities in Mainland Tanzania, according to Ownership 4
Table 2. Population at Risk by Epidemiological Strata and Number of Districts Represented by Each Stratum 19
Table 3. Malaria Prevention Outputs, 2007–2012 25
Table 4. Malaria Diagnosis, Treatment and Preventive Therapies, 2007-2012 25
Table 5. Malaria SME Achievements, 2007–2012 25
Table 6. Type of Routine Information by Source, Frequency and Set of Indicators 54

EXECUTIVE SUMMARY

Background

According to the latest population census of 2012, Tanzania's population is estimated to be almost 45 million and is increasing by a million annually. The country has a varied geography and climate, ranging from tropical coastal lowlands, and is divided into 25 regions. The average annual gross domestic product (GDP) rate is 7%, but considerable variations exist in wealth distribution amongst the different socioeconomic quintiles.

The health system is organized according to a decentralized network of hospitals, health centres and dispensaries. There are currently over 6,500 healthcare facilities in the country, of which 79% are government run, 13% faith-based and voluntary, and 9% privately owned.

Malaria control started over a century ago during the German colonial administration. The largest successes have been achieved in the last decade with national scale up of new preventive strategies and improved quality and access to testing and treatment. Several global initiatives have shaped malaria control strategies over the years, including the Millennium Development Goals and the Roll Back Malaria Partnership. Key national policies that guide malaria planning include the National Health Policy, National Strategy for Growth and Reduction of Poverty, third Health Sector Strategic Plan, as well as the ongoing Local Government Reform processes.

Epidemiology of Malaria

Human malaria is caused by five *Plasmodium* species, of which *P. falciparum* is the most predominant species in Tanzania and causes a severe form of the disease. However, other non-*falciparum* species are encountered with different distribution in the country. Parasite resistance to antimalarial medicines has been a major risk, starting with chloroquine (CQ) in the 1980s and 1990s, followed by resistance to Sulphadoxine-pyrimethamine (SP)soon after its introduction in 2000. In 2007, artmisinin-based combination therapy (ACT), using Artemether-lumefantrine (ALu), was introduced as first-line drug for treatment of uncomplicated malaria. National therapeutic efficacy testing conducted in 2011–2012 showed that malaria parasites are still sensitive to ACT, and the efficacy of AL and other ACTs is still very high. However, resistance has been detected in South East Asia and is expected to occur in Africa in the longer term.

The major vectors of malaria in most areas of mainland Tanzania are members of the *Anopheles gambiae complex*, namely: *An. gambiae sensu stricto,* which is endophilic (indoor resting) and anthropophagic (feeding on human blood); and *An. Arabiensis,* which is more exophilic (outdoor resting) and zoophilic (feeding on animal blood). The second largest malaria vector in Tanzania is *An. Funestus,* which is more anthropophilic and endophilic. Due to its feeding and resting habits, *An. arabiensis* is less vulnerable to control with indoor residual spraying (IRS) or long-lasting insecticidal nets (LLINs). Due to the scale up of indoor vector control interventions, the population of *An. gambiae s.s*. has decreased dramatically, and *An. Arabiensis* has become the predominant vector. Insecticide resistance to pyrethroids in *anopheline* mosquitoes has been reported in a number of districts. As a result, Insecticide Resistance Management (IRM) strategies are being developed.

Current data suggests that Tanzania is currently under a malaria epidemiological transition, with 60% of the population are now living in hypo-endemic areas (parasitaemia 0 - <10 %), up from 30% in 2000. However, the climatic conditions remain favourable for transmission throughout almost the entire country, with close to 95% of Mainland Tanzania at risk.

Malaria Control Achievements 2008–2013

There has been a dramatic decrease in the malaria prevalence during the last strategic planning period, declining from 10% to 9.5% between 2008 and 2012. Malaria prevention through the use of insecticide-treated nets (ITNs), and use of LLINs since 2009, has been successful. In addition, IRS has been scaled up in 18 of the 22 regions in the Lake Zone.

In terms of fever management amongst children, there was a consistent increase in consumption of ACT between 2008 and 2012, especially in rural areas. Despite the drop in malaria prevalence, the proportion of children with a history of recent febrile illness did not change.

Community outreach and mobilisation through radio remains the most important means of communication. However, access to messaging about malaria prevention varies greatly by wealth quintile and level of education.

National Malaria Strategic Plan 2013–2020

This National Malaria Strategic Plan covers the period of 2014–2020. The long-term **vision** is that Tanzania becomes a society free from malaria. The **mission** is to ensure that all Tanzanians have access to quality, effective, safe and affordable malaria interventions through timely and sustainable collaborative efforts with partners and stakeholders at all levels. The **goal** during this planning period is reduce the average country malaria prevalence from 10% in 2012 to 5% in 2016 and further in 2020 to less than 1%. The following five **strategic objectives** support this goal:

1. Reduce malaria transmission by scaling up and maintaining effective and efficient vector control interventions;
2. Prevent the occurrence of severe morbidity and mortality related to malaria infection through the promotion of universal access to appropriate early diagnosis, prompt treatment and provision of preventive therapies and vaccines to vulnerable groups;
3. Create an enabling environment in which individuals and household members are empowered to minimize their own malaria risk and seek proper and timely malaria treatment, if and when needed;
4. Provide timely and reliable information to assess progress in achieving established global and national targets, to ensure that resources are used in the most cost-effective manner and to account for investments made in malaria control; and
5. Ensure effective programmatic and financial management of malaria control interventions at all levels, implemented through effective and accountable partnerships, with adequate funding.

The plan is divided in two strategic stages: the first period (2014 and 2016) will sustain the recent progress and achievements; and the second period (2017 and 2020) will consolidate the achievements and explore the feasibility to enter into a malaria pre-elimination phase in defined areas of the country.

Objectives and Strategies for Core Interventions

The 20142020 NMSP consists of five core interventions divided into the following different strategic approaches:

1. Integrated Malaria Vector Control (IMVC)
   - Ensure the populations universal access to LLINs in all transmission settings;
   - Apply quality IRS in selected suitable epidemiological areas;
   - Implement larviciding and environmental measures to complement core interventions (LLINs and IRS) in targeted communities;
   - Promote environmental management amongst targeted communities; and

- Continuously assess the evidence base on integrated vector control innovations and introduce new tools that address insecticide resistance and changing vector behaviour where and when feasible.

2. Malaria diagnosis, treatment, preventive therapies and vaccines
   - Provide universal access to quality malaria diagnosis to guide appropriate treatment;
   - Provide universal access to quality malaria treatment;
   - Reduce vulnerability to malaria infection among defined risk groups;
   - Provide appropriate logistics arrangements for quality malaria case management commodities procurement and supply chain; and
   - Reduce risk of severe morbidity and mortality due to malaria in emergency situations.
3. Promotion of malaria prevention and curative services through information, education and communication
   - Reinforce and update knowledge amongst community members and promote desired behaviours;
   - Increase knowledge amongst vulnerable groups about their specific malaria risk and the prevention and treatment options available to them;
   - Influence social norms about healthy behaviours around malaria prevention and care and encourage community-based action;
   - Create strong behaviour change communication (BCC) partnership amongst public and private sector stakeholders to maximize efforts, ensure consistency in approach and avoid duplication; and
   - Raise the profile of malaria amongst policy and decision makers at all levels so that national, regional and district plans include appropriate interventions and sufficient budget to implement the malaria strategy.
4. Surveillance and monitoring and evaluation (SME)
   - Improve reporting of routine malaria monitoring data through health management information systems and integrated disease surveillance response (IDSR);
   - Strengthen and expand the M&E scope of periodic malaria indicators, including intervention coverage, quality of service provision, parasite prevalence, vector susceptibility and dynamics, medicines' therapeutic efficacy and availability of quality assured commodities
   - Establish and maintain a comprehensive Malaria Knowledge Management System, including knowledge strategy, identification, storage and sharing;
   - Design and support the implementation of a comprehensive malaria surveillance system for epidemic-prone districts; and
   - Design and support the implementation of a comprehensive malaria surveillance system for epidemic-prone districts.
5. Programme management, partnership development and resource mobilization
   - Provide effective leadership and support to stakeholders on malaria control strategies and implementation of the National Malaria Strategic Plan;
   - Establish a comprehensive/strategic funding framework to support the process of domestic and global resources mobilization; and
   - Strengthen global and regional malaria control cooperation.

Stratification and Malaria Control Strategic Options

Three major stratification categories relevant to malaria and its control were identified: (1) malaria transmission ranging from malaria free to malaria high transmission (>50%); (2) malaria control operational strata related to human population, habitat, malaria control measures and vector biological determinants; and (3) malaria vulnerability of population strata, which includes groups within the community that are at greater risk of becoming

infected or developing a severe form of the disease. The latter two categories are sub-sets of the first strata. Depending on the strata, different approaches for each of the core interventions are recommended.

Implementation Arrangements

The National Malaria Control Programme of the Ministry of Health and Social Welfare is responsible for designing strategies; developing guidelines; mobilizing resources; facilitating implementation and monitoring and evaluating progress on malaria control interventions. NMCP is led by a Programme Manager, reporting to the Director of Preventive Services, and is divided into a Technical Section and an Administration and Finance Section. The Technical Section is made up of four units: Integrated Malaria Vector Control (IMVC), Malaria Diagnosis, Treatment and Preventive Therapies, Behaviour Change Communication and Surveillance, and Monitoring and Evaluation. The Administration Section is divided into two units: Finance and Accounts and Programme Administration.

A National Malaria Steering Committee, with input from two technical sub-committees (vector control and case management) and several working groups, provides governance on all strategic decisions concerning malaria control in the country.

The implementation of the strategic plan is a joint effort of all partners and stakeholders at national, regional, district and community level.

CHAPTER 1: BACKGROUND

Country Profile

Socio-political System

Population Dynamics

The total population of the United Republic of Tanzania, according to the 2012 census, is 44,929,002, compared to 34,443,603 in 2002. Tanzania's population grew by 10,485,399 persons or 30.4% since 2002, an equivalent to 1 million per year. In the inter-censal period of 2002–2012, the growth rate was 2.7%, compared to 2.9% per annum in the previous period (1988–2002). Tanzanian households consist of an average of 5.1 members. The rapid population growth has an impact on the available resources, especially on public expenditures on education, health and water and sanitation (especially in urban areas), as well as demand of other resources such as land (NBS, Census, 2012).

Geography and Climate

Tanzania lies mostly between latitudes 1°and 12°S and longitudes 30°and 40°E and has a tropical climate, with regional variations due to topography. The Coastal Lowlands extend from the seashore of the Indian Ocean for about 150kms inland to an altitude of about 300m. The Coastal Lowlands regions are warm and humid, with temperatures ranging from 17°C to 30°C through most of the year. The basins around Lakes Victoria, Tanganyika and Nyasa, have relatively high temperatures and humidity and heavier rainfall. The greater part of Tanzania consists of the Central Plateau, around 900–1,800m, which is punctuated with mountain ranges. The Central Plateau has more marked diurnal temperature variations, being warm to hot during the day and cool at night. The Highland regions, including Mount Kilimanjaro and the Southern Highlands, are more temperate, with temperatures around 20–23°C throughout the year, except during the cool season (June–September), where temperatures drop below 17°C.

Administrative Setup

Mainland Tanzania is divided into two main administrative levels: regions and councils. The councils are categorised according to population settings: district councils (mainly in rural settings), township, municipal and city (mainly urban settings). Councils are divided into four to five divisions, and each division has three to four wards. Five to seven villages form a ward. The council is the most important administrative and implementation authority for public services, including policies of the Ministry of Health and Social Welfare (MoHSW) and consequently those of the National Malaria Control Programme (NMCP). The administrative councils and regions have increased in number in recent years: the 2012 census includes 25 regions, 159 councils (see *Figure 1*) of which 125 are district councils , 12 towns, 29 municipal and 3 city councils .

Figure 1. Tanzania: Administrative Setup

Source: NMCP (2014)

Socioeconomic Situation

The gross domestic product (GDP) growth in Tanzania shows a rising trend, except for years with when facing a food crisis, power crisis, and global economic and financial crisis. Since 2005, Tanzania's GDP annual growth rate averaged 7%, which was in line with poverty reduction strategy target of 6%–8% per annum. However, the incidence of income poverty (i.e., basic needs and food poverty) did not decline significantly. Out of every 100 Tanzanians, 36 were poor in 2000–2001 compared to 34 in 2007. Income poverty varied across geographic areas, with rural areas worse off than urban. Rural growth, fuelled by growth of the agricultural sector in the same period, was about 4.5% on average. When this growth is contrasted with the national population growth rate of 2.9%, the change in rural per capita income becomes small, thus perpetuating poverty in rural areas (MKUKUTA, 2010).

One of the Government of Tanzania's (GoT's) policy focus is promotion of sustained and shared economic growth. The 4th Phase Government is committed to pursuing pro-investment and pro-growth policies**.** Moreover, the GoT is committed to the promotion of public-private sector partnerships; in this regard, the public and private sectors meet under the umbrella of the Tanzania National Business Council (TNBC), a forum of policy dialogue and consultation between the public and private sectors. Academia, research institutions, non-governmental and community-based organizations and others, are also engaged in dialogue via a number of other forums such as the Public Expenditure Review (PER), designed to promote wider participation in policy discussions.

Main Housing Characteristics and Household Population Indicators

The Tanzania HIV Malaria Indicator Survey (THMIS, 2012) provides key findings about housing and household population characteristics.

Household environment: Slightly more than half (59%) of Tanzanian households have access to clean drinking water. Forty-four percent of households make daily roundtrips 30 minutes or more to fetch water. Only 13% of households in Tanzania use improved modern toilet facilities that are not shared with other households. Overall, few Tanzanian households (15%) have electricity. However, 46% of households in urban areas of Mainland Tanzania have electricity. The vast majority of Tanzanian households use solid fuel for cooking (96%). About 60% of households own a mobile telephone.

Housing: The type of material used for flooring is an indicator of socioeconomic status and to some extent determines the household's vulnerability to exposure to disease-causing agents. Sixty-four percent of Tanzanian households have earthen floors. Large differences exist between rural and urban households in Mainland Tanzania; earth flooring is most common in rural areas (81%) while cement is most common in urban areas (71%).

Food security: Over half of all households report having at least three meals per day; however, almost one-third of Tanzanian households reported that they consumed no meat or fish in the previous seven days. Fifteen percent of households reported that they often or always have problems satisfying their food needs.

Access to healthcare services: On the Mainland, 33% of households reside less than 2km from a health facility. Urban households are much more likely to be located less than 2km from a health facility than rural households (54% and 26%, respectively). Approximately 10% of the rural population lives more than 10km from a healthcare facility.

Wealth: Almost all of the urban population is represented in the fourth and highest quintiles (91%), while half of the population (50%) in rural areas is in the lowest and second wealth quintiles.

Education: The general level of education in a country has a marked influence on the spread of disease, and acceptability and utilization of modern health services. The THMIS 2012 survey shows that literacy has a direct relationship with utilization of malaria control interventions.

There is a substantial gap in educational attainment between males and females: 26% of females have never attended school compared to 19% of males. Urban residents are more likely than rural residents to have attended school and to have remained in school for a longer time. Educational attainment also differs markedly among regions. The most substantial variation in educational attainment is across the wealth quintiles. Only 8% of females in the wealthiest households have never been to school compared with 46% of females from the poorest households.

Access to media: Radio is by far the most popular form of media in Tanzania compared other types of mass media, television, or printed media. Overall, only 6% of women and 18% of men are exposed to all three media at least once per week. Women and men living in urban areas are more likely than those living in rural areas to be exposed to mass media. Newspapers are the least popular form of media. By region, Dar es Salaam has the highest proportion of respondents with exposure to all forms of media. There is a positive correlation between exposure to mass media and the respondents' level of education and wealth.

Organization of Health Services

The National Health System is based on a central-district government structure. The MoHSW and President's Office Regional Administration and Local Government (PORALG) are jointly responsible for the delivery of public health services. The central MoHSW is responsible for policy formulation and the development of guidelines to facilitate policy implementation. Regional Health Management Teams (RHMTs) interpret these policies and monitor their implementation in the districts they supervise. The Regional Medical Officer (RMO) heads the RHMT and reports directly to the MoHSW on issues related to medical management and to PORALG, through the Regional Administration Secretary (RAS), on issues related to health administration and management. The Council Health Management Team (CHMT) is responsible for council health services, including dispensaries, health centres and hospitals. The CHMT follows guidelines for planning and management of district health, which are issued jointly by MOHSW and PORALG. The District Medical Officer (DMO) heads the CHMT is in charge of all Council Health Services; is accountable to the Council Director on administrative and managerial matters; and reports to the RMO on technical matters.

In Tanzania there are 6,525 registered healthcare facilities, including hospitals, health centres and dispensaries (see *Table 1*). Public health services are delivered through government, voluntary agencies non-profit and parastatal healthcare facilities. The healthcare system in Tanzania is based on a hierarchical system represented by administrative level, type and function of facility. The system includes a referral structure from primary healthcare to tertiary district, regional, consultant and specialized hospitals (*see Table 2 and Figure 2*). A dispensary serves a population of 6,000 to 10,000 people; a health centre serves 50,000–80,000; and a district hospital serves more than 250,000. A regional hospital serves as a referral centre to four to eight district hospitals, and the four consultant hospitals serve as referral centres to several regional hospitals.

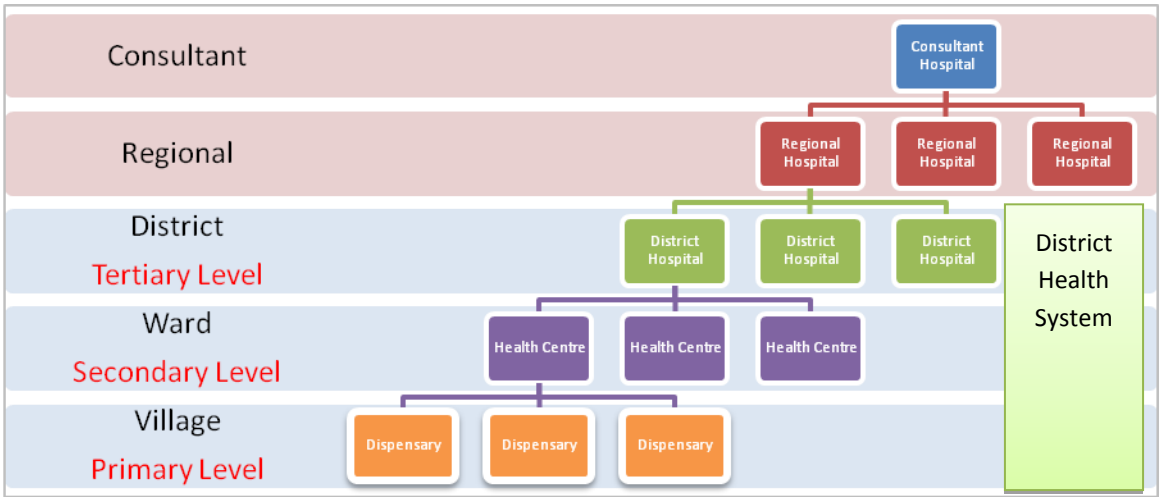
Table 1. Health Facilities in Mainland Tanzania, according to Ownership

	Government	Faith-based organization (FBO)/Voluntary	Total Public	Private	Grand Total
Hospital	113	88	201	15	216
Health Centre	448	105	553	37	590
Dispensary	4514	622	5136	506	5642

Other	51	3	54	23	77
Grand Total	**5,126**	**818**	**5,944**	**581**	**6,525**

Source: MOHSW website www.moh.go.tz.

Figure 2. Administrative and Functional Level and Type of Facilities



Looking Back: 100 years of Malaria Control in Tanzania

Malaria Control under the German Medical Administration: 1890–1914

The German Medical Administration made considerable efforts to control malaria in areas they settled across Tanzania before the World War I. Malaria control in Dar es Salaam started in the 1890s and was initially focused on larval mosquito control. Environmental works targeted at larval control such as oiling, swamp drainage and general sanitation improvement were introduced as early as 1901, principally in the European settled areas. However, the presence of permanent swamps across the town sustained multiple mosquito breeding sites, and vector-control efforts proved too ineffective and were considered too costly.

The focus of the antimalarial campaigns in Dar es Salaam changed to malaria parasite control through quinine administration, first proposed in 1899. Mass administration of quinine under the administration began in 1901. The proportion of infected people decreased from 74% in 1902 to 35% in 1904 across Dar es Salaam. The *blood sterilization* campaign was taken over by the German military in 1904 until the World War I. The malaria programme gradually returned to targeted vector control, including a German ordinance for mosquito extermination (1913) that provided legal sanctions for the destruction of ponds, vessels, tins and other sources of standing water. These efforts consequently were abandoned during the second half of 1914 at the start of World War I.

British Colonial Malaria Control: Between the Wars

Following World War I and the establishment of the British colonial administration, some antimalarial measures were designed. Across Dar es Salaam, malaria control continued to be directed at mosquitoes through oiling and drainage construction. In 1921, malaria was made a notifiable disease, and in 1922, mosquito nets were supplied by the government to all European and Asian officials who required them. In addition, over 138,000 tablets and 1,300 ampoules of quinine were issued from the medical stores for prophylactic and curative purposes in 1922. Throughout the 1920s and early 1930s, emphasis was placed on protecting urban settlements occupied by

Europeans, using brigades of "mosquito boys" established first by the British Royal Army Medical Corps. These brigades were tasked with periodically inspecting each part of a town to identify and destroy mosquito breeding sites through oiling, draining swamps, maintaining the free flow of engineered drains and filling up holes and depressions.

In 1933, the colonial authority released a guide on the prevention of and cure for malaria in which it outlined the seriousness of the disease and how to prevent it with the proper use of a mosquito net, the recommended prophylactic and treatment doses of plasmoquine, quinine, atebrin and a combination treatment of quino-plasmoquine and how to destroy larval breeding sites using oil and kerosene. This represents perhaps the earliest recognition in Tanzania that the design of malaria control must be driven by an understanding of the epidemiology and the cost-effectiveness of interventions.

Malaria Control Post-World War II to Independence: 1946–1961

Following World War II, dichlorodiphenyltrichloroethane (DDT) and dieldrin were introduced for purposes of IRS. In early 1956, pilot approaches were implemented using aerial spraying with dieldrin granules over swamps and creeks in Dar es Salaam. These new vector control approaches were largely limited to urban settlements and were employed in combination with continued vector control approaches using larvicides and environmental management, as well as the introduction of CQ and paludrine as prophylactics in selected populations, including school children. By the end of the 1950s, several pilot control schemes were conducted based on IRS with dieldrin, gammexane or DDT, larviciding, drug-based prophylaxis and mass drug administration at various localities.

In the context of the Pare-Taveta Malaria pilot scheme (1955–1959), IRS achieved a rapid and immediate reduction in *Anopheles gambiae s.l.* household densities after the first spray round and the virtual elimination of *An. funestus*, only to return five years after the cessation of spraying. Overall infection prevalence in children below the age of 10 was reduced from 60% to 5% as a result of spraying over 3.5 years and was associated with a halving of infant and under-five mortality. This was a phenomenal success but was seen as a failure to interrupt transmission in line with expectations of the WHO's supported Global Malaria Eradication Programme. Spraying ceased in 1958 and within several years, transmission returned to its original intensity and mortality; prevalence among young children witnessed a rebound.

Post-Independence Malaria Control to the Launch of Roll Back Malaria: Assembling the Evidence

After the country's independence in 1961, malaria assistants and orderlies, employed by government, were integrated into urban health organizations within their towns. To a large extent, IRS, larval source reduction and disease surveillance came to an end with a few exceptions, notably the continued lariviciding work in Dar es Salaam.

Over the two decades following independence, the GoT focused its efforts on building its broader health system, expanding its community-based care implemented through village health workers. However, adverse economic conditions during the 1970s resulted in the deterioration of the health system in many urban settings, and malaria prevention was largely neglected with the exception of a few pilot approaches to CQ prophylaxis through ten-cell (*Balozi*) leaders.

Throughout the 1970s and 1980s, the focus of malaria control was on presumptive treatment of fevers with CQ. CQ use post-independence increased dramatically. Nevertheless, despite growing access to antimalarials for fever management, the 1980s were a period where very little was done to prevent infection. In 1990 the Government launched the NMCP under the Epidemiology and Disease Surveillance Section. During this period, the NMCP began to reignite a broad health system awareness of malaria through workshops to engage Regional Primary Health

Care Committees, health workers and laboratory staff. A series of revised guidelines were developed for diagnosis, treatment and referral of malaria cases and materials for information education and communications (IEC) were produced.

Malaria research continued under the Tanganyika Medical Services until the establishment of the National Institute of Medical Research (NIMR) in 1979 as a parastatal organization under the MoHSW. An important affiliate of NIMR was the Swiss Tropical Institute's Field Laboratory at Ifakara (STIFL), established in 1949. STIFL was associated with NIMR in 1991. The Ifakara Health Research and Development Centre (IHRDC) subsequently became a nationally independent research centre in 1996 and since 2008 it is now known as the Ifakara Heath Institute (IHI).

Changing Antimalarial Drug Policies

By 1966 there was no documented case of CQ-resistant malaria in Tanzania. Pyrimethamine resistance, however, was detected in 1953 and spread without drug pressure (mono-therapeutic use had been stopped) and appeared miles from its original focus. Suspicions of reduced CQ sensitivity emerged in the late 1970s and early 1980s at sites where there had been a high CQ drug pressure as part of chemo-suppression campaigns.

Countrywide *in vitro* and *in vivo* CQ sensitivity testing began in 1982 under NIMR's direction. Alarming rates of delayed parasitological clearance and resistance following standard treatment courses of CQ began to emerge rapidly. By 1999 many sites had documented CQ clinical failure rates in excess of 40%. In response to the alarming rates of CQ resistance and difficulties in assembling timely and relevant drug efficacy data for national ministry of health engagement, the East African Network for Monitoring Antimalarial Treatment (EANMAT) was founded in 1997. Data generated from this regional network was instrumental in advocating for a change from CQ to SP and subsequently to artemisinine-based combination therapy (ACT) and led to changing the policy in Tanzania from CQ to SP in 2001, and from SP to ALu, a type of ACT, in 2006. However, implementation was delayed until drugs and training could be completed in January 2007.

Establishing a National ITN Policy

Entomological, experimental hut studies on ITNs in Africa started during the early 1980s in Tanzania, using materials impregnated with permethrin or diethyl toluamide (DEET). Several ITN efficacy trials followed over the next decade across Tanzania and were undertaken against a background of ongoing larger community randomized controlled trials on ITNs against mortality. Operational studies for ITN delivery strategies were conducted in Bagamoyo between 1991 and 1996 (community based) and in Kilombero (social marketing), which were influential studies in setting a stage for ITN scale-up in Tanzania.

The National Insecticide Treated Net Strategy (NATNETS) was launched through a partnership of national manufacturers, private sector retailers, social marketing agencies, non-government partners and the government. In 2000, the GoT zero-rated taxes and tariffs on mosquito nets and materials required for their manufacture. The NATNETS strategy provided the framework for Tanzania's nationwide Strategic Social Marketing (SMARTNET), based on subsidized nets to end users. In November 2004, the Tanzanian National Voucher Scheme (TNVS) was launched with funds provided by the Global Fund to selectively target pregnant women by providing them with highly subsidized nets from 6,000 registered retailers. In 2006, the TNVS was expanded to include infants as target vulnerable groups.

Urban Malaria Control Revisited

Another notable operational investigation of combined vector control during this period was the Dar es Salaam and Tanga Urban Malaria Control Project (UMCP) between 1988 and 1996, funded by the Japan International

Cooperation Agency. UMCP was an ambitious programme, deploying IRS every 3-6 months, selling subsidized ITNs, reducing breeding sites through environmental management, conducting weekly larviciding and use of expanded polystyrene beads in closed water collection sites. By 1996, malaria parasitaemia in school children aged 6–16 years fell markedly in the population covered; however, the project ended due to lack of sustained funding.

Epidemics

El Niño Southern Oscillation (ENSO) unstable climate conditions in the Pacific in 1997–1998 led to exceptional rainfall patterns across East Africa, resulting in several dramatic malaria epidemics across the sub-region. In Tanzania, the El Niño epidemics were largely concentrated in the high altitude areas around Lake Victoria, notably Kagera, and the Usumbara Mountains. In north-west Tanzania, refugees from neighbouring countries in 1997 suffered heavily from the coincidence of exceptional transmission and having arrived from areas where immunity had not been acquired.

The 1997–2000 National Malaria Strategy

Tanzania developed a National Malaria Strategy 1997–2000, which promoted a broad suite of vector control methods, including detection and prevention of epidemics, case management and malaria prevention in pregnancy and supporting initiatives such as behavioural change, M&E and research. The target was to achieve by 2000, a 50% reduction in case-fatality rates in hospitals, a 30% reduction in the incidence of malaria in the community, and a 30% reduction in the incidence of severe life-threatening malaria among U5 children. However, the plan lacked the details on how M&E metrics would be measured. The role of the NMCP remained one of providing strategic direction in the development of policies, coordination of activities and provision of technical support and capacity building at the district level, including advocacy and training of the District Management Teams (DMTs).

The Roll Back Malaria Decade: 2000–2010

The launch of Roll Back Malaria (RBM) initiative in 1998 provided the MoHSW with an opportunity to position malaria within the ongoing Health Sector Reforms in the country. Thus, malaria was interwoven with other health sector initiatives, including the following national initiatives: package for essential health interventions, the essential drugs supply, health information systems and primary health care packages. The reforms were also aligned to Millennium Development Goals (MDGs) and Tanzania's Development Vision 2025, which was launched in 1999. In 2000 the NMCP, developed a tailor-made package for malaria planning and implementation for district managers, which was rolled out in all districts.

The 2002–2007 National Malaria Strategy

The goal of the 2002–2007 National Malaria Strategy was "to reduce mortality and morbidity due to malaria in all 20 regions of the country by 25% by 2007 and by 50% by 2010" through the delivery of four strategic approaches: (1) improved malaria case management, (2) vector control through the use of ITNs, (3) control of malaria in pregnancy and (4) malaria epidemic prevention and control. The strategy set all intervention targets at 60% by 2007. The strategy was developed in the era of renewed international commitment and investment in malaria control. Such initiatives included commitments made by African head of states during the Abuja Summit in 2000, the Global Fund in 2002, and the U.S. Presidents Malaria Initiative in 2004.

The biggest challenge facing the NMCP during the time was the very recent change from CQ to SP, particularly its effective implementation at all levels of health care delivery systems and the perceived side effects of the drug by providers. The new strategy included strengthening the delivery of medicines though retail outlets, notably Accredited Drug Dispensing Outlets (ADDOs). There was also a strong emphasis on community-level integration of

correct treatment of fever within the integrated management of childhood illnesses (IMCI) initiative, established in 1996, in Tanzania.

In 2002, intermittent presumptive treatment in pregnancy (IPTp) using SP was introduced as part of a national policy to provide protection to pregnant women in their second and third trimesters through focused antenatal care (ANC). The target of this intervention was to reach at least 60% of pregnant women by 2007.

Scaling up the use of ITNs was the main vector control intervention advocated in this strategy to reach pregnant women, using three interdependent delivery mechanisms: (1) establishment of the ITN cell within the NMCP to provide overall coordination and monitoring of the NATNETs activities in the country with financial support from the Swiss Development Cooperation (SDC); (2) initiation of the Tanzania National Voucher Scheme (TNVS), a public-private initiative targeting biological vulnerable groups; and (3) launching of the social marketing delivery mechanism (SMARTNET), another public-private initiative.

To monitor performance of the strategy, a series of household- and facility-based surveys were carried out in 2001, 2003, 2005, 2006 and 2008. In 2003, the first Annual Malaria Conference with all DMOs was held as a platform to discuss and evaluate implementation issues. The meeting provided an opportunity to collect malaria annual reports from each district using a standardized format. Data collected was used to establish the NMCP database; however, the quality of the data in terms of completeness, accuracy and timeliness remains a challenge and the accuracy of assessing changes in trends of facility-based malaria burden over the years remains sub-optimal.

Two national household surveys were undertaken in 2004–2005 and in 2007–2008. By 2007 33% of U5 children and 24% of pregnant women used an ITN the night before the survey, compared to 20% and 19%, respectively, in 2004. Only 22% of pregnant women took two or more doses of SP during their last pregnancy in 2005, rising to only 30% in 2007–2008. A total of 51% of children who reported a fever in the last two weeks prior to the survey received an antimalarial on the same or next day in 2004–2005. Very few received CQ (1.7%), medicine that was discontinued in 2001, and only 21.4% received SP, the recommended first-line treatment in 2004–2005; however, 18% received amodiaquine. In 2007–2008 fewer (34%) febrile children promptly received an antimalarial treatment during their illness. Few children received SP (2.5%), medicine that was discontinued in 2006, and only 14.2% of febrile children received AL on the same or next day of their illness. A total of 18% of fevers continued to be treated with amodiaquine.

The 2008–2013 National Malaria Strategy

In developing the 2008–2013 strategy, the MoHSW, in collaboration with partners, aligned the strategies framework to correspond with the RBM Partnership's Scale Up For Impact (SUFI), to achieve targets of universal coverage of 80% by 2010 and the MDGs by 2015. The 2008–2013 vision stated: "Tanzania becomes a society where malaria is no longer a threat to the health of its citizens regardless of gender, religion or socio-economic status". The strategy embraced a new paradigm shift towards "phased malaria elimination" for the first time in the history of malaria control in Tanzania. Two main technical areas were included in the strategy: (1) malaria diagnosis and treatment; and (2) IMVC—both supported by improved M&E (including operational research and epidemic early detection and response), community-based malaria control, behavioural change initiatives and retaining a focus on decentralized support through regional and district capacity building around malaria control (NMCP, 2008).

The main changes to the strategy were the emphasis on achieving universal coverage to attain 80% for all interventions by 2013 and a much stronger and clearly defined emphasis on IVMC. This renewed emphasis on IVMC, built on the successes of the UMCP, was launched in 2004 by the Dar es Salaam City Council as part of routine municipal services. The UMCP's interventions involved community-level activities focused on larval breeding site identification/mosquito surveillance and fortnightly larviciding with environmental management by

community-based resource persons. Urban malaria control, based on this model, is now expected to scale up to other urban councils in the country using *Bacillus sphaericus* (Bs,) and *Bacillus thuringiensis israelensis* (Bti). A factory, using GoT infrastructure funding with technical support from the Government of Cuba, is nearly completed at Kibaha in Pwani Region and will have the capacity to produce 6 million litres of Bs and Bti per year.

IRS was re-introduced as part of vector control activities in the epidemic-prone and high-malaria endemic districts. Implementation started in 2007 in Muleba and Karagwe districts, in Kagera Region, to prevent malaria epidemics using lambda-cyhalothrin 0.05%; the operation targeted 100,000 households. The intervention was expanded across Kagera Region, protecting approximately 2.2 million people by 2010. IRS was further scaled up to include the two remaining lakeside regions of Mara and Mwanza, targeting over 1.25 million households and 6.5 million people by 2010. In 2011 the IRS programme had reached over 90% of households in 18 districts in the three regions, and together with increased LLIN use, contributed to a 67% reduction in malaria infection rates in children in sample villages. Resistance to lambda-cyhalothrin was detected in this area; as a result, Bendiocarb, a carbamate, has been the insecticide selected for use since 2013.

In recognition of the slow progress in achieving the targets for ITN coverage and use through public-private initiatives (TNVS and SMARTNET), which mainly targeted vulnerable groups, the ITN strategy evolved to include a mass-campaign delivery mechanism. Two mass LLIN free distribution mass-campaigns, under five catch up campaign and universal coverage campaign, were implemented in Tanzania between 2009 and 2011 during which a total of 26.4 million LLINs were distributed free of charge. The two campaigns were among the most successful and largest distributions of LLINs, resulting in Tanzania being one of the first African countries to achieve universal household ownership of at least one LLIN amongst all segments of the population. The TNVS campaign continues as the cornerstone of the "*keep up*" campaign strategy, having delivered 10 million nets since 2004. However, the two mass-campaigns have reduced some of the inequities in LLIN access, such as the inadequate ownership of LLIN in the lowest wealthy strata of the population. A national household sample survey undertaken toward the end of 2011, showed that 72.3% of all U5 children were reported to have slept under an ITN the night before the survey. These mass distribution campaigns had a clear impact in term of reduction of malaria burden. Both campaigns cost a total of US$160.2 million (between 1-1.5 US$ per person protected per year).

Another observation in the new strategic plan was that providing efficacious and prompt treatment to febrile individuals was a continuous challenge. Significant funds from the Global Fund Rounds and PMI were dedicated to ensuring adequate supplies of AL in the public sector and encouraging early models of delivery through private retail sectors. The revised strategy also promoted the use of diagnostics in the management of febrile illness. This was in-line with a growing recognition that relatively cheap and sensitive malaria rapid diagnostic tests (mRDTs) could be made available at the most peripheral levels of the health sector. Thus as vector control became more wide-spread, asymptomatic infection prevalence would begin to decline, reversing the dogma that it was legitimate to consider all fevers as malaria across Tanzania and as previously advocated as part of IMCI. Standard treatment guidelines were changed in 2011 to support the use of mRDTs and microscopy in the diagnosis of malaria, with the aim to increase the proportion of laboratory confirmed malaria cases from 20% in 2007 to 80% by 2013. Although mRDTs were introduced into the public sector facilities from 2011, wide-scale distribution began in 2013. However, the introduction of mRDTs as a means to change established practices for fever treatment among healthcare workers has not been easy.

The NMCP recognized the difficulties in reaching the majority of malaria-related fevers with the recommended AL treatment. As such, it embraced a pilot initiative to increase AL availability through the private sector and was selected as one of 10 countries to participate in the Global Fund's Affordable Medicines Facility for malaria (AMFm) initiative in 2009. AMFm negotiated with manufacturers to reduce the price of their ACTs. Subsequently, in-country national importers, wholesalers and retailers established an affordable profit margin to ensure quality assured ALu to consumers at the periphery through the accredited drug dispensing outlets ADDOs scheme.

The National Malaria Strategy 2008-2013 was accompanied by a detailed M&E plan. The plan highlights the need to more effectively access the existing national routine data from the Health Information and Management System (HMIS) and the Integrated Disease Surveillance and Response (IDSR) strategy, including data collected on the numbers of malaria and anaemia cases; provision of IPTp, bed net vouchers and iron/folate to ANC clients and deaths related to malaria. However, the plan recognizes that in 2009 most cases were diagnosed on clinical grounds and not with any parasitological testing.

Global Policy Documents and Initiatives

Millennium Development Goals

Malaria control interventions in Tanzania correspond with the MDGs that aim at reducing the child mortality rate by two-thirds, reducing the maternal mortality rate by three-quarters, and combating HIV/AIDS, malaria and other diseases by controlling them by 2015 and thereafter reversing their spread *(see Box 1).*

Box 1. Key MDGs in relation to Malaria control

Goal 2: Achieve universal primary education. Malaria is a leading source of illnesses and absenteeism in school-age children and teachers. It adversely affects **education** by impeding school enrolment, attendance, cognition, and learning.

Goal 4: Reduce child mortality. Malaria is a leading cause of child mortality in endemic areas.

Goal 5: Improve maternal health. Malaria causes anaemia in pregnant women and low birth weight.

Goal 6: Combat HIV/AIDS, malaria, and other diseases. Target 6C: Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases.

Goal 8: Develop a global partnership for development (including as a target the provision of access to affordable essential drugs). There is a lack of access to affordable essential drugs for malaria

Abuja Declaration

In April 2001, African Union countries meeting in Abuja, Nigeria, pledged to increase government funding for health to at least 15% of the government budget and urged donor countries to scale up support. Tanzania played an active role in crafting the declaration on malaria and was instrumental in mobilising the malaria community around its goals. Even if donors funding for malaria control rose over the last decade, the government funding for health is still below the pledged figure.

The Roll Back Malaria Partnership

The RBM Partnership, launched in 1998 and redesigned and strengthened in 2006, is a global framework to implement coordinated action against malaria. It mobilizes for action and resources and forges consensus among partners. The Partnership is composed of more than 500 partners, including malaria endemic countries, their bilateral and multilateral development partners, the private sector, nongovernmental and CBOs, foundations and research and academic institutions.

RBM's overall strategy aims to reduce malaria morbidity and mortality by reaching universal coverage and strengthening health systems. The Global Malaria Action Plan defines two stages of malaria control: (1) scaling-up for impact (SUFI) of preventive and therapeutic interventions, and (2) sustaining control over time (*see Box 2)*.

Box 2. The RBM Partnership Targets in Its Global Strategic Plan 2005–2015

By 2010, through targeting universal coverage:

- 80% of people at risk from malaria are using locally appropriate vector control methods such as LLINs, IRS and, in some settings, other environmental and biological measures;
- 80% of malaria patients are diagnosed and treated with effective anti-malarial treatments;

- 100% of pregnant women in areas of high transmission receive IPTp; and
- 50% reduction in global malaria burden from 2000 levels, to less than 175–250 million cases and 500,000 deaths annually from malaria.

By 2015:

- Universal coverage continues with effective interventions;
- Global and national mortality is near zero for all preventable deaths;
- Global incidence is reduced by 75% from 2000 levels to less than 85–125 million cases per year; and
- Malaria-related MDG is achieved, halting and beginning to reverse the incidence of malaria by 2015; at least 8–10 countries currently in the elimination stage will have achieved zero incidence of locally transmitted infection.

Beyond 2015:

- Global and national mortality stays near zero for all preventable deaths;
- Universal coverage (which translates to 80% utilization) is maintained for all populations at risk until local field research suggests that coverage can gradually be targeted to high risk areas and seasons only, without risk of a generalized resurgence; and countries currently in the pre-elimination stage will achieve elimination.

National Policy Documents

National Health Policy

The National Health Policy was amended since its inception in 1990 to incorporate the ongoing health sector reform process in the country (MoHSW, 2007). The revised policy also takes into account emerging and re-emerging diseases and the changing landscape in science and technology.

In line with Government Development Vision 2025 goals, the MoHSW will contribute towards the improvement of the health status and life expectancy of the Tanzanian population. This will entail ensuring the delivery of effective, efficient, and high-quality curative and preventive health services for all citizens at every level. Success in achieving the objectives of the present health policy will require tangible solutions to the current systematic problems that affect the delivery of health services, notably human resources, which constitute the major problem impeding the implementation of most planned activities. The GoT's vision is to have a healthy society, with improved social wellbeing, that will contribute effectively to personal and national development. The mission is to provide basic health services in accordance to geographical conditions, which are of acceptable standards, affordable, and sustainable. The health services will focus on those most at risk and will satisfy the needs of the citizens in order to increase the lifespan of all Tanzanians.

Vision 2025

The Tanzania National Development Vision 2025 (Vision 2025) was developed in the 1990s and has been in operation since 2000. The Vision 2025 outlines broad national long-term goals, perspectives, and aspirations. The core objective is to influence changes, coordinate and direct the people and the nation's strategic thinking, and direct national resources towards those strategic interventions that will enable Tanzanians to attain their development goals and be able to compete in the growing and competitive world economy.

The Vision has five key elements: (1) a high quality of livelihood; (2) peace, stability, and unity; (3) good governance; (4) a well-educated, learning society; and (5) a strong and competitive economy. To attain a high quality of livelihood, specific commitment was made to (1) ensuring national access to primary health care and reproductive health services (for appropriate ages); (2) reducing the infant mortality rate by three quarters of the current level; (3) reducing the maternal mortality rate, (4) encouraging community participation; (5) enhancing gender equality in health service delivery; and (6) and empowering women and other community members in all health related issues.

The National Strategy for Growth and Reduction of Poverty

Tanzania initiated an approach to promote development among its people, by introducing the National Strategy for Growth and Reduction of Poverty (NSGRP or MKUKUTA in Swahili). The aim of this strategy is to increase productivity by encouraging individual income generation for community development.

Given malaria's impact on poverty in the country, any intervention to reduce malaria will automatically increase productivity and economic growth in the country. The recent NSGRP II, 2010/11–2014/15 built on the achievements of NSGRP I. NSGRP II focuses on: (1) focused and sharper prioritization of interventions in projects and programmes in key priority growth and poverty reduction sectors; (2) strengthening evidence-based planning and resource allocation in the priority interventions; (3) aligning strategic plans of Ministry Departments and Agencies (MDAs) and LGAs to this strategy; (4) strengthening government's and national implementation capacity; (5) scaling up the role and participation of the private sector in priority areas of growth and poverty reduction; (6) improving human resources capacity, in terms of skills, knowledge, and efficient deployment; (7) fostering changes in mind-set toward hard work, patriotism, and self-reliance; (8) mainstreaming cross cutting issues in MDAs and LGAs processes; (9) strengthening the monitoring and reporting systems; and (10) better implementing core reforms, including further improvement of the public finance management systems.

The Health Sector Strategic Plan III (HSSP III)

The vision of the HSSP III is to provide high quality, effective, accessible and affordable health and social welfare services that are delivered through a well-performing and sustainable national health and welfare system that encourages responsiveness to the needs of the people.

The HSSP III mission is to facilitate the provision of equitable and effective health and social welfare services by formulating policies and guidelines, delivered by an adequate, competent and well-motivated human resource to improve the health and well-being of the public with emphasis on those most at risk.

The focus of this strategic is on "Partnership for delivering the Millennium Development Goals". The crosscutting issues elaborate on the approach towards quality, equity, gender and governance. The document explains which types of services are provided in the health sector, and also explains the roles and responsibilities of each level in the health system.

Health Sector Reform

The government of Tanzania initiated Health Sector Reforms (HSR) in 1994. The objective was to improve access, quality, and efficiency of health service delivery. Primary healthcare was adopted as the most cost-effective strategy to improve health of the people. The major focus of the HSR is on strengthening the district health services, as well reorienting secondary and tertiary service delivery in hospitals in support of primary healthcare. The programme also aims at strengthening support services at the central level, in the MoHSW, it agencies and training institutions. The HSR introduced a long-term programmatic approach, replacing the short-term project approach, in order to create coherence between activities and continuity.

Local Government Reform Policy Paper

The Local Government Reform Policy emphasises devolution of power from the central government and the establishment of a holistic local government system in order to achieve democratic and autonomous institutions. Within this context, primary healthcare services are also managed and administered by local government authorities.

CHAPTER 2: EPIDEMIOLOGY OF MALARIA

Epidemiological Profile of Malaria in Tanzania

Malaria Parasites and Vectors in Tanzania

Malaria Parasites

Human malaria is caused by five *Plasmodium* species, which include *P. falciparum, P. malariae, P.ovale, P. vivax* and the more recently described *P. knowlesi*. *P. falciparum* is the most predominant species in most of the malaria endemic countries, and it causes a severe form of malaria leading to high morbidity, mortality and other disabilities. In most malaria endemic regions of sub-Saharan Africa, including Tanzania, co-infections with *P. falciparum* and *P. malariae* or *P. ovale* in individual human hosts or mosquito vectors are not uncommon. However, in most cases there is underestimation of the burden of co-infections, especially when diagnosis is based microscopy.

In Tanzania very few studies have been conducted to identify species composition responsible for malaria transmission considering that the only dominant (>95%) species remaining is *P. falciparum*. Since mRDTs can detect qualitatively *P. falciparum* and non-*falciparum* parasites, knowledge of species distribution will enhance the understanding of malaria parasites and targeting treatment depending on the parasite species causing the disease.

Although *P. falciparum* is the main species in Tanzania, other non-*falciparum* species are commonly encountered with different distribution in the country. Despite a lack of detailed information, studies conducted in North-eastern Tanzania showed that the prevalence of *P. malariae* ranged between 3.9% and 8.3 %. *P. ovale* is distributed throughout sub-Saharan Africa and Asia, and the parasites have been recently divided into two sympatric species, *P. ovale curtisi* and *P.ovale wallikeri*, a variant type. The two variants of *P. ovale* occur globally although their distribution in Tanzania is unclear. The dynamics of other parasites fluctuates over time and depending on the prevalence of the dominant *P. falciparum*. *P. vivax* is another malaria species which is an important public health concern globally. However, the parasite has never been reported in mainland Tanzania despite recent reports of a single infection of *P. vivax* in Zanzibar, which suggest that further mapping of this species is urgently needed. *P. knowlesi* is recognised as the fifth human malaria parasite and is found in South East Asia. To date, little is known about the epidemiology of *P. knowlesi* in other malaria endemic areas, including sub-Saharan Africa.

Parasite Resistance to Antimalarial Medicines

In Tanzania, high levels of Chloroquine CQ treatment failures were reported between 1980s and 2000 and resulted into policy changes to replace it with other drugs. CQ was replaced with Sulphadoxine/pyrimethamine (SP) which became the first-line drug for treatment for uncomplicated malaria. Soon after introduction of SP, rapid selection and spread of parasite resistance occurred and was initially reported in Muheza District, Tanzania, where parasitological failure at day 7 following SP treatment was more than 50%. Thereafter, resistance was detected in other parts of the country and rendered the drug ineffective for treatment of malaria, which led to another policy change in 2006. Based on research findings, which showed high efficacy of ACTs, the treatment guidelines introduced Artemether-Lumefantrine (ALu) as first- line drug for treatment of uncomplicated malaria and became operational in January 2007.

National therapeutic efficacy testing conducted in 2011–2012 showed that malaria parasites are still sensitive to ACT and the efficacy of ALu and other ACTs are still very high. However, recent reports showed that resistance

against artemisinins has emerged in South East Asia, which can seriously threaten malaria control efforts if spread to the African continent. A recent study in Mombasa, Kenya, showed a significant decline of parasitological response to treatment with ACTs, which was associated with reduced drug sensitivity.

Main Malaria Vectors

The major malaria vectors in most areas of Mainland Tanzania are members of the *Anopheles gambiae complex*. Among them, *A. gambiae sensu stricto* is endophilic (resting inside houses) and anthropophagic (feeding human blood). Another member of the *A. gambiae* complex, *A. arabiensis* is more exophilic (resting outside houses) and zoophilic (feeding on animal blood) but exhibits a wide range of feeding and resting patterns, depending on geographical location and blood-host availability. Due to its feeding and resting habits, *An. arabiensis is* less vulnerable to control with IRS or LLINs. Almost all members of the *An. gambiae s.l*. prefer to breed in clean waters under well-lit sunshine conditions. *Anopheles gambiae s.s*. is associated with wet and humid environments. *An, arabiensis* is able to utilize a very wide variety of natural and artificial habitats, even in dry environments, including irrigation schemes, puddles, swamps, springs, stream margins, drains, ditches, trenches, borrow pits, wells, and storage containers. *An. gambiae s.s.* and *An. arabiensis* may occur sympathetically with differing proportions during the dry and wet seasons.

The second largest malaria vector in Tanzania is *An. funestus,* which like *An. gambiae s.s*., is more anthropophilic and endophilic. Normally, this species is highly affected by use of indoor vector measures such as IRS and LLIN. *An. funestus* species prefers to breed in shaded, slow-moving waters with some vegetation. *An. funestus* is an efficient vector that can maintain malaria transmission in the absence of *An. gambiae complex*. Available data suggests that *An. funestus* is found throughout Mainland Tanzania, often in the same locations as *An. gambiae* complex.

Secondary vectors may include species such as *An. pharoensis, An. ziemanni, An. rivulorum, An. rufipes, An. coustani* and *An. squamosus.*

Recent Changes in Vector Dynamics in Tanzania

Until very recently, *An. gambiae s.s*. was considered the most important malaria vector in most parts of Tanzania, particularly because of its high vectorial capacity, near-exclusive dependence on human blood, and the tendency to preferentially bite sleeping humans indoors. However, recent evidence suggests that vector population densities, and contribution towards overall malaria transmission, has been dwindling, to the extent that in some parts of the country (e.g., Lower Moshi, Ulanga, and Kilombero) it is rarely detected. The dwindling populations of *An. gambiae s.s.* is often associated with scale up of indoor insecticidal interventions such as IRS and LLINs. However, there are places such as Muleba District in the Lake Zone Region, where insecticide resistant populations of *An. gambiae s.s.* have persisted despite large-scale use of IRS, as well as in Dar es Salaam, where the species is still regularly caught despite in generally low densities. In the eastern regions of Tanga, Pwani and Morogoro, the vector species has largely been overtaken by *An. arabiensis,* which is now the predominant vector. The increased dominance of *An. Arabiensis,* and the fact that it tends to feed and rest outdoors and can feed on non-human blood sources, presents an important and widespread challenge to malaria control in Tanzania.

Following the decline in *An. gambiae* populations despite the rise in proportional abundance of *An. arabiensis*, *An. funestus* remains a dominant malaria vector in several parts of Tanzania. Due to its very high vectorial capacity, this vector is increasingly associated with the persistent residual malaria, particularly in south-eastern Tanzania, where its densities and sporozoite rates have risen steadily in recent years.

Insecticide Resistance in Mainland Tanzania

The first studies on resistance in malaria vectors were conducted during the Pare-Taveta Malaria Scheme (1954–1959), resistance of malaria vectors to dieldrien (the insecticide used for IRS during the Scheme) was observed to be significant in areas under the spraying programme compared with non-sprayed areas. The same was true even for non-target insects such as bedbugs, fleas, and lice. Later studies include those conducted in 1980s and 1990s during the introduction of ITNs.

In 2011, the NIMR and the Pan African Malaria Vector Research Consortium (PAMVEREC) reported insecticide resistance to pyrethroids in *Anopheline* mosquitoes in Muleba District, thereafter pyrethroid resistance was reported in other districts in Mainland Tanzania including Tanga, Moshi, Dar es Salaam, and Dodoma, involving a diversity of insecticides, even those not currently in use in Tanzania. So far, causative factors for the emerging resistance have not been established. However, it is strongly suspected that, the use of agricultural pesticides, use of nets impregnated with pyrethroids (e.g., LLINs/ITNs) and spraying indoor walls with pyrethroids for malaria vector control, and the use of acaricides against pests of veterinary importance might be responsible for the emergence of resistance.

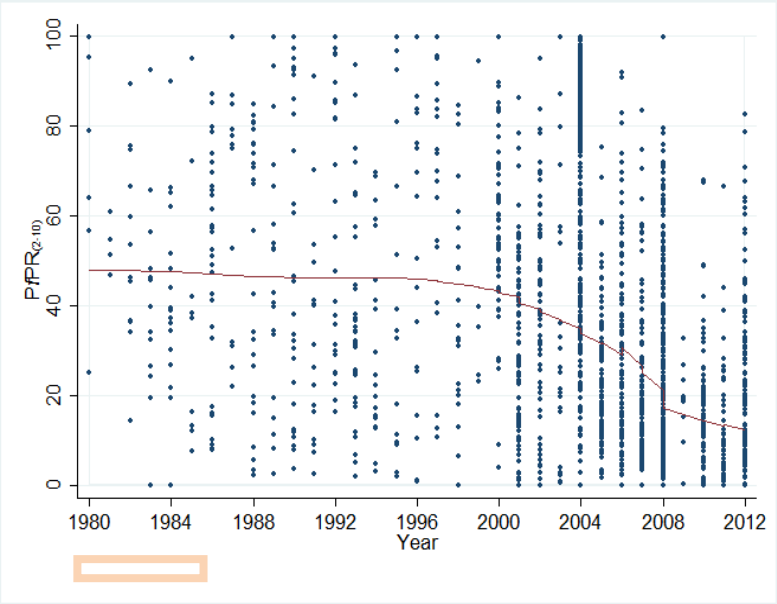
According to WHO (2012), one of the Insecticide Resistance Management (IRM) strategies is the judicious use of insecticides in vector control programmes. Although, several strategies exist for IRM for vector control, based on the use of IRS and ITNs, some of these include the rotation of insecticides, use of interventions in combination, and mosaic spraying. Potential future strategies include use of mixtures (WHO, 2012). In some settings, resistance management strategies may be implemented in the broad context of integrated vector management. These strategies can have several effects on populations of resistant vectors: They can delay the emergence of resistance by removing selection pressure (e.g., rotations) or kill resistant vectors by exposing them to multiple insecticides (e.g., mixtures, when they become available).

Malaria Epidemiological Transition 2000–2010

There is increasing evidence that malaria prevalence dropped over the last decade. The latest national representative malaria indicator surveys (THMIS, 2008 and 2012) show that malaria prevalence in children 6–59 months old halved (from 18.1% to 9.5%) between 2008 and 2012. A temporal analysis of available malaria prevalence surveys between 1980 and 2012 suggests that, from 2000 there are consistent signs of declining parasite prevalence (NMCP, 2013). Across Tanzania, between 2000 and 2010, there has been a greater than 50% reduction in predicted mean population-adjusted parasite prevalence in children aged 2–10 years (PA*Pf*PR_{2-10}).

Even with the due caution, since the data are generated from different spatial locations with time, there is general consensus to affirm that Tanzania is currently under a malaria epidemiological transition (see *Figure 3*).

Figure 3. Loess Regression Line of 2193 Survey Data Points Assembled Between 1980 and 2012

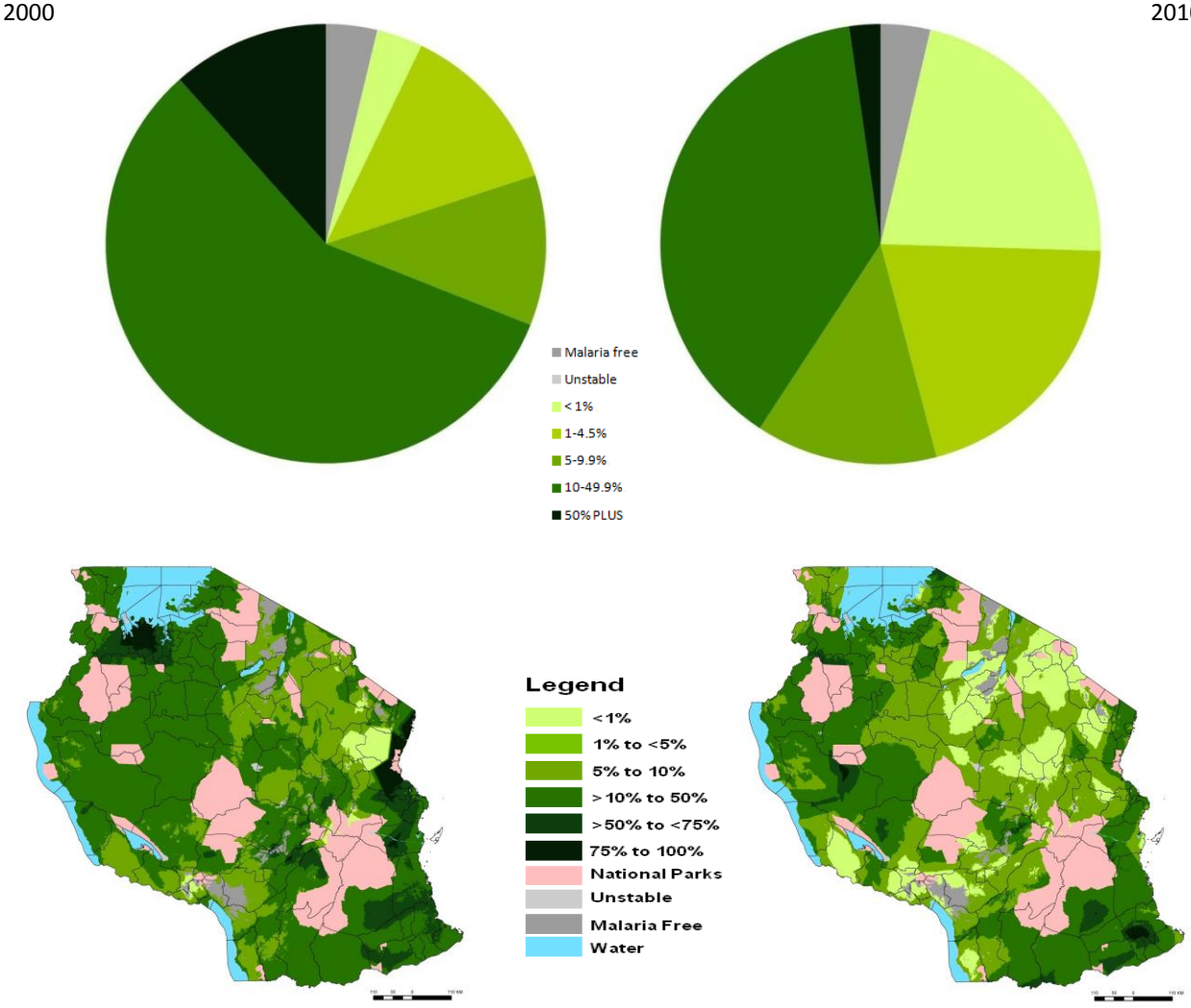


Note: P*f*PR$_{(2\text{-}10)}$: *P. falciparum* Parasite rate in children 2-10 years of age.

Source: Epidemiological Profile of Malaria and its Control in Tanzania. NMCP 2013

The proportion of Tanzania's population living in areas of intense transmission (PA*Pf*PR$_{2\text{-}10}$ ≥ 50%) declined from 11.6% to only 2.3% by 2010. While only 30% of Tanzania's population lived in areas where transmission regarded as hypo-endemic (parasitaemia 0 - <10 %) in 2000, by 2010 almost 60% of Tanzanian's were living under these conditions (*see Figure 4*). Dramatic declines in malaria transmission intensity have not been witnessed everywhere; areas that have not been subject to the epidemiological transition are located in the Southern and parts of the Northwestern regions of Tanzania.

Figure 4. Percentage of Tanzania's Population at Various Classes of P. falciparum Endemic Risk in 2000 and 2010



Source: Epidemiological Profile of Malaria and its Control in Tanzania. NMCP 2013

Malaria Epidemiological Dynamics and Population at Risk

Tanzania has the third largest population at risk of stable malaria in Africa after Nigeria and the Democratic Republic of Congo. The climatic conditions are favourable for transmission throughout almost the entire country, with close to 95% of Mainland Tanzania at risk.

According to the most recent estimate, about one quarter of the Tanzanian population lives in unstable malaria transmission, with less than 1% expected malaria prevalence. In addition, about 59% of the population lives in malaria hypo-endemic areas while the remaining 41% lives in meso-, holo-, and hyper-endemic areas (*see Table 2*.

Seasonal malaria peaks occur at the end of the rainy season. The Central and Southern parts of the country have a single main rainy season (peak in March-April), with more than 60% of rainfall concentrated in less than three

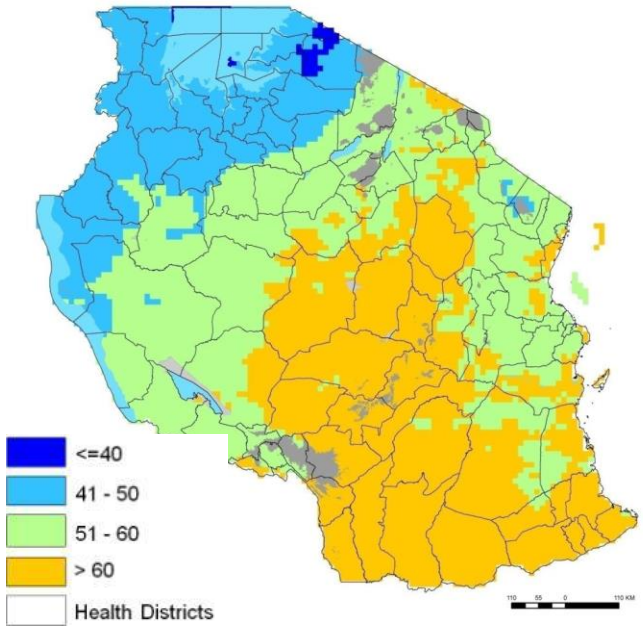
months. The Eastern, Northern, and Western zones experiences bimodal rainfall (with peaks in November and April), with rainfall spread over a long period (see *Figure 5)*.

Table 2. Population at Risk by Epidemiological Strata and Number of Districts Represented by Each Stratum

Epidemiological Class	Population at Risk		
	Population	Proportion %	Cumulative %
Pop Malaria free	1,573,594	3.63%	3.63%
Pop unstable	12,161	0.03%	3.66%
Pop < 1%	9,462,802	21.83%	25.48%
Pop 1-4.5%	8,850,001	20.41%	45.90%
Pop 5-9.9%	5,785,627	13.35%	59.24%
Pop 10-49.9%	16,675,631	38.46%	97.71%
Pop 50% PLUS	993,639	2.29%	100.00%

Source: Epidemiological Profile of Malaria and its Control in Tanzania. NMCP 2013

Figure 5. Rainfall Probability (%) Within 3 Months



Source: Epidemiological Profile of Malaria and its Control in Tanzania. NMCP 2013

CHAPTER 3: MALARIA CONTROL ACHIEVEMENTS 2008–2013

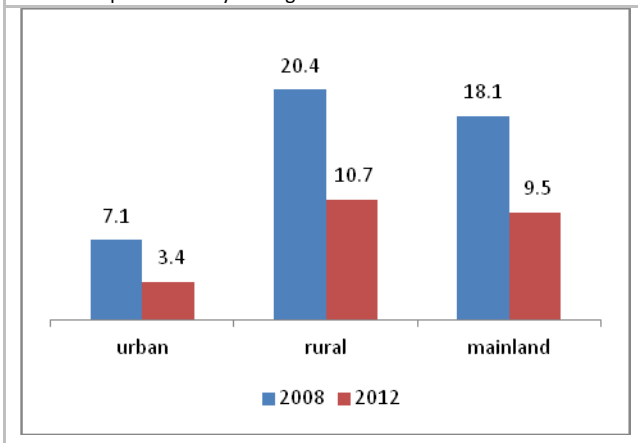
Main Malaria Control Impact and Outcome Indicators, 2008 and 2012

Malaria prevalence

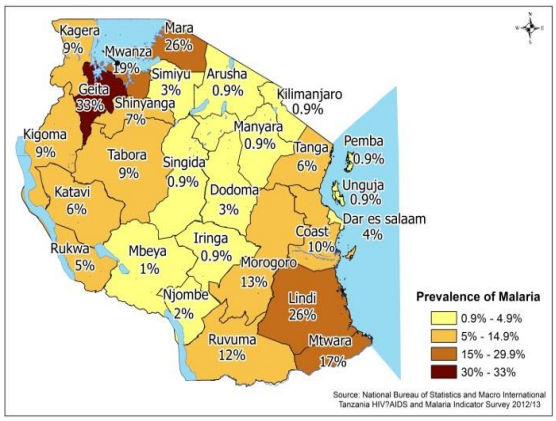
The Tanzania HIV/AIDS and Malaria Indicator Surveys (THMIS) carried out in 2008 and 2012 showed that malaria prevalence has declined by 50% from 18.1% to 9.5% (*See Figure 6a*). There is, however, considerable variation across regions (*see Figure 6b*). Overall, malaria prevalence decreased in all the zones (*see Figure 6c*) and in all age groups (*see Figure 6d*). In both surveys, malaria prevalence was significantly higher in the children living in household within the two lowest wealth quintiles (*see Figure 6e*) and with mothers with low educational levels (*see Figure 6f*). However, malaria prevalence decreased across all wealth quintiles and all educational levels.

Figure 6. Malaria Prevalence Indicators (THMIS 2008, 2012) Among Children 6–59 Months of Age by (a) Setting (b) Region, (c) Zone, (d) Age, (e) Wealth Quintile, and (f) Mother's Education Level

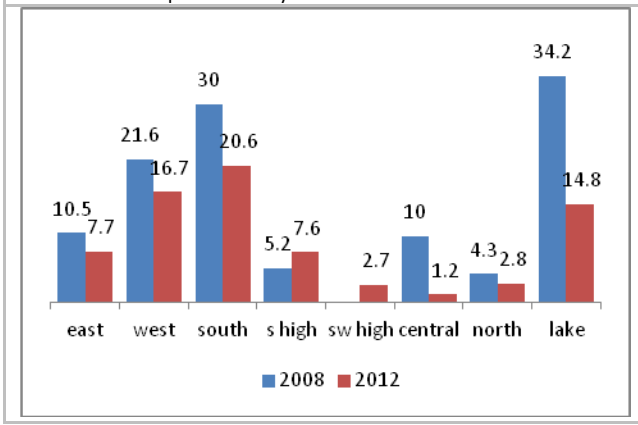
a. Malaria prevalence by setting



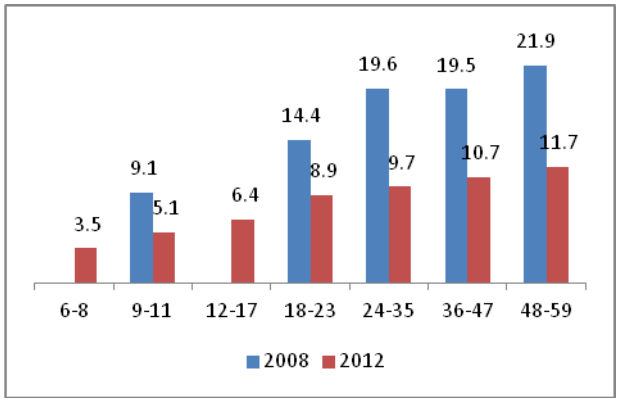
b. Malaria prevalence by region



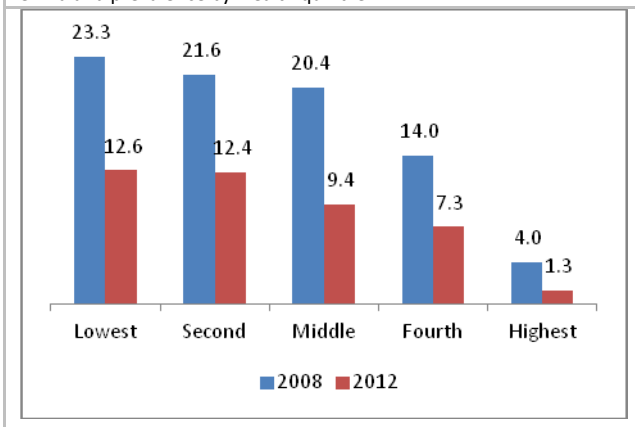
1c. Malaria prevalence by zone



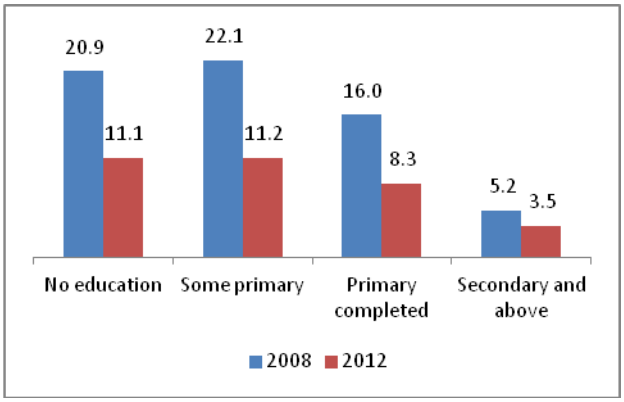
1d. Malaria prevalence by age (months)



e. Malaria prevalence by wealth quintile



f. Malaria prevalence by mother's educational level



Adapted from THMIS 2008 and 2012

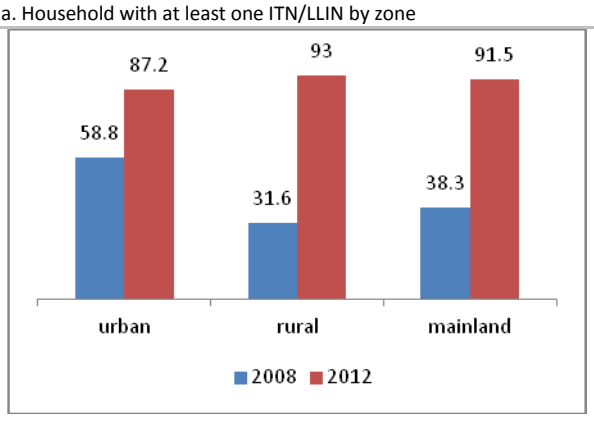
Malaria Prevention

There has been a dramatic increase in ITN/LLIN ownership (*see Figure 7a)* and use (*see Figure 7b*) between the 2008 and 2012 THMIS. Rural areas had a three-fold increase in ownership. Use amongst biologically vulnerable groups remains higher than the rest of the population. Populations living in household of the lowest quintile had a four-fold increase in ownership of nets (see *Figure 7c*). The net source pattern changed between 2008 and 2012 due to different distribution mechanisms (*see Figure 7d*), with 55% of nets in the households provided through free campaigns in 2012, while in 2007 the bulk of the nets (59%) came from a shop, mobile vendor, or market.

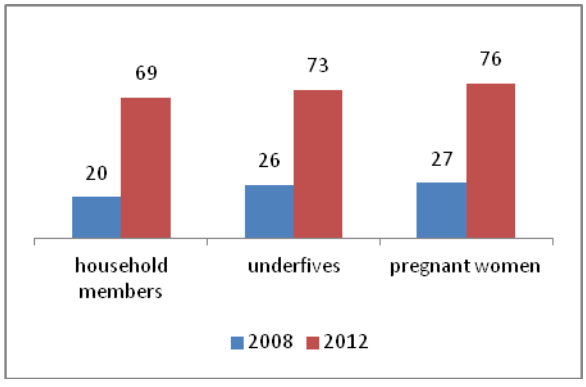
The overall proportion of households sprayed in the previous 12 months increased seven-fold between 2008 and 2012 (*see Figure 7e*). IRS has been implemented in selected areas of the country and scaled up in 18 out of 22 councils in three regions of the Lake Zone (see *Figures 7d and 7f*). The proportion of women with a history of pregnancy in the previous two years accessing two or more doses of SP for IPTp did not change over the two surveys (*see Figure 7g*).

Figure 7. Malaria prevention indicators (THMIS 2008, 2012) by (a) Household with at Least One ITN/LLIN by Zone, (b) ITN/LLIN Use, (c) Wealth Quintile, (d) Source of Nets, (e) Proportion of Households Sprayed by Strata, (f) IRS Coverage by District, and (g) IPTp coverage

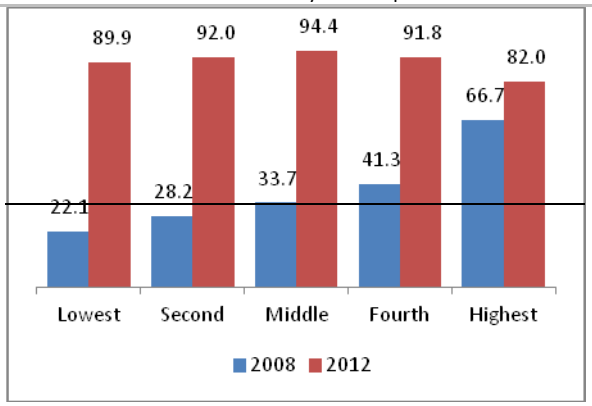
a. Household with at least one ITN/LLIN by zone



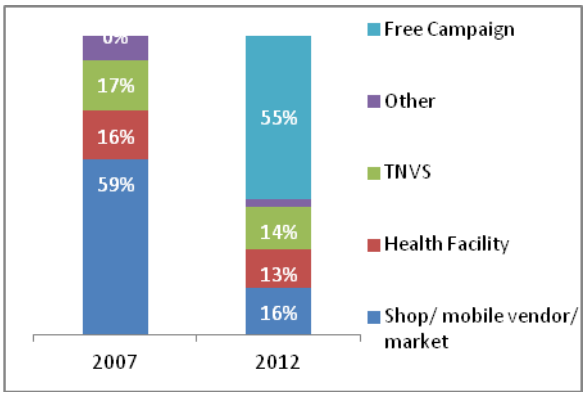
b. ITN/LLIN Use



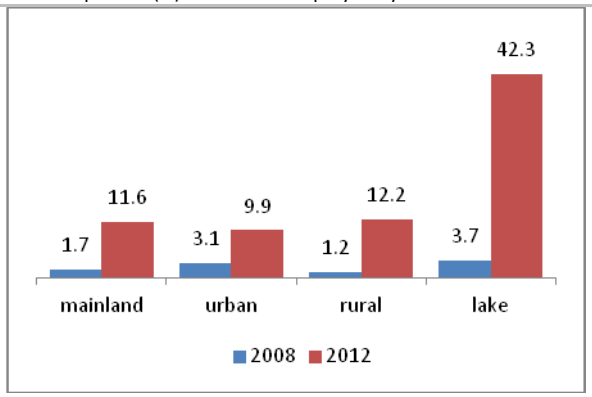
c. Household with at least one ITN by wealth quintile



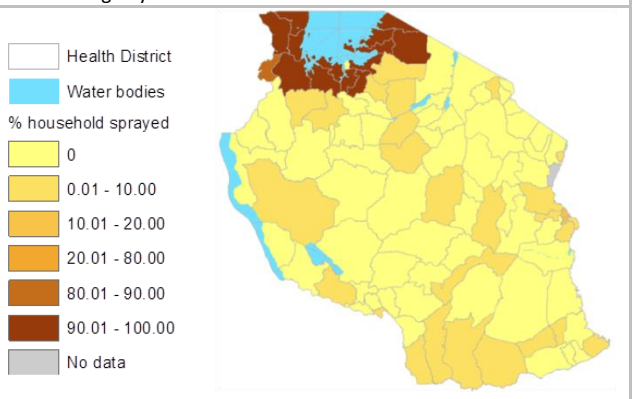
d. Source of nets



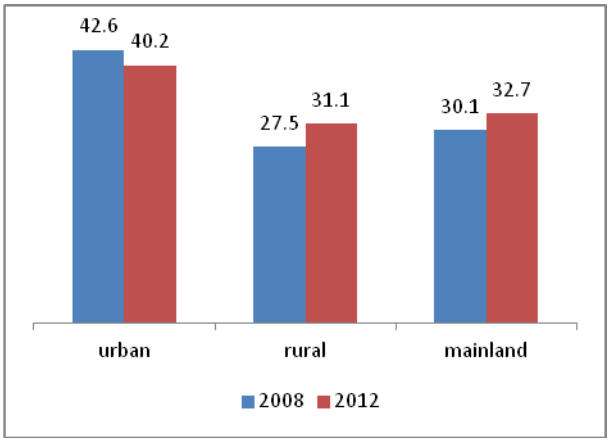
e. IRS: Proportion (%) of household sprayed by strata



f. IRS coverage by district



g. Proportion of women receiving SP for IPTp: 2+ doses in last pregnancy



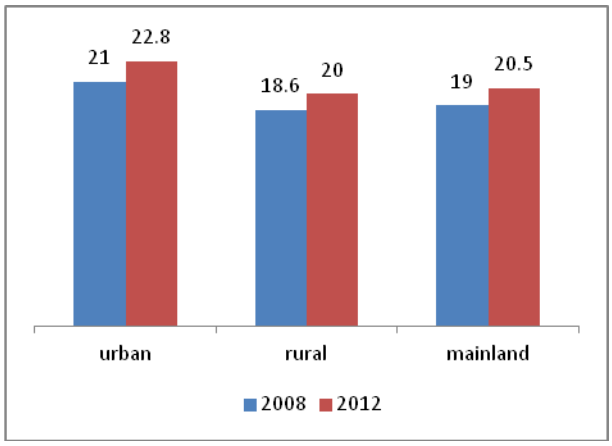
Adapted from THMIS 2008 and 2012

Management of Fever in Children

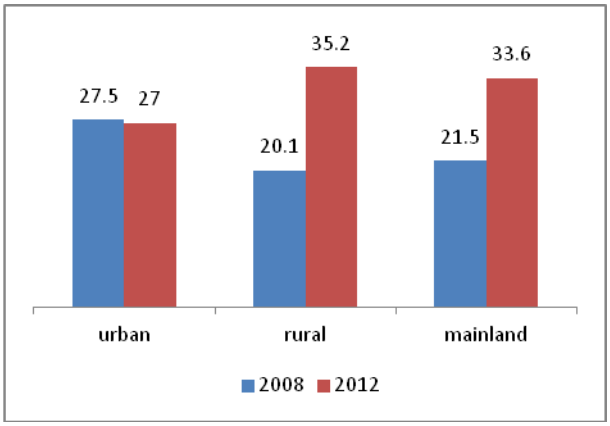
Despite the drop in malaria prevalence, the proportion of children with a history of recent febrile illness did not change in all settings (*see Figure 8a*). In the 2012 THMIS, there was a consistent increase in consumption of ACT compared to the 2008 survey, especially in rural areas (*see Figure 8b*). ACT was the leading antimalarial taken during the illness in both surveys, but its share went up from 37% to 61% in 2008 and 2012, respectively (*see Figure 8c*). Two out of three children treated with antimalarials in rural areas were given an ACT (*see Figure 8d*).

Figure 8. Malaria Treatment Indicators (THMIS 2008, 2012): (a) Children 6-59 Months with Recent History of Fever, (b) Children Who Took ACT, (c) ACT and Other Types of Antimalarial, and (d) By Area

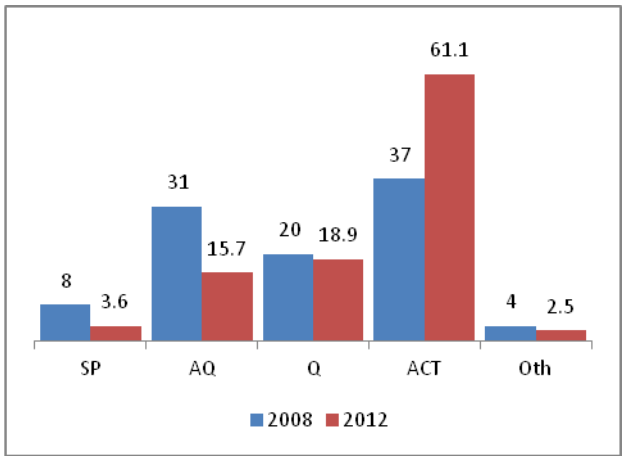
a. Prevalence of fever (%) among children 6-59 months by area



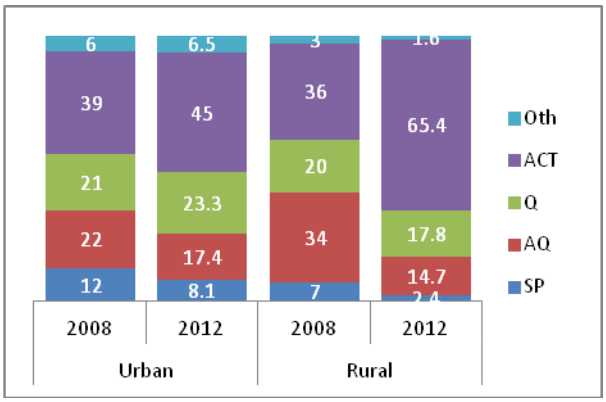
b. Proportion of children 6-59 months by area who took an ACT during recent febrile illness



c. Proportion of children with fever who took antimalarials by type of medicine



d. Children with fever who took antimalarials by type of medicine and area



SP=sulfadoxine-pyrimethamine, Q=quinine, Oth= other, AQ=Amodiaquine, ACT= Artemisinine combination therapy

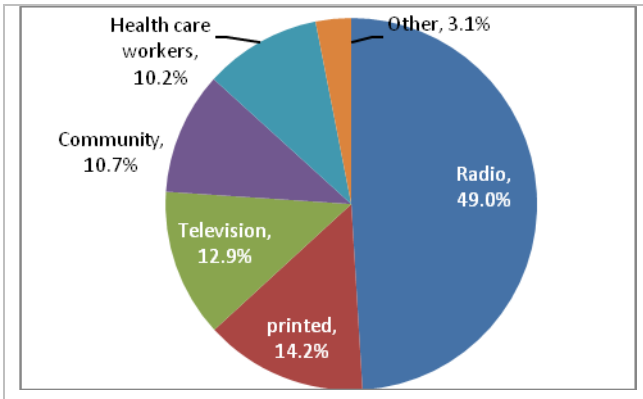
Adapted from THMIS 2008 and 2012

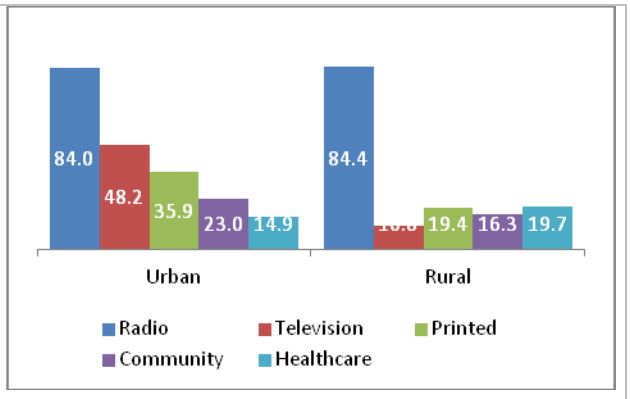
Malaria knowledge and communication

According to THMIS 2012, the largest media source to convey malaria messages to women aged 15-49 year was the radio (*see Figure 9a*). A similar proportion of radio diffusion was observed in rural and urban communities while printed materials and television largely reached urban areas (*9b*). Women living in households within the lowest wealth quintile and with no education had significantly lower access to malaria messages compared to women in the respective highest class (*see Figures 9c and 9d*); they also have a much higher chance of receiving malaria messages from healthcare workers (*see Figures 9e and f*).

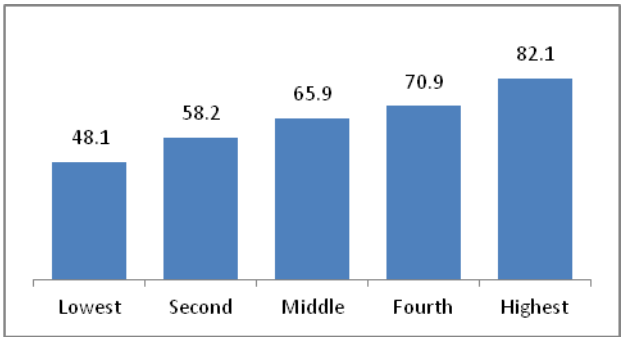
Figure 9. Malaria Knowledge and Communication Indicators (THMIS 2012)

a. Proportion of malaria messages accessed by type of media	b. Proportion of the population accessing malaria message by type of media and setting

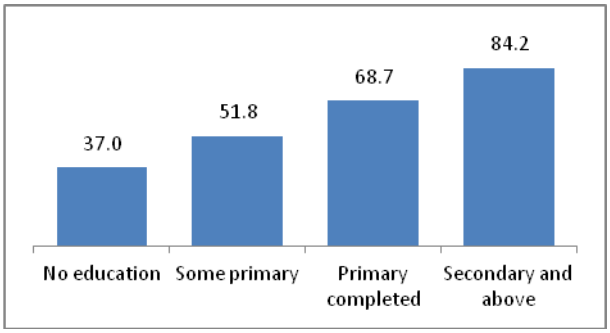




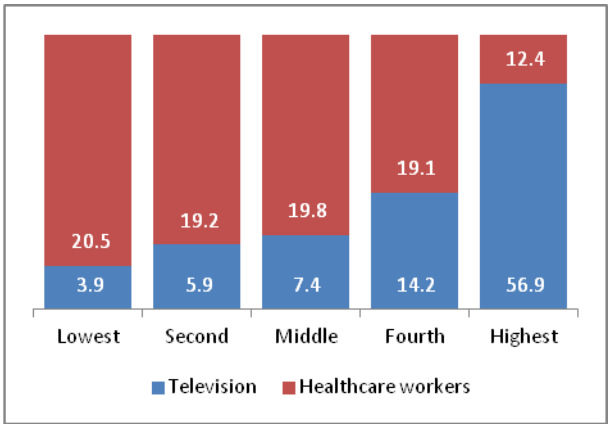
c. Proportion (%) of women accessing messages about malaria prevention by wealth quintile



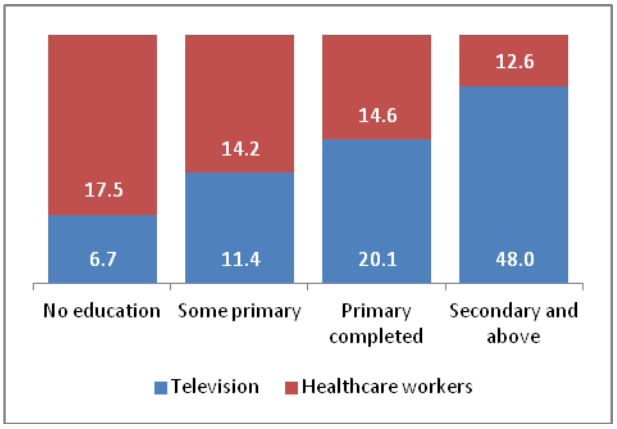
d. Proportion (%) of women accessing messages about malaria prevention by education level



e. Proportion (%) of women accessing selected messages about malaria prevention by wealth quintile



f. Proportion (%) of women accessing selected messages about malaria prevention by education level



Adapted from THMIS 2008 and 2012

Medium-Term Strategic Plan 2008–2013 Main Achievements

During the implementation of the last Medium-Term Strategic Plan four major initiatives were undertaken for **malaria prevention**: (1) continuation of TNVS for infants and pregnant women, (2) free net mass distribution campaigns for children under-fives (2009-2010) and for universal coverage (2010-2011), (3) IRS in three regions of Lake zone and (4) application of larviciding in Dar es Salaam city. Between 2007 and 2012 a total of 34,151,183 ITN and LLIN were distributed in Tanzania: 7.8 million ITNs and LLINs were sold through the TNVS while through the

two mass distribution campaigns—U5 Catch-Up Campaign and Universal Coverage Campaign--8.7 million nets and 17.6 million nets were distributed, respectively. A total of 3,053,247 households were sprayed (see *Table 3*).

The four main initiatives regarding **malaria diagnosis, treatment, and preventive therapies** between 2007 and 2012 were as follows: (1) treatment of uncomplicated malaria by consolidating the use of ACT (introduced in 2007); (2) establishment of QAACT co-payment scheme in the private sector through the Affordable Medicine Facility for Malaria (AMFm); (3) introduction and scale up of mRDTs for malaria diagnosis; (4) treatment of severe malaria by using Quinine injectable; and (5) continuation of IPTp. Between 2007 and 2012 a total of 93,858,422 AL treatments and 29,523,750 mRDTs were procured and distributed in public health facilities; 25,672,590 QAACT were procured and distributed through private facilities (see *Table 4*).

The three major **SME** initiatives were as follows: (1) establishment in 2009 of weekly reporting for malaria commodities stock, (2) establishment in 2010 of national insecticide resistance monitoring; and (3) revitalization, starting in 2010, of the national sentinel sites for monitoring antimalarial drug efficacy ***(see Table 5.)***

Table 3. Malaria Prevention Outputs, 2007–2012

	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	Total
TNVS Infant vouchers redeemed	332,055	516,102	394,690	768,338	548,924	750,783	3,310,892
TNVS Pregnant women vouchers redeemed	931,193	827,805	527,163	722,439	675,278	785,084	4,468,962
Under five years catch up campaign LLIN distributed	0	0	5,498,322	3,264,116	0	0	8,753,438
Universal coverage campaign LLIN distributed	0	0	0	4,641,192	12,976,699	0	17,617,891
Total ITN/LLIN distributed	1,263,248	1,343,907	6,420,175	9,396,085	14,200,901	1,535,867	34,151,183
Number of house structures sprayed with insecticides	34,745	95,548	185,217	425,118	1,144,621	1,167,998	3,053,247
Number of districts implementing IRS	1	2	2	7	18	18	18

Table 4. Malaria Diagnosis, Treatment and Preventive Therapies, 2007-2012

	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	Total
ACT procured and distributed through public healthcare facilities	16,227,818	15,387,302	18,091,532	16,156,620	16,159,890	11,835,260	**93,858,422**
QAACT procured and distributed through private facilities	0	0	0	1,865,050	9,747,340	14,060,200	**25,672,590**
mRDTs procured and distributed through public healthcare facilities	0	0	1,937,300	5,003,000	9,247,600	13,335,850	**29,523,750**
Number of regions (n=21) implementing mRDT	0	0	3	8	16	21	**21**

Table 5. Malaria SME Achievements, 2007–2012

	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Health facilities reporting weekly SMS for life for malaria commodities	0	0	135	132	4,784	4,458
National sentinel sites monitoring Insecticide resistance (in bracket	0	0	0	12 (12)	12 (12)	12 (28)

cumulative)						
National sentinel sites monitoring antimalarials drug efficacy (in bracket cumulative)	0	0	0	0	4 (4)	4 (8)

CHAPTER 4: NATIONAL MALARIA STRATEGIC PLAN 2013–2020 FRAMEWORK

Vision

Tanzania becomes a society free from malaria.

Mission

Ensure all Tanzanians have access to quality, effective, safe and affordable malaria interventions through timely and sustainable collaborative efforts with partners and stakeholders at all levels.

Goal and Objectives

Goal

Tanzania seeks to substantially reduce the burden of malaria in the near and medium term by reducing morbidity and mortality attributable to malaria. The aim is to transition from the current areas of malaria meso-endemicity to hypo-endemicity and eventually elimination. The most appropriate way to record progress towards achieving this aim is to track the number of malaria cases and deaths nationally. At present, data on malaria cases and related deaths are unreliable due to challenges related to the health system. Although measures of malaria prevalence do not indicate burden of disease, they reflect the intensity of malaria transmission and indirectly the burden of the disease in the population. In this context, it is deemed reasonable to assume that a reduction in transmission, measured through malaria parasite prevalence, will lead to reduction in the disease burden.

The goal is to reduce the average country malaria prevalence from 10% in 2012 to 5% in 2016 and further down to less than 1% in 2020

Strategic Objectives

The 2013-2020 MMTSP has five strategic objectives:

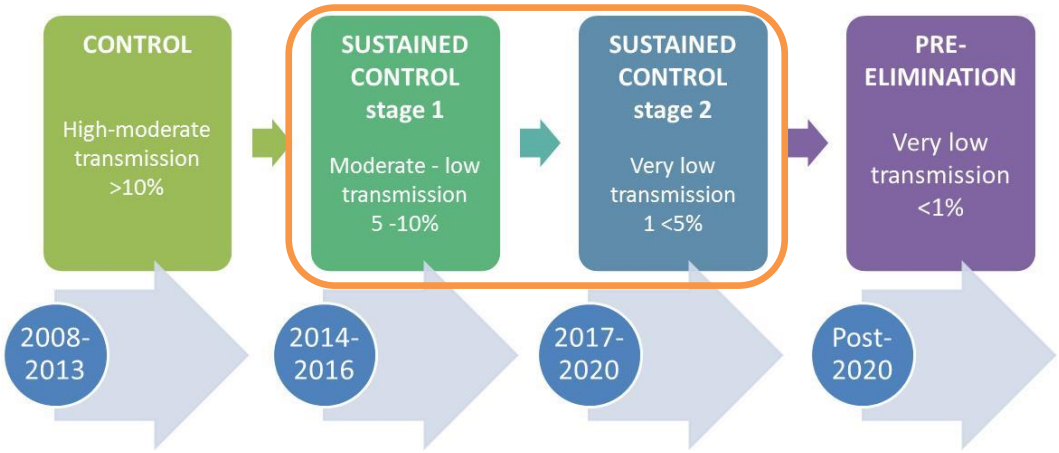
1. **Reduce transmission of malaria by scaling-up and maintaining effective and efficient vector control interventions**
2. **Prevent the occurrence of severe morbidity and mortality related to malaria infection through promotion of universal access to appropriate early diagnosis and prompt treatment and provision of preventive therapies and vaccines to vulnerable groups**
3. **Create an enabling environment where individuals and household members are empowered to minimize their own malaria risk and seek proper and timely malaria-treatment if and when needed**

4. **Provide timely and reliable information to assess progress towards the set global and national targets, to ensure resources are used in the most cost effective manner and to account for investments made in malaria control**
5. **Ensure effective programmatic and financial management of malaria control interventions at all levels, implemented through effective and accountable partnerships with adequate funding**

Strategic Malaria Control Phases

Malaria control can be represented as a continuum with different phases depending on transmission levels, as shown in *Figure 10.* Tanzania is currently in the control phase but is rapidly transitioning to a sustained control phase with moderate to low transmission, with some areas in a pre-elimination stage with transmission levels of less than 1%. The 2014-2020 National Malaria Strategic Plan intends primarily to sustain the achievements of the previous phase to further reduce malaria transmission, and to consolidate the malaria control level achieved, and to explore the possibilities to move further. The plan is divided in two strategic stages: the first period (2014-2016) will sustain the recent progress and achievements while the second period (2017-2020) will consolidate the achievements and will explore the feasibility to enter into a malaria pre-elimination phase in defined areas of the country.

Figure 10. Malaria Control Phases and Timelines in Tanzania



Each stage requires a set of different intervention packages across all strategic areas. As malaria cases decline, interventions must become more targeted and intensified. Building strong surveillance and health systems will become increasingly important. Accurate diagnostics and treatment of both clinical as well asymptomatic cases will be crucial to eliminate the malaria parasite in the human population. Vector control interventions will need to be intensified to reduce transmission to very low levels.

The sections below outline the generic strategies for the core malaria control interventions. The malaria programme will be reviewed midway through the strategic planning period, and strategies will be revised and adapted based on the changing malaria interventions in the different geographical areas of the country. Specific application of the strategic interventions according to the different strata will be described in the next chapter.

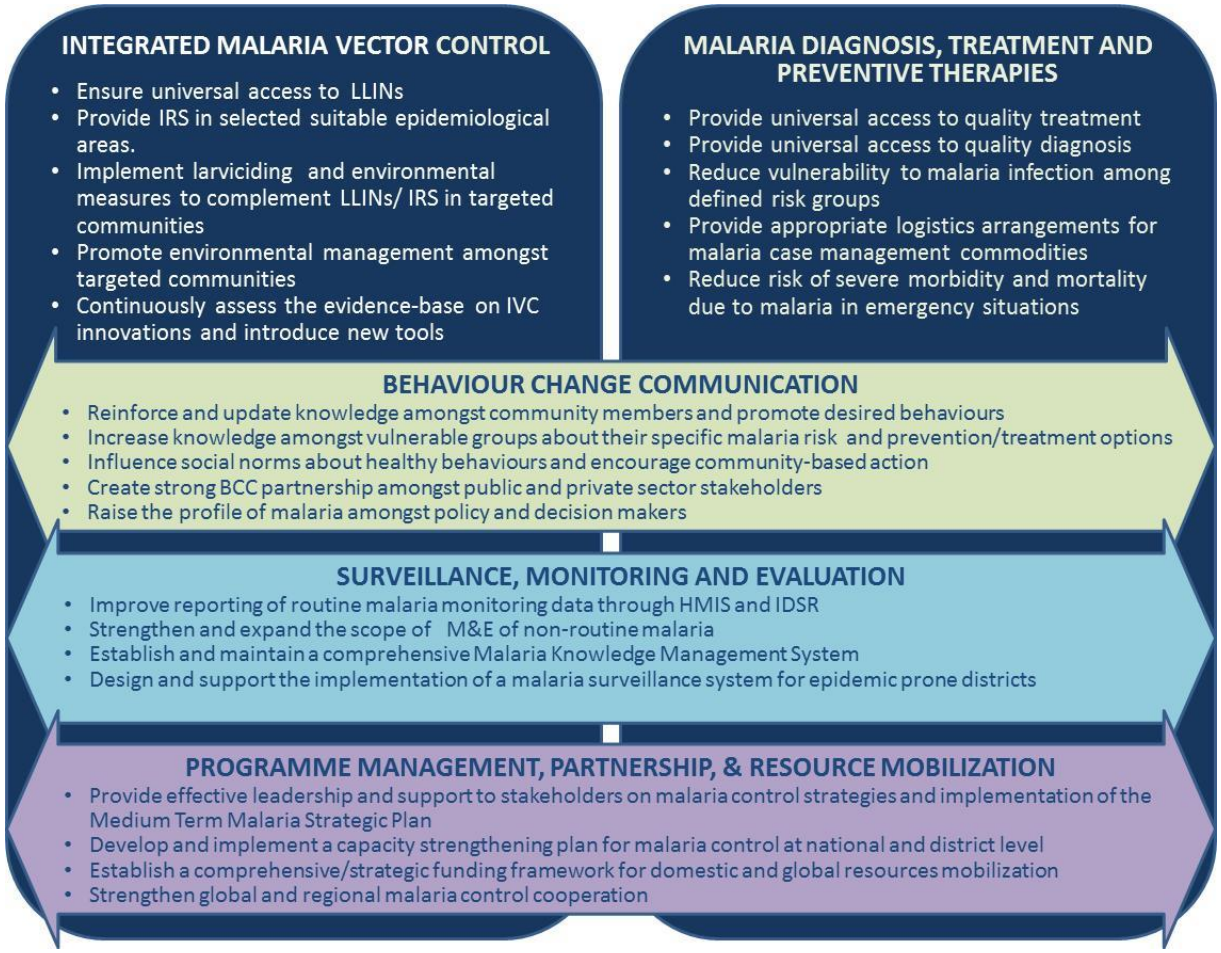
Objectives and Strategies for Core Interventions

The 2013-2020 MTSP consists of five core interventions:

1. Integrated Malaria Vector Control
2. Malaria diagnosis, treatment, preventive therapies and vaccines
3. Promotion of malaria prevention and curative services through information, education and communication

4. Surveillance, monitoring and evaluation
5. Programme management, partnership development and resource mobilization

Figure 11. Overview of Malaria Strategies



Component 1: Integrated Malaria Vector Control

Despite the progressive decline in malaria prevalence over the past decade, Tanzania remains highly vulnerable to malaria transmission due to the climatic and geographic suitability in most of the country. Since 2001 the World Health Organization has been promoting Integrated Vector Management (IVM) as the strategic approach for vector control. IVM is defined as the targeted use of different vector control methods alone or in combination to prevent or reduce human-vector contact cost-effectively, and render the environment unsuitable for mosquito breeding. IVM is a multi-sectoral approach, aimed at rationalising resources by targeted various vector borne diseases simultaneously when present in the same area. Successful implementation of IVM relies on effective collaboration with other line ministries such as the Ministry of Agriculture and Ministry of Works as well as Public Private Partnership (PPP).

The main methods include the use of long-lasting insecticidal nets (LLINs), indoor residual spraying (IRS), larval source management (larviciding and environmental management). New innovations especially those that address the emerging threat of insecticide resistance and preserving the effectiveness of modern malaria vector control will be considered as they become available. Key interventions will be directed based on geographical reconnaissance and mapping for identifying target areas, collecting data on overlapping vector borne diseases and

determining the choice of vector control measure(s). IVM entails regular monitoring and compliance inspections and recruitment and training of field technicians.

Strategic Objective and Targets for IMVC

Strategic Objective			
To reduce transmission of malaria by scaling-up and maintaining effective and efficient vector control interventions			
Targets	**Baseline 2012**	**Mid-term 2016**	**Final 2020**
Reduce entomological inoculation rate (EIR) to <0.1 [1]	NA	<0.25	<0.1
Percentage of the population who slept under an LLIN the previous night or in a dwelling sprayed with IRS in the past 6 months	73%	80%	90%

Specific Objectives and Outcomes for Integrated Malaria Vector Control (IMVC)

The following objectives will be achieved:

1. Maintain universal access to LLINs among the population
2. Consolidate and expand the scope of IRS interventions in selected areas using evidence-based criteria
3. Scale-up larviciding interventions to selected urban areas where breeding sites are few, fixed, and findable
4. Promote effective environmental management for malaria control amongst targeted communities
5. Introduce new innovations in vector control products and information systems to manage insecticide resistance and address changing vector behaviour

The expected outcomes for the above objectives are:

Indicator	Baseline 2012	Mid-term 2016	Final 2020
Percentage of households with at least one LLIN for every two persons	74%	80%	85%
Percentage of house structures in the country sprayed with recommended insecticide(s) during the past 12 months	12%	15%	20%
Percent decrease in larval density in selected areas treated with appropriate larvicides, measured on quarterly intervals	NA	80%	95%
Proportion of urban wards implementing environmental management to prevent mosquito breeding sites	NA	25%	50%
Number of evidence-based innovations for malaria vector control adopted and integrated introduced in Tanzania	NA	1	2

Strategic Approaches and Interventions

The five strategic approaches to reduce man-vector contact will be

1. Ensure universal access of the population to LLINs in all transmission settings and control stages

[1] It is recognized that measuring of the Entomological Inoculation Rate (EIR) is problematic and a representative baseline for Tanzania in not yet available. However, the aim is to establish a baseline through representative sampling by 2016.

2. Consolidate and expand IRS in epidemiologically and operationally suitable areas
3. Implement larviciding to complement core interventions (LLINs and IRS) in targeted communities
4. Promote environmental management amongst targeted communities
5. Continuously assess the evidence-base on IVC innovations and introduce new tools that address insecticide resistance and changing vector behaviour where and when feasible

Strategic Approach 1: Ensure Universal Access of the Population to LLINs in all Transmission Settings and Control Stages

Through the NATNETS Programme, Tanzania has been able to significantly scale-up the use of ITNs and LLINs and achieve universal coverage on Mainland Tanzania**.** From 2009 onwards, the programme has been promoting the distribution and use of LLINs, which are factory-treated with pyrethroids and do not need retreatment such as conventional ITNs.

The current LLIN strategy will build on the successes of previous years and the strong net use culture in the population. Stratification in terms of LLIN delivery mechanisms will continue to be developed in line with RBM recommendations[2] (i.e., a combination of campaign [catch-up] and continuous distribution [keep-up] systems of distribution). A key priority for maintaining universal coverage will be to establish systems to monitor coverage and variations in the rate of loss, so that the rate of the expected LLIN input can be adjusted to balance this loss. When resources are constrained, LLINs will be targeted to risk groups, especially young children and pregnant women in high transmission areas.

Strategic Interventions

1.1 Implement a mass replacement campaign to bring LLIN coverage[3] up to 80%
1.2 Implement continuous distribution mechanisms to keep up coverage
1.3 Implement targeted distribution to vulnerable groups: Infants and pregnant women
1.4 Create an enabling environment to revive the commercial market for ITNs and LLINs

1.1 Implement a mass replacement campaign to bring LLIN coverage[4] up to 80%

According to field studies, the median lifetime of a net is approximately 3 years. Most of the LLINs distributed during the two past mass campaigns (in 2009-2010 and 2010-2011) will be over 3 years old by 2014, and have passed their effective lifetime. Household net use throughout the country will likely have dropped below a threshold of 60% as ownership decreases due to the decay of nets. Mathematical modelling[5] has shown that if coverage of LLINs drops below this threshold, it is not possible to bring coverage back through a Continuous Distribution/ Keep-Up Strategy. Therefore, as an interim measure prior to rolling out a national Continuous Distribution Mechanism (see below), the MoHSW, with GFATM funding, will implement a LLIN replacement campaign which will provide one LLIN for every two people living in a household. The campaign will be implemented in 22 of the 25 regions in Tanzania (not including the three regions in the Southern Zone where the School Net Programme is implemented. see below). It is expected that the campaign will be rolled out from 2014 to 2015.

1.2 Implement continuous distribution mechanisms to keep up coverage

[2] From the RBM Consensus Statement on Continuous Distribution Systems for Insecticide Treated Nets.

[3] Measured as one net for every two people.

[4] Measured as one net for every two people.

[5] NetCalc, http://www.networksmalaria.org/networks/netcalc.

Approximately 7 million new nets are needed annually in Tanzania, increasing to 8 million by 2020, to maintain LLIN coverage at 80%. Therefore a continuous distribution mechanism will be implemented nationally, starting one year after the mass replacement campaign. A detailed review of different keep-up strategies was conducted in 2011[6] to assess which continuous distribution mechanism(s) would be most feasible and cost-effective. This review showed that a combination of school-based distribution together with the existing TNVS will provide enough nets annually to sustain universal coverage. This combination model has the lowest cost per net delivered and the least number of excess nets. It also ensures continuity across geographical areas and over time. According to mathematical modelling, the combined approach of SNP and TNVS will reach 85% of the Tanzanian population. The model can be expanded to reach the remaining households without pregnant women or school children (e.g., by enabling these individuals to register with the schools for a free net). The continuous distribution approach and the individual mechanisms (i.e., SNP and TNVS) will be regularly monitored and evaluated. When and if necessary, the model will be adapted and revised.

The bulk of the LLINs required annually will be distributed to households through an annual SNP. This mechanism was piloted in the Southern Zone in 2013 and will continue to be implemented there prior to national roll out. As distributing an LLIN to each student would provide more nets than needed to maintain universal coverage, a staggered approach is taken whereby students in alternate classes (standards 1, 3, 5, and 7 and Form 2 and 4) receive a net annually As the child moves through the school system, he or she will bring home a new net every other year for redistribution within the household. The SNP pilot will inform the development of a national programme that will be implemented annually (pending positive evaluation of the SNP), starting one year after completion of the mass campaign.

1.3 Implement targeted distribution to vulnerable groups: Infants and pregnant women

While the SNP targets all community members, it does not specifically target the groups most biologically vulnerable to malaria—pregnant women, infants, and young children. Therefore a health facility-based distribution mechanism needs to be implemented in conjunction with the SNP to ensure that those most at risk from (severe) malaria are continuously protected and have access to an LLIN when they need it.

The TNVS is a public private partnership (PPP) that has been implemented on a national scale since 2004. Health facility providers give pregnant women a discount voucher during their first ANC attendance and tp caretakers of infants during the infant's 9-month measles vaccination. The voucher enables pregnant women and caretakers to buy an LLIN from a retail outlet for 500 Tanzanian Shillings. The TNVS optimizes the comparative advantages of the public and private sectors: The health system provides the subsidy and all necessary information to the beneficiaries, while the LLIN suppliers through a network of retail outlets carry out the distribution and sale of nets. The TNVS model is both a continuous distribution mechanism and a targeted distribution mechanism.

The TNVS model will be reviewed in the upcoming strategic planning period to address the supply and demand-side constraints of the programme. Key issues include ensuring that all public and private health facilities in the country participate in the programme, recruiting more retail outlets, and preventing voucher and LLIN stock outs. Further analysis of voucher uptake will be also assessed, including ability to pay, particularly amongst the lowest socioeconomic quintiles in the rural areas. The TNVS review will consider a stratified approach, especially in remote areas where voucher uptake is low, due to inability to pay and poor access to facilities and retail outlets.

1.4 Create an enabling environment to revive the commercial market for ITNs and LLINs

In the long term, the only economically sustainable approach to continuous LLIN distribution is the re-establishment of a viable commercial market for insecticide treated nets, at least in urban and peri-urban areas. A

[6] Tanzania Keep-Up Strategy Options: Options and recommendations for maintaining universal coverage with LLINs in Tanzania: 2012 – 2021. Final Report July 31, 2011; Hannah Koenker, Yosh Yukich, Alex Mkindi.

Choice and Competition policy was introduced as part of the TNVS programme in early 2013 to provide a wider range of LLIN sizes, shapes, and brands to both voucher recipients and commercial customers. However, the implementation of this policy is still in its infancy and has not yet yielded results. Further studies will be undertaken in 2014 to determine the realistic future potential commercial market in different areas as well as the extent to which the private sector can play a role in continuous distribution of LLINs. The analysis will also include consumer behaviour in terms of ability and willingness to pay (specifically in light of the availability of free or highly subsidized LLINs) as well as access of hard-to-reach and vulnerable populations to LLINs and recommendations at to most effective methods to reaching the poor.

Approximately 1.2–1.5 million untreated polyester nets are currently sold on the commercial market in Tanzania annually, without any intervention from programmes. NMCP will assess whether it is feasible to reintroduce retreatment kits in order to make these nets into ITNs and help maintain ITN coverage.

Outputs

Indicators	Baseline 2012	Mid-term 2016	Final 2020
Percentage of household population sleeping under LLINs.	67%	80%	80%
Number of LLINs distributed through the different distribution channels (SNP, TNVS and commercial market) annually	NA	7 million	8 million
Percentage of children sleeping under LLINs	71%	80%	85%
Percentage of pregnant women sleeping under LLINs	73%	75%	85%
Number of ITNs/LLINs sold commercially	NA	2 million	3 million

Strategic Approach 2: Consolidate and Expand Indoor Residual Spraying in Epidemiologically and Operationally Suitable Areas

The prerequisite of the current strategy will be to develop criteria for identifying areas that are epidemiologically and operationally suitable for IRS. Currently the evidence regarding the added value of combining the use of LLINs and IRS is inconclusive, particularly when coverage of either strategy is high. However, there are conditions under which a combined approach of LLINs and IRS is deemed beneficial particularly in focal areas with seasonal malaria transmission to pre-empt malaria epidemics; and areas with high levels of insecticide resistance. Mapping of local transmission patterns and potential will allow more targeted and focal spraying in these areas.

Strategic Interventions

2.1 Build capacity of local government authority and private sector to plan, manage, implement, and evaluate IRS
2.2 Application of quality IRS in selected areas

2.1 Build capacity of local government authority and private sector to plan, manage, implement, and evaluate IRS

The major focus of IRS will be to build implementation capacity at the council level. The capacity building plan will target council staff to enable them to plan, manage, implement, monitor, and evaluate IRS interventions in the respective councils. This process will involve a broad partnership of players from local governments, civil society, and the private sector.

2.2 Application of quality IRS in selected areas

Currently IRS is implemented in selected areas in 18 districts of the three regions of Lake Zone (Kagera, Mara, and Mwanza). IRS operations will be scaled up in selected focal areas in 43 districts, based on the following criteria: (1)

identified holo- and hyper-endemicity areas with perennial transmission and resilient to changes; (2) moderate and high prevalence areas with seasonal transmission; (3) areas with high levels of insecticide resistance (especially pyrethroids); (4) areas with increased risk of epidemics; and (5) focal areas in the Lake Zone where IRS has historically been implemented. Using the malaria risk map it has become possible to locate the target areas more accurately so that IRS operations can be more focused and precise. The proposed IRS scale up entails a geographical expansion, with an increase in target areas. However, the total number of households sprayed will remain similar to the current levels (i.e., approximately 14% of households in mainland Tanzania).

The focus of implementation will be on ensuring optimum coverage, in space (houses sprayed) and frequency of spray rounds (in accordance with the residual effect of the insecticide used). To preserve optimal protection with LLIN which are currently treated with pyrethroids, NMCP recommends the exclusive use of insecticides with different mode of action to that of pyrethroids for IRS, such as organophosphate and carbamates.

Standard Operating Procedures will be developed for the IRS implementing councils to provide quality IRS The Standard Operation Procedures (SoPs) will outline the procedures to be followed for quality IRS including; monitoring of spray procedures in the field; monitoring of effectiveness of spray by conducting cone bioassay and apply insecticides quantification kits.; human safety and environmental compliance. Exit strategies will be planned well in advance, even at the start of the implementation in selected areas.

Outputs

Indicators	Baseline 2012	Mid-term 2016	Final 2020
Number of councils capacitated to deliver quality IRS services	**18**	**43**	**43**
Percentage of house structures sprayed in the IRS targeted areas out of the total eligible	**85%**	**90%**	**95%**

Strategic Approach 3: Implement larviciding to complement core interventions (LLINs and IRS) in targeted communities

Larviciding is an appropriate method to control mosquitoes in their larval stage by applying larvicides or biological products in breeding sites with first to third larval instars of *Anopheline* mosquito. Larviciding offers the additional advantage of targeting other vectors and contribute to control of other vector-borne diseases transmitted by mosquitoes (viruses and lymphatic filariasis). Evidence[7] suggests that larviciding, particularly in combination with environmental modification, could also potentially help reduce selection pressure in areas where it is applied on a large scale and contribute to the management of insecticide resistance. Larviciding is potentially an effective tool in addition to LLINs and IRS since it will attack both indoor and outdoor biting *An. arabiensis* or secondary malaria vectors, which are less anthropophilic and sustain low malaria transmission after high LLIN/IRS coverage.

As per WHO guidelines, larviciding is only recommended in areas where mosquito breeding sites are few, fixed, and findable, as a supplement to the core vector control interventions of LLINs and IRS. The ideal situation for larviciding application is in high-population density areas, where breeding sites are easily recognized and mapped.

Strategic Interventions

3.1 Application of larvicides where mosquitoes breeding sites are few, fixed, and findable
3.2 Promote larviciding application by the private sector in suitable environment and civil works sites

[7] Large-scale use of mosquito larval source management for malaria control in Africa: a cost analysis; Worrall E, and Fillinger U; Malaria Journal 2011 10: 338.

3.3 Establish a system for monitoring larva density in areas where larviciding is applied

3.1 Application of larvicides where mosquitoes breeding sites are few, fixed, and findable

The GoT is constructing a bio-larviciding production plant, which is expected to be operational by 2014. The plant is capable of producing 6 million litres per annum and will be the main source of the biolarvicides in the country. Currently the MoHSW is implementing larviciding activities in three municipalities out of 23 municipal councils in Tanzania. The intention is to gradually scale up larviciding to 11 municipal councils in 2016 to all 23 in 2020, using biolarvicides produced in Tanzania. NMCP will provide training and oversight to the LGAs to plan, manage, and monitor larviciding activities in the selected areas, with participation from the communities. Councils will be encouraged to include the operational costs in their Comprehensive Council Health Plans.

3.2 Promote larviciding application by the private sector in suitable environment and civil works sites

NMCP will work with the private sector (including large-scale mining and industrial companies, hotels, and construction companies) to encourage the implementation of larviciding operations in their respective premises/compounds.

3.3 Establish a system for monitoring larva density in areas where larviciding is applied

In all operation areas where larviciding is introduced, a continuous system for monitoring larva density will be established in collaboration with the respective councils. All the process of monitoring and evaluation of any larviciding operation will be coordinated by the National Malaria Control Programme.

Outputs

Indicator	Baseline 2012	Mid-term 2016	Final 2020
Proportion of city and municipal councils implementing larviciding	3/23	11/23	23/23
Number of advocacy and coordination initiatives targeting the private sector companies/institutions on proper use of larviciding	NA	6	12
Proportion of city and municipal implementing councils with on-going larva monitoring	NA	80%	80%

Strategic Approach 4: Promote Environmental Management amongst Targeted Communities

Environmental management is one of the sustainable methods for malaria vector control, and it embraces environment modification, environmental manipulation, and manipulation of human habitation. The principal role of environmental management is to reduce malaria transmission by attacking local vector mosquitoes and will require an understanding of the ecology of the species.

Strategic Interventions

4.1 Promote community-led environmental initiatives in selected urban wards
4.2 Promote environmental measures in all infrastructure development projects

4.1 Promote community-led environmental initiatives in selected urban wards

Reduction of vector breeding sites will be carried out either through physical reduction or alteration of mosquitoes breeding sites (e.g. marsh alteration, ditching, impoundment, basic sanitary measures, filling ground and drainage, house screening and brick pits, and barrier planting). The implementation of environment management measures will depend on the fullest understandings of the mosquito ecology and population dynamic as well as the malaria epidemiology. Identification of vectors habitats and mapping must therefore be intensified in order that the attack

may be made on a sound basis. In urban and peri-urban areas, NCMP will encourage local authorities to take a leading role in the implementation of environmental measures through planning, regulation and engaging community and other stakeholders.

4.2 Promote environmental measures in all infrastructure development projects

NMCP shall also coordinate and collaborate with different stakeholders (public and private) as well as regulatory agencies such as the National Environmental Management Council (NEMC) and develop guidelines on the implementation of environmental management measures. Environmental management can be an integral part of any developmental project such as road construction, irrigation scheme development, and even hydroelectric power stations; when poorly planned or designed, such projects can potentially exacerbate the proliferation of mosquito vectors.

Outputs

Indicators	Baseline 2012	Mid-term 2016	Final 2020
Proportion of urban wards capacitated to deliver effective environmental measures	**NA**	**25%**	**50%**
Number of advocacy and coordination initiatives targeting the infrastructure development projects on adoption of appropriate environmental measures	**NA**	**6**	**12**

Strategic Approach 5: Continuously assess the evidence-base on IVC innovations and introduce new tools that address insecticide resistance and changing vector behaviour where and when feasible

It is unlikely that current vector control methods alone can eliminate malaria because none of the existing tools have proven to sustain an annual EIR less than one[8], especially in endemic countries such as Tanzania where transmission rates are very high. As a result of the scaling up of LLINs and IRS, there has been a shift in malaria vector species composition, resulting in a proportional increase of outdoor and early biting vectors. Addressing the residual transmission by these vectors requires different control strategies, which might also be based on reducing host-vector contact or targeting other key environmental resources. In addition, the threat of insecticide resistance could reverse the gains made in malaria vector control so far in Tanzania, and management of emerging resistance is critical. A range of new tools is being developed and tested, and these need to be continuously assessed for potential use in Tanzania

Strategic interventions

5.1 Actively participate in regional and international vector control partnerships and apply new evidence-based tools for malaria control in Tanzania
5.2 Implementation of insecticide resistance management plan

5.1 Actively participate in regional and international vector control partnerships and apply new evidence-based tools for malaria control in Tanzania

8 'Using the entomological inoculation rate to assess the impact of vector control on malaria parasite transmission and elimination'; Ayesha M Shaukat, Joel G Breman and F Ellis McKenzie; Malaria Journal 2010, 9:122

The Roll Back Malaria Vector Control Working Group (RBM-VCG)[9] is a main coordinating body which meets annually to discuss new developments. Also, the Pan African Mosquito Control Association (PAMCA) is a newly formed organisation which is expected to play a key role in integrated vector control in Africa. NMCP will actively engage with and participate in meetings with these and other relevant organisations to collect and share evidence on potential new tools.

5.2 Implementation of insecticide resistance management plan

NMCP has developed an Insecticide Resistance Management Plan (IRMP) based on the WHO Global Plan for Insecticide Resistance Management (GPIRM). The key objective of the IRMP is to preserve insecticides susceptibility, slow down the evolution of resistance, and prolong the effectiveness of current vector control interventions. Regular insecticide resistance monitoring is a key element of the IRMP. The key strategies in the IRMP are judicious use and operational quality rotations, mosaics, combinations, and mixtures of insecticides for IRS, as well as promotion of new tools such as combination LLINs (using a mixture of pyrethroid insecticide and synergist) which have an increased efficacy against the pyrethroid-resistant malaria vectors, and also durable wall lining which with mixtures of different classes of insecticides. As these and other innovations become available, NMCP will continue to review and assess these tools for suitability for IVC in Tanzania.

Outputs

Indicators	Baseline 2012	Mid-term 2016	Final 2020
Number of annual regional and/or international meetings in which Tanzania participated and presented field evidence	NA	1	2
Insecticide susceptibility tests conducted in national representative sentinel sites	28	30	33

Component 2: Malaria Diagnosis, Treatment, Preventive Therapies and Vaccine

Tanzania is transitioning from malaria meso-endemicity to hypo-endemicity. The current malaria epidemiological pattern has several implications on management of suspected malaria cases and on preventing severe morbidity in specific vulnerable population groups. This component of the strategic plan aims to ensure that symptoms and signs of malaria in the general population are recognized early and that appropriate management is provided promptly at the individual, family, community, and facility levels. Appropriate management of suspected malaria cases is based on provision of quality diagnostic and therapeutic services. Additionally, the component comprises the provision of preventive therapies services for populations at risk of malaria, such as infants and children, pregnant women, people living with HIV/AIDS, and non-immune travellers. Emphasis on appropriate malaria case management services is also advocated for special population groups (e.g., refugees, migrants, the poor) and for specific operational, epidemiological, and emergency situations (e.g., urban areas, areas underserved by health services, malaria seasonal transmission, and malaria outbreaks).

Strategic Objective and Target

Strategic Objectives

9 www.rbm.who.int/mechanisms/vcwg.html

To prevent the occurrence of severe morbidity and mortality related to malaria infection through promotion of universal access to appropriate early diagnosis and prompt treatment and provision of preventive therapies in vulnerable groups			
Target	**Baseline 2012**	**Mid-term 2016**	**Final 2020**
Case Fatality Rate in patients admitted due to severe malaria (%)	3%	2%	<1%

Specific Objectives and Outcomes

The following specific objectives will be achieved:

1.	All people with signs and symptoms of malaria are able to access appropriate and timely malaria diagnosis
2.	All people who have malaria are able to access appropriate and timely treatment
3.	Biological and socio-economical population vulnerable to malaria has access to services to reduce the risk of malaria infection and its complications
4.	Commodities used in patient care and prevention are consistently available at the points of care and are consistently quality assured
5.	Appropriate malaria case management interventions are deployed in malaria epidemics and other emergency and resurgence situations

The expected outcomes for the above objectives are as follows:

Indicator	Baseline 2012	Mid-term 2016	Final 2020
% of U5 children with fever who had a malaria test the same or next day after onset of a disease	25%	80%	80%
% children under age 5 with fever who were treated with recommended ant malarial the same or next day following the onset of fever	33%	60%	80%
% of women with live birth in the previous two years who received two doses or more of SP (IPTp2+)	32%	80%	80%
Proportion of public healthcare facilities with no stock outs of both antimalarials and mRDTs	NA	90%	90%
Proportion of emergency situation in which specific malaria case management interventions have been implemented	NA	80%	90%

Strategic Approaches and Interventions

The case management component will focus on 5 strategic interventions:

- Provide universal access to quality malaria diagnosis to guide appropriate treatment
- Provide universal access to quality malaria treatment
- Reduce vulnerability to malaria infection among defined risk groups
- Provide appropriate logistics arrangements for quality malaria case management commodities procurement and supply chain
- Reduce risk of severe morbidity and mortality due to malaria in emergency situations

Strategic Approach 1: Provide Universal Access to High-Quality Malaria Diagnosis

Prompt, accurate diagnosis of malaria is part of an effective disease management strategy. In light of decreasing malaria prevalence, there is even greater need to increase access to high-standard, affordable, and-quality diagnosis for malaria at all healthcare levels in both the private and public sectors to combat overtreatment of suspected malaria and target ACTs to true malaria cases. Therefore, all suspected malaria cases in all epidemiological, operational and population-based malaria control strata must be confirmed by a diagnostic test as recommended by national diagnosis and treatment guidelines. In particular, mRDTs are used to increase access and coverage of malaria diagnostics at all levels of the healthcare delivery system.

The focus of the current strategy will be to achieve and maintain high coverage of parasitological diagnosis of malaria by ensuring that in both public and private facilities that: (1) highly sensitive and specific malaria test methods are available; (2) providers skilled in malaria testing are available; and (3) that the malaria testing services are of a high quality. Behaviour change communication (BCC) will play an important role in encouraging patients to seek a confirmatory diagnostic test before treatment, and healthcare providers to adhere to the test results (these activities are covered in component 3 below).

Strategic Interventions

1.1 Provide high-standard, accessible, affordable, equitable, and quality-assured testing for patients seeking treatment in the public sector
1.2 Facilitate the provision of high-standard, accessible, affordable, and quality-assured testing to patients seeking treatment in the private sector
1.3 Provide quality-assured testing services from skilled providers
1.4 Ensure quality testing services through quality assurance of the diagnostic sites and tests used
1.5 Introduce evidence-based, innovative diagnostic tools for malaria detection and differential diagnosis of other pathogens causing febrile illnesses

The current strategy focuses on the following implementation priorities

1.1 Provide high-standard, accessible, affordable, equitable, and quality-assured testing for patients seeking treatment in the public sector

NMCP and its partners will make sure that only high-standard, highly sensitive, and specific diagnostics will be selected for use in public health facilities. To improve continuous accessibility to diagnostics, the supply chain and logistics system will be strengthened, from quantification and procurement process up to delivery and to service points. Through global partnership mechanisms, NMCP will ensure that malaria diagnostics are affordable for patients attending public healthcare facilities.

1.2 Facilitate the provision of high-standard, accessible, affordable, and quality-assured testing to patients seeking treatment in the private sector

NMCP and its partners will aim to broaden access to diagnostic by establishing alternative malaria testing points outside of formal healthcare facilities. Accredited Dispensing Drug Outlets (ADDOs) and community-based services will be empowered to test suspected malaria patients, if required. A regulatory framework will be set up to allow malaria testing in non-conventional diagnostic outlets. An appropriate M&E system will be introduced to verify adherence to SOPs. Accessibility and affordability of quality diagnostics will be promoted in the private sector by facilitating the procurement of quality diagnostic devices at subsidized/low costs through the global partnership.

1.3 Provide quality-assured testing services from skilled providers

Throughout the strategic period, NMCP and its partners will develop and implement a continuous training, supervision, and quality assurance plan to improve the adherence of healthcare providers to the SOPs.

1.4 Ensure quality testing services through quality assurance of the diagnostic sites and tests used

An accreditation and certification scheme to all laboratory services and laboratory staff will be strengthened in collaboration with the MoHSW diagnostic services section. Quality assurance of diagnostics equipment, reagents, and devices will be carried out in collaboration with global and national institutions. An innovative, district-based malaria test quality assurance scheme to monitor quality mRDT performances will be developed and scaled up during the first three years of the implementation of this strategic plan. Lastly, the national malaria reference laboratory, established within the National Health Laboratory and Quality Assurance Training Centre (NHLQATC) will be strengthened to consistently assist the NMCP in quality improvement of malaria microscopy.

1.5 Introduce evidence-based, innovative diagnostic tools for malaria detection and differential diagnosis of other pathogens causing febrile illnesses

Improved access to quality malaria diagnostics will be associated with introduction of fever management schemes and, eventually, innovative diagnostic tools to detect other pathogens and to facilitate differential diagnosis at all levels. Innovative malaria diagnostic technique will be explored, assessed in collaboration with research institutions, and eventually promoted if adequate and affordable.

Outputs

Indicators	Baseline 2012	Mid-term 2016	Final 2020
Proportion of suspect malaria cases tested in the public healthcare delivery sector	58%	80%	90%
% of private facilities that have QA mRDT service available	NA	40%	80%
% of malaria test performers in public & private sector who attend a training in past three years	59%	80%	80%
% of facilities that pass laboratory accreditation	NA	90%	90%
Number of evidence based innovative diagnostic tools introduced	0	2	4

Strategic Approach 2: Provide Universal Access to High-Quality Malaria Treatment

Early effective treatment of malaria patients remains the most important intervention in terms of its contribution in preventing mortality and reducing the incidence of severe illness. It is known that the majority of children who die from malaria do so within 48 hours of onset of illness, and referral to a healthcare facility can take several days. Studies have also shown that treatment of more than 70% of febrile illnesses is managed at home. Nationally representative surveys (TDHS & THMIS) indicate that access and utilisation of treatment with the recommended antimalarials within 24 hours after the onset of fever by children less than 5, has not improved for the last 10 years and is currently around 21% (THMIS 2011-2012). Countrywide, ACTs have been used by 2/3 patients treated with antimalarials.

The national guidelines for malaria diagnosis and treatment define the diagnostics and therapeutics of choice, the recommended clinical procedures, and their application at various levels of the healthcare delivery system in public, private, and community-based sectors. The guidelines are updated according to the status of therapeutic efficacy of antimalarials and evidence-based development of innovative diagnostics. The periodic revision of the guidelines is coordinated by NMCP and is carried out by an *ad hoc* task force. The National Therapeutic Committee is the MoHSW body responsible for approval of the proposed therapeutic options. The current strategy aims to

increase the access to quality treatment by making ACTs more readily available in private sector facilities and communities, in addition to public facilities. BCC will be used to encourage patients to use recommended antimalarials and complete the dose.

The following strategic interventions are proposed to achieve this.

Strategic Interventions

2.1 Provide highly efficacious, accessible, affordable, equitable, and quality-assured antimalarials to patients seeking treatment in the public sector
2.2 Facilitate the provision of accessible, affordable, and quality-assured antimalarials to patients seeking treatment in the private sector
2.3 Provide high-quality case management of fever services from skilled providers
2.4 Provide equitable access to malaria diagnosis and treatment by creating an integrated community case management system for communities that are underserved by other health outlets

The current strategy focuses on the following implementation priorities:

2.1 Provide highly efficacious, accessible, affordable, equitable, and quality-assured antimalarials to patients seeking treatment in the public sector

The strategic direction for malaria treatment is to continue to ensure that the recommended antimalarials, with high efficacy profile, are available to patients seeking treatment in the public healthcare facilities. The supply chain and logistic system will be improved from quantification and procurement process up to delivery to service points. To increase equitable access to health services, the Government of Tanzania's is implementing the Primary Health Services Development Programme (*Mpango wa Maendeleo Afya ya Msingi* - MMAM) The MMAM is planning to establish first level health care facilities in all villages of the country.

To improve affordability, treatment with ACTs will continue to be free in the public facilities for vulnerable groups, while efforts will be made to encourage the private for-profit sector to provide ACTs at the lowest possible price, as well as ensuring the quality of commodities.

2.2 Facilitate the provision of accessible, affordable, and quality-assured antimalarials to patients seeking treatment in the private sector

The Affordable Medicine Facility for malaria (AMFm) experiences (2010–2013) showed that the market for quality assured ACTs in the private sector is significantly larger than was expected. With a high level of presumptive treatment of suspected malaria it will be challenging to saturate the market with affordable ACTs. Furthermore, the gap is filled by continued sale of ineffective antimalarial medicines. In the course of implementation of this strategic plan, subsidized ACTs must be better targeted to those with malaria, and work is still needed to remove less effective treatments from the marketplace. To improve affordability, NMCP will encourage the private for-profit sector to provide ACTs at the lowest possible price as well as ensure the quality of commodities. To increase accessibility to quality ACTs, the expansion of Accredited Drug Dispensing Organisations (ADDOs) coverage will be encouraged.

2.3 Provide high-quality case management of fever services from skilled providers

Health care service providers' capacity for differential diagnosis and management of fever cases will be strengthened at all level of health care delivery system. A key element in this approach is that health care workers provide or prescribe ACTs for malaria treatment only for those cases with a positive malaria diagnostic test. Health workers should use other diagnostic tests and clinical signs and symptoms to determine other causes of illness in

those fever cases that test negative for malaria. Health worker competencies will be enhanced in this area through several initiatives including: (1) specific uncomplicated and severe malaria management training; (2) diagnosis and management of febrile conditions; (3) supporting IMCI training and, (4) supportive supervision for in service and pre service staff.

2.4 Provide equitable access to malaria diagnosis and treatment by creating an integrated community case management system for communities that are underserved by other health outlets

To address the problem of physical and financial access, and to ensure prompt and effective treatment, this strategy incorporates home-based management of malaria. Home malaria management (HMM) is one of the recommended strategies for improving access to prompt and effective treatment of malaria episodes, which makes use of trained community members living as close as possible to where the patients live. The focus of this effort will cover the community services gap in underserved communities, especially in rural areas by introducing an integrated community case management package that will include health education, testing (mRDT), medicines for treatment of uncomplicated malaria (ACT), treatment support, and, eventually, pre-referral care of patients.

Outputs

Indicators	Baseline 2012	Mid-term 2016	Final 2020
% of public facilities that have no QAACT stock out continuous for one week in the last 3 months	74%	80%	95%
% of private facilities have recommended antimalarials available	66%	80%	95%
Proportion of public and private HF with at least one provider trained in fever case management in the past three years	59%	80%	80%
% of targeted villages where an ICCM system is established	NA	25%	50%

Strategic Approach 3: Reduce Vulnerability to Malaria Infection and Its Complications amongst Specific At-Risk Populations

The population groups most vulnerable to malaria infection and its complication are (1) infants and children who have not yet developed partial immunity to malaria; (2) school-age children, who are becoming more susceptible to malaria infection due to the changing malaria epidemiology, especially in low transmission areas; (3) pregnant women whose immunity is decreased by pregnancy, especially during the first and second pregnancies; (4) sickle cell anaemia patients, due to the risk of a severe form of malaria and associated deaths; (5) people living with HIV/AIDS due to the acquired immunodeficiency and higher risk of infection; and (6) travellers or migrants who come from areas with little or no malaria transmission and therefore have very low or no immunity.

All of these groups need to have their vulnerability to malaria infection reduced. Chemoprevention and prophylaxis are currently viable options for some of them, and vaccines are still under development and may become an option in a later stage of the strategic plan implementation. Other malaria prevention measures, especially the use of LLINs, should be advised to all vulnerable groups.

The impact of malaria on a pregnant woman and her foetus differs with the intensity of malaria transmission but in all cases represents a significant burden on the health of mother and child. To reduce maternal morbidity and mortality and improve the new-born's chances of survival, malaria in pregnancy will remain an essential part of the malaria control strategy. The 2010 TDHS showed that although approximately 70% of women come early enough and frequently enough to receive two doses of SP, IPTp2 coverage has essentially remained constant at about 27% (30% in the THMIS 2007, 22% in the TDHS 2005). Over the past few years of implementation, in addition to having

low numbers of trained service providers with good interpersonal skills and recording practices, a significant bottleneck to successful provision of IPTp has been frequent stock outs of SP at facility level.

Strategic Interventions

3.1 Increase the uptake of IPTp2+ to reduce vulnerability in pregnancy
3.2 Reduce vulnerability among other vulnerable groups: people with sickle cell, people with HIV, non-immune travellers, and infants
3.3 In the event of the introduction of a malaria vaccine, the country is able to rapidly scale up its use

3.1 Increase the uptake of IPTp2+ to reduce vulnerability in pregnancy

The focus of the strategy will be to increase the number of women accessing IPTp2 through (1) improved supply chain management of SP; (2) IPTp administration at each scheduled ANC visit; (3) improved capacity of healthcare providers through training and supervision; and (4) improved frequency of ANC attendance. Pregnant women attending ANC also will be encouraged to take medicine to prevent anaemia and will be targeted to increase their access to LLIN through discount voucher or alternative schemes. Pregnant women living with HIV/AIDS should follow the PMCTC and NMCP guidelines and should take daily co-trimoxazole preventive therapy.

3.2 Reduce vulnerability among other vulnerable groups: people with sickle cell, people with HIV, non-immune travellers, and infants

Reduction in vulnerability of infant and young children through the introduction of malaria vaccine is an attractive public health initiative, and its introduction will be assessed and considered during the implementation of this strategic plan. Currently, infants and young children in areas with pronounced malaria seasonal transmission may be targeted by Seasonal Malaria Chemoprevention (SMC). Both malaria vaccine and SMC are priority in the operational research agenda and will be eventually introduced in the public health system if operational research will provide evidence for their effective and safe utilization. Currently, there are no effective chemoprophylaxis options for sickle cell anaemia patients. Due to their vulnerability to severe malaria, the most important approach to decrease their susceptibility is early diagnosis and treatment. Researchers should be encouraged to provide evidence on alternative medicines for malaria prophylaxis. Preventive therapies should target people living with HIV/AIDS are targeted in accordance with National AIDS Control Programme (NACP) and NMCP guidelines. Travellers or migrants coming from areas with little or no malaria transmission are advised to take malaria-suppressive prophylaxis.

3.3 In the event of the introduction of a malaria vaccine, the country is able to rapidly scale up its use

NMCP will promote a consultative process with partners to set up innovative intervention delivery within the healthcare system.

Outputs

Indicators	Baseline 2012	Mid-term 2016	Final 2020
% of pregnant women who receive IPTp2+	**NA**	**60%**	**80%**
% of HIV eligible cases receiving CPT	**NA**	**50%**	**75%**
Preliminary plans established for introduction of vaccine	**NA**	**NA**	**NA**

Strategic Approach 4: Provide Appropriate Logistics Arrangements for Continuous Availability of Quality-Assured Malaria Case Management Commodities

Uninterrupted supply of malaria medicines and diagnostics is essential to provide quality healthcare for suspect malaria patients and, eventually, to avoid unnecessary deaths. A number of partners are involved in malaria commodities supply chain: (1) national institutions involved in quantification, registration, quality assurance, pharmacovigilance, storage and distribution such as National Malaria Control Programme, Pharmaceutical Service Section (PSS), Tanzania Food and Drug Authority (TFDA), Pharmacy Council (PC), Medical Store Departments (MSD), Private Health Laboratory Board (PHLB), National Health Laboratory and Quality Assurance Training Centre (NHLQATC); (2) district and health facilities teams, responsible for efficient commodities requisition and reporting.; and (3) global level funding initiatives (GFATM, PMI), procurement agencies (Voluntary Pooled Procurement - VPP) and quality assurance mechanisms (GMP certification).

Standardized paper-based and electronic platforms (ILS and e-ILS) are used to facilitate and control the management supplies at healthcare facility, council, and MSD level. Mobile phone based platforms, currently SMS for life (SfL) and ILS gateway (ILSg), are also contributing to real time assessments of the supply chain.

Several bottlenecks have been identified in the procurement and supply chain of case management commodities: (1) late release of funds from global funding initiatives due to delay in submission and approval of reporting requirements; (2) long and cumbersome procurement process; (3) delay in delivery goods from manufacturers; (4) complex and lengthy logistics to distribute commodities from MSD central to zonal stores; (5) failure to submit appropriate requisition from healthcare facilities; and (6) erratic supply chain from zonal MSD to district and consequently to healthcare facilities. Interrupted supply chain cycle resulting in frequent commodities push delivery and failure to respond to the critical situation were the consequent outcomes resulting in frequent stock outs.

Strategic Interventions

4.1 Facilitate malaria commodities procurement process as indicated by the comprehensive annual quantification through the provision of timely ordering and clear delivery schedule to the selected procurement agency
4.2 Improve logistic information system to facilitate the commodities supply chain from MSD to healthcare facilities and to respond to stock-outs
4.3 Eliminate counterfeit, suboptimal, substandard products through monitoring and regulation reinforcement

5.1 Facilitate malaria commodities procurement process as indicated by the comprehensive annual quantification through the provision of timely ordering and clear delivery schedule to the selected procurement agency

NMCP intends to work with global, regional, and national institutions, implementing partners, and agencies to eliminate the identified supply chain bottlenecks and to maintain a constant flow of essential malaria diagnosis and treatment commodities to all healthcare facilities in the country. The current strategy focuses on the following implementation priorities: (1) perform semi-annual adjusted consumption-based quantification for all antimalarials and diagnostics in collaboration with PSS, MSD, and implementing technical partners; (2) maintain efficient logistics for appropriate storage and timely transportation and delivery of malaria commodities to public health facilities through the delegated country authority (MSD); (3) improve management of the supply chain through improved capacity of healthcare workers; and (4) maintain private-sector access to affordable and quality facilities for malaria case management by facilitating low-cost/subsidized schemes through global partnerships.

5.2 Improve logistic information system to facilitate the commodities supply chain from MSD to healthcare facilities and to respond to stock-outs

Multiple partnerships will be promoted to improve the malaria commodities information system: (1) at the MSD level, NMCP and partners will constantly monitor the flow of information, expected shipments, received goods, stock levels, and distribution to zonal stores and healthcare facilities; (2) at the NMCP level, a system to monitor accessibility and availability of malaria commodities will be consolidated and used through the existing electronic platforms (SMS for Life [SFL] and integrated logistics system [ILS] gateway) and regular stock verification at the zonal MSD level; (3) at district and health facility levels, specific, periodic surveys will be promoted to monitor the efficiency of the logistic system in the public and private sectors. The current and anticipated initiatives will include (1) end-use verification surveys; (2) assessment of service provision at healthcare facilities; (3) spot-checks at all levels of the supply chain; and (4) batch tracking surveys. Specific periodic surveys will be promoted to monitor the efficiency of the logistic system in the public and private sectors.

PSS and NMCP, in collaboration with implementing partners, will promote and maintain a system for ordering, supply, accounting, and loss of malaria commodities.

4.3 Eliminate counterfeit, suboptimal, substandard products through monitoring and regulation reinforcement

NMCP, through national regulatory authorities (Tanzania Food and Drug Authority [TFDA], Private Health Laboratory Board (PHLB), Pharmacy Board (PB), NHLQATC) will ensure that a continuous quality assurance system is in place and it is properly running. Dissemination of the information will be assured through the existing governance arrangements.

Outputs

Indicators	Baseline 2012	Mid-term 2016	Final 2020
Proportion of malaria commodities received according to the annual delivery schedule	**NA**	**80%**	**80%**
SfL reporting rate	**75%**	**80%**	**80%**
% of products assessed which are found to be counterfeit/ suboptimal/ substandard	**0**	**0**	**0**

Strategic Approach 5: Reduce Risk of Severe Morbidity and Mortality Due to Malaria in Emergency Situations and Defined Epidemiological and Operational Settings

The changed epidemiology of malaria in Tanzania presents a few scenarios were malaria case management should be delivered with different modalities compared to the conventional, individual-based approaches presented above: (1) resurgence of malaria transmission in areas previously controlled, (2) incumbent malaria epidemics, and (3) identified persistent transmission foci in areas of extremely low transmission. Response to the above epidemiological circumstances should be considered in the implementation of this strategic plan.

Strategic interventions

5.1 Select and provide appropriate community level mass fever screening, test and treatment initiatives as response to emergency situation
5.2 Implement malaria patients follow up and active case detection in identified transmission foci in low endemic areas

The following implementation priorities should be focused:

5.1 Select and provide appropriate community level mass fever screening, test, and treatment initiatives as response to emergency situation

Following a malaria epidemic detection, investigation, and notification, an appropriate case management approach will be established to mitigate the effects of the epidemic in the community, especially occurrence of severe morbidity and mortality. The recommended community-level case management interventions are included in the malaria diagnosis and treatment guidelines and in the malaria surveillance and response guidelines. Health management councils and healthcare facilities teams in the identified epidemiological areas will be adequately trained and supported by NMCP and partners**.** Contingency malaria commodities stock will be established at the appropriate level.

5.2 Implement malaria patients follow-up and active case detection in identified transmission foci in low endemic areas

Malaria patients in areas with extremely low transmission malaria cases will be adequately followed up and a system of active case detection will be established.

Outputs

Indicators	Baseline 2012	Mid-term 2016	Final 2020
Proportion of mass fever screening and testing initiatives undertaken as response to emergency situation	NA	50%	75%
Proportion of targeted people actively screened and treated	NA	50%	75%

Component 3: Behaviour Change Communication and Advocacy

The BCC and Advocacy Strategy support the implementation of the technical strategies. BCC promotes positive behaviour for prevention, health seeking, and treatment and enables community members to make informed choices that will result in improved health and more effective services. This is only possible if the environment in which communities function is conducive (i.e., quality services are available; pro-malaria policies and guidelines are in place; plans and budgets include all necessary interventions for malaria control; the social and cultural norms encourage positive behaviour; communities initiate and take action to control malaria; and individuals have the right knowledge and mind-set to take appropriate action).

The primary audiences for the BCC interventions are the populations for whom the primary behaviour change is expected to take place. These populations include people living in all transmission strata. Where needed, interventions will be tailored to address specific needs in different sub-groups, taking into account specific vulnerability, regional variations, and differences between urban and rural populations, level of education, and wealth quintile. The secondary audiences of the BCC strategy are all those who influence the primary audience and those who are instrumental in creating an environment conducive for action, including policy- and decision-makers, teachers, healthcare workers, and community leaders. The BCC strategy targets both primary and secondary audiences, using a range of communication channels, including mass media, community outreach, and interpersonal communication.

Strategic Objective and Target

Strategic objective:			
To create an enabling environment where individuals and household members are empowered to minimize their own malaria risk and seek proper and timely malaria-treatment if and when needed			
Impact indicator	**Baseline 2012**	**Mid-term 2016**	**Final 2020**

Proportion of caretakers who are able to take actions to protect their children from malaria	82%	85%	90%

Specific Objectives and Outcomes

The following specific objectives will be achieved:

1. Community members of all age groups in all strata understand the malaria risk to themselves and their families, as well as the appropriate action they should take for malaria prevention and treatment-seeking
2. Vulnerable groups with increased risk of malaria infection and complication understand and accept their specific situation and are empowered to access the relevant preventive therapy, treatment, and care
3. Communities are actively involved in creating and promoting positive social norms about healthy behaviours around malaria prevention, treatment, and care and are initiating and implementing community-based malaria control interventions
4. Public and private sector stakeholders are actively promoting and implementing the national malaria control strategies within their "sphere of influence" and agreed target areas in a coordinated and harmonized manner
5. The political will and commitment to combat malaria is translated into actionable plans and budgets

The expected outcomes for the above objectives are as follows:

Outcome Indicator	Baseline 2012	Mid term 2016	Final 2020
Proportion of population (disaggregated by age and sex) with knowledge of ways to avoid and treat malaria	92%	92%	92%
Proportion of women 15-49 years who know pregnant women are at higher risk of getting malaria	90%	90%	90%
% of women who state that malaria is the most serious health problem in the community	67%	70%	75%
% of CCHPs that include malaria interventions and budgets	14%	50%	80%
Small scale and local initiatives planned and budgeted	NA	5	10

Strategic Approaches and Interventions

The five strategic approaches to reach the strategic objectives are:

1) Reinforce and update knowledge amongst community members and promote desired behaviours
2) Increase knowledge amongst vulnerable groups about their specific malaria risk and the prevention and treatment options available to them
3) Influence social norms about healthy behaviours around malaria prevention and care and encourage community-based action
4) Create strong BCC partnership amongst public and private sector stakeholders to maximize efforts, ensure consistency in approach, and avoid duplication
5) Raise the profile of malaria amongst policy and decision makers at all levels so that national, regional and district plans include appropriate interventions and sufficient budget to implement the malaria strategy

Strategic Approach 1: Reinforce and Update Knowledge Amongst Community Members and Promote Desired Behaviours

General awareness of malaria and understanding of prevention are almost universal in Tanzania, and positive attitudes towards malaria control are prevalent. The focus of the BCC will build on pre-existing knowledge, reinforce understanding of desired behaviours, and promote action by community members through interpersonal communication. The main entry point to the households will be through the existing ward and village structures, (including village healthcare workers, health assistants, and Community Change Agents), health facilities, and schools. The interpersonal communication will focus on changing attitudes and encouraging positive behaviours. The content of the messaging will be determined by the two technical strategies of malaria prevention and case management, described above.

Strategic Interventions

1.1 Improve capacity of healthcare workers to effectively provide accurate and relevant information to patients on desired behaviours for malaria prevention and treatment
1.2 Improve capacity of ward- and village-level health staff and extension workers to effectively provide accurate and relevant malaria information in their interaction with community members

1.1 Improve capacity of healthcare workers to effectively provide accurate and relevant information to patients on desired behaviours for malaria prevention and treatment

Healthcare workers are a crucial source of information, especially amongst the lowest wealth quintiles and those with the lowest level of education. NMCP will add a BCC component into all existing malaria training programmes provided to healthcare workers. This effort will ensure that BCC is fully integrated into the two key technical strategies and becomes an integral part of interactions between healthcare workers and patients.

Similarly, school teachers are an ideal entry point to reach young people with malaria messaging. NMCP will work in collaboration with the School Health Programme to ensure that updated malaria information is included in the teacher training and school curriculum.

1.2 Improve capacity of ward- and village-level health staff and extension workers to effectively provide accurate and relevant malaria information in their interaction with community members Building on exiting community outreach programmes, village and ward staff will be trained on appropriate malaria messaging and effective communication methods. The training will be done through a cascade system involving NGOs, district councils, and CBOs. A range of communication materials on malaria messaging has already been developed which will be updated and further elaborated. These materials will be provided to the village and ward staff to use during household visits and village meetings.

Output

Indicators	Baseline 2012	Mid-term 2016	Final 2020
Proportion of health facilities with health staff trained on providing relevant malaria BBC information to patients	**NA**	**40%**	**80%**
Proportion of wards with health worker(s) or volunteers capacitated with adequate messages on malaria control	**30%**	**40%**	**50%**

Strategic Approach 2: Increase Knowledge Amongst Vulnerable Groups About Their Specific Malaria Risk and the Prevention and Treatment Options Available to them

Although all Tanzanians are potentially at risk from malaria, there are a number of sub-groups that have an elevated risk of malaria infection and complications, either due biological factors, co-existing diseases, or socio-economic or cultural reasons. These sub-groups will be targeted separately with specific communication interventions tailored to their needs.

Strategic Intervention

2.1 Improve capacity of healthcare workers to provide accurate and relevant information on specific malaria risks and appropriate action to biologically vulnerable groups during health visits
2.2 Develop and implement outreach programme for socioeconomically vulnerable groups and hard-to-reach mobile populations in high-transmission areas

2.1 Improve capacity of healthcare workers to provide accurate and relevant information on specific malaria risks and appropriate action to biologically vulnerable groups during health visits

The groups that are biologically or genetically more susceptible to malaria infection due to lower immunity include pregnant women, infants and young children, people living with HIV/AIDS, and people with sickle cell anaemia. These sub-groups are best reached through the health system during their regular interaction with healthcare workers. Specific messaging for these groups will be developed based on their specific needs as outlined in the two technical strategies above and will be incorporated into the healthcare worker curriculum.

2.2 Develop and implement outreach programme for socioeconomically vulnerable groups and hard-to-reach mobile populations in high-transmission areas

Groups in the lowest economic quintile and with the lowest education generally are more likely to face barriers to behaviour change, including lower availability, accessibility and affordability of services and products, and less exposure to media. The same barriers apply to mobile populations such as nomadic groups and migrants and displaced populations, including refugees. In some circumstances, there is also a social barrier in terms of acceptability of getting and using services or products, or practicing the desired behaviour. Peer education has been successful in reaching highly mobile, marginalized, and difficult-to-reach populations and can be applied to malaria control. Other options include interventions at shifting markets and during road shows. A separate outreach programme for these sub-groups will be developed, particularly for those living in high-transmission areas.

Output

Indicators	Baseline 2012	Mid-term 2016	Final 2020
Percentage of health workers/ health assistants who have received specific BCC training on malaria risk for vulnerable groups	**NA**	**50%**	**75%**
Proportion of wards in which outreach interventions for target populations have been implemented in high-transmission areas	**NA**	**40%**	**80%**

Strategic Approach 3: Influence Social Norms about Healthy Behaviours around Malaria Prevention and Care and Encourage Community-Based Action

The behaviour of individuals is influenced by their peers, the social norms of their communities, and the context in which they live and work. This social setting can be influenced and moulded by people that are respected in the community. Actions and opinions of these influential people strongly influence the course of events and can play a

role in sparking. The BCC strategy will capitalize on this and work through these influencers to create a conducive environment for individual and community action.

Strategic Interventions

3.1 Engage local leadership as malaria ambassadors
3.2 Develop and implement mass campaign with influential people to spark action

3.1 Engage local leadership as malaria ambassadors

NMCP will work with partners to develop a comprehensive set of malaria messages and materials that can be used by religious leaders, elected district councillors, school teachers, village leadership, and other influential persons in their interaction with community members. NCMP will work with NGOs, CBOs and FBOs to disseminate these messages and materials through a mix of channels, such as sermons, school curriculum, and radio.

3.2 Develop and implement mass campaign with influential people to spark action

NMCP will work with implementing partners to create and implement a mass campaign with special events with local celebrities (e.g., singers, actors and sport stars) with calls for action. NMCP will also engage the print and electronic media journalists to develop their capacity for responsible reporting.

Output

Indicators	Baseline 2012	Mid-term 2016	Final 2020
Proportion of districts with 'malaria ambassadors'	**NA**	**50%**	**75%**
Proportion of people reached with appropriate malaria messages through mass media	**80%**	**90%**	**90%**

Strategic Approach 4: Create Strong BCC Partnership Amongst Public and Private Sector Stakeholders to Maximize Efforts, Ensure Consistency in Approach and Avoid Duplication

BCC interventions are initiated by a multitude of private sector and public sector partners in different areas of the country. Given the range of communication mechanisms, the diversity of target audiences, and the different strata of malaria control, it is essential that BCC interventions are well coordinated and harmonized. NMCP will continue to ensure that all the different interventions are in line with the malaria communication plan, that messages are approved and consistent, and that there is no duplication of efforts.

Strategic Interventions

4.1 Provide a forum and strategic framework for BCC partners to ensure coordinated and harmonized implementation of the BCC strategy
4.2 Create a platform for private sector companies to provide malaria control services to their workforce and the communities in which they work
4.3 Create a common framework to evaluate BCC interventions

4.1 Provide a forum and strategic framework for BCC partners to ensure coordinated and harmonized implementation of the BCC strategy

All malaria communication activities by different stakeholders are guided by the Malaria Communication Plan (MCP) and coordinated by NMCP through the BCC Working Group. The MCS will be updated and a detailed operational plan will be developed with stakeholders. The BCC Working Group will continue to meet regularly and

function as the main forum in which the different interventions and messages implemented by the different partners are discussed and reviewed.

4.2 Create a platform for private sector companies to provide malaria control services to their workforce and the communities in which they work

There are numerous large-scale private sector companies in Tanzania with large workforces that have a strong incentive to prevent malaria as it reduces worker productivity. As labourers interact with surrounding communities it is also essential for companies to address malaria transmission in those areas as part of their Corporate Social Responsibility (CSR) programmes. A private sector platform, called the Malaria Safe Programme, has been created for these companies to develop joint approaches. The programme is based on four pillars: education, protection, visibility and advocacy. Main interventions include protecting employees against malaria and educating them about prevention; by distributing LLINs to employees and their families and encouraging regular net use; and promoting malaria test and treatment according to guidelines.

4.3 Create a common framework to evaluate BCC interventions

NCMP will work with all stakeholders to ensure that BCC interventions by the different partners are regularly monitored and that indicators are aligned to allow comparison of interventions.

Output

Indicators	Baseline 2012	Mid-term 2016	Final 2020
Technical working groups meeting conducted	90%	90%	100%
Number of companies participating in the Malaria Safe Companies Initiatives	52	150	250
Percentage of quarterly verification visits undertaken	25%	50%	90%

Strategic Approach 5: Raise the Profile of Malaria amongst Policy and Decision Makers at All Levels

The GoT has shown great political will to combat malaria internationally through the African Leaders Malaria Alliance (ALMA) and nationally in political speeches. This commitment is a first step to ensuring that the national and district plans and budgets include sufficient funding to implement the malaria strategies. NMCP will initiate a series of advocacy interventions targeted at policy and decision-makers to translate the political commitment into tangible action.

Strategic Interventions

5.1 Engage politicians, and policy and decision-makers in political debate on malaria control

5.1 Engage politicians, and policy and decision-makers in political debate on malaria control

To increase the focus and budgetary allocation for malaria control, a comprehensive package of advocacy tools and interventions will be developed aimed at those in power. Target groups include Members of Parliament and ministers and senior managers of relevant ministries (including the MoHSW, Ministry of Finance and Economic Affairs, Ministry of Industry, Ministry of Agriculture, Ministry of Education, Regional Administrations, and local governments). Methods include public debates on radio and television with parliamentarians and politicians, as well as high-level promotional activities and field visits. Tools include malaria policy briefs and facts sheets outlining key issues, messaging, and concrete action points. The focus will be on including malaria on the political agenda during budget speeches of the different ministries.

Output

Indicators	Baseline 2012	Mid-term 2016	Final 2020
Number of national meetings with policy- and decision makers conducted	1	4	8

Component 4: Surveillance, Monitoring and Evaluation

SME is a crosscutting component of the strategic plan and an essential activity to assure that accurate malaria-related information is gathered, analysed, and used to track performance and implementation progress. NMCP will update the SME plan, providing the guiding principles for a harmonized set of activities to verify the status of the strategic plan implementation. NMCP and partners will collect, analyse, and share global malaria core indicators, as indicated by the Monitoring and Evaluation Reference Group (MERG), as well as program-specific indicators to measure performance.

Operational research findings will be used for regular assessment and evaluation of the interventions, and the evidence generated will be used to fill gaps and help policy makers to make appropriate, informed decisions.

Strategic Objective and Target

Strategic Objective			
To provide timely and reliable information to assess progress towards the set global and national targets, to ensure resources are used in the most cost-effective manner and to account for investments made in malaria control			
Indicators	**Baseline 2012**	**Mid-term 2016**	**Final 2020**
Number of national representative population based and service provision surveys that include key malaria indicators that are completed	1 THMIS 2012	3 THMIS 2016, TDHS 2014 TSPA 2013	2 TDHS 2018 THMIS 2020

Specific Objectives and the Outcomes for SME:

The following specific objectives will be achieved:

- Improved quality, completeness, and timeliness of malaria information within the routine health information system
- Comprehensive framework in place for collecting and storing malaria impact, outcome, and output data from periodic surveys and programmatic monitoring
- Malaria knowledge management system working effectively to collate, disseminate, and promote use of quality malaria data for evidence-based decision making at national and district level
- Malaria epidemics detected within one week and responded to within two weeks from of onset

The expected outcomes for the above objectives are:

Indicator	Baseline 2012	Mid-term 2016	Final 2020
Proportion of health facilities reporting monthly through the HMIS timely	60%	80%	90%
Proportion of the planned malaria key indicators surveys, for monitoring malaria interventions coverage, quality of service provision, vector and parasite dynamics and, quality assured malaria commodities availability, executed.	NA	80%	80%
Proportion of evaluation reports developed according to the national SME plan	NA	80%	90%
Proportion of malaria epidemics responded to by district councils within two weeks from the onset	0%	80%	90%

Strategic Approaches

The strategic approaches to reach the strategic objectives are as follows:

1. Improve reporting of routine malaria monitoring data through HMIS and IDSR
2. Strengthen and expand the scope of the M&E malaria indicators collected periodically, including intervention coverage, quality of service provision, parasite prevalence, vector susceptibility and dynamics, therapeutic efficacy of medicines, and availability of quality assured commodities
3. Establish and maintain a comprehensive Malaria Knowledge Management System, including knowledge strategy, identification, storage and sharing Design and support the implementation of a comprehensive malaria surveillance system for epidemic prone districts
4. Design and support the implementation of a comprehensive malaria surveillance system for epidemic-prone districts

Strategic Approach 1: Improve Reporting of Routine Malaria Monitoring Data Through HMIS, and IDSR

The HMIS and the IDSR system are the two data systems established by the MoHSW to collect routine SME data from healthcare facilities. The main malaria indicators are included in the existing HMIS and IDSR framework. Specific malaria modules are complementing the two main platforms with some additional essential malaria specific indicators. The establishment of a common electronic platform, through the District Health Information System (DHIS), is vital for achieving and maintaining reliable data collection, timing reporting, and updated outputs. DHIS is also crucial for real time data analysis. Current data collection and reporting in the private health sector are inadequate due to low involvement and commitment.

The MoHSW is undertaking other initiatives to improve the situation. The Pharmaceutical Service Section (PSS) of the MoHSW adopted an electronic Integrated Logistics System (eILS) to improve pharmaceutical commodities management. Two initiatives within the eILS, are currently undertaken to monitor the status of supplies: SMS for Life (SfL) and ILS gateway (IG). NMCP is actively involved in the delivery and utilization of the services provided by the two initiatives and will promote a full integration within the DHIS.

The Diagnostic Service Section (DSS) of the MoHSW has established a countrywide a comprehensive diagnostic information system (DIS) in all laboratory services. NMCP expects to collaborate with the DSS to collect timely and complete quality malaria laboratory information.

Strategic Interventions

1.1 Support HMIS/DHIS units in the MoHSW to improve quality of reporting malaria indicators and roll out of the electronic DHIS platform at all levels
1.2 Develop quality assurance/control system for data auditing and verification

1.1 Support HMIS/DHIS units in the MoHSW to improve quality of reporting malaria indicators and roll out of the electronic DHIS platform at all levels

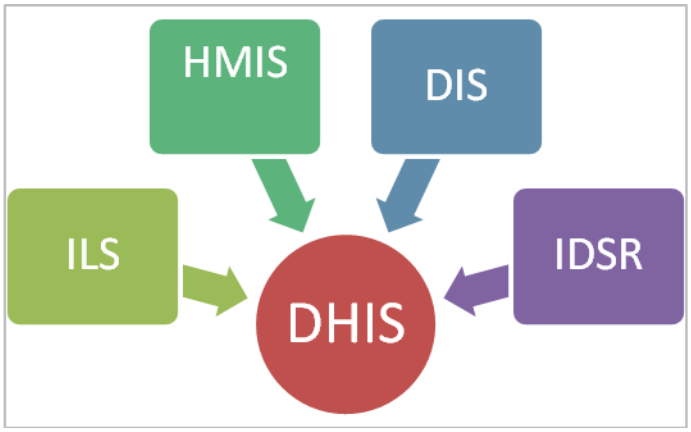
NMCP will continue to collaborate and support the HMIS and IDSR units to improve the quality and timeliness of routine data collected. Electronic platforms will be expanded through DHIS to improve data management and to provide real-time outputs, including charts and maps, for data analysis, interpretation, and use. Private health sector reporting will be strengthened through a complete involvement in the routine reporting systems. The Integrated platform for malaria SME through DHIS will include all malaria-related data collected and indicators generated. Weekly and monthly epidemiological, service delivery, and logistic data will be linked through DHIS at various level of healthcare delivery. Web- and desktop-based outputs will be provided from healthcare facilities to the national level, and (*see Table 6 and Figure 12*).

Table 6. Type of Routine Information by Source, Frequency and Set of Indicators

Type of information	Source	Frequency	Indicators
Epidemiological	HMIS*, IDSR*	Weekly, Monthly	Malaria surveillance
Service Delivery	HMIS*, DIS	Monthly	IPTp, Laboratory, RCH
Logistic	ILS, SfL*	Weekly, Monthly	Malaria commodities

*Specific malaria modules

Figure 12. Malaria Information Systems and DHIS



NMCP and partners will be involved in providing training to healthcare workers in information management at different level. DHIS utilization will be promoted from the national to the district level. All regional and district malaria focal points will be enabled to regularly access the DHIS and make use of the information for improving malaria service delivery. NMCP will appoint a dedicated person to liaise daily with HMIS/IDSR/DHIS..

1.2 Develop Quality Assurance/Control System For Data Auditing And Verification

The received weekly and monthly data will be sampled for data auditing and verification during routine supervision.

Outputs

Indicator	Baseline 2012	Mid-term 2016	Final 2020
Number of health facilities reporting complete and timely monthly malaria indicators	20%	80%	80%
Proportion of health facilities reporting quality assured malaria data	NA	60%	80%

Strategic Approach 2: Strengthen and Expand the Scope of M&E of Non-Routine Malaria Indicators, including Intervention Coverage, Quality of Care, Service Provision, Parasite Prevalence, Vector Susceptibility and Dynamics, Therapeutic Efficacy, and Availability of Quality-Assured Commodities

NMCP, in collaboration with malaria stakeholders, is currently engaged in coordinating a number of initiatives to collect, analyse, and interpret periodic surveys for malaria-related indicators. Impact and outcome indicators are principally made available through national representative surveys conducted by the NBS, mainly Tanzania Demographic and Health Survey (TDHS), THMIS, and Tanzania Service Provision Assessment (TSPA). Those surveys are performed regularly at fixed interval usually every 4-5 years. These surveys are collecting the core impact and outcome indicators to assess the long term progress towards the achievements of malaria control strategic objectives.

Other relevant programmatic indicators are collected by partners and research institutions to evaluate antimalarial efficacy and insecticide susceptibility in national sentinel sites. Outputs indicators for national and sub-national initiatives, such as vector control interventions, including LLIN, IRS, and LSM are collected by the implementing partners and evaluated through regular surveys by research institutions.

Quality assurance of malaria commodities is monitored by the relevant national regulatory authorities, TBS, Tanzania Food and Drug Authority (TFDA), and Private Health Laboratories Board (PHLB). Pharmacovigilance of antimalarial medicines is also a routine activity performed by the TFDA.

Four major areas are currently not, or only partially, covered by periodic and routine information systems: (1) quality of malaria case management in healthcare facilities; (2) malaria case management commodities monitoring in the private sector; (3) continuous longitudinal parasitological prevalence; and (4) comprehensive longitudinal entomological monitoring. NMCP plans to address these challenging initiatives in the course of the implementation of this strategic plan.

Strategic Interventions

2.1 Establish selected sentinel districts/sites to capture non-routine malaria data on quality of care
2.2 Collaborate with the National Bureau of Statistics to ensure the regular national representative population surveys and other specific sub-national surveys include relevant malaria indicators
2.3 Establish countrywide longitudinal vigilance of malaria parasitaemia in sentinel population: pregnant women and infants at RCH clinics, school-age children
2.4 Establish and expand longitudinal monitoring of mosquito population dynamics and behaviour in sentinel sites and strengthen surveillance of insecticide susceptibility
2.5 Coordinate and oversee the implementation of standard antimalarial efficacy tests as per WHO guidelines

by national research institutions
2.6 Coordinate the collection, use, and interpretation of the programmatic monitoring of vector control initiatives (including LLINs, IRS, and LSM)
2.7 Work with national regulatory authorities to improve the monitoring and quality assurance of all malaria commodities
2.8 Regularly update malaria epidemiological profile

2.1 Establish selected sentinel districts/sites to capture non-routine malaria data on quality of care

Sentinel districts will be selected to perform regular surveys on quality-of-care indicators for malaria diagnosis and treatment. These sites will collect data on appropriate case management according to guidelines as well as indicators not included in the routine HMIS (e.g., adherence to testing results, prescription habits, commodities storage and distribution practices, data validation). The private sector will be included in the surveys, and NMCP will assess these data biannually. In addition, NMCP together with partners will conduct regular end user verification and commodities tracking.

2.2 Collaborate with the National Bureau of Statistics to ensure the regular national representative population surveys and other specific sub-national surveys include relevant malaria indicators

NMCP will continue to collaborate with NBS to prepare, conduct, and disseminate the well-established national and sub-national representative surveys such as the TDHS, THMIS, and TSPA.

2.3 Establish countrywide longitudinal vigilance of malaria parasitaemia in sentinel population: pregnant women and infants at RCH clinics, school-age children

Two major parasitological surveillance initiatives in sentinel population will be conducted during the implementation of this strategic plan: (1) longitudinal assessment of malaria parasitaemia in pregnant women and children under five will be scaled up to all RCH clinics, and (2) longitudinal malaria parasitaemia prevalence in school age children will be assessed in selected nationally representative primary schools. The initiatives will be implemented in collaboration with CHMTs and research institutions. Sentinel population parasitological surveillance will be providing continuous assessment of the status of malaria control and seasonal and geographical malaria risk mapping.

2.4 Establish and expand longitudinal monitoring of mosquito population dynamics and behaviour in sentinel sites and strengthen surveillance of insecticide susceptibility

Longitudinal entomological monitoring and insecticide susceptibility test will be implemented in collaboration with research institutions in sentinel sites countrywide. NIMR will continue to coordinate the institutions and provide capacity building to district-based entomological teams. Insecticide resistance test will be carried out annually in conformity with the standard WHO guidelines. Core vector population indicators will be selected to monitor continuously mosquito composition and dynamics.

2.5 Coordinate and oversee the implementation of standard antimalarial efficacy tests as per WHO guidelines by national research institutions

Standard antimalarial efficacy tests as per WHO guidelines will be conducted in alternating years to monitor the recommended antimalarials. Molecular biology markers also will be collected to monitor resistance markers of drugs used for chemoprevention. NMCP will coordinate all the research work by the different institutions

2.6 Coordinate the collection, use, and interpretation of the programmatic monitoring of vector control initiatives (including LLINs, IRS, and LSM)

Routine monitoring of programmatic indicators of vector control programmes will be conducted by implementing partners. NMCP will coordinate the collection, use, and interpretation of the results. A standard set of indicators will be proposed for the initiatives. (See also Component 1 above.)

2.7 Work with national regulatory authorities to improve the monitoring and quality assurance of all malaria commodities

Pharmaceutical quality assurance and pharmacovigilance are core functions of TFDA. NMCP will liaise with the institution to make sure antimalarials from both public and private sectors are continuously tested to assess their quality. NMCP will also assist TFDA to reinforce the passive pharmacovigilance system by promoting the use of drug adverse reaction notification system in healthcare facilities through training opportunities and supportive supervision.

2.8 Regularly update malaria epidemiological profile

In 2013 NMCP, in collaboration with KEMRI Welcome trust and IHI, developed an epidemiological profile for malaria and its control. The document provides a series of malaria risk maps and related action points. The malaria epidemiological profile (2013) will be updated every two years.

Output

Indicator	Baseline 2012	Mid-term 2016	Final 2020
Proportion of sentinel districts/sites avail reports on non-routine malaria data, including ACTs dispensed from health facilities and other outlets	NA	40%	80%
Proportion of report of national representative surveys availed, according to M&E plan	100%	100%	100%
Proportion of selected health facilities conducting assessment of malaria parasitaemia in pregnant women and U5 children	25%	50%	80%
Number of insecticide resistance reports from sentinel sites (cumulative)	3	6	9
Number of antimalarial therapeutic efficacy reports per site (cumulative)	8	16	28
Proportion of vector control initiatives with appropriate monitoring system in place according to standard national set of indicators	NA	100%	100%
Proportion of antimalarials batches tested for quality assurance by TFDA	NA	80%	80%
Frequency of updating malaria epidemiological profile	NA	1	3

Strategic Approach 3: Establish and Maintain a Comprehensive Malaria Knowledge Management System

Malaria SME initiatives are implemented by multiple partners and institutions at different levels. This malaria knowledge needs to be managed through a system which covers all aspects of knowledge strategy, identification, storage, and sharing. Currently much of the malaria data are fragmented, stored with different institutions, and not readily available for sharing or use. NMCP will undertake a series of strategic interventions which jointly will constitute a Malaria Knowledge Management Plan.

Strategic Interventions

3.1 Establish a national SME Partnership Framework

3.2 Develop a national malaria data management plan and data repository to enable evidence-based decision making at all levels
3.3 Undertake periodic malaria program reviews and evaluation of the implementation of malaria strategic plan

3.1 Establish a national SME Partnership Framework

The national framework for the implementation of SME activities will include an updated SME Plan, a revitalised governance structure, and a Malaria Operational Research Agenda. The framework will provide technical guidance to ensure that malaria data collection, assessment tools, and monitoring and evaluation initiatives are coordinated and standardized. NMCP has developed an SME plan and has established a malaria SME technical working group (TWG) and network. A malaria operational research agenda will be developed by NMCP and research partners to include essential research initiatives to guide the strategic plan implementation and provide evidence for innovative initiatives. The agenda and the identified operational research priorities will form the bases for resource mobilization.

3.2 Develop a national malaria data management plan and data repository to enable evidence-based decision making at all levels

A data management unit will be established within the NMCP which will be responsible for systematic malaria data management. The Unit will develop a malaria data management plan outlining how the different sources of malaria data can be consolidated, stored, and regularly updated. NMCP plans to develop a national composite malaria database (or "knowledge warehouse") which brings together all the relevant databases in a manner that is user-friendly and easily accessible.

3.3 Undertake periodic malaria program reviews and evaluation of the implementation of malaria strategic plan A midterm and a final programme review will be conducted to evaluate the status of the strategic plan implementation. This review will provide crucial information needed to update and adapt the malaria strategy where needed.

Outputs

Indicator	Baseline 2012	Mid-term 2016	Final 2020
Proportion of initiatives conducted according to the national SM&E plan	**NA**	**80%**	**80%**
Established and regularly updated composite NMCP database	**NA**	**1**	**1**
MPR and midterm reports available (cumulative)	**NA**	**1**	**2**

Strategic Approach 4: Design and Support the Implementation of a Comprehensive Malaria Surveillance System for Epidemic-Prone Districts

A consequence of the changed malaria epidemiology in Tanzania is the expansion of areas with transmission instability and the consequent increased risk of malaria outbreaks and malaria resurgence. See also Chapter 2 *Epidemiology of Malaria*. A comprehensive surveillance system will need to be developed and put in place in these areas. Districts should have the capacity to respond immediately after an epidemic has been detected and to effectively contain it within two weeks.

Strategic Interventions

4.1 Map the malaria epidemic-prone districts, including stratification of epidemic "hot spots"
4.2 Strengthen Capacity for malaria epidemics containment at district and health facility level in epidemic

prone districts
4.3 Establish Malaria Epidemic Early Warning System and a Malaria Epidemic Early Detection System

4.1 Map the malaria epidemic-prone districts, including stratification of epidemic "hot spots"

NMCP will map epidemic hot spots using the recently developed Malaria Epidemiological Profile which provides ward-level transmission information. This mapping exercise will be discussed with the relevant district and will form the basis for a national contingency supply stock for epidemic containment. Post-epidemic assessment will be encouraged to further investigate local epidemic dynamics and to establish pre-emptive control measure.

4.2 Strengthen Capacity for malaria epidemics containment at district and health facility level in epidemic prone districts

NMCP will prepare guidelines for malaria epidemics prevention and control and a capacity building plan for the relevant districts. NMCP and partners will roll out a capacity building plan to improve capacity at district and health facility levels to respond to incumbent epidemics. Training will include development of a district-specific epidemics preparedness plan, SOPs, and medical supplies contingencies.

4.3 Establish Malaria Epidemic Early Warning System and a Malaria Epidemic Early Detection System

A malaria epidemic early warning system (MEEWS), malaria early detection system (MEEDS), and rapid response is important to quickly reduce malaria burden in the event of malaria epidemics. NMCP plans to establish MEEWs and MEEDS in the epidemic-prone districts, including protocols for the production of alerts and action thresholds that will initiate field verifications and investigations.

MEEWS will capitalize from weather information and other potential threats, such as interruption of malaria control services that may be able to trigger malaria outbreaks. The essential component for functional MEEDS is proper and timely routine HMIS/IDSR data management plotted to detect an epidemic.

Output

Indicators	Baseline 2012	Mid-term 2016	Final 2020
Presence of maps with detailed information on malaria epidemic hotspot	60%	80%	80%
Proportion of epidemic prone districts trained on epidemic preparedness	60%	80%	80%
Proportion of epidemics alert investigated within 2 weeks after detection	60%	80%	80%

Component 5: NMCP Programme Management, Partnership Development, and Resource Mobilization

The NMCP requires a strong programme management capacity to effectively and efficiently execute its role as the focal point for planning, coordination, resource mobilisation, and staff development for malaria control. The recent Malaria Programme Performance Review[10] conducted revealed a number of challenges in the overall coordination of the programme in regard to management of the massive funding generated in recent years.

The planning of interventions should be collaborative, and all interventions should be organised in a single comprehensive plan at each level to be efficient and effective. For quality implementation and coordination, each level should be accorded with adequately skilled human resource that would be able to either execute or oversee

[10] *Malaria Programme Performance Review Tanzania Mainland*; MoHSW; April 2012.

implementation. Cost-effective control measures should be installed to ensure strict adherence to standard procedures and implementation.

Strategic Objective and Target

Strategic Objective			
Efficient programmatic and financial management of malaria control interventions at all levels, implemented through effective and accountable partnerships with adequate funding			
Strategic Target	**Baseline 2012**	**Mid-term 2016**	**Final 2020**
Programme performance as rated overtime through semi-annual independent evaluation (Global Fund)	B+	A+	A+

Specific Objectives and Outcomes

The programme shall have the following specific objectives throughout the strategic period:

1. Improve the effectiveness and accountability of malaria control implementation by strengthening partnerships and cooperation with malaria control stakeholders at all levels
2. Increase the level of resource mobilization to fund the strategic plan, according to the programmatic needs
3. Promote a harmonized regional approach to malaria control in line with the Global Malaria Action Plan

Outcome Indicators

The following outcomes are expected:

Outcome indicators	Baseline 2012	Mid-term 2016	Final 2020
Proportion of CCHP that have approved budgets for comprehensive malaria control interventions, according to the National Malaria Strategic Plan	14%	50%	80%
Proportion of total strategic plan budget funded	N/A	80%	90%
Number of cross-border malaria initiatives in which Tanzania is a participant	NA	2	2

Strategic Approaches and Interventions

The three strategic approaches to reach the strategic objectives are:

1. Provide effective leadership and support to stakeholders on malaria control strategies and implementation of the National Malaria Strategic Plan
2. Establish a comprehensive strategic funding framework to support the process of domestic and global resources mobilization
3. Strengthen global and regional malaria control cooperation

Strategic Approach 1: Provide Effective Leadership and Support to Stakeholders on Malaria Control Strategies and Implementation of the National Malaria Strategic Plan

The main role of NMCP is to develop policies, strategies, and guidelines, as well as to provide oversight of the national malaria projects and programmes. The main responsibility for the implementation of the strategic interventions lies with the regional and local government authorities, with support from national and international implementing partners. NMCP will undertake a series of strategic interventions to ensure that all malaria control interventions are designed and implemented in line with the strategies outlined in this plan.

Strategic Interventions

1.1 Improve coordination and governance structures at national, regional, and district levels
1.2 Develop and disseminate strategies and updated implementation guidelines
1.3 Strengthen human resources capacity for effective programme management at national level
1.4 Enhance supervision and verification systems involving implementing entities at various levels
1.5 Build capacity of municipal and district councils in malaria planning and budgeting

1.1 Improve coordination and governance structures at national, regional, and district levels

The NMCP will establish a new malaria governance and coordination structure composed of one malaria steering committee and two technical sub-committees with technical working groups. All existing functioning committees will be merged into these new structures. In addition, NMCP will continue conducting periodic zonal review meetings with regional and local government authorities on the implementation of the malaria interventions at district and community levels.

1.2 Develop and disseminate strategies and updated implementation guidelines

The NMCP will develop and update the different technical plans and implementation guidelines, as outlined in the technical and supportive strategies above. NMCP will disseminate these documents to all relevant implementing entities and, when necessary, hold sensitization meetings and provide trainings.

1.3 Strengthen human resources capacity for effective programme management at national level

NMCP will develop three core documents to form the basis of comprehensive capacity strengthening of the NMCP: (1) NMCP Staffing Plan, (2) Training Needs Assessment (TNA), and (3) Continuous Learning Programme. The Staffing Plan will provide an objective analysis of staffing needs in terms of numbers of positions as well as skills-mix required for NMCP to successfully implement this strategic plan. A Training Needs Assessment will be conducted amongst existing and new NMCP staff to assess the gap between current skills and experience and the requirements of the job, convert the training gaps into training objectives, and identify training needs. A Continuous Learning Programme for NMCP staff will be developed based on the outcome of the TNA, which will include formal training, mentorship, and on-the-job training support in collaboration with technical partners and implementing agencies. NMCP also will work with research and academic institutions on developing expertise through post-graduate operational research training.

1.4 Enhance supervision and verification systems involving implementing entities at various levels

The main responsibility for supervision of (malaria control) interventions by the health facilities falls under the local government authorities. The role of the NMCP is to ensure that supervision by regional and district health management teams is conducted effectively and that the reports generated are accurate, complete, and timely. NMCP will (1) update and improve the supervision tools and checklists to be used by the regional and district teams during their supervision of health facilities, (2) conduct training for district data managers and malaria focal persons and training on data management and proper reporting, (3) work with regional and district authorities to

ensure that there are sufficient resources in regional and district budgets for regular supervision visits, and (4) focus NMCP supervision visits to the districts on verification of data and financial reports, as well as on capacity building of district staff.

1.5 Build capacity of municipal and district councils in malaria planning and budgeting

NMCP will coordinate with partners supporting local government planning to ensure that malaria interventions are included in the CCHPs and budgets.

Output Indicators

Output indicators	Baseline 2012	Mid-term 2016	Final 2020
Proportion of planned meetings of the steering committee, and sub-committees held	0	80%	80%
Number of regional and local government authorities oriented on malaria control strategies and updated guidelines	NA	80%	80%
Proportion of NMCP vacancies filled by government employed staff	NA	50%	80%
Proportion of districts supervised by national and regional teams in a year	NA	80%	100%
Proportion of CCHP including malaria control initiatives in line with strategic plan	NA	80%	100%

Strategic Approach 2: Establish a Comprehensive Strategic Funding Framework to Support the Process of Domestic and Global Resources Mobilization

Continuous and high-level funding is needed at all levels to achieve the goal of reducing malaria prevalence through the interventions outlined in this strategic plan. NMCP will undertake the following three strategic interventions to support resource mobilization for malaria control.

Strategic Interventions

2.1 Develop and update comprehensive business and operational plans for malaria control
2.2 Improve NMCP capacity to develop successful funding proposals and manage the implementation of the programmes
2.3 Develop and submit funding requests/proposals to relevant government authorities, national and global institutions, and the private sector

2.1 Develop and update comprehensive business and operational plans for malaria control

NMCP will develop a detailed and costed Annual Malaria Business Plan, with clear operational plans for each of the malaria control strategies. These plans will form the basis of all proposal development and resource mobilization efforts.

2.2. Improve NMCP capacity to develop successful funding of proposals and manage the implementation of the programmes

NMCP will identify the different funding sources available to fund components of the Business Plan and develop relevant funding proposals for submission. To access the different funding opportunities, NMCP will organise trainings for key staff in proposal writing and budgeting, in collaboration with technical partners. Based on the Training Needs Assessment (see strategic intervention 1.3 above), further capacity strengthening support also will

be organised in the areas of financial managements of grants, procurement processes, and reporting to prevent delays in programme implementation or problems with low absorption capacity.

2.3 Develop and submit funding request/proposals to relevant government authorities, national and global institutions, and the private sector

The NMCP and partners have developed a Financial Sustainability Plan to identify opportunities for implementing novel financing mechanisms that will generate resources to support malaria control efforts. To expedite this intention, the MoHSW should develop a resource mobilisation guide that takes into account the local, central, and private sector sources.

Outputs

Output indicators	Baseline 2012	Mid-term 2016	Final 2020
Number of annual updated business/operational plan in place (cumulative)	NA	3	6
Proportion of planned budget disbursed for implementation in a year	NA	80%	80%
Number of comprehensive proposals developed and funded (cumulative)	NA	4	8

Strategic Approach 3: Strengthen Global and Regional Malaria Control Cooperation

Malaria is a global disease which requires cross-border collaboration.

Strategic Interventions

3.1 Participate effectively in global and regional coordination initiatives within East Africa Community and Southern Africa Development Community

Of particular importance are issues related to cross-border transmission, insecticide resistance, leakage, and smuggled drugs and products such as LLINs. To address these and other issues, NMCP will identify and strengthen its participation in key global and region malaria control cooperation.

Outputs

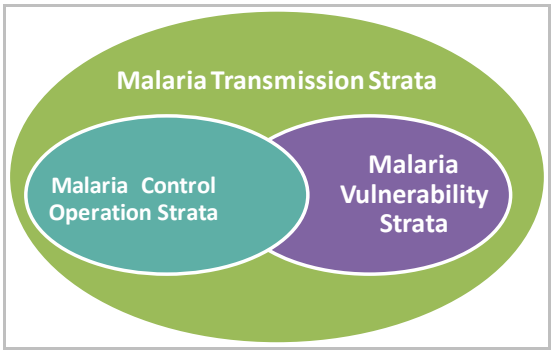
Output indicators	Baseline 2012	Mid-term 2016	Final 2020
Number of global and regional meetings at which NMCP was represented (annually)	2	4	4

CHAPTER 5: STRATIFICATION AND MALARIA CONTROL STRATEGIC OPTIONS

Malaria Stratification

Three major stratification categories relevant to malaria and its control have been identified: one over-arching strata related to malaria transmission and two sub-strata (malaria control operation and malaria vulnerability of the population) within the malaria transmission strata (*see Figure 13*).

Figure 13. Malaria Stratification Categories



Malaria transmission strata depend on the main epidemiological determinants, including (1) expected current parasitaemia levels in the population; and (2) malaria transmission ecological suitability factors such as temperature, precipitation, and altitude. Three main transmission classes are identified in the country: (1) Malaria free, unstable transmission, and less than 1% parasite rate (PR); (2) Malaria low (1% to less than 10% PR) and moderate (10% to less than 50% PR) transmission; and (3) Malaria high (>50% PR) transmission

Malaria control operational setting strata are contingent on a variety of factors related to human population, habitat, malaria control measures, and vector biological determinants. These strata are geographically overlapping with the transmission strata but have distinct significance in respect to circumscribed malaria and its control initiatives. Settings include urban areas, districts in advanced sustained control phase, areas with high seasonal transmission, epidemic-prone areas, areas resilient to changes in malaria transmission over last 10 years, areas with insecticide resistance, specific economic and development projects, areas with limited access to healthcare services (hard to reach areas), and areas vulnerable to outbreaks and complex emergency.

Malaria biological and socioeconomic vulnerability of the population strata include groups within the community that are at greater risk of getting infected or developing a severe form of the disease. Vulnerability is determined either by biological factors mainly related to the immunity status or by the infection exposure risk. These groups are subsets of the population included in the other epidemiological and operational setting strata. They are mainly targeted by specific malaria preventive measures or alternative healthcare service delivery and include infants and children, pregnant women, school-age children, people living with HIV/AIDS, people with Sickle cell anaemia, non-immune travellers, populations with extremely low incomes, nomadic populations, refugees, and migrants.

Strategic Options in Malaria Epidemiological Transmission Strata

Malaria Control in Malaria Free, Unstable and Very Low Transmission Areas

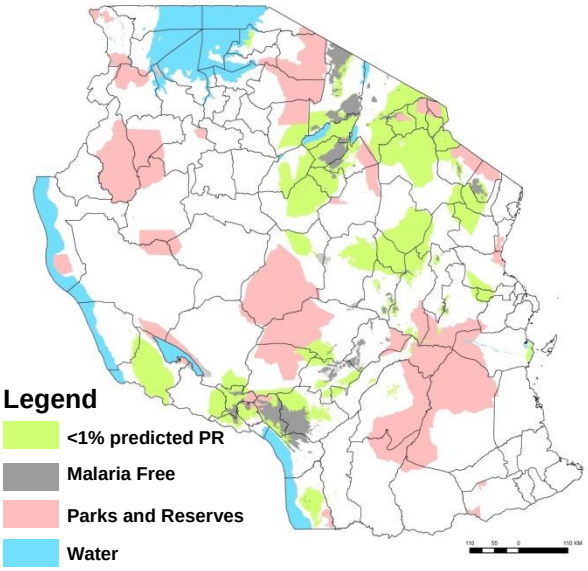
In **malaria free** areas, *Anopheles* mosquitoes may breed but, in an average year, their lifespan is shorter than the time required for sporogony of the malaria parasite. These conditions are generally due to low temperatures found at altitudes over 2,000 meters above sea level (below 16 ^{o}C). These are easily defined places, generally surrounded by low to moderate transmission areas.

Unstable transmission areas are extreme arid places that affect *Anopheline* development and survival due to limited surface water to lay eggs, and reduced survival of vectors due to the extreme dryness.

Malaria very low transmission areas have a predicted parasite prevalence of <1%, which represent a pre-elimination transitional state. These unstable malaria endemic areas have increased over the last 10 years and currently include about 22% of the country population (9.5 million people) (see *Figure 14.)*

This stratum includes distinct operational areas—such as areas potential to target malaria pre-elimination, epidemic-prone areas—which necessitate specific interventions (see relevant sections under Strategic Options in Malaria Control Operational Strata).

Figure 14. Malaria Free, Unstable, and Very Low Transmission Areas



Malaria Free Areas (MFA): 4% of the country population, 1.6 million people, in 25 councils. More than 50% of the population of two districts (Makete and Mbulu) live in MFA. The other 11 districts have between 10% and 50% of the population living in MFA.

Unstable transmission areas: Very small proportion of the country population (0.02%) in nine districts.

Malaria very low transmission areas: (predicted *Pf*PR_{2-10} <1%) 22% of the country population (9.5 million people) in 57 district councils. Among them, 17 districts have more than 50% of the population living in low transmission areas.

Data Source and Map: Epidemiological Profile of Malaria and Its Control in Tanzania (NMCP 2013).

Implication for Malaria Control Interventions

In an average year, malaria transmitting mosquitoes do not harbour parasites in malaria-free areas and seldom carry parasites in very low endemicity areas. The EIR varies in these areas from 0 to 0.1. The risk of local malaria transmission is latent, and continued vector control initiatives are required to prevent the occurrence of epidemics, or, in case of an incumbent outbreak, to control it. The use of LLINs is the standard approach to prevent transmission. Use of IRS aims to prevent epidemics and to complement LLINs in case of low net use rate. Given the

long lead time needed to deploy an IRS operation, it should be limited to respond to a sensitive early warning such as climatic change. IRS can also be considered as a tool for malaria elimination in areas with very low transmission.

Fever rate in this stratum is high, while malaria positivity is low. Hence clinicians should ensure malaria is considered in differential diagnosis of fevers, especially to detect imported cases, or eventual local transmitted cases in abnormal years. Severe malaria management due to the high risk of the non-immune population is extremely important. In these areas all ages are equally at risk. Epidemics are a real threat and the prompt implementation of specific malaria case management arrangements during malaria outbreaks is of paramount importance. The effectiveness of IPTp in this epidemiological stratum is probably low. However, there is no definitive programmatic evidence on withholding IPTp, and SP should be still administered to pregnant women due to the risk of acquired malaria once they are travelling.

Standard BCC approaches may be not effective in malaria-free and in very low transmission areas due to the low perception of malaria risk among the population and the low mosquito density. Messages to increase the use of LLINs should be reinforced by the risk of low usage due to perceived low malaria risk and low vectorial density. Populations living in these areas needs to be made aware of the risk of acquiring malaria when travelling to endemic transmission areas.

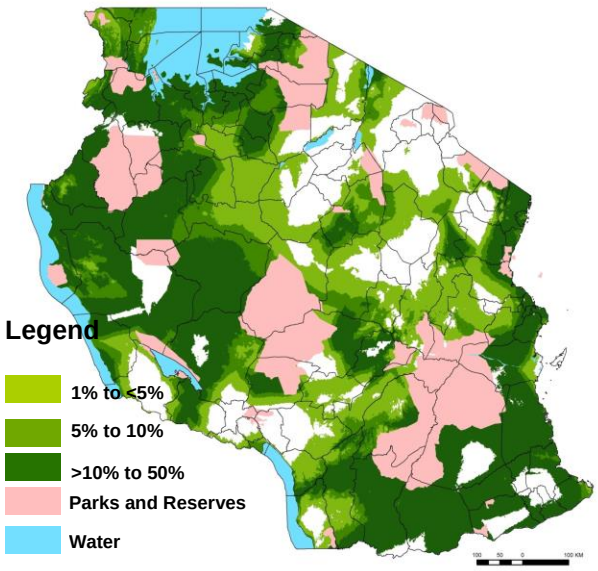
The event of imported malaria is quite common. Therefore passive surveillance is required, and cases should be investigated, including history of travel in endemic areas to detect eventual local transmission. Early warning and early detection of malaria epidemics should be established in all facilities within malaria-free and extremely low endemic areas. The most important meteorological parameter to be monitored for early warning in this area is the minimum temperature, rather than precipitation, since ambient temperatures below 16^{o}C usually inhibit the sporogonic cycle for *P. falciparum*.

District councils with malaria-free and very low endemic areas should be supported to ensure the CCHP includes stratified interventions (e.g., selective vector control initiatives, special epidemiological, and entomological surveillance); plan for active surveillance; identify and map areas of potential local transmission; and establish early warning and detection of epidemics.

Malaria Control in Low and Moderate Transmission Areas

This vast epidemiological stratum includes three epidemiological classes described in the *Epidemiological Profile of Malaria and its Control in Mainland Tanzania* (NMCP, 2013): **Hypo-endemic 1** (predicted parasite rates in children 2-10 years old (*Pf*PR$_{2-10}$) between 1 and 5%), **Hypo-endemic 2** (*Pf*PR$_{2-10}$ 5-<10%) and c) **Meso-endemic** (*Pf*PR$_{2-10}$ 10%-50%) *(see Figure 15).* In terms of malaria control, these epidemiological areas are grouped together as the strategic interventions are the same. Most of the districts included in this stratum are currently transitioning from a higher to a lower intensity of malaria transmission. These achievements are fragile and yet to be consolidated, in order to progress towards further reduction and sustained malaria control. This stratum includes a number of distinct operational areas, such as urban settings, that in terms of malaria control can be considered separate entities.

Figure 15. Malaria Low and Moderate Transmission Areas



Hypo-endemic 1: (1% to <5% PR)

20.4% of the population (8.8 million people) across 81 districts

Hypo-endemic 2: (5& to <10% PR)

13.4% of the population (5.8 million people) across 82 districts

Meso-endemic: (10% to 50% PR)

38.5% of the population (16.8 million) across 85 districts

Cumulatively the three classes represent 72.2% of the population (31.3 million people).

Data Source and Map: Epidemiological Profile of Malaria and Its Control in Tanzania (NMCP 2013)

Implication for Malaria Control Interventions

The EIR for this wide stratum varies from hypo- to meso-endemic transmission with <0.25 and 0.25-10 respectively. Therefore the risk of transmission is constantly present at varying levels. The principal vector control measure in all areas of this epidemiological stratum is the appropriate use of LLINs. Other vector control measures may be applied based on other considerations such as feasibility, availability of funds, cost effectiveness, and other local factors such as urbanization, insecticide susceptibility profile, seasonality, intensity of transmission, failure or interruption of malaria control interventions, amd epidemic prevention.

In hypo- and meso-endemic settings, slide positivity rate is generally higher than 5%. Biologically vulnerable groups (U5 children and pregnant women) in this stratum are at higher risk compared to the rest of the population, due to low levels of acquired immunity. Use of LLINs in all transmission settings and control stages is the recommended vector control strategy. Other vector control initiatives may complement LLINs in identified operational strata such as IRS in areas with high detected insecticide resistance, areas resilient to malaria transmission changes, high seasonal transmission areas, areas with economic and development projects, and LSM in urban settings (*see Strategic Options in Malaria Control Operational Strata below*). Standard approaches for testing for and treating malaria are recommended for the entire population throughout the year--testing all suspect malaria cases, treating positive cases, providing two or more doses of IPTp to pregnant women, and reducing vulnerability in risk groups. Adherence to preventive and treatment options is important to consolidate the achieved gains in this epidemiological stratum. This epidemiological stratum is ideal for the standard SME approach. Changes in transmission pattern should be carefully monitored, as well as abnormal trends and signs of control failure such as interrupted case management commodity supply.

In this stratum stable and unstable malaria transmission coexists, and the epidemiological transition towards hypo-endemicity may increase the areas with transmission instability. Hence, epidemic-prone areas should be identified and outbreak prevention and control measures established.

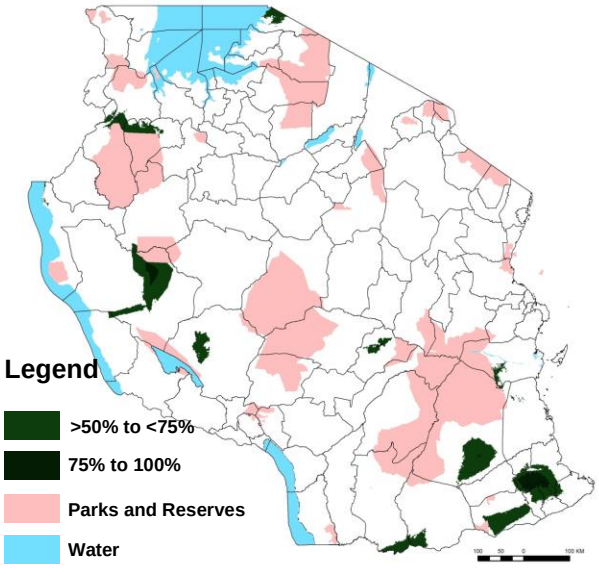
The large majority of councils are represented in this epidemiological stratum. Well-defined arrangements for malaria control activities within the CCHP should be strengthened, including preparedness plans. The councils should make sure that universal access to high-quality malaria diagnosis and treatment is achieved everywhere

and throughout the year and that commodities used in patient care are consistently affordable, of high quality, and safe.

Malaria Control in High Transmission Areas

Malaria transmission determinants in areas (*see Figure 16)* included in this epidemiological stratum need to be carefully investigated, and, intensified and targeted control measures implemented. Possible factors associated with high transmission are: (1) vector population dynamics; (2) status of vector control initiatives; and (3) access to malaria diagnosis and treatment services.

Figure 16. Malaria High Transmission Areas



Areas supporting predicted Parasite Rate >50%. The strata include **holo-endemic** areas (50-<74% PR) and **hyper-endemic** areas (<75% PR).

Two percent of the population (0.9 million people) across 26 district councils is estimated to live in this epidemiological stratum.

Data Source and Map: Epidemiological Profile of Malaria and Its Control in Tanzania (NMCP 2013)

Implication for Malaria Control Interventions

Local factors that favour focal transmission should be identified through risk mapping and, if possible, aggressively addressed through targeted IRS. Universal coverage of LLINs remains the key vector control intervention in this stratum. Malaria test positivity rate in this stratum is consistently above 25%. Improving health service accessibility and promotion of early healthcare-seeking behaviour is a priority for this stratum. Intensified BCC campaigns on appropriate treatment seeking and compliance should be initiated. Measure to reduce vulnerability in special groups should be maintained, and interventions to reach and maintain high coverage should be promoted.

Specific operational researches to investigate the reasons for high transmission are needed. Possible reasons for persistent transmission in these areas need further investigation, including low coverage of malaria control services, resistance to use protective measures, impaired accessibility to healthcare services, biological resistance to either insecticide or therapeutics, and persistent breeding sites.

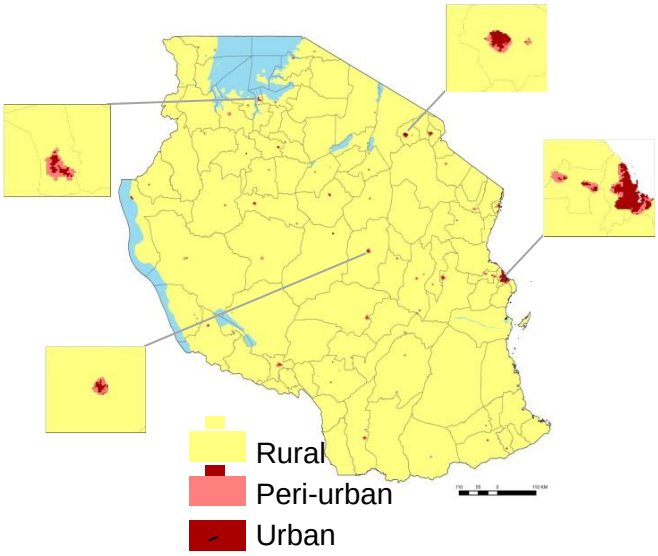
Strategic Options in Malaria Control Operational Strata

Malaria Control in Urban Areas

Vector and human population dynamics greatly influence malaria transmission and its control in urbanized settings (*see Figure 17*). In Tanzania malaria prevalence in urban areas is one third of that in rural areas, 3% versus 10% (THMIS, 2012), mainly due to the following factors: (1) there are fewer malaria mosquitoes breeding habitats in

cities due to the modified environment; and (2) urban populations generally are wealthier than rural populations, have better access to health services, more education opportunities, more access to media, and better housing conditions.

Figure 17. Urban Areas



Data Source and Map: Epidemiological Profile of Malaria and Its Control in Tanzania (NMCP 2013)

27% of the Tanzanian population lives in urbanized areas (2002 Census). Since urbanization constantly increased over the last few decades (NMCP, 2013), it is estimated that approximately one Tanzanian out of three will be living in urban and peri-urban areas by 2020.

The 2012 Census reports that about 23% of population (10.2 million) is living in 34 defined administrative urban councils (12 town, 19 municipal, and 3 city councils) and another 4-6% are expected to live in the remaining scattered urban areas.

Dar es Salaam city, with over 4.5 million people, accounts for about 10% of the population in the country.

Implication for Malaria Control Interventions

Although malaria prevalence is considerably lower in urban compared to rural areas, the prevalence of fever is quite similar in the two settings. Urban malaria transmission is substantially less intense and much more focal than in rural and peri-urban settings. However, the danger of epidemics is higher and the presence of substantial non-immune populations places people of all ages at comparable levels of risk.

Ownership of LLINs in urban areas is slightly lower than in rural areas, which is likely to be linked to the difficulty of mass distribution in cities. A different approach to LLIN distribution mechanisms is needed in cities, with a stronger focus on private sector involvement. IRS in urban areas is a low priority in the current settings due to logistic and operational implications such as low level of community involvement with consequent high refusal rate and entomological reasons, which include abundance of nuisance mosquitoes not targeted by the intervention. Recent entomological observations show that an increasing proportion of malaria transmission in urban areas is from outdoor-biting and early-biting vectors, due the changing composition on dominant vector species to *An. arabiensis*. These findings have practical implications on the establishment of vector control measures targeting both outdoor and indoor mosquitoes, such as larval source management (LSM). LSM can be a prominent component of urban malaria control since the mosquitoes breeding sites are relatively few, easier to find, and fixed compared to rural areas.

Accessibility to health facilities in urban areas is very high, with 96% of the population living within a 5km radius, compared to 54% in rural areas. The urban public health sector is severely overburdened, and the private health services are unaffordable for large proportion of population. The key intervention to promote improved malaria case management in urban areas is the full involvement of private sector in the delivery of quality and affordable (subsidised) services through the adherence to the national standard guidelines.

Three factors make unique the urban environment in respect to malaria communication: (1) high mass media exposure; (2) visibility of billboards adverts; and (3) higher level of education of the population. These three opportunities should be taken into consideration increasing LLIN usage and promoting compliance with malaria testing and treatment.

Strategic Options

a) **IMVC:** The commercial distribution of LLINs is an appropriate keep-up mechanism, together with a targeted mass campaign. LSM, using larviciding, is recommended in major cities in moderate/high transmission areas such as Dar es Salaam, Tanga, and Mwanza, as well as in other municipal councils in in the same transmission areas: Musoma, Bukoba, Songea, Kigoma, Lindi, Mtwara, and Tabora. LSM is also recommended, but with a lower priority, in cities and municipalities in low transmission areas such as Arusha, Moshi, Iringa, Mbeya, Singida, and Dodoma. Community based initiatives to control breeding sites in urban and peri-urban settings

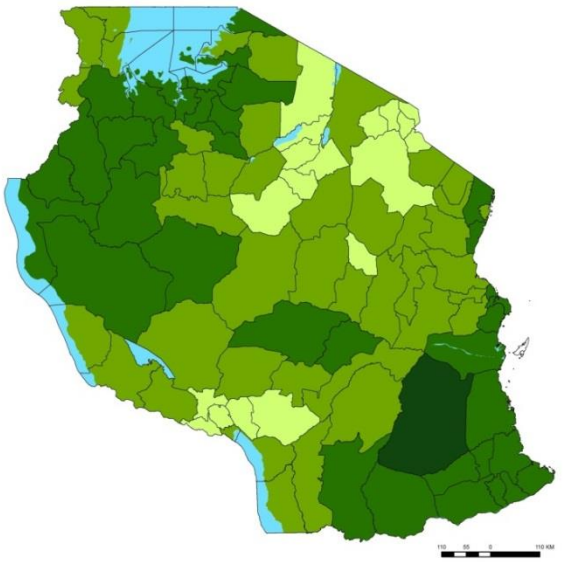
b) **Malaria diagnosis, treatment, and preventive therapies:** Due to the high involvement of private sector in healthcare service provision in urban areas it is essential to prioritize its involvement in delivery of quality and affordable diagnostic and treatment services in line with the National Malaria Case Management Guidelines. Targeted BCC for populations living in urban settings is essential to comply with the recommended diagnostics and therapies.

c) **SME:** Mapping urban focal transmission areas through school-based sentinel surveillance programme and appropriate epidemiological and entomological monitoring for early warning and early detection of abnormal transmission are vital to improve malaria services in urban settings.

Malaria Control in Districts in Advanced Sustained Control Phase

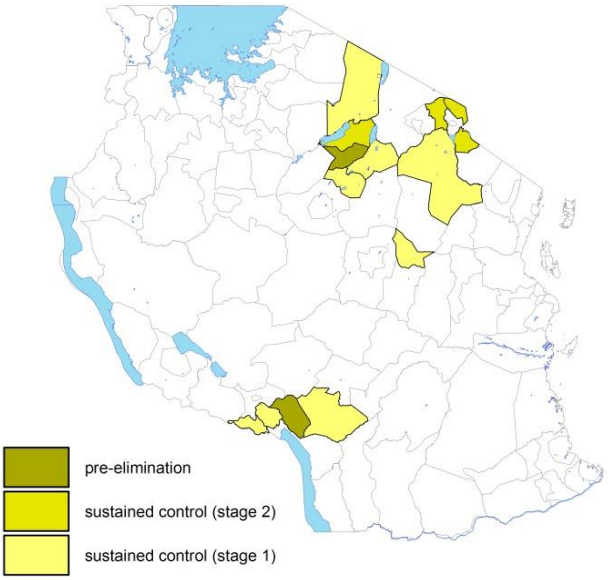
Due to the large heterogeneity of malaria transmission, Tanzania can be further stratified according to malaria control phases. A substrate for this stratification is offered by the district-based predicted 2010 population weighted parasite rate for *P. falciparum* in children 2-10 years of age *($PfPR_{2-10}$) (see Figure 18).* A total of 18 districts, with a population of approximately 7.3 million, have a predicted PR below 1%. Other 23 districts, with a population of approximately 10 million, have a predicted PR between 1% and 5%. The above districts can be considered at different control phases compared to the rest of the country. The 18 districts with predicted PR below 1% have the potential to progress towards a malaria pre-elimination phase while the remaining 23 districts with predicted PR between 1% and 5%, are in advanced stage of sustained control (*see Figure 19).*

Figure 18. Predicted 2010 Population Weighted Parasite Rate for P. falciparum in Children 2-10 years of Age ($PfPR_{2-10}$) by District



Data Source and map: Epidemiological profile of malaria and its control in Tanzania (NMCP, 2013).

Figure 19. Districts in Advanced Sustained Control Phase



Data Source: Epidemiological Profile of Malaria and Its Control in Tanzania (NMCP 2013), Map: NMCP (2013)

Among the 18 districts with predicted PR below 1%, nine districts (4 million people), have almost the entire population (>99%) living in malaria-free areas or with very little transmission. Three of those districts, (Mbulu, Makete, and Mbeya) have historical evidence, based on 2000 predicted PR, of very low transmission. The above districts may be classified as malaria **pre-elimination** phase. The remaining 9 districts in this stratum (3.3 million people), have over 60% of the people living in areas of very low transmission (<1% predicted PR) and may be classified as in an **advanced stage of sustained control** phase. Among the 23 districts with predicted PR between 1% and 5%, eight, (4.2 million population), have over 50% of the people living in areas of very low transmission and may be classified as in an **early stage of sustained control** phase.

Implication for Malaria Control Interventions

Due to the high malaria heterogeneity in Tanzania, large areas of the country may be considered under different malaria control phases: control, sustained control and, even, pre-elimination (*see chapter 4: Strategic phases*). For

implementation reasons, the NMCP subdivided the sustained control in two consecutive stages, according to the prevailed predicted prevalence. The second period of the sustained control phase, as well as the subsequent pre-elimination, can be sub-divided into two stages: (1) controlled low-endemic and (2) controlled non-endemic. In the first stage, endemic malaria transmission was reduced to such low levels that it no longer constitutes a major public health burden, but endemic transmission continues to occur even without importation of new cases. In the controlled non-endemic stage, endemic transmission has been interrupted and onward transmission from imported infections is controlled but not yet completely prevented, resulting in some level of local transmission. The elimination stage is reached when both endemic transmission and onward transmission from imported infections are prevented to a level where there risk of transmission reoccurring is minimal[11].

Strategic Options

Four main tools are advocated in the districts that are targeting advanced/sustained control and pre-elimination:

a) **Detection of cases** that includes individual malaria case notification; active case detection at the household level; epidemiological investigation of every confirmed case, institution of a district malaria case register; continuing education and quality control for all public and private clinical services that diagnose and/or treat malaria; quality control of all laboratory services that diagnose malaria; intensified use of microscopy for species identification; detection of gametocytes; and determination of parasite densities.

b) **Prevention of onward transmission,** including a series of intervention such as vector control aimed at reducing human–vector contact and the vectorial capacity of local mosquito vectors; case management (radical treatment) aimed at reducing the period of infectivity and the occurrence of secondary infections by using ACT and gametocytocidal medicines (e.g. primaquine) for *P. falciparum* infections.

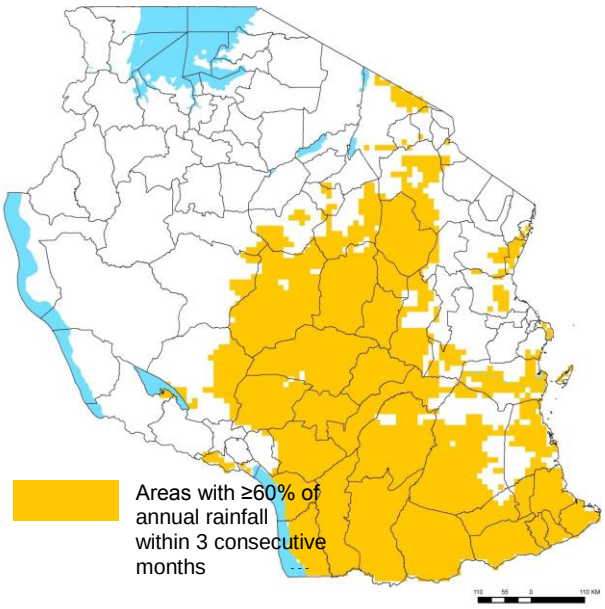
c) **Management of malaria foci:** including tools for managing malaria foci such as vigilance, malaria surveys, geographical reconnaissance, vector control and entomological investigations, involvement of local authorities (such as local authorities taking over programme responsibilities for vector control), and community involvement.

Malaria Control in Seasonal Transmission

In areas with seasonal transmission, 60% of annual rainfall occurs within three months, and consequently more than 60% of cumulative malaria cases occur in four consecutive months (see *Figure 20*). High malaria transmission occurs towards the end of the rain season, usually 3-8 weeks after the peak of precipitation when there are the ideal conditions—sunlight, temperature, humidity, abundance of breeding sites, time for completion of aquatic stage—for the proliferation of vectors, especially *A. gambiae*. In these areas, the end of malaria transmission is quite rapid and is usually determined by the change of the above conditions due to cold and dry weather.

[11] Cohen J. et al; How absolute is zero How absolute is zero? An evaluation of historical and current definitions of malaria elimination; Malaria Journal 2010, 9:213.

Figure 20. Areas with malaria seasonal transmission



A population of 10.2 million in 59 districts lives in areas compatible with the definition of high seasonal transmission.

In 2010, 34 districts were identified as having more than 50% of their total population residing in areas classified as acutely seasonal transmission, covering a total population of 9.3 million people.

Of these, 15 districts with >10% PR (Liwale, Tandahimba, Ruangwa, Masasi, Lindi, Newala, Tunduru, Namtumbo, Nachingwea, Kilwa, Kilolo, Rufiji, Mtwara, Pangani, and Iringa).

Of these, 8 districts had >25% PR (Liwale, Tandahimba, Ruangwa, Masasi, Lindi, Newala, Tunduru, and Namtumbo).

Data Source: Epidemiological profile of malaria and its control in Tanzania (NMCP, 2013).

Implication for Malaria Control Interventions

In these areas, the population should be encouraged to use LLINs throughout the year despite the perception of low mosquito density. IRS may offer an added advantage to prevent transmission, with only a single spray round per year—provided that the operation is implemented at the right time of the year, just before the start of transmission. To maximize the desired effect of IRS, high intensity transmission areas should be targeted. LSM can be considered in the eligible areas (highly densely populated) within resilient malaria transmission areas, especially during the dry season when the breeding sites are few, findable, and fixed.

The majority of malaria cases are detected passively in health facilities in a relatively short period, usually immediately after the cessation of precipitations. In areas where seasonal malaria chemoprevention is indicated, specific/targeted BCC should be delivered to targeted populations, especially child caretakers, to attend RCH clinics.

Intensified surveillance is needed to detect abnormal transmission outside the expected malaria season. Differentiating seasonal peaks and true epidemics may be difficult to identify in the districts where SMC and IRS are indicated. Capacity building of district and healthcare facilities staff should be emphasized.

Strategic Options

a) **IMVC:** LLINs are recommended in all seasonal transmission areas irrespective of the transmission intensity. Targeted messages for BCC to encourage net usage should be delivered due to the possible low vector density in the dry season and the consequent low risk perception among the comminities. IRS is indicated in eight southern districts with seasonal but high malaria transmission (Liwale, Tandahimba, Ruangwa, Masasi, Lindi, Newala, Tunduru, and Namtumbo); LSM may be considered during the dry season, if feasible.

b) **Malaria diagnosis, treatment, and preventive therapies:** The councils in this stratum should improve logistics to make sure that optimal stock status is in place before the transmission season. Malaria test and treatment

approaches should be promoted even when transmission is low. Introduction of Seasonal Malaria Chemoprevention (SMC) in selected districts with high transmission intensity and resilience to change in malaria transmission should be further investigated and, eventually and promptly introduced.

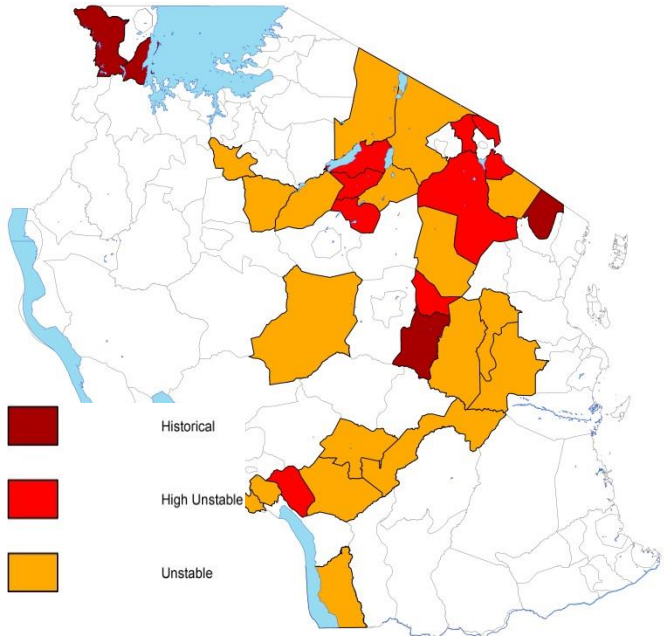
c) **SME:** Weather-based (weekly) early warning to anticipate the start of the malaria transmission season and to improve preparedness are recommended, as well as monitoring weekly epidemiological surveillance to detect the start and end of the transmission season

Malaria Control in Epidemic-Prone Districts

A malaria epidemic is defined as an increase of malaria cases in an area with low malaria endemicity, which is ***above what is expected*** for the season and place. Alternatively, epidemics could be defined when the malaria caseload exceeds the usual capacity of the existing healthcare facilities to handle them.

Malaria epidemics are usually triggered by abnormal meteorological conditions, including (1) Increased rainfall; (2) higher temperatures favouring parasite development in the mosquito especially in highlands; (3) high humidity that favours survival of mosquito vectors; and (4) prolonged drought may lower nutrition and immunity and may confine breeding places for vectors where vector- host interactions are intensified Other factors associated to malaria epidemics are affecting population vulnerability (susceptibility) to malaria, including (1) change in malaria epidemiology—this often happens when malaria is controlled in an area, leading to loss of malaria-specific immunity by the population; (2) population movements may occur within the country or between neighbouring countries: this includes internally displaced persons, returnees, or refugees moving due to war or natural disaster; people may be moving from areas of no malaria transmission to areas with transmission, in which case they do not have much immunity to malaria and are vulnerable to infection in the new location; (3) failure of or breakdowns in malaria control interventions such as drug and insecticide resistance, interruption of malaria vector control campaigns, and disruption of malaria commodities supply; and (4) environmental changes that increase the risk of transmission include the development of dams or irrigation schemes or road construction, where breeding sites are created in dug out pits.

Figure 21. Districts Prone to Malaria Epidemics



Data Source: Epidemiological Profile of Malaria and Its Control in Tanzania (NMCP 2013), Map: NMCP (2013)

Four districts, with a population of 1.8 million, are classified as epidemic prone, according to **historical reports** of outbreaks in the past 15 years (Lushoto, Karagwe, Mpwapwa, and Muleba). Another 13 districts (5.7 million) are **highly unstable** with over 80% of the population living in areas below 1% of predicted PR (Rombo, Hai, Mbulu, Arusha and Meru, Moshi, Mwanga, Mbeya, Makete, Karatu, Kongwa, Simanjiro, Singida, Hanang). A total of 23 districts, the majority of them under epidemiological transition from meso- to hypo-endemicity, are becoming largely **unstable** and consequently prone to epidemics. More than 80% of the population are living in areas below 5% of predicted PR (Babati, Dodoma, Hanang, Igunga, Ileje, Iramba, Kilombero, Kilosa, Kiteto, Manyoni, Mbinga, Monduli, Morogoro, Mufindi, Mvomero, Ngorongoro, Njombe, Rungwe, Same, Shinyanga, and Sumbawanga).

Data Source: Epidemiological profile of malaria and its control in Tanzania (NMCP, 2013).

Implication for Malaria Control Interventions

A malaria epidemic is a rare but quite dramatic event. Experiences in Tanzania show that in the few districts where outbreaks of malaria have occurred (*see Figure 21*), the health system was embarrassingly caught unaware and ill prepared to contain the epidemic. Often the news of the outbreak came from community leaders after the epidemic was in advanced stages, with scores of people sick and some already dead from the disease. Sometimes districts have reported increases in malaria cases thought to be epidemics, but upon further investigation happened to be normal seasonal increases of malaria or outbreaks of non-malaria febrile illness. The changed malaria epidemiology is an urgent call for the establishment of malaria early epidemic detection and control systems in all districts. Implementing such a system will not only reduce the morbidity and mortality associated with malaria epidemics but also the misery, blame, and social and economic disruption that often goes with it.

Strategic Options

a) **Intensified Surveillance**: Epidemic early warning and detection systems need to be established in all the epidemic-prone districts. Occurrence of extraordinary or unforeseen large-scale events related to possible abnormal malaria transmission—such as long-term weather forecasting indicating abnormal precipitations, interruption or decreased efficacy of vector control measures, disruption of therapeutics supply chain or indication of therapeutics suboptimal profile, influx of non-immune refugees or displaced people—should be monitored by the NMCP and promptly communicated to the respective RHMT and CHMT. Communities in identified unstable malaria transmission areas should be sensitized to provide necessary information to local

authorities in the event of abnormal increase of febrile illness and, eventually, fatalities in the respective areas.

b) **Epidemic Preparedness**: Malaria epidemic-prone districts should be guided by NMCP to set up appropriate preparedness plans. A contingency stock of essential malaria therapeutics and diagnostics will be established in the zonal MSD.

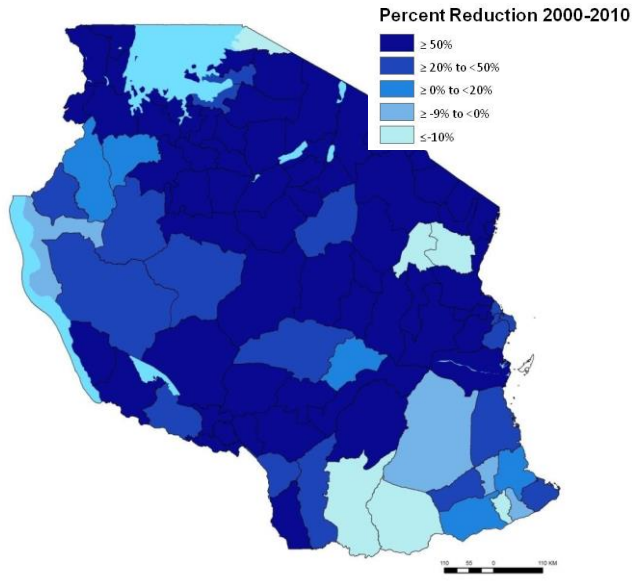
c) **Epidemic Response**: District team will be adequately trained to perform immediate investigations after being alerted to a potential outbreak by the established malaria early epidemic detection system. The suggested control measures should be immediately—within two weeks from the alert—deployed and monitored.

d) **Capacity Building**: An intensive plan for capacity building at the district level should be prepared and carried out by NMCP in the selected epidemic-prone districts. The district teams will be conducting the necessary training and support to the healthcare facilities level.

Malaria Control in Areas Resilient to Malaria Transmission Changes

The last two malaria control strategic plans (2002-2007 and 2008-2013) presented a uniform package for malaria interventions in the majority of the country. The only significant difference was the deployment of IRS in 3 out of the 21 regions (about 10% of the country population). Despite the uniform approach in malaria control there were a few differences in terms of malaria reduction. Local malaria transmission factors and determinants in areas resilient to changes in prevalence should be investigated. Many of those areas are still included in the holo- and hyper-endemic strata (see *Figure 22*).

Figure 22. Areas resilient to malaria transmission changes



The greatest reductions in malaria prevalence (≥ 90%) were recorded in 19 districts: Rombo, Mwanga, Mbulu, Kongwa, Karatu, Kibaha, Igunga, Arusha/Meru, Singida, Makete, Kilosa, Tanga, Bagamoyo, Hai, Iramba, Shinyanga, Mufindi, and Moshi.

Conversely a small predicted rise was recorded in ten districts across the same interval: Kigoma, Ruangwa, Liwale, Tarime, Tandahimba, Newala, Tunduru, Namtumbo, Handeni and Kilindi).

Data Source and Map: Epidemiological Profile of Malaria and Its Control in Tanzania (NMCP 2013)

Implication for malaria control interventions

Local entomological factors as well as epidemiological and operational reasons that negatively affect malaria control achievements in these areas, despite implementation of standard approaches, should be carefully investigated. In districts applying IRS, quality of insecticides, spray coverage and insecticide resistance should be assessed. LLIN usage pattern should also be investigated. Aggressive vector control measures should be planned, implemented and monitored.

Bottlenecks in logistic supply management should be investigated and, eventually, resolved. Full malaria diagnosis and treatment options should be assured throughout the year and at all levels. Local factors affecting proper utilization of preventive and therapeutic services in these areas should be resolved.

The access to health services, availability of adequate malaria case management commodities, vector control measures, insecticide susceptibility and eventually therapeutic efficacy should be investigated.

The councils in this stratum should advocate for increased resource allocation. Capacity building options for district teams to be prioritized by NMCP.

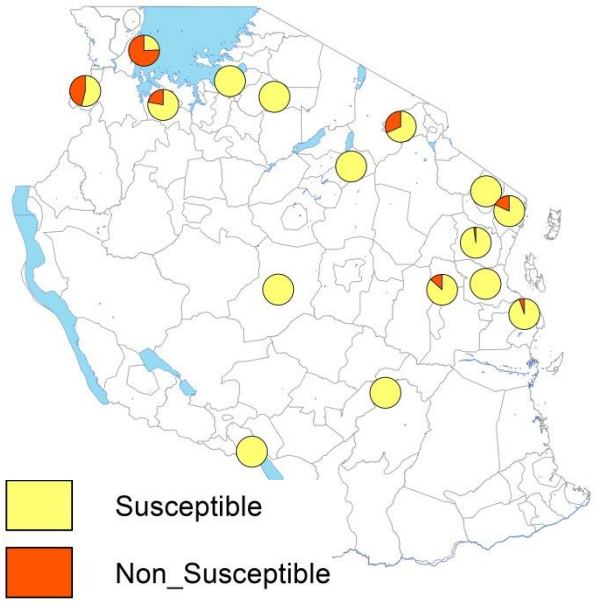
Strategic Options

a) **IMVC:** Increase access to and use of LLINs is still the primary recommended vector control intervention. IRS is highly recommended in districts with consistent past lack of achievements with standard approaches: Kigoma, Ruangwa, Liwale, Tarime/Rorya, Tandahimba, Newala, Tunduru, Namtumbo, Handeni, and Kilindi. LSM should be judiciously introduced if there is evidence of outdoor transmission.
b) **BCC:** Should deliver targeted messages for BCC for adherence to vector control and treatment measures

Malaria Control in Areas with Insecticide Resistance

Insecticide resistance sentinel sites across the country and data from recent surveys are showing evidence of a rapid spread of resistance amongst *An. gambiae s.l* populations to pyrethroids. There are some indications of reduced susceptibility to DDT insecticide resistance detected in different areas of the country both targeted and non-targeted by IRS. The emergence of resistance may be attributed to multiple factors and not necessarily related to malaria control. There is some evidence of rapid increase of resistance in areas where IRS has been intensively used: Muleba, Geita, Magu, and Ngara (see *Figure 23)*.

Figure 23. Areas with Pyrethroid (lambda-cyhalothrin) Resistance



Surveys conducted between 2009 and 2012 showed that *An. gambiae s.l*. were resistant to deltamethrin, lambda-cyhalothrin, or permethrin in 14 out of the 81 study areas (17%), while other 23 (32%) shown level of possible resistance.

Among 21 sites where lambda-cyhalothrin was tasted, 5 sites showed a significant level of resistance (Muleba, Moshi, Ngara, Geita, and Arusha/Meru) and other 4 showed possible resistance (Muheza, Mvomero, Ilala and Handeni).

Data Source and Map: NMCP (2013)

Implication for Malaria Control Interventions

The possible effect of insecticide resistance on malaria transmission is not yet clear but may be significant. In 2012 NMCP adopted an interim IRMP, which will be updated as new evidence becomes available The key strategies in

the IRMP are outlined in the IMVC component above. LGas in the affected districts will require additional technical and operational support on appropriate measures to mitigate resistance. Intensified entomological monitoring as well as epidemiological surveillance is required in these areas. The standard malaria diagnosis, treatment, and preventive therapies apply.

Strategic Options

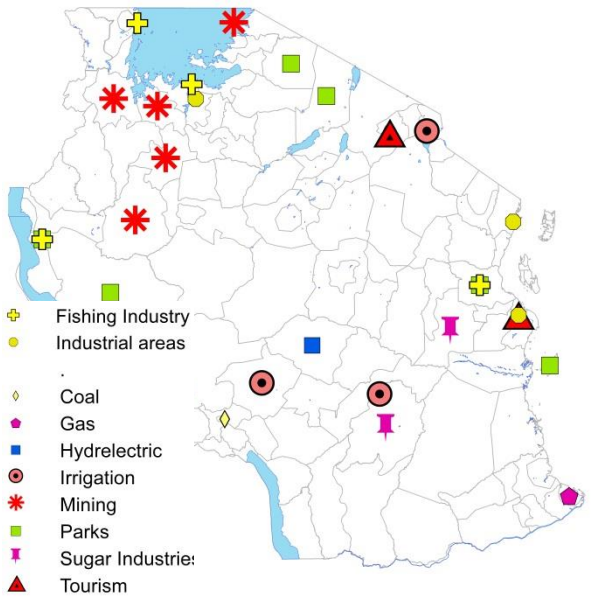
a) **IMVC:** If high resistance is detected, judicious use of IRS with alternative class of insecticide, according to the IRMP is recommended. Insecticide resistance testing should be intensified. Consistent use of LLINs, even if pyrethroid resistance is detected, is still recommended. Innovative efficacious vector control methods should be introduced.

b) **Intensified epidemiological surveillance** should be emphasized due to the risk of malaria rebound or epidemics and to monitor the effect of insecticide resistance in malaria transmission.

Malaria Control in Economic and Development Projects Areas

There are a large number of national and international private companies engaged in activities that modify the environment, which potentially increase the number of malaria breeding sites and transmission. These include large civil works, hydro-electric power and road construction projects, irrigation schemes, mining schemes, and the tourism industry (see *Figure 24).*

Figure 24. Economic and Infrastructural Development Projects



Large-scale economic and infrastructural development projects are indicated in the map.

Number of employees and population affected by the projects is not known.

Data Source and Map: NMCP (2013)

Implication for Malaria Control Interventions

The active participation of these companies in malaria control, as part of Corporate Social Responsibility (CSR) programmes, could have an important positive impact on reducing malaria transmission. These companies can be an important target for bio-larviciding and environmental management interventions, as well as outreach to their work force and the surrounding communities. A private sector platform, called the Malaria Safe Programme, has been created to encourage these initiatives (see BCC component above).

The NMCP will also liaise with the NEMC to promote inclusion of malaria risk in Environmental Impact Assessments.

Strategic Options

a) **IMVC:** Advocate for introduction of IRS in project areas; targeted distribution of LLIN through private companies; and LSM to be adopted for large projects involving excavation and environmental modification.

b) **Malaria diagnosis, treatment and preventive therapies:** Promote standard approach to malaria diagnosis and treatment in company clinics as indicated by current national guidelines is recommended

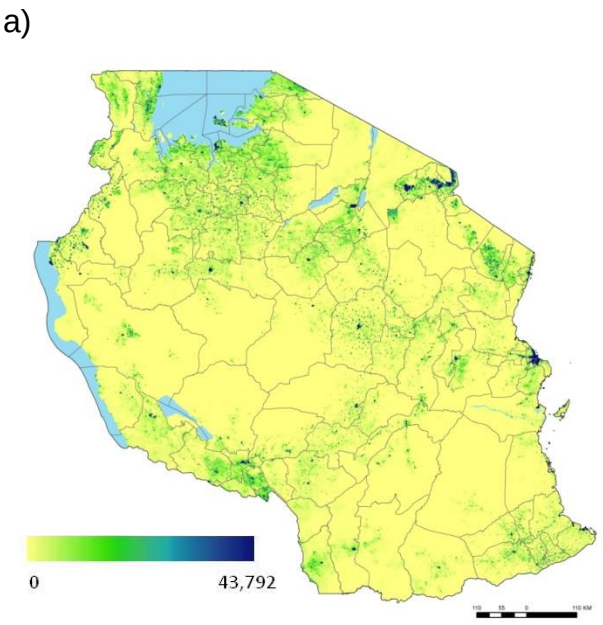
c) **BCC:** Develop BCC targeted messages according to the Malaria Safe Company Initiative; promote initiatives to involve communities surroundings large development projects

d) **SME:** Ensure companies are adhering to the set up malaria SME system through standard reporting modalities; Include specific indicators to demonstrate outcomes and impact

Malaria Control in Areas with Limited Access to Healthcare Services (Hard to Reach Areas)

Populations living far from healthcare services (5km or more) have higher parasitaemia levels compared to people living closer to services (NMCP, 2010). About 1 in 10 Tanzanians living in rural areas has extremely difficult access to health services (distance of more than 10km). These populations in hard-to-reach areas have poor access to treatment for uncomplicated and severe malaria, and related complication such as severe anaemia. Treatment opportunities are often delayed, which leads to an increased risk of severe malaria and death. Delivery of preventive services, such as access to LLINs and preventive therapies delivered by healthcare facilities, is also sub-optimal. There is a need to address the impaired health services accessibility especially for malaria case management. The identification of hard to reach areas is quite complex. More stratification is needed to identify underserved areas. Approximately 10% and 30% of rural population lives over 10 Km and 5Km far from health facilities respectively *(see **Figure 25)***.

Figure 25. (a) Modeled Population Density Projected to 2010 and (b) Distribution of Geo-Coded Hospitals, health Centres and Dispensaries



Data Source and Map: Epidemiological Profile of Malaria and Its Control in Tanzania (NMCP 2013)

Implication for Malaria Control Interventions

There is a need to address impaired health services accessibility, especially for malaria case management, possibly through introduction of community case management coupled with a strong monitoring system. Access to the preventive measure (such as the voucher scheme) and BCC provided through health facilities may be compromised in these areas. Specific community outreach mechanisms for commodities (e.g. LLINs) and messages are required in these areas. Selected community health workers need to be supported by local councils (village and districts) to be motivated to render the necessary services to the communities.

Strategic Options

a) **Identify and map** communities living far from health services
b) **Integrated vector control:** Identify alternative LLIN distribution mechanism for populations with compromised access to healthcare service delivery
c) **Malaria diagnosis, treatment, and preventive therapies:** Introduce appropriate community malaria case management schemes; work in collaboration with stakeholders to develop appropriate logistic and information systems
d) **Behaviour change communication:** Develop alternative interpersonal communication channels through the community based health care delivery system

Strategic Options in Vulnerable Population Strata

Malaria Control for Infants and Children

Approximately 16.4 % of population (7.1 million) are U5 children. Among them, 1.8 million children live in areas that are malaria free or have less than 1% of prevalence; 2.4 million live in hypo-endemic areas; and to 2.7 million

children and meso-endemic areas. Only 160,000 children live in very high transmission areas. About 900,000 children are potential target for Seasonal Malaria Chemoprophylaxis (SMC) in 11 districts.

The **strategic interventions** to improve malaria services for infant and children are based on innovative and evidence based preventive therapies (e.g., SMC) and vaccines, if and where appropriate. Caretakers of infant and children should be targeted by appropriate BCC initiatives to improve early care-seeking behaviour and use of LLINs. Infants and children attending RHCs are the ideal sentinel population to monitor parasitaemia. This vulnerable group is still targeted by special LLIN distribution mechanisms through TNVS.

Malaria Control for Pregnant Women

Pregnant women account for about 4% of the population (1.7 million) of which about 450,000 live in areas that are malaria free or with less than 1% prevalence, while 580,000 and 660,000 live in hypo-endemic and meso-endemic areas, respectively. Only 40,000 pregnant women live in very high transmission areas. It should be considered that about a half million pregnant women live in areas where IPTp is unlikely to be of benefit. It is not clear what the strategic implication is of withholding IPTp in those areas.

The **strategic interventions** to improve malaria preventive and curative services for pregnant women are: early diagnosis and prompt treatment, including anaemia; IPTp, anaemia prevention; and delivery of LLINs through TNVS or other alternative distribution mechanisms. Pregnant women attending RCH services are monitored for parasitaemia (i.e., sentinel population surveillance).

Malaria Control for People living with HIV/AIDS

The overall HIV seroprevalence for population between 15 to 49 years is 5.1% (THMIS, 2012). This age group accounts for 45.7% of the population. Therefore, the expected HIV seroprevalence among this population is about 1,012,000, while the total estimate people living with HIV/AIDS is around 1.6 million (UNAIDS). The total number of people enrolled in the treatment and care scheme is about 300,000 (UNAIDS).

The **strategic interventions** to improve malaria services for people living with HIV are (1) standard indications for malaria diagnosis and treatment and vulnerability reduction for the HIV affected population and for PMCT as provided by the national guidelines; (2) use of LLINs and other personal protection measures; and (3) targeted messages on adherence and compliance with the suggested preventive therapy for reducing malaria vulnerability in eligible people living with HIV. Close collaboration and coordination with NACP, the RCH section of MoHSW, and other stakeholders are required to implement and monitor the initiatives.

Malaria Control for Non-immune Travellers

Tanzania is expecting to receive about 800,000 non-immune tourists per year (Tanzania Tourist Board). Several thousands of other non-immune people are currently living in Tanzania as expatriate employees and their families.

The **strategic interventions** to improve malaria services for non-immune travellers are (1) chemo-prophylaxis as recommended by the national guidelines; (2) use of LLINs and other personal protection measures; and (3) information to be delivered through the tourism industry, diplomatic missions, and at ports of entry. A Safe Malaria Company Initiative for the tourism industry and other sectors employing non-immune foreigners are advocated.

Malaria Control for School Children (5–15 years)

Children between 5 and 15 years of age account for 27.8 % of population (12 million). Among them only 3 million are living in areas with no malaria transmission or very low risk. Another 2.9 million are expected to live in the defined urban councils while the rest are located in the remaining hypo-, meso- and holo-endemic areas. As a

consequence of the current epidemiological transition and the low acquired immunity, a possible shift in malaria incidence should be considered from U5 children to this age group, especially in the low transmission areas.

The **strategic interventions** to improve malaria services for school aged children focuses on standard malaria case management approach, but it should be considered that school children in low transmission areas might be immunologically naïve and prone to abrupt severe malaria forms. This is also considered a target for the SNP for LLIN keep-up strategy. The group can provide an ideal platform for regular prevalence surveillance.

Malaria Control for People with Sickle Cell Disease

The frequency of the sickle heterozygous carrier state in Tanzania is 13%, with an estimated annual birth of 8,000 homozygous children that are likely to develop Sickle Cell Anaemia (SCA). There is more compelling evidence to suggest that patients with SCA are protected from malaria, both in terms of a lower prevalence of malaria infection and a lower parasite density. However, recent studies revealed that malaria is significantly associated with severe anaemia and death in hospitalized patients with SCA and mortality was considerably higher among SCA than non-SCA children hospitalized with malaria (Makani, 2010). Since malaria plays a central role in the high early mortality seen in children with SCA, consequently it is important to provide all children living with SCA in malaria-endemic areas with effective prophylaxis and promptly and effectively diagnosis and treatment.

The **strategic interventions** to improve malaria services for sickle cell patients include the following: (1) since currently no suitable chemoprophylaxis options are available, early diagnosis and prompt care is necessary to avoid the occurrence of severe malaria; (2) facilitated distribution and use of LLIN is highly recommended; (3) specific BCC messages should be delivered for prompt treatment and preventive measures in clinical settings; and (4) special case surveillance needs to be established in clinical settings for regular follow up of patients.

Malaria Control for Population below Poverty Level

The results of THMIS 2012 show that population in the highest wealth quintile has 10 times less malaria compared to population in the lowest two quintiles (1.3% and 12.6%, respectively). The same survey shows that better education level is also associated with lower malaria prevalence. Children 6–59 months old, with a caretaker with no education, have three times more parasitaemia prevalence compared to children whose caretaker has a secondary education (6% and 2%, respectively). Furthermore, education is also influenced by wealth: Approximately half of the population in the lowest wealth quintile has no education compared to 8% in the highest quintile.

The level of poverty remained high in Tanzania, with one-third of the population considered poor. Poverty dropped only marginally from 35.7% in 2001 to 33.6% in 2007. The absolute number of the poor has increased by 1.3 million during the same period, per the Household Budget Survey 2007.

The THMIS 2012 reports that half of the population in rural areas falls in the lowest and second wealth quintiles. The distribution of the population by wealth quintile among regions shows large variations. The Southern and Central Zones have the largest proportions in the two lowest wealth quintiles.

The 2012 THMIS reveals that there is an equal access to LLIN among different wealth quintiles. Net ownership in the poorest quintile increased from 22% to 90% between 2008 and 2012, due to the free net distribution campaigns (2009–2011). In addition, it should be remarked that the malaria prevalence in the poorest quintile halved between 2008 and 2012 (from 23% to 12%). There is a very close relationship between the huge increase in LLIN ownership and the decreased prevalence in the lowest wealth quintiles of the population (NBS 2008 and NBS 2012). Free net access should be the main initiative to maintain large access to LLINs in the economically disadvantaged classes, but the high prevalence of malaria in the poorest class of the population demonstrates that the standard preventive measures are inadequate. LLINs alone are not enough to assure complete protection of

the poorest. Other factors should be taken in consideration: Improved housing is probably the most important factor but falls beyond the scope of the malaria control programme.

Access to health services and affordability of healthcare is an obstacle for a large class of individuals. The DHS 2010 observed that 24% of women and child caretakers have problems in accessing healthcare due to lack of money for treatment. The proportion increases to 42% for women included in the lowest wealth quintile. Delivery of affordable healthcare is key to improve access to malaria case management for a large section of the Tanzanian society that, in fact, is most at risk of malaria.

Both educational level and access to media are remarkably lower in the poorest strata of the population compared to the wealthiest strata. BCC options to reach the target population should consider the several disadvantages related to those factors. Use of conventional media is not a viable option. Innovative ways to improve interpersonal communication should be taken into account, starting from the available channels such as use of healthcare workers in health facilities and in the territory.

Improved access to preventive and treatment services should be explored, and eventually monitored and evaluated. Reduction of extreme poverty is a millennium development goal. Promote collaborative links between malaria agenda and poverty reduction strategic options within the government and developing partners.

The **strategic interventions** to improve malaria services for population below poverty level are (1) free LLIN distribution and other IMVC initiatives, according to epidemiological and operational strata; (2) identification of population strata with extremely limited resources and income; (3) provision of equitable and affordable malaria diagnosis and treatment; and (4) establishment of community case management.

Effective use of healthcare workers and community workers is necessary to propagate the appropriate messages for this economically vulnerable class. Alternative interpersonal communication channels should be identified. Involvement of local government authorities and social welfare services may be required.

Malaria Control for Nomadic Populations and Mobile Populations

It is estimated that less than 1.5 million nomads live in northern and central regions of Tanzania and account for about 3% of the total population of the country. Given their high mobility, and being located in remote areas, the nomadic communities are very hard to reach for delivery of public health interventions. Provision of accessible, affordable, and sustainable healthcare services to populations living in nomadic life-styles is challenging.

The **strategic interventions** to improve malaria services for nomadic communities are (1) mobile clinic outreach; (2) community LLIN delivery mechanisms; and (3) peer education. Community-directed interventions should be the cardinal mechanism to deliver appropriate services in mobile population.

Malaria Control for Refugees and Displaced Populations

Refugees, displaced populations, and migrants are particularly vulnerable to malaria for several reasons, including poor health and malnourishment, lower immunity due to lack of malaria transmission in place of origin, high malaria transmission in the refugee camps, and poor access to health services. The main priority for these populations is to improve coverage of malaria control services through prioritized interventions.

The **strategic interventions** to improve malaria services for migrants, refugees and displaced people are (1) provision of testing and treatment services in the camps; (2) targeted distribution of LLINs; (3) culturally appropriate BCC interventions through interpersonal communication and community interventions; and (4) close monitoring of cases. All interventions should be provided in close collaboration with the organisations managing the camps.

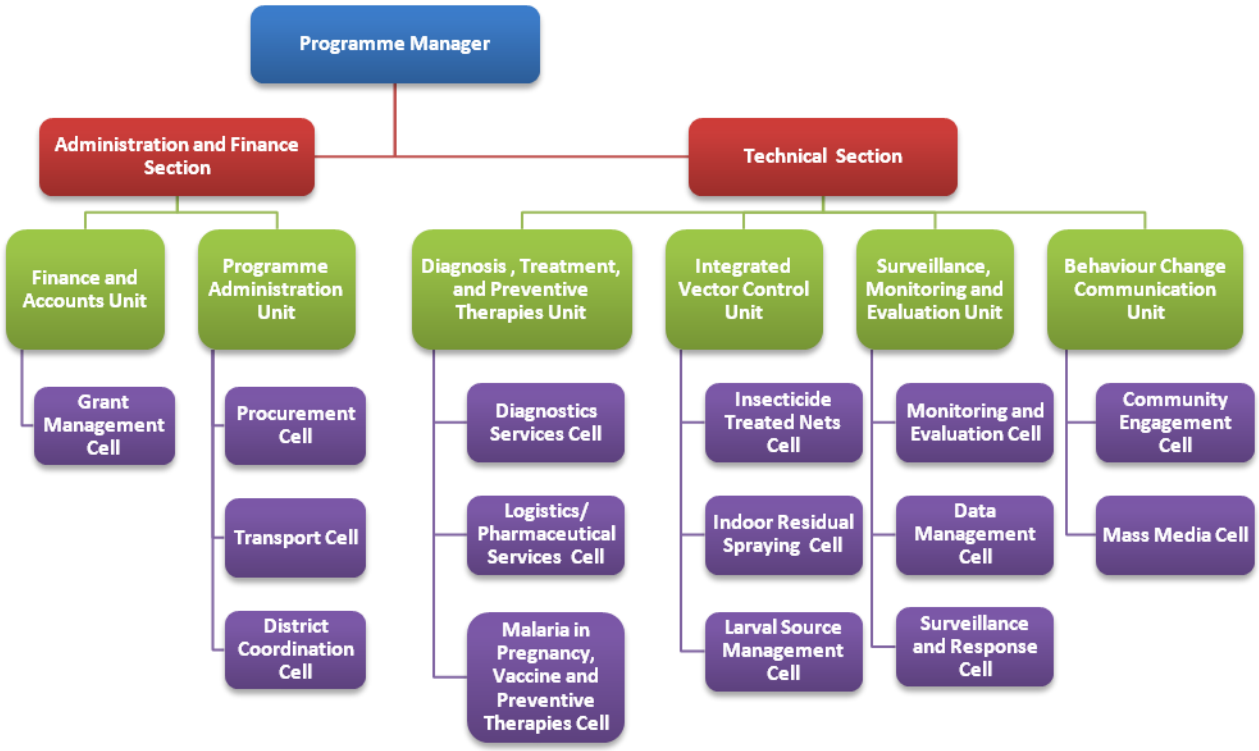
CHAPTER 6: IMPLEMENTATION ARRANGEMENTS

Administration and Management of NMCP

The NMCP falls under the Directorate of Preventive Services in the MoHSW and is organised as show in ***Figure 26***.

NMCP is responsible for designing strategies, developing guidelines, mobilizing resources, facilitating implementation and M&E on progress on malaria control interventions. The regional and local government authorities are responsible for overseeing and implementing the malaria strategies in the communities and districts, together with implementing partners. Regional and district Malaria and IMCI Focal Persons are responsible for coordinating malaria interventions in their respective areas.

Figure 26. NMCP Organogram



Roles, Responsibilities and Functions

NMCP Programme Manager

1. Provide leadership to the staff of the National Malaria Control Programme;

2. Coordinate preparation, development and dissemination of malaria periodic plans and policy guidelines in the country;
3. Coordinate all partners and stakeholders to mobilise adequate resources for malaria control;
4. Coordinate the overall implementation of malaria medium strategic plan;
5. Ensure adequate control, effective and efficient utilisation of malaria control resources at all levels;
6. Coordinate effective liaison with other country malaria control programmes or global forums; and
7. Act as principal spokesman of the programme.

Functions of the Sections and Units

The NMCP is divided into two sections: Technical and Administration and Finance, which in turn are divided into units and cells. The heads of the sections report to the Programme Manager. NMCP is staffed by government employees, as well as technical staff contracted through development partners.

Technical Section and Units

1. Provide technical oversight and coordination of the NMCP's technical units; and
2. Provide technical advice to the Programme Manager on all technical matters of malaria control.

The technical section, headed by a senior public health specialist, is divided into four units: (1) Integrated Malaria Vector Control, (2) Malaria Diagnosis, (3) Treatment and Preventive Therapies, (4) Behaviour Change Communication and Surveillance, Monitoring and Evaluation respectively. The functions of the Technical Section units are as follows:

1. Coordinate the four thematic units in the planning and implementation of the respective malaria control activities; and
2. Plan, coordinate, monitor and evaluate the implementation of malaria control activities by regional and district authorities and implementing partners.

Integrated Malaria Vector Control Unit

The Integrated Malaria Vector Control unit is led by a head (Entomologist or Vector Control Specialist) and includes three cells: (1) Insecticide Treated Net, (2) Indoor Residual Spraying and (3) Larval Source Management. The functions of the Integrated Malaria Vector Control cells are as follows:

1. Coordinate, manage and provide technical assistance on all matters related to malaria vector control; countrywide, including ITNs, IRS, environmental management and larviciding in urban settings;
2. Develop malaria vector control policy guidelines and strategies in the country;
3. Provide support to Local Government Authorities to plan, manage and implement vector control interventions at district and community level; and
4. Liaise with global and national research institutions to gather and create a database of scientific evidence on malaria vectors and related issues for decision-making forums over time.

Malaria Diagnosis, Treatment and Preventive Therapies Unit

The Malaria Diagnosis, Treatment and Preventive Therapies (DT&PT) unit is led by a head (Physician or Public Health specialist) and includes three cells: (1) Diagnostics Services, (2) Logistics and Pharmaceutical Services and (3) Malaria in Pregnancy, Vaccine and Preventive Therapies. The functions of the DT&PT cells are:

1. Coordinate and provide technical assistance on matters related to malaria diagnosis, treatment and preventive therapies countrywide;

2. Coordinate preparation and review of malaria policy guidelines for malaria diagnosis, treatment and preventive therapies;
3. Coordinate and supervise training of health workers on all issues related to malaria diagnosis, treatment and preventive therapies;
4. Coordinate the implementation of mRDT use and clinicians' adherence to laboratory malaria results countrywide; and
5. Participate in malaria research studies conducted by various partners.

Behaviour Change Communication Unit

The Behaviour Change Communication Unit, led by a head (Sociologist or Communication Specialist), includes two cells: (1) Community Engagement, and (2) Mass Media. The functions of the BCC cells are as follows:

1. Oversee and coordinate malaria BCC activities implemented by various partners in the country;
2. Coordinate and harmonise the development of BCC messages and materials in line with the overall strategy;
3. Develop malaria communication policy guidelines and strategies;
4. Act as liaison between NMCP and the MoHSW's Health Education Unit; and
5. Conduct malaria control advocacy to decision makers, influential groups and the community at large countrywide.

Surveillance, Monitoring and Evaluation Unit

The Surveillance, Monitoring and Evaluation unit, led by a head (Epidemiologist or M&E Specialist), includes three cells: (1) Programme Monitoring and Evaluation, (2) Data Management and (3) Surveillance and Response. The functions of the Surveillance, Monitoring and Evaluation cells are as follows:

1. Coordinate, manage and provide technical assistance on all matters related to malaria surveillance, monitoring and evaluation;
2. Coordinate the development and implementation of the Malaria Surveillance Monitoring and Evaluation Plan;
3. Coordinate the collection, processing, analysis and interpretation of malaria control data;
4. Liaise with technical and research institutions in planning and conducting programmatic surveys, reviews and implementation assessments;
5. Liaise with technical institutions to carry out epidemiological and entomological studies for further scientific evidences on malaria control; and
6. Manage malaria database for malaria control.

Administration and Finance Section and Units

The Administration and Finance section, headed by a Senior Administrative Specialist, is divided into two units: (1) Finance, and (2) Administration. The functions of the Administration and Finance's units are as follows:

1. Coordinate timely availability and optimal utilisation of programme resources, including finance, human resource, transport facilities and equipment; and
2. Coordinate regional malaria and IMCI focal persons, district malaria and IMCI focal persons and implementation partners at all levels.

Financial Management Unit

The financial management unit includes a Grant Management cell. The unit is led by a senior financial specialist and its functions are as follows:

1. Coordinate all financial management of NMCP;
2. Provide budget oversight for all financial resources for malaria control at the national level;

3. Verify financial expenditures by contracted malaria partners; and
4. Establish and maintain a financial data system for all financial resources accrued countrywide in the malaria sector by the government and other implementing partners.

Programme Administration Unit

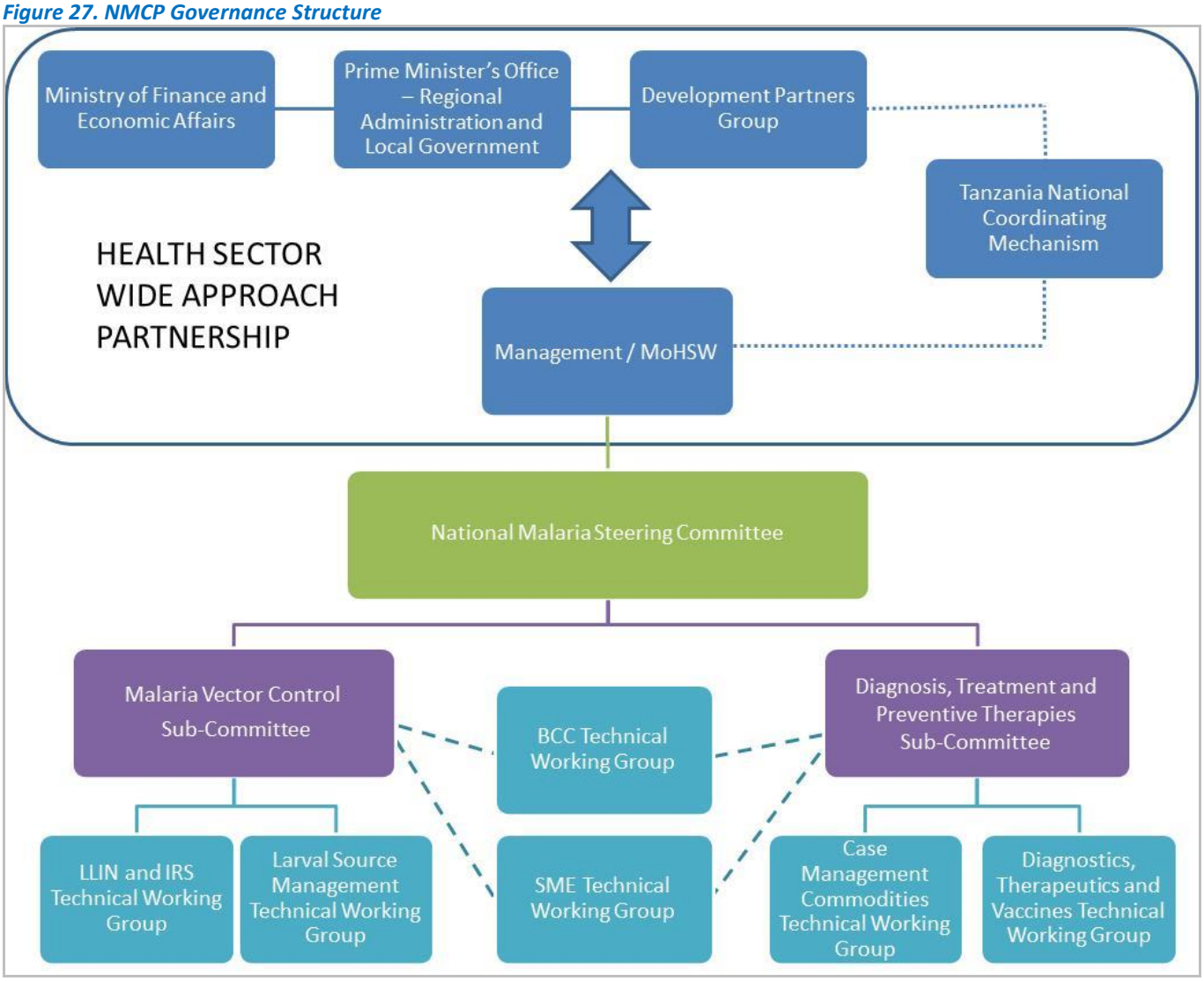
The financial management unit incorporates three specific cells: (1) Transport, (2) Procurement and (3) District Coordination. The unit is led by an administrative specialist and its functions are as follows:

1. Manage the NMCP's human resources and capacity building;
2. Manage all NMCP procurement processes;
3. Manage the NMCP's vehicle fleet;
4. Coordinate preparation of technical quarterly and annual implementation plans, budgets and reports;
5. Ensure that malaria and IMCI focal persons in all regions and districts receive adequate training and support;
6. Support regional and local government authorities in budgeting and planning to ensure availability and maintenance of effective and efficient transport system and facilitative equipment and supplies in malaria control at all levels.

NMCP Governance and Coordinating Mechanisms

NMCP is responsible for overall management of malaria control in the country, but many of the issues are multisectoral and involve a range of stakeholders, including other vertical programmes under the Directorate of Preventive Services, other ministries and government statutory bodies, and the development partners. A National Malaria Steering Committee (NMSC) will be established that is responsible for governance and will be supported by two technical sub-committees with a number of technical working groups, as shown in *Figure 27*.

Figure 27. NMCP Governance Structure



The National Malaria Steering Committee

This NMSC is responsible for strategic decisions concerning malaria control, based on recommendations from sub-committees. Issues that involve new implementation initiatives or policy change will be submitted to the MoHSW Senior Management for review and/or endorsement. The MoHSW Senior Management in turn interacts with the MoF, the Prime Minister's Office – Regional and Local Government Authorities as well as coordinating bodies of the development partners.

The purpose of the NMSC is to fast track malaria control activities all aimed at scaling up interventions towards the achievement of RBM targets and MDGs, as per the terms of reference (TOR) outlined below.

- Advise and make recommendations to the MoHSW on all matters related to policies and strategies of national malaria control;
- Receive and discuss reports and approve recommendations from sub-committees on changes to malaria control policies, strategies and interventions;
- Facilitate development of consensus among partners on strategic issues related to implementation of interventions for the prevention and control of malaria;

- Identify critical strategic and programmatic issues arising from implementation of malaria interventions and activities and assign responsibilities to working groups for follow up;
- Identify emerging programmatic and implementation research questions and bring these to the attention of relevant partners;
- Recommend strategies for addressing the capacity gaps for scaling up for impact;
- Advocate for increased attention to and resources targeted to control of malaria; and
- Advocate for strengthening of partnership in addressing malaria interventions.

Composition of Committee

The composition of the NMSC should not exceed 20 members of whom the Chief Medical Officer shall be the chairperson. The NMCP Programme Manager will function as the secretary and NMCP heads of units will form a secretariat.

The NMSC members will include senior representatives from MoF, Prime Minister's Office – Regional Administration and Local Government (PMORALG), Development Partner Group (DPG), Tanzania National Coordinating Mechanism TNCM secretariat, World Bank, WHO, and ZAMEP. The MoHSW members will include the Director of Preventive Services, the Director of Policy and Planning, the Director General of NIMR and the chairpersons of the two technical sub-committees.

The new NMSC will co-opt members in accordance to subject matter, when needed. The NMSC will meet twice per year. Ad-hoc meetings can be convened whenever necessary.

Malaria sub-Committees and Technical Working Groups

Two malaria technical sub-committees will be formed, namely a Malaria Vector Control Sub-Committee and a Malaria Diagnosis, Treatment And Preventive Therapies Sub-Committee. The permanent membership of the main sub-committees will be determined through a process approved by the NMSC and based on the following criteria:

- Expertise and experience in malaria programmes for at least 5 years;
- Knowledge of malaria and reproductive health issues;
- Balance of scientific and programmatic knowledge and experience; and
- Commitment to participate actively in malaria control interventions.

The sub-committee will meet every quarter, and ad-hoc meetings can be convened whenever necessary. The two sub-committees will be answerable to the NMSC. The respective NMCP Head of Malaria Vector Control and Malaria Diagnosis, Treatment And Preventive Therapies Units will function as the secretariat.

Malaria Vector Control Sub-Committee

A Malaria Vector Control Sub-Committee will be established with the following TOR:

- To advise on implementation plans and progress reports related to Malaria Vector Control
- To review vector control activities in the country and advice the NMSC accordingly.
- To review policies, legislation, regulations and procedures and advise the NMSC on their enforcement and application
- To review various malaria vector control activities carried out by other stakeholders and give on-the-spot advice on the appropriate technical aspect
- To identify potential areas for research and suggest ways and mechanisms towards obtaining appropriate solutions

- To review and advise on the best modalities of publicizing policies, policy guidelines and communication strategies on IEC related to malaria
- To advise on innovative and cost-effective approaches for implementation of IEC on malaria to reach people at all levels.
- To advise on maximum utilization of appropriate communication channels available locally i.e. zonal, regional, district and community
- To advise on the appropriateness of IEC materials that would disseminate correct and effective information in regard to malaria vector prevention and control
- To device best mechanisms to track progress of program interventions
- To develop TOR and members composition for each working group under it

Composition of Sub-committee

The Malaria Vector Control Sub-Committee has a multisctoral composition. Members are selected by the respective institutions based on their expected contribution to the specific vector control matters within their areas of expertise. The sub-committee membership includes the following:

1. Director of Preventive Services (chairperson)
2. Head of Integrated Vector Control Unit (secretariat)
3. Programme Manager, NMCP
4. A representative from research institution
5. A representative from Tropical Pesticides Research Institute (TPRI)
6. A representative from the National Environmental Management Council (NEMC)
7. Chairpersons of technical working groups related to malaria prevention
8. A representative from Vice President's Office- Division of Environment
9. Representative from the Ministry of Agriculture
10. Representative from the Prime Minister's Office for Regional Administration and Local Government
11. Head of Vector Borne Disease Unit of the MoHSW
12. Donor Partner Group representative (Malaria Technical Advisor)
13. USAID-PMI Malaria Technical advisor
14. NMCP Technical Advisor
15. WHO representative

The Head of IVCM Unit will be the secretariat for the sub-committee. Should it be deemed necessary the sub-committee will co-opt members in accordance to subject matter.

Malaria Diagnosis, Treatment and Preventive Therapies Sub-Committee

A Malaria Case Management Sub-Committee will be established covering diagnosis, treatment, preventive therapies and vaccine sub-committee and will have the following TOR:

- Review the status of drug resistance and make recommendations;
- Maintain under review the quality of antimalarial drugs and manufacturing practices and recommend action, as necessary, to deal with substandard products and practices;
- Advise on government policy on antimalarial drugs;
- Review and revise, or develop as necessary, clinical guidelines for case management and laboratory diagnosis for various cadres of health workers and for use in the community;
- Review pre-service and in-service training needs for case management and laboratory diagnosis and recommend changes to curricula or training packages needed to meet these needs.

- Review needs and stocks of supplementary supplies for treatment and diagnosis of malaria.
- Submit resolutions pertaining to malaria diagnosis and treatment to the NMSC for endorsement
- Monitor the implementation of current drug policy, identify problems and recommended solutions to MSC.
- Develop TOR and members composition for each working group under it

Composition of Sub-committee

The Malaria Diagnosis, Treatment and Preventive Therapies Sub-Committee members are selected by the respective institutions based on their expected contribution to the specific areas of expertise. The sub-committee membership includes the following:

1. Director of Hospital Services (chairperson)
2. Head of the Malaria Diagnosis, Treatment and Preventive Therapies Unit (secretariat)
3. Programme Manager, NMCP
4. Paediatrician from a referral or teaching hospital
5. Obstetrician/Gynaecologist from a referral or teaching hospital
6. Representative of Therapeutical Efficacy Testing Network
7. Representative from Pharmaceutical Supply Section (PSS) of the MoHSW
8. Representative from Medical Stores Department
9. Representative from Tanzania Food & Drugs Authority (TFDA)
10. Laboratory Technologist from reference laboratory, MoHSW
11. Assistant Director, Diagnostic Services, MoHSW or representative
12. Chief Nursing Officer's Office (CNO Office)
13. Representative from Association for Private Hospitals
14. Assistant Director, Reproductive & Child Health Services (IMCI, MIP, PMCTC, EPI)
15. WHO representative
16. Donor Partner Group representative (Malaria Technical Advisor)
17. PMI Malaria Technical advisor
18. NMCP Technical Advisor

Technical Working Groups

A total of six working groups will be formed

1. LLIN and IRS
2. Larval Source Management
3. Case Management Commodities
4. Diagnostics, Therapeutics and Vaccines
5. Behaviour Change and Communication
6. Surveillance, Monitoring, and Evaluation

The first and second working groups report to the Malaria Vector Control Sub-Committee. The third and fourth report to the Malaria Case Management Sub-Committee and the last two groups are cross-cutting.

All technical implementation/programmatic issues related to malaria case management will be discussed at respective technical working groups and their resolutions be submitted to the respective sub-committee. The working groups will meet monthly. The head of NMCP units will be the SC secretariat Technical working groups

Thematic programmatic areas that require competent and dedicated technical contributions should be addressed by specific task forces. A few examples from the recent experiences include task forces to address the following

subjects: selection of first line antimalarials, malaria in pregnancy and access to malaria treatment in the private sector. The composition of the task forces and their term of reference are designated by the respective technical working groups. Task forces are reporting to the technical working groups.

Quarterly, Biannual and Annual Progress Review Meetings

Quarterly reports are submitted by districts, regions and all implementing partners. NMCP also prepares quarterly reports for submission to the Department of Preventive Services. Biannual reports, in the form of Progress Updates and Disbursement Requests (PUDR), are prepared and submitted to the Ministry of Finance (Global Fund Programme Management Unit) through the MoHSW, PMU. Annual reports are prepared by all districts, regions and implementing partners and are submitted to the NMCP.

Implementation Mechanisms

Implementation of the strategic plan will be a joint effort of all partners and stakeholders at national, regional, district and community levels. Implementation will occur through (1) the public health system, including parastatal or multisectoral public health services (e.g., health services within the Ministry of Education, local government authorities, etc.); (2) CSOs (NGOs, CBOs and FBOs); and (3) through and with the private sector. The MoHSW is the overall responsible entity for the implementation of malaria control interventions by different organizations under the strategic plan framework.

Regional and Council Authorities

Tanzania's public health system operates at the national (strategy and policy making), regional (technical advice and capacity building) and district (coordination and supervision of implementation) levels. Delivery of health services is shared among the MoHSW and PMO-RALG. Consultant hospitals, zonal health training centres and special programs fall directly under the MoHSW. PMO-RALG manages district and regional health services, including the regional and district councils.

In line with the decentralization introduced in the 1990s, the MoHSW has delegated decision-making power on primary healthcare to the district and regional level. The primary healthcare system is organized as a pyramidal system with different levels, including village health services, dispensary services, health centre services, district hospitals, regional hospitals, and referral/consultant hospitals. RHMTs and CHMTs, comprising of a total of nine core and another eight co-opted members, are responsible for developing annual health plans and budgets. The CCHPs are developed in line with MoHSW guidelines; however, the plans often do not provide detailed strategies or sufficient resources for effective malaria control interventions.

The day-to-day implementation of the regional and district malaria interventions are coordinated by the Regional and District Malaria and IMCI focal persons, who are members of the RHMTs and CHMTs, respectively. NMCP maintains a technical link to the districts and regions through the RMIFPs and the DMIFPs to align to the implementation process. The regions and districts employ other health professionals who have been trained by NMCP and partners on specific subjects (e.g., SME, malaria diagnosis and treatment, malaria in pregnancy, IRS, LLIN delivery, etc.).

Roles of the Regional Malaria IMCI Focal Persons

The RMIFP is a health professional selected by the RHMT and successively trained by the NMCP. The roles of the RMIFP are as follows:

1. Coordinate malaria DIMCIFs and CIMCIFs in the region;

2. Liaise with NGOs and other partners on malaria control activities or interventions in the region; Consolidate district/council quarterly malaria implementation reports into a single regional quarterly malaria implementation report and reporting to NMCP in a timely manner;
3. Advise the RHMT on better implementation tactics of malaria control activities or interventions in the region;
4. Function as the liaison between the NMCP and RHMT on malaria control issues, especially on the availability and distribution of malaria policy guidelines; and
5. Carry out any other standing or periodic assignment prescribed by RMO/RHMT.

Roles of the District Malaria IMCI Focal Persons

The DMIFP is a health professional selected by the CHMT. The majority have been trained by the NMCP for a period of four weeks. The roles of the DMIFP are as follows:

1. Coordinate the malaria control interventions in the district and council;
2. Liaise and ensure adherence to national malaria policy guidelines by all NGOs and other partners in malaria control activities and interventions in the district;
3. Prepare and submit an annual technical implementation report to RMIFP and NMCP;
4. Advise the CHMT on better implementation tactics of malaria control activities and interventions;
5. Carry out any other standing or periodic assignment prescribed by DMO or CHMT.

District Primary Healthcare Committee

The District Primary Healthcare Committee, chaired by the District Commissioner, is the health advisory board at district level. The committee membership includes all key actors at district level, development partners, and representatives of the private sector, NGOs and voluntary agencies. The PHC committee will include malaria control issues as a permanent activity on its agenda.

Council Health Management Team

The CHMT, chaired by the DMO, is the technical body at district level and is responsible for implementation of the malaria strategy, including advocacy and resource mobilisation for malaria control. The CHMT is responsible for supporting health facilities and communities in the implementation of malaria control activities, as well as supervision and M&E of the district's Health Plan.

Community-Level Committees

Village councils, primary healthcare committees and ward development committees are responsible for implementation of community based malaria control activities. They coordinate, with the technical assistance of the local health staff, activities of the different actors involved in the delivery of interventions at household level: implementers of development projects, community resource persons, traditional birth attendants, opinion leaders, leaders of FBOs, extension workers, teachers and private providers of drugs and other health commodities.

Guiding Technical Documents

A series of documents, such as plans, guidelines and training packages, are needed to inform the implementers and stakeholders at different level about standardized control interventions.

Box 3. Technical NMCP Document

Plans

- Communication Plan[a]

- Monitoring and Evaluation Plan[a]
- Human Resource Plan [c]
- Resource mobilization Plan [c]
- Insecticide Resistance Management Plan [b]

Guidelines

- Malaria Diagnosis and Treatment Guidelines [d]
- Malaria Surveillance and Response Guidelines [b]
- Integrated Malaria Vector Management Guidelines [a]

Training packages

- Malaria Diagnosis and Treatment Trainers Guide and Learners Manual [d]
- mRDT Trainers Guide and Learners Manual [d]
- IMCI modules [d]
- Referral Care Manual [d]
- IRS training package (IRS series)[d]

APPENDIX 1: PERFORMANCE FRAMEWORK

Table 2-1: Programme Goal

Items	Indicators	Baseline and Target Values			Sources	Method	Frequency	Responsible	Assumptions
		Y0	Y3	Y7					
Goal	**Target**								
Reduce the average country malaria prevalence	Parasitaemia Prevalence in Children 6-59 months	10%	5%	1%	THMIS/ TDHS	National representative survey	3 years	NBS, NMCP	Political willingness, resources available, and communities complying with antimalarial measures

Table 2-2: Integrated Malaria Vector Management

Items	Indicators	Baseline and Target Values			Sources	Method	Frequency	Responsible	Assumptions
		Y0	Y3	Y7					
Strategic Objectives									
To reduce transmission of malaria by scaling-up and maintaining effective and efficient vector control interventions	Percentage of the population who slept under an LLIN last night or in a dwelling sprayed with IRS in the past 6 months	73%	80%	90%	THMIS/ TDHS	National repr survey	3 years	NBS, NMCP	Availability of funding and partner support, communities are aware and willing to use preventive measures, optimal susceptibility of vectors to insecticides
	Reduce entomological inoculation rate (EIR) to <0.1[12]	NA	<0.25	<0.1	Entomological reports	Sentinel sites	Annual	NMCP, Research Institutions (RI)	Framework for entomological monitoring in place
Specific Objectives	**Outcome indicators**								
1. Maintain universal access of the population to LLINs	Percentage of households with at least one LLIN for every two persons	74%	80%	85%	THMIS/ TDHS	National repr survey	3 years	NBS, NMCP	Distribution mechanisms available and maintained throughout the strategic period
2. Consolidate and expand the scope of IRS intervention in selected areas using evidence-based criteria	Percentage of house structures in the country sprayed with recommended insecticide(s) during the past 12 months	12%	15%	20%	THMIS/ TDHS	National repr survey	3 years	NMCP, NBS	Political will and availability of adequate resources
3. Scale-up larviciding interventions to	Percent decrease in larval density in	NA	80%	95%	Evaluation	Survey	Annual	NMCP, RI	Political will and availability

[12] It is recognized that measuring of the Entomological Inoculation Rate (EIR) is problematic, and a representative baseline for Tanzania in not yet available. However, the aim is to establish a baseline by 2016 through representative sampling.

Items	Indicators	Baseline and Target Values			Sources	Method	Frequency	Responsible	Assumptions
		Y0	Y3	Y7					
selected urban areas where breeding sites are few, fixed, and findable	selected areas treated with appropriate larvicides, measured on quarterly intervals				report				of adequate resources
4. Promote effective environmental management for malaria control amongst targeted communities	Proportion of urban wards implementing environmental management to prevent mosquito breeding sites	NA	25%	50%	Evaluation report	Annual survey	Annual	NMCP	Availability of funds, compliance of LGAs, Stakeholders' willingness
5. Introduce new innovations in vector control products and information systems to manage insecticide resistance and address changing vector behaviour	Number of evidence-based innovations adopted and integrated for malaria vector control introduced in Tanzania	NA	1	2	Reports	End of implement ation report	Annual	NMCP, Partners	Availability of evidence-based products, compliance with regulatory institutions, stakeholders' willingness
Strategic Interventions/approaches	**Output indicators**								
1.1 Implement a Mass replacement campaign to bring LLIN coverage13 up to 80%	Percentage of household population sleeping under LLINs.	67%	80%	80%	THMIS/ TDHS	National repr Survey	3 years	NBS, NMCP	Compliance to funding mechanisms requirements. Delivery mechanism in place.
1.2 Implement continuous distribution mechanisms to keep up coverage	Number of LLINs distributed through the different distribution channels (SNP, TNVS and commercial market) annually	NA	7 million	8 million	Implemen-tation report	National repr Survey	Annual	NMCP	School net programme being evaluated and strategic approach approved. Resources for scale up available
1.3 Implement targeted distribution to vulnerable groups: infants and pregnant women	Percentage of children sleeping under LLINs.	71%	80%	85%	THMIS/ TDHS	National repr Survey	3 years	NBS, NMCP	Delivery mechanism in place. Resources for maintaining targeted net delivery available. Communities willing to use LLIN
	Percentage of pregnant women sleeping under LLINs.	73%	75%	85%	THMIS/ TDHS	National repr Survey	3 years	NBS, NMCP	Delivery mechanism in place. Resources for maintaining targeted net delivery available. Communities willing to use LLIN
1.4 Create an enabling environment to revive the commercial market for ITNs and LLINs	Number of ITNs /LLIN sold commercially	NA	2 million	3 million	THMIS/ TDHS	National repr Survey	3 years	NBS, NMCP	Strong commercial sector available and willing to participate in delivery mechanisms
2.1 Build capacity of local government	Number of councils capacitated to	18	43	43	NMCP	Periodic	Annual	NMCP	Councils identified

[13] Measured as one net for every two people

Items	Indicators	Baseline and Target Values			Sources	Method	Frequency	Responsible	Assumptions
		Y0	Y3	Y7					
authority and private sector to plan, manage, implement, and evaluate IRS	deliver quality IRS services				report	surveys			according to epidemiological and operational criteria
2.2 Application of quality indoor residual spraying (IRS) in selected areas	Percentage of house structures sprayed in the IRS targeted areas out of the total eligible	85%	90%	95%	Implementation report	sub-national survey reports	Annually	NMCP, implementing partners	Community aware and accepting to participate in IRS implementation. Availability of capacity of the targeted councils.
3.1 Application of larvicides where mosquitoes breeding sites are few, fixed, and findable	Proportion of city and municipal councils implementing larviciding	3/23	11/23	23/23	Evaluation report	Inspection	Annual	NMCP, RI, LGA	Councils identified according to epidemiological and operational criteria. Continuity of political willingness to implement larviciding measures among local government authorities
3.2 Promote larviciding application by the private sector in suitable environment and civil works sites	Number of advocacy and coordination initiatives targeting private sector companies/institutions on proper use of larviciding	NA	6	12	NMCP reports	Inspection	Annual	NMCP	Acceptability and willingness of private sector to invest in and use larviciding
3.3 Establish a system for monitoring larva density in the areas where larviciding is applied	Proportion of city and municipal implementing councils with ongoing larva monitoring	NA	80%	80%	NMCP reports	Inspection	Annual	NMCP	SOP for larva monitoring available. Skilled staff deployed at council level
4.1 Promote community-led environmental initiatives in selected urban wards	Proportion of urban wards capacitated to deliver effective environmental measures	NA	25%	50%	NMCP reports	Inspection	Annual	NMCP, NEMC, LG	Community aware and accepting to participate in environmental management activities Availability of guidelines
4.2 Promote environmental measures in all infrastructure development projects	Number of advocacy and coordination initiatives targeting the infrastructure development projects on adoption of appropriate environmental measures	NA	6	12	NMCP reports	Inspection	Annual	NMCP, NEMC	Acceptability and willingness of private sector to invest and use environmental management
5.1 Actively participate in regional and international vector control partnerships and apply new evidence-based tools for malaria control in Tanzania	Number of annual regional and/or international meetings in which Tanzania participated and presented field evidence	NA	1	2	Meeting reports		Annual	NMCP	Funds availability, global support to regional and international initiatives
5.2 Implementation of insecticide resistance management plan	Insecticide susceptibility tests conducted in national representative sentinel sites	28	30	33	Technical report	Technical Supervision	Annually	NMCP, Implementing partners	Availability of capable research institutions

Table 2-3: Malaria Diagnosis, Treatment and Preventive Therapies

Item	Indicators	Baseline and Target Values			Data Sources	Method	Frequency	Responsible	Assumptions
		Y0	Y3	Y7					
Strategic Objectives	**Target**								
To prevent the occurrence of severe morbidity and mortality related to malaria infection through promotion of universal access to appropriate early diagnosis and prompt treatment and provision of preventive therapies in vulnerable groups	Case Fatality Rate in patients admitted due to severe malaria (%)	3%	2%	1%	HMIS DHIS	Web based reports and surveys	Monthly and annual	NMCP HMIS	Referral system of severe patient-optimized, quality malaria diagnostics and therapeutics constantly available, prompt management of uncomplicated malaria cases, availability of services for severe cases
Specific Objectives	**Outcome indicator**								
1. All people with signs and symptoms of malaria are able to access appropriate and timely malaria diagnosis	Percentage of children under age 5 with fever who had a malaria test the same or next day of onset of a disease	25%	80%	80%	THMIS/ TDHS	National repr Survey	3 years	NBS, NMCP	mRDT are available at all level of healthcare, in both private and public sectors
2. All people who have malaria are able to access appropriate and timely treatment	Percentage of children under age 5 with fever who were treated with recommended antimalarials the same or next day following the onset of fever	33%	60%	80%	THMIS/ TDHS	National repr Survey	3 years	NBS, NMCP	QAACT are available at all level of healthcare, in both private and public sectors ICCM is implemented in underserved communities
3. Biological and socioeconomical population vulnerable to malaria have access to services to reduce the risk of malaria infection and its complications	Percentage of women with live birth in the previous two years who received two doses or more of SP (IPTp2+)	32%	80%	80%	THMIS/ TDHS	National repr Survey	3 years	NBS, NMCP	Effective alternative AM for IPTp are available
4. Commodities used in patient care and prevention are consistently available at the points of care and are consistently quality assured	Proportion of public healthcare facilities with no stock-outs of both antimalarials and RDTs	NA	90%	90%	SMS for Life	Web	Weekly	NMCP	Global funding mechanism in place, PSM adequate to the needs
5. Appropriate malaria case management interventions are deployed in malaria epidemics and other emergency and resurgence situations	Proportion of emergency situations in which specific malaria case management interventions have been implemented	NA	80%	90%	NMCP	Report	Annual	NMCP	MEEDS in place, CHMT and HF staff trained
Interventions	**Output indicators**								
1.1 Provide high-standard, accessible, affordable, equitable, and quality-assured testing for patients seeking treatment in the public sector	Proportion of suspect malaria cases tested in the public healthcare delivery sector	58%	80%	90%	SMS for life/ILS gateway/ end user verifica-tion	m-health	biannual	NMCP, partners	QARDT are timely procured and efficiently distributed to service points

Item	Indicators	Baseline and Target Values			Data Sources	Method	Frequency	Responsible	Assumptions
		Y0	Y3	Y7					
1.2 Facilitate the provision of high-standard, accessible, affordable, and quality-assured testing to patients seeking treatment in the private sector	Percentage of private facilities that have QA mRDT service available	NA	40%	80%	Periodic private sector surveys	Periodic surveys	Biannual	NMCP/MoHSW/Partners	Biannual surveys in selected sentinel districts
1.3 Provide quality-assured testing services from skilled providers	Percentage of malaria test performers (public and private sector) who attend training	59%	80%	80%	Health Facility Survey	Sentinel district Periodic surveys	Biannual	NMCP/ MoHSW / RI	Diagnostic services are able to provide periodic accreditation of health providers through regional and district laboratory services
1.4 Ensure quality testing services through quality assurance of the diagnostic sites and tests used	Percentage of facilities that pass laboratory accreditation	NA	90%	90%	Health Facility Survey	Periodic surveys	Biannual	NMCP/ MoHSW / RI	Diagnostic services are able to provide periodic certification of point of care through regional and district laboratory services
1.5 Introduce evidence-based, innovative diagnostic tools for malaria detection and differential diagnosis of other pathogens causing febrile illnesses	Number of evidence based innovative diagnostic tools introduced	0	2	4	Health Facility Survey	Periodic surveys	Biannual	NMCP/ MoHSW / RI	Manufacturers ready to develop innovative tools and Research institutions capable to test them
2.1 Provide highly efficacious, accessible, affordable, equitable, and quality-assured antimalarials to patients seeking treatment in the public sector	Percentage of public facilities that have no QAACT stock-out continuous for one week in the last 3 months	74%	80%	95%	SMS for life/ILS gateway	m-health	Semiannual	NMCP, partners	Supply chain will operate without interruption
2.2 Facilitate the provision of accessible, affordable, and quality-assured antimalarials to patients seeking treatment in the private sector	Percentage of private facilities that have recommended antimalarials available	66%	80%	95%	Periodic private sector surveys	Periodic surveys	Semiannual	NMCP/MoHSW/Partners	Affordable QA AM for the private sector available
2.3 Provide high-quality treatment services from skilled providers	Proportion of HF with at least one provider trained in malaria case management (public and private)	59%	80%	80%	Health Facility Survey	Periodic surveys	Biannual	NMCP MoHSW RI	NMCP has a comprehensive capacity building plan for MCM
2.4 Provide equitable access to malaria diagnosis and treatment by creating an integrated community case management system for communities that are under-served by other health outlets	Percentage of targeted villages where an ICCM system is established	NA	25%	50%	iCCM implementation report	Periodic survey	Annually	NMCP, CBHC	MAAM will provide a platform for establishment of ICCM Policy and regulatory environment available

Item	Indicators	Baseline and Target Values			Data Sources	Method	Frequency	Responsible	Assumptions
		Y0	Y3	Y7					
3.1 Increase the uptake of IPTp2+ to reduce vulnerability in pregnancy	Percentage of pregnant women who receive IPTp2+	NA	60%	80%	THMIS/ TDHS	National representative Survey	3 years	NBS, NMCP	FANC package available to all health facilities delivering RCH Private sector to be included
3.2 Reduce vulnerability among other vulnerable groups: people with sickle cell, people with HIV, non-immune travellers, and infants	Percentage of HIV eligible cases receiving CPT	NA	50%	75%	THMIS/ TDHS	National representative Survey	3 years	NBS, NMCP, NACP	Good recording and reporting practices in CTC
3.3 In the event of the introduction of a malaria vaccine, the country is able to rapidly scale up its use	Preliminary plans established for introduction of vaccine	NA	1	1	Plan available	Not Applicable	Not Applicable	NMCP/EPI/ Partners	Malaria vaccines go through all experimental phases and are available for public health use
4.1: Facilitate malaria commodities procurement process as indicated by the comprehensive annual quantification through the provision of timely ordering and clear delivery schedule to the selected procurement agency	Proportion of malaria commodities received according to the annual delivery schedule	NA	80%	80%	Shipment and delivery documents	Data analysis	Monthly	NMCP	Partners ready to generate and share documentation
4.2: Improve logistic information system to facilitate the commodities supply chain from MSD to healthcare facilities and to respond to stock-outs	SfL reporting rate	75%	80%	80%	Web and DHIS2	Data analysis	Weekly	NMCP	System functional and integrated, staff motivated to send weekly reports
4.3 Eliminate counterfeit, suboptimal, substandard products through monitoring and regulation reinforcement	Percentage of products assessed which are found to be counterfeit/ suboptimal/ substandard	0	0	0	TFDA reports	Post marketing Survey	Annual	TFDA	TFDA QA laboratory full equipped to test for QA of AM
5.1: Select and provide appropriate community level mass fever screening, test, and treatment initiatives as response to emergency situation	Number of mass fever screening and testing initiatives undertaken as response to emergency situation	NA	10	20	Activity report	Document review and site visit	Semiannual	NMCP and CHMT	Emergency situations detected, investigated. Protocol for initiative developed and staff trained on its use.
5.2: Implement malaria patients follow-up and active case detection in identified transmission foci in low endemic areas	Proportion of targeted people actively screened and treated	NA	50%	75%	Activity report	Document review and site visit	Semiannual	NMCP and CHMT	Areas identified. Protocol for active case detection developed and staff trained on its use.

Table 2-4: Malaria Communication

Item	Indicators	Baseline and Target Values			Sources	Method	Frequency	Responsible	Assumptions
		Y0	Y3	Y7					
Strategic objective:	**Outcome indicators**								
To create an enabling environment	Proportion of caretakers who are	82%	85%	90%	THMIS/	National	3 years	NBS, NMCP	Malaria services are

Item	Indicators	Baseline and Target Values			Sources	Method	Frequency	Responsible	Assumptions
		Y0	Y3	Y7					
where individuals and household members are empowered to minimize their own malaria risk and seek proper and timely malaria-treatment if and when needed	able to take actions to protect their children from malaria				TDHS	representative Survey			accessible and affordable
Specific Objectives									
1. Community members of all age-groups in all strata understand the malaria risk to themselves and their families, as well as the appropriate action they should take for malaria prevention and treatment-seeking	Proportion of population (disaggregated by age and sex) with knowledge of ways to avoid malaria	92%	92%	92%	THMIS/ TDHS	National representative Survey	3 years	NBS, NMCP	Outreach services available, healthcare workers enabled to deliver appropriate malaria messages, mid-media events delivered to rural communities, community leaders sensitized and willing to participate in malaria campaigns
2. Vulnerable groups with increased risk of malaria infection and complication understand and accept their specific situation and are empowered to access the relevant preventive therapy, treatment, and care	Proportion of women 15-49 years who know pregnant women are at high risk of getting malaria	90%	90%	90%	THMIS/ TDHS	National representative Survey	3 years	NBS, NMCP	Malaria messages developed and continuously aired through electronic media. Appropriate malaria printed messages developed and distributed in public places.
3. Communities are actively involved in creating and promoting positive social norms about healthy behaviours around malaria prevention, treatment, and care and are initiating and implementing community-based malaria control interventions	Percentage of women who state that malaria is the most serious health problem in the community	67%	70%	75%	THMIS/ TDHS	National representative Survey	3 years	NBS, NMCP	Vulnerable population identified and targeted with specific BCC campaign
4. Public and private sector stakeholders are actively promoting and implementing the national malaria control strategies within their "sphere of influence" and agreed target areas, in a coordinated and harmonized manner	Number of private sector institutions that include malaria interventions and budgets	2	10	20	Plan, Budget and Report	Document review and site visits	Annual	NMCP and PPP	Private sector sensitized and willing to plan and budget for malaria initiatives
5. The political will and commitment to combat malaria is translated into	Small scale and local initiatives planned and budgeted	NA	5	10	Plan, Budget	Document review	Annual	NMCP and LGA	Local Government authorities sensitized and

Item	Indicators	Baseline and Target Values			Sources	Method	Frequency	Responsible	Assumptions
		Y0	Y3	Y7					
actionable plans and budgets					and Report	and site visits			willing to plan and budget for malaria initiatives
Strategic Interventions	**Output indicators**								
1.1 Improve capacity of healthcare workers to effectively provide accurate and relevant information to patients on desired behaviours for malaria prevention and treatment	Proportion of health facilities with health staff trained on providing relevant malaria BBC information to patients	NA	40%	80%	Training Report SPA Surveys	Periodical Survey	Annual	NMCP and CHMT	Plan and budget available, training needs assessed
1.2 Improve capacity of ward and village level health staff and extension workers to effectively provide accurate and relevant malaria information in their interaction with community members	Proportion of wards with healthcare worker(s) or volunteers capacitated with adequate messages on malaria control	30%	40%	50%	Training Report SPA Surveys	Periodical Survey	Annual	NMCP and CHMT	Communication plan available, training package developed, funds for training available
2.1 Improve capacity of healthcare workers to provide accurate and relevant information on specific malaria risk and appropriate action to biologically vulnerable groups during health visits	Percentage of healthcare workers/ health assistants who have received specific BCC training on malaria risk for vulnerable groups	NA	50%	75%	Training Report SPA Surveys	Periodical Survey	Annual	NMCP and CHMT	Communication plan available, training package developed, funds for training available
2.2 Develop and implement outreach programme for socioeconomically vulnerable groups and hard-to-reach mobile populations in high-transmission areas	Proportion of wards in which outreach interventions for target populations have been implemented in high-transmission areas	NA	40%	80%	Implementation reports	Surveys	Annual	NMCP and CHMT	Skilled and motivated staff trained in outreach intervention, communities willing to participate
3.1 Engage local leadership as malaria ambassadors	Proportion of districts with 'malaria ambassadors'	NA	50%	75%	District reports	Periodical Survey	Annual	NMCP and CHMT	Role of district ambassadors known, leadership sensitized and willing to participate
3.2 Develop and implement mass campaign with influential people to spark action	Proportion of people reached with appropriate malaria messages through mass media	80%	90%	90%	THMIS TDHS	NRS	Every 2–3 years	NMCP and NBS	Messages available and campaign implemented timely
4.1 Provide a forum and strategic framework for BCC partners to ensure coordinated and harmonized implementation of the BCC strategy	Technical working groups meeting conducted	90%	90%	100%	Minutes and matters arising	Reports	Quarterly	NMCP and partners	Communication plan available, partners willing to be involved
4.2 Create a platform for private sector companies to provide malaria control services to their workforce and the communities in which they work	Number of companies participating in the Malaria Safe Companies Initiatives	52	150	250	Initiatives records	Reports and site visit to project	Annual	NMCP and partners	Companies sensitized and willing to adopt malaria safe plans

Item	Indicators	Baseline and Target Values			Sources	Method	Frequency	Responsible	Assumptions
		Y0	Y3	Y7					
4.3 Create a common framework to evaluate BCC interventions	Percentage of quarterly verification visits undertaken	25%	50%	90%	Visit reports	site visit to project	Semiannual	NMCP and partners	Visit checklist available, timely planning performed
5.1 Engage politicians, policy and decision-makers in political debate on malaria control	Number of national meetings with policy- and decision makers conducted	1	4	8	Meeting minutes	Document review	Annual	NMCP and partners	politicians, policy- and decision makers willing and motivated

Table 2-5: Malaria SME

Item	Indicators	Baseline and Target Values			Data Sources	Method of Verification	Frequency	Responsible	Assumptions
		Y0	Y3	Y7					
Strategic Objective	**Outcome Indicators**								
To provide timely and reliable information to assess progress towards the set global and national targets, to ensure resources are used in the most cost-effective manner and to account for investments made in malaria control	Number of nationally representative, population-based and service provision surveys which include key malaria indicators that are completed	1 THMIS 2012	3 THMIS 2016, TDHS 2014 TSPA 2013	2 TDHS 2018 THMIS 2020	TDHS/THMIS/SPA/ Other reports	Report	Periodic surveys	NMCP/ NBS/ Partners	THMIS, TDHS, TSPA regularly carried out and reports timely available
Specific Objectives	**Outcome Indicators**								
1 Improved quality, completeness, and timeliness of the malaria information within the routine health information system	Proportion of health facilities reporting monthly through the Health Management Information System	60%	80%	90%	HMIS/IDSR/NMCP/ DHIS	Reports	Monthly/ weekly	NMCP/ District	NMCP data system capture and processing is fully operational Capacity of malaria focal person is strengthened and resources made available for this task) eIDSR is smoothly scaled up DHIS fully functional countrywide, with capacity in place to interpret data
2 Comprehensive framework in place for collecting and storing malaria impact, outcome, and output data from periodic surveys and programmatic monitoring	Proportion of the planned malaria key indicators surveys, for monitoring malaria interventions coverage, quality of service provision, vector and parasite dynamics, and quality-assured malaria commodities availability, executed.	80%	80%	80%	Surveys report	Reports	Annual	NMCP/ research Institutions	Financial and technical support available
3. Malaria knowledge management system working effectively to collate, disseminate, and promote	Proportion of evaluation reports developed according to the national SME plan	60%	80%	90%	Evaluation report	Documents review	Annual	NMCP and implementing partners	Malaria SME plan available

Item	Indicators	Baseline and Target Values			Data Sources	Method of Verification	Frequency	Responsible	Assumptions
		Y0	Y3	Y7					
use of quality malaria data for evidence-based decision making at national and district levels									
4. All malaria epidemics detected within one week and responded to within two weeks from onset	Proportion of malaria epidemics responded to by district councils within two weeks from the onset	0%	80%	95%	IDSR/NMCP/District	Reports	Immediately	NMCP/District	Functional system to detect epidemics in place and response guidelines available
Strategic Approaches and interventions	**Output indicators**								
1.1 Support HMIS/DHIS units in the MoHSW to improve quality of reporting malaria indicators and roll out of the electronic DHIS platform at all levels	Number of health facilities reporting complete monthly malaria indicators	20%	80%	80%	HMIS/IDSR/DHIS	Reports	Weekly/ Monthly	HMIS, SME, Districts	Financial and technical support available DHIS fully functional countrywide, capacity in place to judge and interpret data
1.2 Develop quality assurance/control system for data auditing and verification	Proportion of health facilities reporting quality assured malaria data	NA	60%	80%	HMIS, DHIS, IDSR	Reports	Every 6 months	HMIS, SME, Districts, Regions	HMIS and DHIS working well
2.1: Establish selected sentinel districts/sites to capture non-routine malaria data on quality of care	Number of sentinel districts/sites avail reports on non-routine malaria data including ACTs dispensed from health facilities and other outlets	NA	40%	80%	Survey	Reports	Annually	SME	Financial support for survey
2.2: Collaborate with the National Bureau of Statistics to ensure that regular, nationally representative population surveys and other specific sub-national surveys include relevant malaria indicators	Proportion of reports of nationally representative surveys available according to M&E plan	100%	100%	100%	TDHS, THMIS, SPA and others	Reports	2-5 years	SME NBS and MACRO	Funding of nationally representative surveys available
2.3: Establish countrywide longitudinal vigilance of malaria parasitaemia in sentinel population: pregnant women and infants at RCH clinics, school-age children	Proportion of selected health facilities conducting assessment of malaria parasitaemia in pregnant women and children under five	25%	50%	80%	Activity report	Reports	Biannually	MPR	Financial and technical support available
2.4: Establish and expand longitudinal monitoring of mosquito populations dynamics and behaviour in sentinel sites and strengthen surveillance of insecticide susceptibility	Number of insecticide resistance reports from sentinel sites (cumulative)	3	6	9	HMIS/ IDSR	Reports	Monthly	NMCP/ districts	Financial and technical support available
2.5: Coordinate and oversee the implementation of standard antimalarial efficacy tests as per	Number of antimalarial therapeutic efficacy reports per site (cumulative)	8	16	28	Test site technical report	Site supervision	Annual	NMCP and research partners	Technical capacity of the implementing institutions to perform

Item	Indicators	Baseline and Target Values			Data Sources	Method of Verification	Frequency	Responsible	Assumptions
		Y0	Y3	Y7					
WHO guidelines by national research institutions									efficacy tests; enough people enrolled
2.6: Coordinate the collection, use, and interpretation of the programmatic monitoring of vector control initiatives (including, LLIN, IRS and LSM)	Proportion of vector control initiatives with appropriate monitoring system in place according to standard national set of indicators	NA	100%	100%	Implementation report	Report review and site supervision	Not applicable	NMCP and partners	Monitoring system available and M&E system set up
2.7: Work with national regulatory authorities to improve the monitoring and quality assurance of all malaria commodities	Proportion of antimalarials batches tested for quality assurance by TFDA	NA	80%	80%	TFDA report	Survey	Annual	TFDA	TFDA capacitated to perform test, QA laboratory adequate to the needs
2.8 Regularly update malaria epidemiological profile	Frequency of updating malaria epidemiological profile	NA	1	3	Profile available	Document review	Every two years	NMCP and partners	Technical assistance available
3.1 Establish a national SME Partnership Framework	Proportion of initiatives conducted according to the national SME plan	NA	80%	80%	Report	Document review	Annual	NMCP	Financial and technical support available
3.2 Develop a national malaria data management plan and data repository to enable evidence-based decision making at all levels	Established and regularly updated composite NMCP database	NA	1	1	SME TWG/Network	reports	Quarterly/ Biannually	SME	Financial and technical support available
3.3 Undertake periodic malaria program reviews and evaluation of the implementation of malaria strategic plan	MPR and mid-term reports available (cumulative)	NA	1	2	M&E Plan	Reports	Mid-term	SME	Financial and technical support available from research institutions
4.1 Map the malaria epidemic prone districts including stratification of epidemic “hot spots”	Presence of Maps with detailed information on malaria epidemic hot spots	60%	80%	80%	HMIS/IDSR	Reports	Weekly/Monthly	NMCP/districts	1. NMCP system of data capture and processing is fully operational (capacity of malaria focal person is strengthened and resources made available for this task) 2. eIDSR is smoothly scaled up 3. DHIS is fully operational
4.2 Strengthen Capacity for malaria epidemics containment at district and health facility levels in epidemic-prone districts	Number of training conducted	60%	80%	80%	HMIS/ IDSR	Reports	Routine	NMCP/ districts/ partners	Financial and technical support available
4.3 Establish Malaria Epidemic Early Warning System and a Malaria Epidemic Early Detection System	Number of epidemics alert investigated within 2 weeks after detection	60%	80%	80%	IDSR/ NMCP/ District	Reports	Weekly	NMCP/ District	Functional system to detect epidemics

Table 2-6: Malaria Programme Management, Partnership Development and Resource Mobilization

Items	Indicators	Baseline and Target Values			Sources	Method	Frequency	Responsible	Assumptions
		Y0	Y3	Y7					
Strategic objective:	**Target**								
Efficient programmatic and financial management of malaria control interventions at all levels, implemented through effective and accountable partnerships with adequate funding	Programme performance as rated over time through semi-annual independent evaluation (GFATM)	B+	A+	A+	PUDR		Semi-annually	Heads of units NMCP	NMCP with malaria stakeholders are committed to developing new proposals to meet set targets
Specific Objectives	**Outcome indicators**								
1. Improve the effectiveness and accountability of malaria control implementation by strengthening partnership and cooperation with malaria control stakeholders at all levels	Proportion of CCHP which have approved budget for comprehensive malaria control interventions according to the national strategic plan	14%	50%	80%	CCHP	Document Review	Annual	NMCP Head admin and finance	CHMT oriented in the current malaria strategic approaches
2. Increase the level of resource mobilization to fund the medium-term strategic plan according to the programmatic needs	Proportion of total strategic plan budget funded	N/A	80%	90%	NMCP financial report	Document Review	Annual	NMCP Head admin and finance	Costed plan available and submitted for funding,
3. Promote a harmonized regional approach to malaria control in line with global malaria action plan	Number of cross-border malaria initiatives in which Tanzania is a participant	NA	2	2	Meeting report	Document	Annual	NMCP and RBM partners	RBM partners willing to organise coordination meeting at regional and sub-regional levels
Strategic approaches and interventions	**Output indicators**								
1.1 Improve coordination and governance structures at national, regional, and district level	Proportion of planned meetings of the steering committee, and sub-committees held	0	80%	80%	Minutes	Meetings	Biannually, Quarterly	NMCP	Smooth availability of funds, partners willing to participate and contribute
1.2 Develop and disseminate strategies and updated implementation guidelines	Number of regional and local government authorities oriented on malaria control strategies and updated guidelines	NA	80%	80%	Guidelines and plan	Printed Documents	Not applicable	NMCP	NMCP capable to develop strategic documents and to disseminate
1.3 Strengthen human resources capacity for effective programme management at national level	Proportion of NMCP vacancies filled by government employed staff	NA	50%	80%	Training need assessment	Report	Annual	NMCP, regions, districts	Training need assessment performed, available qualified staff at different level available
1.4 Enhance supervision and verification systems involving implementing entities at various	Proportion of districts supervised by national and regional teams in a year	NA	80%	100%	Implem-entation reports	Report	Annual	NMCP, regions, districts	Objective supervision timetable available, timely funding, checklist

Items	Indicators	Baseline and Target Values			Sources	Method	Frequency	Responsible	Assumptions
		Y0	Y3	Y7					
levels									and protocol developed
1.5 Build capacity of municipal and district councils in malaria planning and budgeting	Proportion of CCHP including malaria control initiatives in line with strategic plan	NA	80%	100%	CCHP	Analytical Report	Annual	NMCP, regions, districts	CHMT able to plan according to the needs
2.1 Develop and update comprehensive business and operational plans for malaria control	Number of annual updated business/operational plan in place (cumulative)	NA	3	6	Annual business plan	Document	Annual	NMCP	NMCP able to develop quality documents, with or without assistance from consultants
2.2 Improve NMCP capacity to develop successful funding proposals and manage the implementation of the programmes	Proportion of planned budget disbursed for implementation in a year	NA	80%	80%	Proposal write-up	Document	Not applicable	NMCP, regions, districts	NMCP able to develop quality documents, with or without assistance from consultants
2.3 Develop and submit funding request/proposals to relevant government authorities, national and global institutions, and private sector	Number of comprehensive proposals developed and funded (cumulative)	NA	4	8	Proposal write-up	Document	Not applicable	NMCP	Global and bilateral funding initiatives ready to fund national programmes,
3.1 Participate effectively in global and regional coordination initiatives within East Africa Community and Southern African Development Community	Number of global and regional meetings where NMCP was represented (annually)	2	4	4	Meeting Report	Report	Annual	RBM partners	RBM partners willing to organise regional and subregional events