Ministry of Health

Mozambique Malaria Programme Performance Review 2010 Report

Scaling up for Universal Access to Malaria Control Interventions

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Acronyms/Abbreviations

ACT	Artemisinin-based Combination Therapy
AIDS	Acquired Immune Deficiency Syndrome
AL	Artemether-Lumefantrine
ANC	Antenatal clinic
APE	'Agentes Polivalentes Elementares' (Community-based Healthcare Worker)
APHL	American Public Health Laboratories
ARV	Anti-Retroviral Therapy
AS–AQ	Artesunate-amodiaquine
BCC	Behavior Change and Communications
BES	'Boletim Epidemiológico Semanal' (Weekly Epidemiologic Bulletin)
CDC	Centers for Disease Control and Prevention
CISM	'Centro de Investigação em Saúde Manhiça' (Maniça Research Center)
CMAM	'Central de Medicamentos e Artigos Médicos' (Central Medical Stores)
DDT	Dichloro-Diphenyl-Trichloroethane
DDS	'Departamento Distrital de Saúde' (Ditrict Health Department)
DEPROS	'Departamento de Promoção de Saúde' (Health Promotion Department)
DHS	Demographic and Health Survey
DIFD	United Kingdom Department for International Development
DNAM	'Direcção Nacional de Assistencia Médica' (National Directorate of Medical Assistance)
DPS	'Departamento Provincial de Saúde' (Provincial Health Department)
ELISA	Enzyme-Linked Immunosorbent Assay
FAO	Food and Agriculture Organization
FBO	Faith-Based Organization
FP	Family Planning
FY	Fiscal Year
Global Fund	Global Fund to Fight AIDS, Tuberculosis, and Malaria
GHI	Global Health Initiative
HCW	Healthcare Worker
HIV	Human Immunodeficiency Virus
IEC	Information and Education Campaign
IMCI	Integrated Management of Childhood Illnesses
INCAM	'Inqúerito sobre Causas de Mortalidade' (Cause of Death Survey)
IPTp	Intermittent Preventive Treatment of Pregnant Women
INS	'Instituto Nacional de Saúde' (National Institute of Health)
INSIDA	'Inquérito de Indicadores de SIDA' (AIDS Indicator Survey)
IRS	Indoor Residual Spraying
ITN	Insecticide-Treated bed Net
JHPIEGO	Johns Hopkins University affiliated non-governmental organization
LLIN	Long-Lasting Insecticide-treated bed Net
LATH	Liverpool Associates for Tropical Health
LSDI	Lubombo Spatial Development Initiative

M&E	Monitoring and Evaluation
MCH	Maternal and Child Health
MICOA	'Ministério de Coordenação de Acção Ambiental' (Ministry of Coordination of Environmental Affairs)
MICS	Multiple Indicator Cluster Survey
MINAG	'Ministério de Agricultura' (Ministry of Agriculture)
MIP	Malaria In Pregnancy
MIS	Malaria Indicator Survey
MISAU	'Ministério de Saúde' (Ministry of Health)
MOP	Malaria Operational Plan
NGO	Non-Governmental Organization
PCR	Polymerase Chain Reaction
PEPFAR	President's Emergency Plan for AIDS Relief
PIRCOM	'Programa Inter-Religioso contra a Malária' (Inter-Religious Campaign Against Malaria)
PMI	President's Malaria Initiative
PMTCT	Prevention of Mother-To-Child Transmission (of HIV/AIDS)
NMCP	'Programa Nacional de Controlo da Malária' (National Malaria Control Program)
PSI	Population Services International
RH	Reproductive Health
RBM	Roll Back Malaria
RDT	Rapid Diagnostic Test
SCIP	Strengthening Community Through Integrated Program
SEA	Supplemental Environmental Assessment
SP	Sulfadoxine-Pyrimethamine
TAM	Together Against Malaria
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USG	U.S. Government
WHO	World Health Organization

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1. Introduction

1.1 Background

In October 2010, the Ministry of Health Mozambique decided to undertake an in-depth review of the national malaria control program. This decision was made in the context of an observed decline in malaria incidence and deaths in Mozambique. The purpose of the review was to assess the current strategies and activities with a view of scaling up implementation. Furthermore, Mozambique decided to conduct the MPR because the malaria Strategic plan 2006-2009 had expired. In order to update the strategic plan, it was felt necessary conduct a malaria programme review involving all the key malaria partners.

1.2 Objectives

The specific objectives of the review were:

a. To review the epidemiology of malaria in Mozambique;
b. To review the structure, organization, and management framework for malaria control within the health system and the national development agenda;
c. To assess progress toward achievement of national targets;
d. To review the current program performance by intervention thematic areas and service delivery levels;
e. To define the next steps for improving program performance.

1.3 Methodology of the MPR

The review covered the period from October to December 2010. It comprised of a broad evaluation of the National Malaria Programme, based on the MPR methodology as proposed by WHO, that included the participation of the key malaria partners and an external review team. The MPR process included adaptation of the tools for data collection and field visits, desk reviews, data collection field visits, development and presentation of findings and recommendations to key stakeholders, including the Minister of Health, bilateral and multi-lateral partners and civil service organizations. Finally a report , aide memoire and PowerPoint presentation of the key findings were made.
The review was conducted in three phases.

Phase 1 : Planning Consultations and Preparations
The NMCP held discussions within the Ministry of Health and partners and gained consensus on conducting the review. A proposal was developed to mobilize funding and technical support. The main activities included establishment of the secretariat, task

teams and appointment of a review coordinator; defining the MPR objectives and work plan; selecting the national and sub-national sites for field visits, identification of internal and external reviewers and developing relevant TORs; developing the MPR plan and proposal and mobilisation of the required resources and logistics.
See annex xx (1) for the TOR, the composition of the review teams and their respective designations.

Phase 2: Thematic Desk reviews.
This phase entailed conducting desk reviews covering all the thematic areas including: Programme management, Procurement and supply chain management, Malaria Vector Control, Malaria Case Management (MCM), Advocacy, BCC, Information, Education and Communication (IEC) and Social mobilisation, Malaria in Pregnancy(MIP), and finally, Surveillance, Monitoring and Evaluation, Epidemiology, Operations Research. Thematic review teams were set up to conduct desk reviews using published and unpublished reports on malaria in Mozambique. The main documents reviewed included policy, legislative, strategic and operational reports and plans; M & E reports as well as regional and global policy and strategic frameworks on malaria. The list of documents consulted is included in the bibliography in annex xx (2). Members of the various thematic groups are shown in annex 1.

This phase was concluded at a national MPR retreat to gain consensus and finalize the thematic reports. These reports were then shared with the external team who provided an independent evaluation and comments on how to improve the reports guided by a standard MPR reporting format.

Phase 3: Field Reviews and Observations.

The completed thematic review reports were shared with the external review team before they arrived in Mozambique. On arrival, the external team joined the internal team to familiarize themselves with the issues in the thematic reports, seek clarification and enhance team-bonding since they were expected to conduct field visits and work on the reports jointly.
At the end of the desk review sessions, the review team, which included local and external reviewers, was sub-divided into the following groups:
Central level Review Team; this team conducted central level interviews with key stakeholders including the Ministry of Health and affiliated parastatals, the NMCP, CSOs, local and international NGOs as well as multilateral and bilateral partners. A list of the people, agencies/organizations visited is provided in annex 2

Provincial Level Teams comprising of at least one external reviewer to provide technical leadership and internal reviewers each were constituted to visit Gaza, Nampula, Maputo, Tete and Zambezia, that were representative of the diverse malaria eco-epidemiology and status of control.

The main focus of the field visits was to validate the thematic reports through observing the performance of the malaria control programme at provincial, district, facility and community levels through meetings and interviews with the responsible structures for policy, regulation, implementation and monitoring and evaluation. These included the public and private health sectors, communities, partners and the civil society groups. The other purpose of the visit was to obtain the information required to fill the data gaps identified during the preparation of the thematic reports. The main outputs of this phase included the field review reports, copies of key reference documents and presentation of the field findings to plenary by the respective teams.

The findings were summarised in the main MPR report, an Aide Memoiré and PowerPoint slides. The aide memoire was presented to the Minister of Health and key stakeholders at a debriefing meeting. The partners and the MOH were given an opportunity for further review and comments to the aide memoire before finalization and signing.

The fourth and last phase was to finalise the review report with key recommendations on the way forward for the Mozambique malaria programme.

1.4 Report Outline

This report is structured to cover the following; context of malaria control in Mozambique; epidemiology of malaria in Mozambique; programme performance by thematic areas, conclusions and key recommendation. Various annexes have also been provided.

2. Context of Malaria Control

2.1 Historical Milestones in Malaria Control

Malaria control in Mozambique dates back to the 1950s at the beginning of the Global Malaria Eradication Programme. The current NMCP was established in 1982 mainly focusing on vector control activities.

In 1991, the NMCP formally adopted three main strategies for malaria control, namely: (i) Early diagnosis and treatment, (ii) Vector Control and (iii) Health Education.

A joint RBM review mission in 1999 concluded that these strategies had been ineffective in controlling malaria in Mozambique mainly because:

a. The majority of the rural population had limited access to the formal health facilities run by the National Health Service.
b. There was insufficient health infrastructure following 16 years of civil war and destruction.
c. (3)There was a weak link between the community and health services.
d. The emergence of Chloroquine resistance coupled with limited availability of drugs at community level.
e. Concentration of IRS campaigns in urban areas only.
f. Health education, information and communication often did not reach the target population.
g. Limited capacity of the population to recognize symptoms and signs of malaria.
h. Existence of cultural practices that negatively influence treatment-seeking behaviour.

Consequently, the MOH adopted a new vision for control of Malaria that culminated in drafting the 1st malaria strategic plan.

The 1999 brief evaluation of the malaria situation by a joint international consultancy mission was followed by a situation analysis led by the Ministry of Health. The analysis conducted in 2000 covered the districts of Moatize, Massinga, Quelimane, Angoche, Mocuba and Manhiça. The results helped inform the development of the 1st Malaria Srategic Plan for Mozambique that expired in 2005. Following a review of this plan, a new plan to cover the period 2006-2009 was developed but has also expired hence the need for an MPR to help inform the next plan 2010-2015.

More recently, and taking into account the new guidelines, Mozambique has adopted a strategy to ensure Universal access to LLINs and the elimination of malaria in the selected three islands namely: Mozambique Island in Nampula Province; Ibo Island in Cabo Delgado Province and Inhaca Island in Maputo City..

2.2 Malaria within the national development agenda

In Mozambique, malaria prevention and control is a top priority. Both national and provincial political leaders as well as their spouses frequently mention the need to prevent and control malaria in their speeches at public gatherings.

Mozambique is committed to the **Millennium Development Goals (MDGs)**. MDG 6 covers the "fight against HIV/AIDS, Malaria and other diseases." All health and development plans are always consistent with the MDGs.

2.3 National Health Policy

Mozambique does not have a consolidated national health policy. However, policy statements and guidelines on various aspects of the health sector have been issued. Similarly, Mozambique does not have a standalone malaria policy but has several policy statements and guidelines for the key malaria control interventions. In the absence of such a policy, it might be prudent for the malaria control programme to compile a malaria policy that clearly outlines what they intend to do that would be adhered to by all implementing partners. For example, a clear policy on implementation of IRS and malaria treatment and diagnosis would go a long way in harmonizing implementation of these vital services by the diverse implementing agencies.

2.4 National Health Sector Strategic Plan

The Strategic Plan for the Health Sector in Mozambique (PESS 2007-2012) has prioritized malaria as a major public health problem since it is one of the leading causes of morbidity and mortality in the country. Specifically, the health sector strategic plan sets the following objectives related to malaria: (i) To reduce the incidence of severe malaria in children under 5 years, (ii) To protect children under five years of age from malaria through a combination of individual and collective measures; (iii) To reduce mortality by severe and complicated malaria in children under 5 years; and (iv) To reduce the prevalence of anemia in children of 6 to 59 months.

2.5 The Five-Year Development Plan 2010 - 2014 (PARPA)

The main goal of the national development plan is fighting poverty and promoting the culture of work and development of human and social capital. The Five Year Plan provides for "reducing the number of cases and deaths from malaria" by (i) Increased IRS coverage to 80% in selected districts, (ii) Ensuring access to at least two mosquito nets per household in the districts without IRS and (iii) Increase from 40% to 60% correct

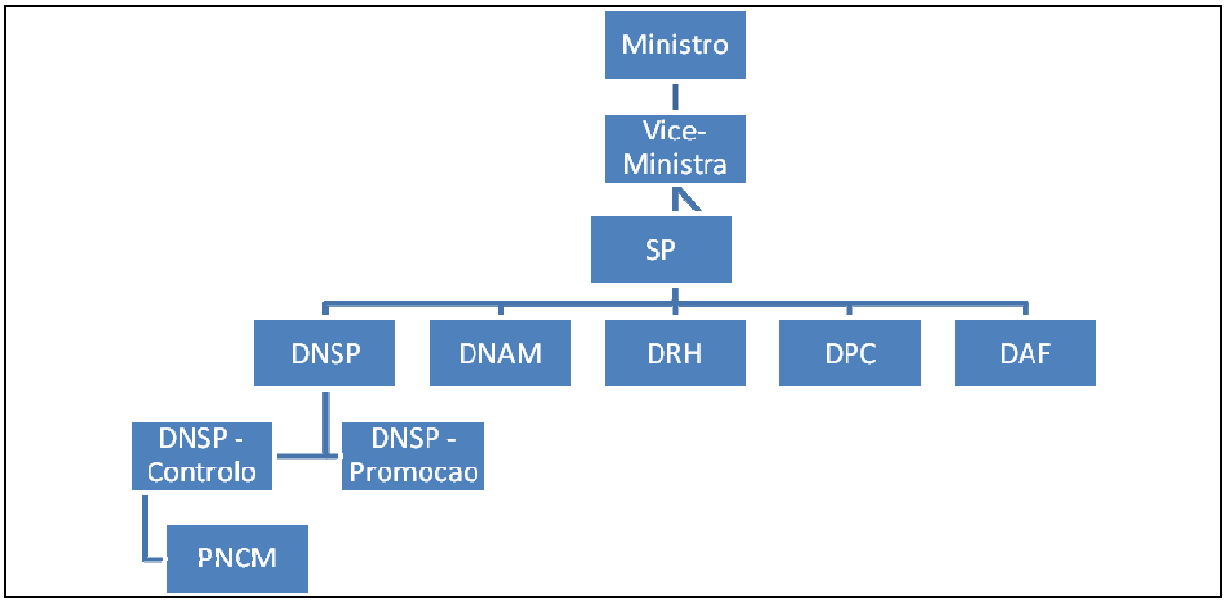
diagnosis and treatment for children under five years and pregnant women within 24 hours of onset of symptoms increased

2.6 Organizational Structure for Malaria Control

The organogramme of the Ministry of Health is under review. Currently the malaria control programme is under the area of prevention and control of diseases in the National Directorate of Public Health. Malaria control services are decentralized to the province and district levels.

The Fig 2.1 below is the new organogram of the department level which is still under development and the NMCP organogram has been drafted recently but has not been yet approved.

Fig 2.1 NMCP in relation to the MOH Organogram



Regardless of the position of the NMCP within the MOH organogramme, the malaria programme manager has access to the key decision-makers within the MOH including the minister as needed.

2.8 Key Players in Malaria Control

The NMCP has initiated the process of mapping Malaria partners at National, provincial down to district levels. The main RBM partners by national and provincial levels are shown in table 2.

Table 2.1 The main Technical Cooperation partners for malaria

CENTRAL LEVEL	OMS, UNICEF, PMI/USAID, FHI, MALARIA CONSORTIUM, PSI
Maputo Province	LSDI, PSI, AGRIFOCUS.
Gaza Province	LSDI, UNICEF, PSI, Médicos do Mundo Portugal, Right to play, World Vision, Pathfinder,
Inhambane Province	Malaria Consortium, Medicus Mundi,
Sofala Province	HAI, Malaria Consortium, PSI, UNICEF
Manica Province	UNICEF, Malaria Consortium
Tete Province	UNICEF, Malaria Consortium
Zambezia Province	RTI, PSI, World Vision
Nampula Province	PSI, Malaria Consortium
Cabo Delgado Province	Aga Khan, Progresso, Malaria Consortium, UNICEF, PSI, World Bank (PPSS), RTI
Niassa Province	UNICEF

There is a Movement of Rolling Back Malaria (RBM), which in addition to Civil Society includes leaders from the majority of religious congregations existing in Mozambique. In addition to the RBM partners, there is another organization, the Programa Inter-Religioso Contra a Malaria (PIRCOM), which brings together many faiths and has been operating as PIRCOM since 2007. Since its creation PIRCOM has trained over 20,000 of its members in four provinces to become advocates for positive behaviour change among the country's population. This change has focused on taking specific actions to prevent and treat malaria.

Role of PIRCOM

PIRCOM has developed 38 councils, including a national-level and four provincial-level councils, and amassed considerable experience mobilizing religious leaders and congregations to deliver malaria-related behavior change messages. While many National PIRCOM members are recognized leaders of specific faith groups, their combined influence in an interfaith setting is substantial. They also have significant political influence with the government of Mozambique including the Ministry of Health and these faith leaders can drive the expansion of PIRCOM activities through the following actions:

- Mobilizing Provincial PIRCOM through a) leading the establishment of province PIRCOM units; b) participation in provincial PIRCOM launches; and c) using the media to expand coverage and awareness of key malaria messages beyond the community level

- National and international PR for the PIRCOM campaign. National advocacy for anti malaria work with the Ministry of Health and other government of Mozambique agencies.
- Development of key communication tools such as sermons and local congregation action idea lists.

2.9 Linkages and Coordination

2.9.1 Cross-border initiatives

Mozambique has a large border with six countries namely; Swaziland, South Africa, Zimbabwe, Malawi, Zambia and Tanzania. Mozambique is a founding member of the Libombos Spatial Development Initiative (IDEL (LSDI), a tripartite program of malaria control which covers Mozambique, Swaziland and South Africa. Currently LSDI is operational in 6 of 8 districts of Maputo province, and was expanded to 8 of 12 districts of Gaza province in 2006.

Following the encouraging results achieved by LSDI, the MOH decided to replicate IRS in Zambezia Province. The goal is not only accelerating the control of malaria in this province, but also creating a greater national capacity to combat malaria, with a view to its expansion to other parts of the country.

The drawback with these initiatives/projects is the creation of parallel management and implementation structures including paying higher salaries and better office infrastructure. Ideally, they should gradually move towards strengthening the already existing malaria control system in each province. Moreover, when such projects wind up the MOH is unable to sustain their work and standard of service delivery hence losing the impressive gains already made.

2.9.2 Partnership Coordination Mechanisms

At central level, the NMCP holds a monthly stakeholders meeting and also participates in Endemic Diseases Working group on a weekly basis chaired by the National Directorate of Public Health. Since July 2010, a monthly meeting is held with the RBM partners and in the past an annual malaria meeting used to be held involving the provincial administrators (Provincial Director and/or Provincial Chief Physician and Provincial Head of NMCP). This annual meeting was headed by the Minister of Health and covers all issues related to malaria.

Issues related to malaria, are also discussed in the National Health Coordination Meeting, led by the Minister of Health. In 2005, the National Commission for Fight Against Malaria (CNLM) was established as an advisory body headed by the Minister of Health. The scope of action of CNLM includes the development of policies and strategies relevant to the Malaria Control in Mozambique.

It is a multidisciplinary committee that derives membership from top MOH management. The committee includes Senior Clinicians, the NMCP Director, the Directors of the Pharmaceutical Department, Administration and Management, and Community Health Departments. Others include the Chief of the Bureau of Health Education (RESP), the Scientific Director of the National Institute of Health and representatives from the Department of Pharmacology Faculty of Medicine of Eduardo Mondlane University. Other technical staff might be invited to CNLM sessions depending on the subject such as senior representatives from other levels of the MOH, Provincial and District Directories of Health, Ministries of Education and Culture, Agriculture, Industry and Trade Coordination, for Coordination of Environmental Action, and Finance. Key stakeholders from the private sector who support activities of fight against malaria are also included. Unfortunately, this Committee has not met, constituting a major weakness.

At Central level, there is a forum of partners directly involved in the fight against malaria (**Technical Committee for Coordination of the Fight Against Malaria**), which supports the design of policies and strategies, as well as operational aspects relevant to the National Program for Control of Malaria. Its members include WHO, UNICEF, USAID, Malaria Consortium, PSI, CISM, PSI, FHI, Save the Children and INSA.

At the central level, there are technical groups which also include Cooperation Partners) that work in specific areas including Case Management, Monitoring & Evaluation, Nets Group, Communications Group and IEC but there is neither approval of the establishment of these working groups, their terms of reference nor a calendar of activities. No technical advisory committee in place for managing the program, however, since September 2010, the NMCP relies on the Clinical advice from an Internist Doctor in service at the Central Hospital of Maputo. The NMCP has not yet adopted the principle of the three “ones", compounded by the fact that there are no approved policy documents that can be shared with partners for their use.

Internally, the National Program for Malaria Control collaborates actively with other areas of the Ministry of Health, particularly with the Reproductive Health and the strategy of Integrated Management of Childhood Illness (IMCI). The program is related with the Bureau of Education for Public Health (RESP) and has close links with the Laboratory Section for Medical Assistance, the National Institute of Health, in addition to the coordination with the Pharmaceutical Department, Central Medical Stores and virtually with all departments of the MOH.

2.10 Key Issues and Challenges

1. Several partners are working alongside the government on malaria control. Although partner coordination mechanisms have been established in the form of coordination committees, there is a need to streamline their operations including providing clear terms of reference and matching membership to the TORs. There is also a need to review the frequency of meetings to avoid duplication of efforts since some of the issues are already discussed in other fora.

2. Although the malaria policy is implied in several publications of the NMCP, there is need to consolidate all the policies in one document that would be a key reference for all malaria stakeholders and implementers.

3. The programme should complete the mapping of all partners clearly indicating the areas in which they operate, the interventions that they promote/implement. In addition, they should establish the partners' comparative advantage including the technical expertise available at country level or that can be called upon as appropriate. The partner information should be entered in the NMCP database should be easily accessible. The information will be vital when revamping the technical working groups that will be populated by personnel working for partners, among others.

4. The LSDI initiative has achieved spectacular results in Maputo and Gaza provinces. Some elements of the project have been duplicated in Zambezia province with promising results. However, it is not clear how the NMCP is documenting the best practices and the plans for replicating some of the activities country-wide. Furthermore, it is not clear how the NMCP will sustain the gains in partners' supported provinces in the event of winding up of partner support.

5. The NMCP organogram is undergoing review. This should be completed as soon as possible taking into account the available staff as well as advocating for more positions as recommended by the review if the NMCP is to safely navigate the current partner landscape as well ensure timely delivery of high quality services to those at risk of malaria. The capacity of the provincial malaria managers and focal points at district level should be built through regular meetings, trainings, sharing of information updates and supervision if the decentralized malaria control programme is to succeed.

2.11 Action Points

a. The NMCP should streamline the operations of partners and consultative stakeholders' meetings. The NMCP should also provide clear terms of reference for partners and matching membership to the TORs.

b. The NMCP should consolidate all the policies in one document that would be a key reference for all malaria stakeholders and implementers.

c. The NMCP should complete the mapping of all partners clearly indicating the areas in which they operate, the interventions that they promote/implement. In addition, they should establish the partners' comparative advantage including the technical expertise available at country level or that can be called upon as appropriate.

d. The NMCP should put in place mechanisms to sustain the gains in partners' supported provinces in the event of winding up of partner support.

3. Malaria Epidemiology

3.1 Geography

At 309,475 sq mi (801,537 km^2), Mozambique is a very large country. It is bordered by Swaziland to the south, South Africa to the southwest, Zimbabwe to the west, Zambia and Malawi to the northwest, Tanzania to the north and the Indian Ocean to the east that stretches for more than 2500km.

The country is divided into two topographical regions by the River Zambezi. To the north of the Zambezi River, the narrow coastline moves inland to hills and low plateaus, and further west to rugged highlands, which include the Niassa highlands, Namuli or Shire highlands, Angonia highlands, Tete highlands and the Makonde plateau, covered with Miombo woodlands. To the south of the Zambezi River, the lowlands are broader with the Mashonaland plateau and Lebombo Mountains located in the Deep South.

The country is drained by five principal rivers and several smaller ones with the largest and most important the Zambezi. The country has three notable lakes: Lake Niassa, Lake Chiuta and Lake Shiruwa all found in the northern region.

Mozambique is divided into ten provinces and one capital city with provincial status. The provinces are subdivided into 129 districts. The districts are further divided in 405 Administrative Posts and then into localities, the lowest geographical level of the central state administration. Since 1998, 43 "Municípios" (Municipalities) have been created in Mozambique. The major cities are Maputo, Beira, Nampula, Tete, Quelimane, Chimojo, Pemba, Inhambane, Xai-Xai and Lichinga.

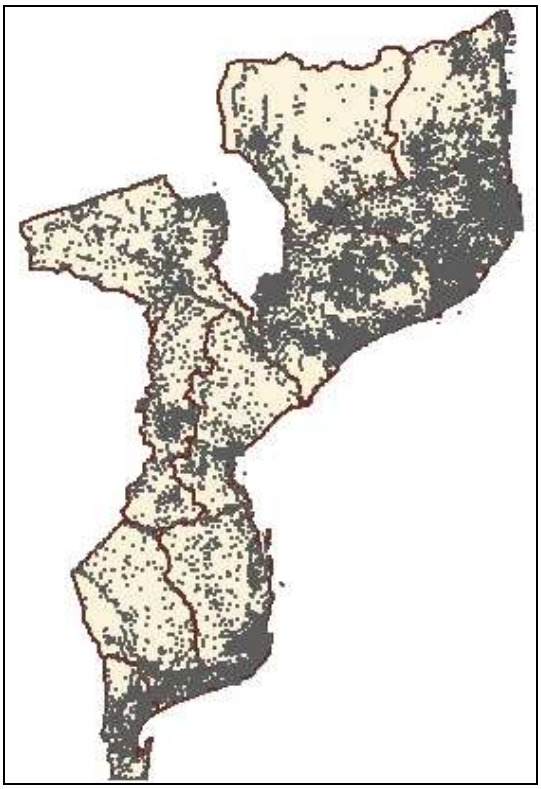
The estimated population of Mozambique in 2010 is 21.854,387 million when projected from the national census of 2007 assuming an annual population growth rate of 2.36% per year. The north-central provinces of Zambezia and Nampula are the most populous with about 45% of the entire population of Mozambique. In addition, over 1 million people reside in the urban area of Maputo and another 1 million in the peri-urban area of Maputo. The population density across the country is variable with majority of the population residing along the coastline as shown in figure 3.1.

About 37% of the population lives in urban areas while 44% of the population is aged below 15 years. It is estimated that in 2010, there were 3,800,000 children under than five years old and 1.1 million pregnant women. Table 3.1 shows some key demographic indicators. According to the results of the 2008 Multiple Indicator Cluster Survey (MICS), the under-five mortality rate was estimated at 138 per 1,000 live births representing a reduction of 15% compared to 153 per 1,000 live births derived from the 2003 DHS. The contribution of malaria control interventions to this decline is not known.

Table 3.1 Key demographic indicators:

INDICATOR	VALUE	YEAR	SOURCE
Under 5 mortality rate	138/1000	2008	MICS 2008
Neonatal Mortality rate	43/1000	2008	WHSIS 2010
Infant Mortality rate	90/1000	2008	WHSIS 2010
Total fertility rate	5.1	2008	WHSIS 2010

Fig 3.1 Mozambique Population Density map



Mozambique has a tropical climate with two seasons, a wet season from October to March and a dry season from April to September. Climatic conditions, however, vary depending on altitude. Rainfall is heavy along the coast and decreases in the north and south. Annual precipitation varies from 500 to 900 mm depending on the region with an average of 590 mm (23.2 in). Average temperature ranges in Maputo are from 13 to 24 °C in July to 22 to 31 °C in February.

Mozambique is prone to natural disasters such as drought, cyclones, and floods that have often contributed to increased malaria transmission in recent years, particularly in low-lying coastal areas and along major rivers.

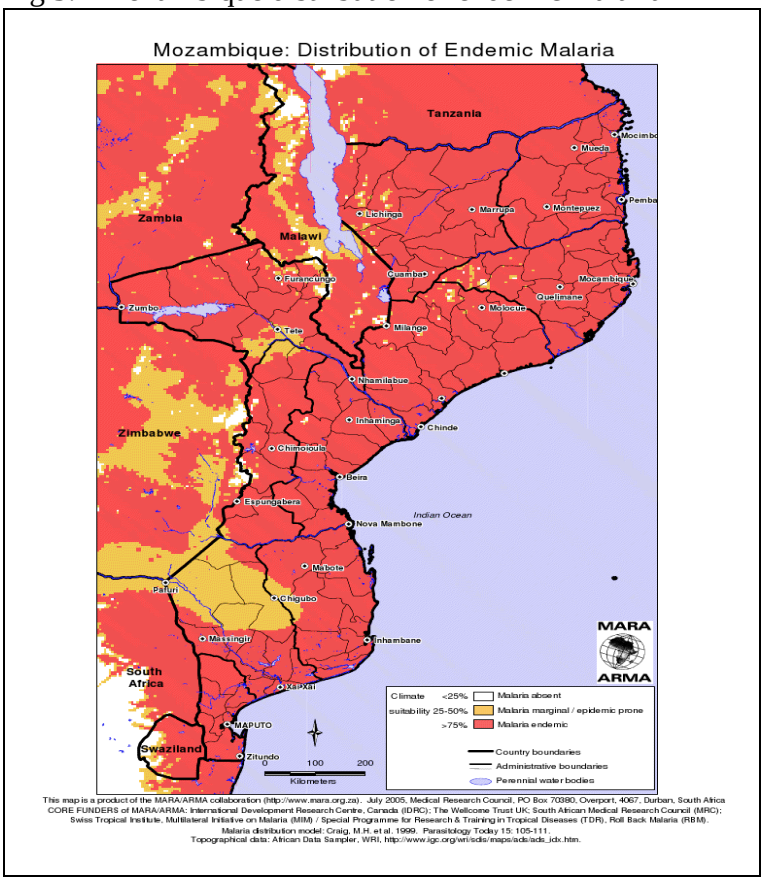
3.2 Population at risk of Malaria

Malaria is endemic throughout the country, due to a multiple factors including climatic/environmental (favourable temperatures and rain patterns, abundant breeding sites) and socio-economical (poverty related improper housing/shelter, unaffordable preventive means).The MARA map (fig 3.2) shows the geographic boundaries and the malaria transmission potential based on geographic and climatic features. The map demonstrates that potentially, malaria is endemic across the entire country and the contiguous parts of the neighbouring countries.

Transmission is perennial, with seasonal peaks during and after the rainy season which is between November and December. The peak malaria transmission season extends from December into April. The seasonal intensity of transmission may vary depending on the amount of rain and air temperature. However, at present there is a lack of good quality and updated information on the endemicity levels in the country. There is no stratification and risk map for malaria in the country. The existing MARA climate-based map was developed in 2000. There is thus need to develop a new malaria-endemicity map using the most recent data.

Previously, malaria transmission was assumed to be very low in Maputo city. In April 2009, however, a rapid urban malaria assessment was conducted within the city limits of Maputo. Data from this assessment suggests on-going transmission at higher-than-expected levels, even in urban areas of the city. Using RDTs, the prevalence of malaria among febrile patients presenting for care to public health facilities was 10.8% in urban Maputo, 16.5% in peri-urban areas surrounding Maputo, and 24.2% in rural areas in Maputo City. Based on these results, both urban and peri-urban areas of Maputo City should be targeted for malaria prevention and control activities.

Fig 3.2 Mozambique distribution of endemic malaria



3.3 Malaria parasites

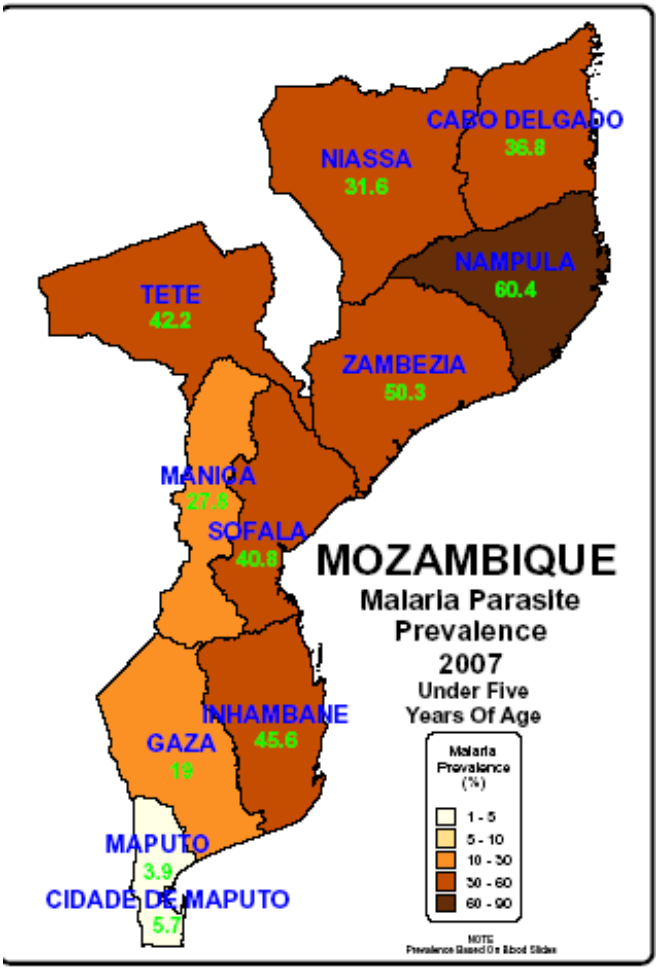
P. falciparum infections account for 90% of all malaria infections, with *P. malariae* and *P. ovale* responsible for about 9% and 1%, respectively. To date, no study has documented existence of *P vivax* transmission.

The MIS 2007 included assessment of parasitaemia among children and pregnant women. Parasitemia in children 6 to 59 months old was 38.5% (microscopic diagnosis) and 51.5% (rapid diagnostic test). Parasite prevalence is lowest as in Maputo province (3.9 %) and in Gaza (19%) which has been the focus of intense malaria control under LSDI, as shown in Fig 3.3. The highest parasite prevalence rates were recorded in the Zambezia 50.3% and Nampula 60.4% where more than 45% of the population live.

Among pregnant women, parasite prevalence was estimated at 16.3% (microscopic diagnosis) and 17.9% (RDT). *Plasmodium falciparum* was present in 97.7% of the blood slides – in 87.8% as a mono-infection and 9.9% as a mixed infection, mainly in association with *P. malariae* (7.8%).

Since this survey was conducted, several interventions have been scaled up especially the expansion of IRS to more districts and LLINs distributed through limited campaigns to <5 year olds and to pregnant women attending ANC. Also, the malaria treatment policy has been revised raising the possibility that the parasite prevalence rates could have declined. There is need for more up to date data on the burden that would potentially inform the targeting of interventions.

Fig 3.3 Map of Malaria Parasitaemia among Children under five years (MIS 2007)



3.5 *Malaria vectors*

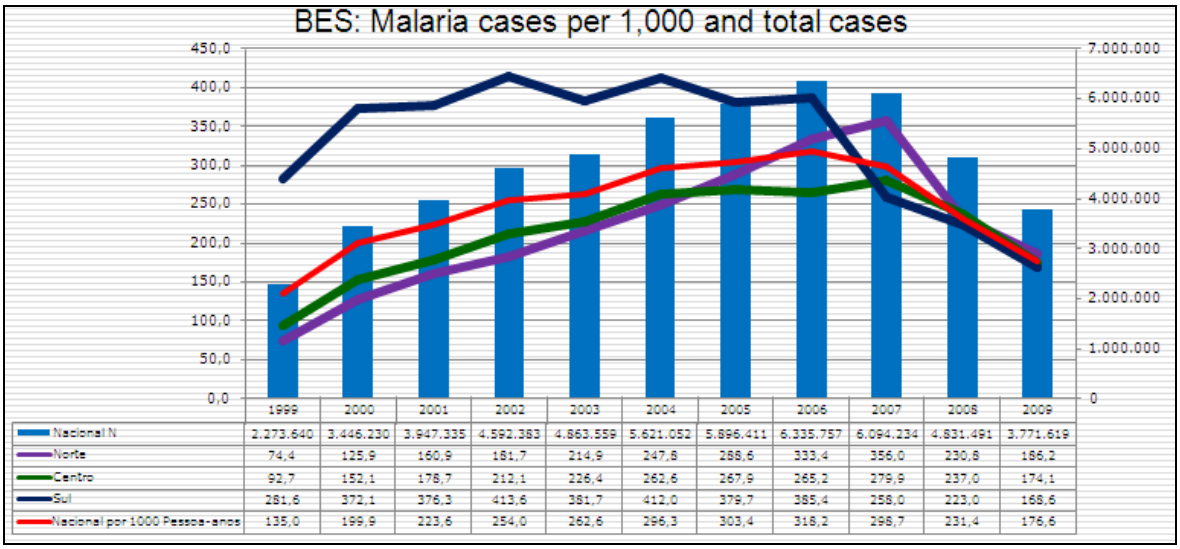
The main vectors belong to the *Anopheles funestus* group and *Anopheles gambiae* complex. The major vectors in Mozambique are *Anopheles gambiae s.s., A. arabiensis,* and *A. funestus s.s.* Among the major subspecies of the *A. gambiae* complex, *A. arabiensis* is more prevalent in the south and *A. gambiae s.s.* in the north. (See detailed description of vector bionomics in the vector control section of his report).

3.6 Disease trends

Malaria is still an enormous public health problem in Mozambique. Although records show a reduction in the malaria case fatality rates, incidence rate, inpatient malaria cases and inpatient malaria deaths in the last 4 years, this disease is still the main cause of morbidity and mortality at health facilities.

The malaria burden is large; nearly 45% of the all cases observed in external consultations and approximately 56% of pediatric in-patient admissions and nearly 26% of hospital deaths.

The malaria statistics reported are based on the malaria surveillance and information systems and shows a decrease in malaria cases and deaths compared to two previous years as presented in the data showing the malaria trends since 1999 until 2009.
Fig 3.4 Malaria Cases per 1000 population and total cases from BES



	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Nacional N	2.273.640	3.446.230	3.947.335	4.592.383	4.863.559	5.621.052	5.896.411	6.335.757	6.094.234	4.831.491	3.771.619
Norte	74,4	125,9	160,9	181,7	214,9	247,8	288,6	333,4	356,0	230,8	186,2
Centro	92,7	152,1	178,7	212,1	226,4	262,6	267,9	265,2	279,9	237,0	174,1
Sul	281,6	372,1	376,3	413,6	381,7	412,0	379,7	385,4	258,0	223,0	168,6
Nacional por 1000 Pessoa-anos	135,0	199,9	223,6	254,0	262,6	296,3	303,4	316,2	298,7	231,4	176,6

According to data on mortality and morbidity collected through the Weekly Epidemiologic Bulletin (BES), comparing the same time period in 2008 and 2009, there were 5,168,684 reported malaria cases and 3,191 malaria deaths in 2008 versus 4,020,574 and 2,786, respectively, in 2009, as shown in Fig 3.4. Malaria cases included both clinically diagnosed as well as those that had laboratory confirmation by either +microscopy or RDTs.

The decline in cases although seems real and across all regions, the accuracy of data collected from BES is questionable. First, clinical diagnosis will always over-estimate the number of malaria cases. Secondly, cases treated within the community whether through the APEs or self-treatment are not captured by the system. Additionally, RDTs have been progressively implemented since 2008, and the impact of this intervention on case management practices as well as reporting is unknown.

The following maps of Malaria incidence rates and mortality rates calculated using BES data indicate that the burden of disease is variable across the 3 zones and individual districts. Malaria incidence rates are lowest in Maputo province and city as well as neighbouring Gaza and tend to mirror the parasite prevalence map derived from the MIS 2007.

Fig 3.5 Malaria Incidence Maps 2006-2007

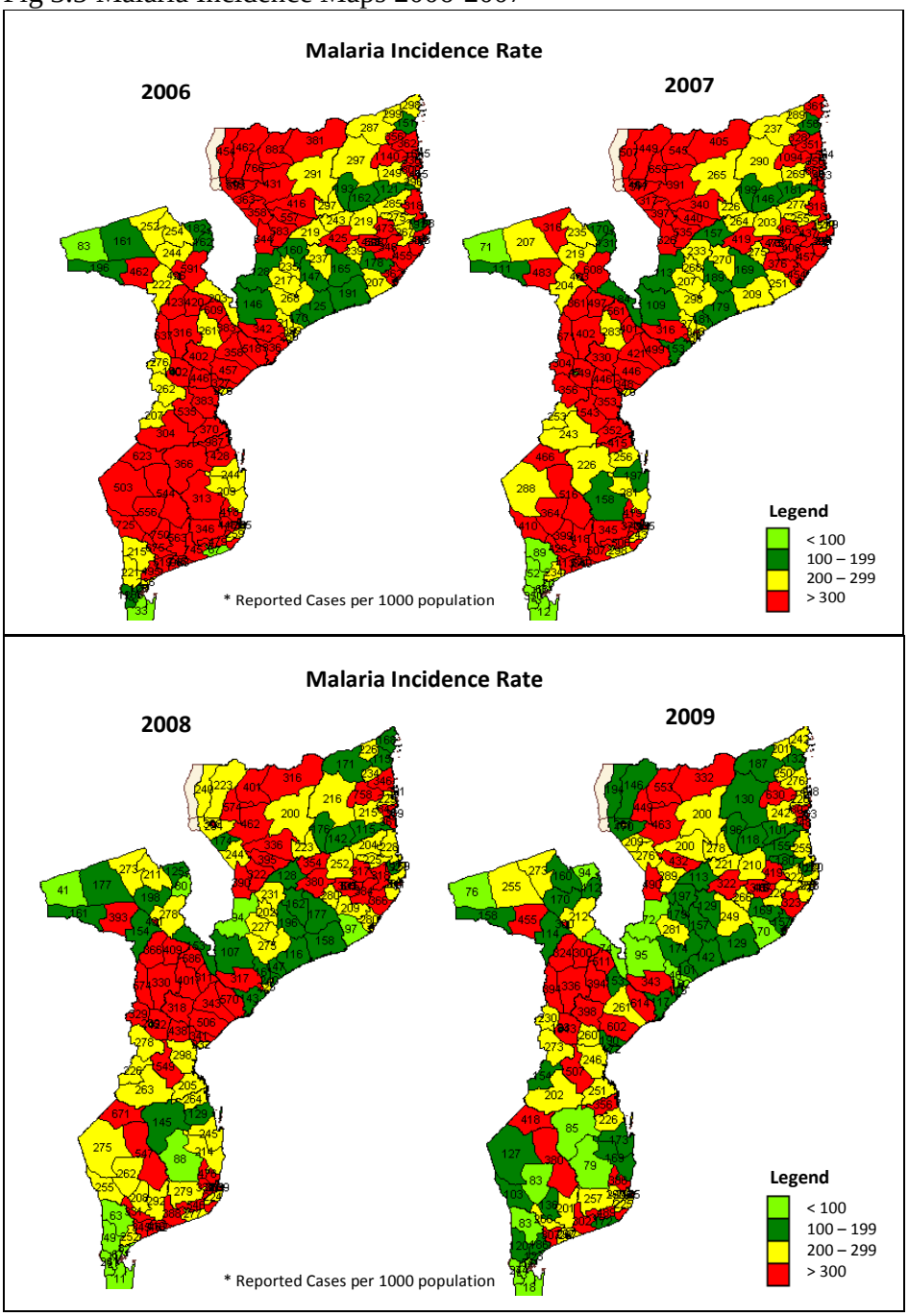
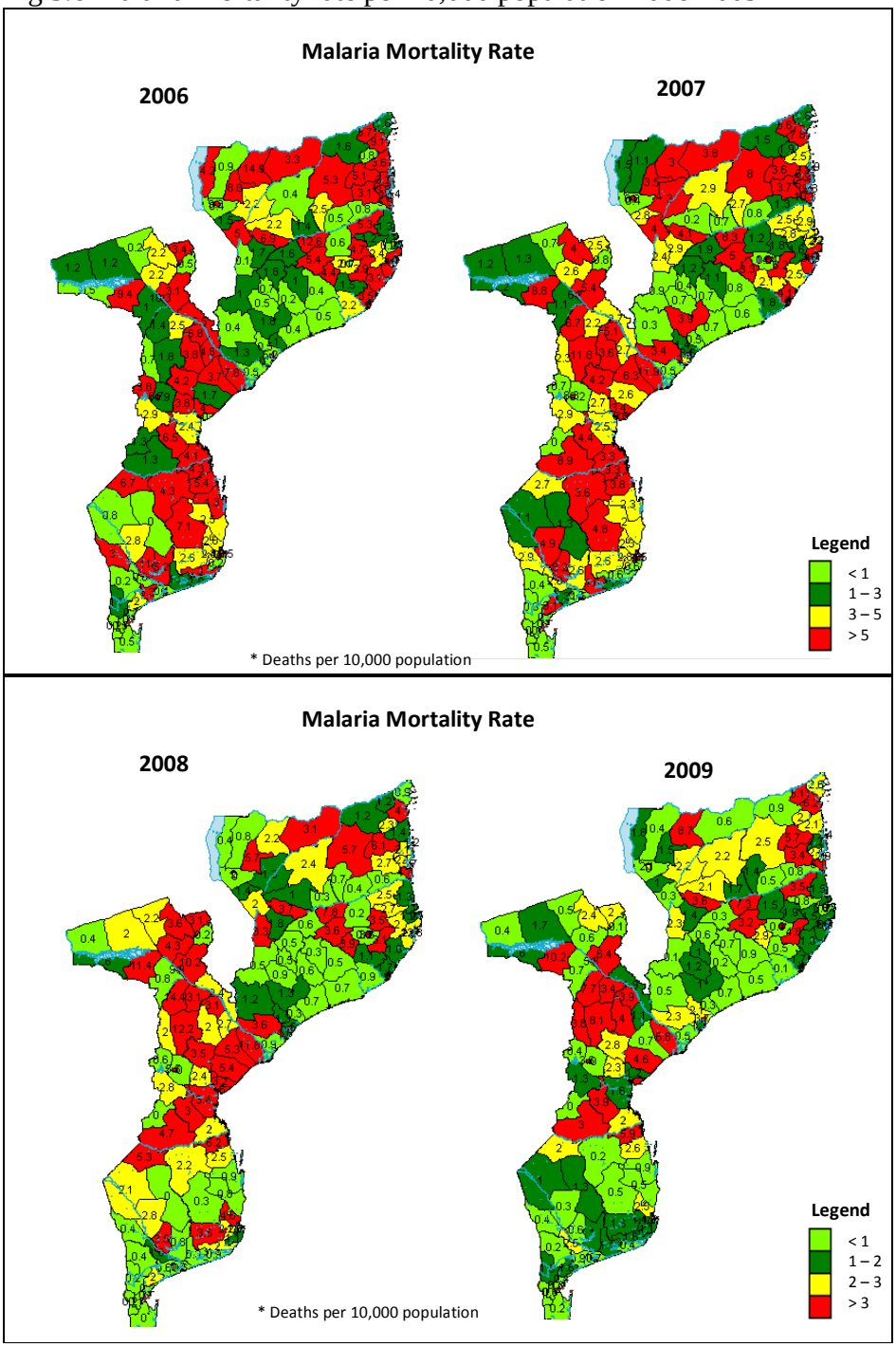


Fig 3.6 Malaria Mortality rate per 10,000 population 2006-2009



A Cause of Death Survey (INCAM) post-census survey carried out between 2007 and 2008 showed that malaria was the leading cause of death (29%), followed closely by AIDS (27%) in Mozambique. Among children less than five years old, this difference is more pronounced: malaria accounted for 42% of the deaths, followed by AIDS at 13%.

3.7 Key Issues

Based on classical epidemiological techniques, malaria transmission zones could be classified into three zones based on malaria parasite prevalence data collected during peak transmission season. The estimated prevalence which is a proxy for transmission intensity can aid in epidemiological zoning of the country will aid the NMCP to targeting interventions in a such a way as to achieve maximum impact.

Table 3.2 Malaria epidemiological zoning in Mozambique.

ZONE	**CHARACTERISTICS**	**PARASITE PREVALENCE**	**PROVINCE**
Zone 1	Low to no transmission	<1%	N/a
Zone 2	Low transmission	<10%	Maputo
Zone 3	Moderate to high transmission	> 10%	Gaza, Inhambane, Sofala, Manica, Tete, Zambezia, Nampula, Niassa, Cabo Delgado

Based on the above zone classification and using data from 2007, the country could be zoned into low-transmission settings such as Maputo province while the rest of the provinces are moderate to high transmission settings. Maputo province has benefited from LSDI where intensive malaria control interventions with wide geographical coverage were implemented over a long have demonstrable decline in disease burden.

It was previously thought that areas around Maputo had a very low burden of malaria and therefore needed a different set of interventions. However, Maputo is divided into both rural and urban areas that may require more targeted interventions especially regarding appropriate vector control approaches.

The epidemiology of malaria in Mozambique could have been altered by the scaling up of malaria interventions. Although health facility data on slide-positivity rates could also be used for gauging transmission intensity, the available data is limited and there are serious issues regarding the quality, quantity and how long ago the data was collected limiting the team's ability to draw definite conclusions on any changes in malaria epidemiology. There are no updated stratification and risk maps for malaria in the country apart from the MARA map which was produced about a decade ago.

The current malaria control interventions should therefore be implemented throughout the country until there is sufficient evidence of an epidemiological shift calling for a shift in the targeting of malaria control interventions.

3.8 Action Points

- To conduct a detailed analysis and triangulation of the various data sources to determine the current epidemiological situation in Mozambique from which decisions on scaling up malaria control interventions could be based.
- Strengthen collection of malaria data through the BES and SIS for future analysis and use in helping detect any epidemiological transitions that would warrant a change in delivery of services.

4. Programme Performance by thematic areas

4.1 Programme Management

4.1.1 Introduction

This review focused on assessing the adequacy of the NMCP policies, structure, organization and management framework within the context of the national health system and overall development agenda. The identified best practices are highlighted as well as proposing actions for certain issues and challenges.

4.1.2 Policy

A comprehensive policy encompassing all the thematic areas is key to effective and efficient malaria control. Mozambique neither has a national health policy nor a malaria policy. Although certain policy statements are reflected in the thematic guidelines such as vector control and case management, there is need for one comprehensive policy framework that encompasses all the key malaria prevention and control interventions.
However, the country has developed several guidelines that highlight some of the policy issues.

Key malaria control interventions are governed by government legislative instruments as shown in the table below. The law provides for registration and regulation of medicines and chemicals; tax exemption of medicines and chemicals but not spray pumps; regulation of the private sector involvement in malaria control and the national health policy. These legislative instruments can be explored to streamline malaria control across other sectors and the private sector. Specifically, there should be a tax waiver on malaria control commodities and regulation of availability of oral Artemisinin monotherapies in pharmacies.

Table 4.1 Useful Legislation Supporting Malaria Control

LEGISLATION	SUBJECT
Article 1 of Law nr 26/91 of 31 December	Licensing and registration of private health facilities
Decree nr 9/92 of 26 May	
Ministerial Order nr 4072003 of 2 April	Regulating the mechanisms of partnership between the NHS and the non-profit oriented Private Sector.
The Decree nr 31/89 of 10 October published in the BR nr 40, Supplement 2	For regulation of the Norms for Establishment and Functioning of Health Posts and clinics at the work place.
Resolution nr nº 4/95 of 11 July and published in the BR nr 27 Supplement.	Was for the approval of the national health policy
Law No. 4/98	The law on Drugs and establishing the Council of Drugs
Decree No. 22/99 of May 4	For regulation of the Drug Registration System.
Law No. 6/2009, of March 10 in	The importation of antimalarial drugs, RDTs, ITNs, Insecticides for IRS are exempt from customs duties and taxes but not spray pumps.

4.1.3 Organisation

Partnerships and Coordination Mechanisms

The partnership landscape has changed dramatically in Mozambique in the last 5 years. Clearly there is a need to revamp the partnership mechanisms to improve collaboration, coordination and maximize the efficiency of malaria services delivery by all stakeholders. In 2005, the NMCP established the National Commission for Fight against Malaria (CNLM) as an advisory body headed by the Minister of Health. The terms of reference for the CNLM includes guidance on policies and strategies relevant to malaria control and prevention It is a multidisciplinary committee that includes Senior Clinicians, the Director of the National Malaria Control Program, the Directors of the Pharmaceutical, Administration and Management, and Community Health Departments, Chief of the Bureau of Health Education (RESP), the Scientific Director of the National Institute of Health. Other members include representatives from the Faculty of Medicine of Eduardo Mondlane University. Other members are co-opted on adhoc basis depending on the subject for discussion and may include representatives from other MOH departments Provincial and District Directorates of Health, Ministries of Education and Culture, Agriculture, Industry and Trade Coordination and Ministry of finance. Some slots are filled by representatives of the private sector involved in malaria control. Unfortunately, the committee has never met 5 years after its inception.

At Central level, there is a forum of partners directly involved in the fight against malaria (**Technical Committee for Coordination of the Fight against Malaria**), which

supports the design of policies and strategies, as well as operational aspects relevant to the National Program for Control of Malaria. Its members include WHO, UNICEF, USAID, Malaria Consortium, PSI, CISM, PSI, FHI and INSA. This committee is supported by technical groups (that comprise of MOH staff and Cooperation Partners) that work in specific areas including Case Management, Monitoring & Evaluation, Nets Group, Communications Group and IEC. However, the composition of these technical working groups is loose; they lack clear terms of reference formal appointments and meet on an adhoc basis when technical matters relevant to their thematic areas arise that require discussion and consensus-building.

For the last three months however, the NMCP has been conducting monthly malaria stakeholders' meeting involving NMCP staff and partners with minutes. This is an attempt to revive the coordination forum for partnerships that had been appointed but never met. However, there are no clear terms of reference for the group, formal appointments and meeting frequency. Although the monthly meetings have been applauded by most partners, they are too frequent given that there are other regular MISAU meetings that are already scheduled and discuss similar issues with the same partners. Clearly, there is a need to streamline the meetings including reviewing the TORs, appointing members formally and agreeing on frequency of meeting. It is recommended that the CNLM meet quarterly while the technical working groups can meet on an ad hoc basis.

The NMCP has been holding weekly stakeholders meeting, specific to the program and also participates in the all-hands meeting of the National Directorate of Public Health, where other issues including malaria are discussed with other sectors. A monthly meeting is held with the direct partners of the program and each year an annual meeting of Malaria is held, involving the provincial administrators (Provincial Director and/or Provincial Chief Physician and Provincial Head of NMCP). This annual meeting is headed by the Minister of Health and covers all issues related to malaria.

In addition, issues related to malaria are also discussed in the National Health Coordination Meeting chaired by the Minister of Health which meets every year.
The NMCP collaborates with other MOH departments including Reproductive Health which directly in charge of implementing the Integrated Management of Childhood Illness (IMCI) strategy and IPTp as part of the focused antenatal care package. The programme also works closely with the Health Promotion Unit, the department in charge of Laboratory Services, the National Institute of Health, the Pharmaceutical Department, Central Medical Stores (CMAM). However, most of these departments felt that the linkage should be strengthened through regular meetings, joint planning, joint implementation of training and supervision as well as sharing financial resources.

In some provinces, similar partner coordination and collaborative mechanisms exist. However, the programme should devise mechanisms for malaria control issues to be discussed on a regular basis at the sub-national level using already planned and instituted partnership coordination mechanisms. For example, some programs conduct annual meetings that can be attended by NMCP staff.

While it is recognized that malaria contributes to high economic losses, high rates of school and work absenteeism, and low agricultural productivity, there is limited intersectoral collaboration with the concerned line ministries. For example there are no joint plans with some of the line ministries that include Agriculture, Tourism, Environment, Education, Public Works, Housing, Fisheries, etc. These sectors have access to populations that are affected by malaria but are usually not targeted by interventions delivered through the health sector.
However, staff from the other sectors from time to time contribute to technical working groups.

4.1.4 Guidance

The following table summarizes the various guidelines and plans that are either in draft form or are yet to be developed or updated. Specific comments and next steps on their completion are in the relevant sections by thematic area in this report.

Table 4.2 Guidelines at various stages of development

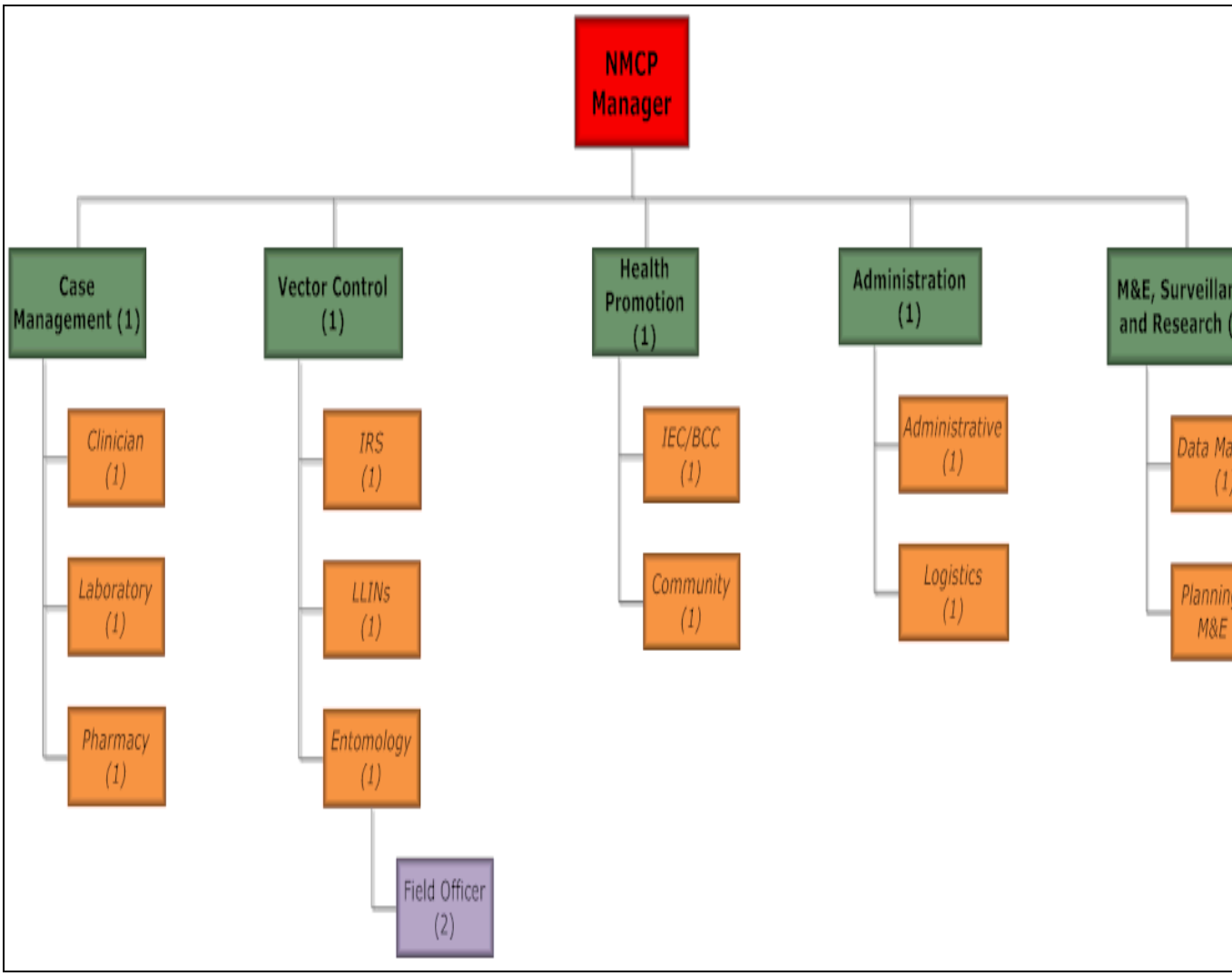
Policies And Guidelines	**Stage**
Guidelines for Diagnosis of Malaria	Final stage
Guidelines for Treatment of Malaria	Approved and ready for printing
Vector Control Guidelines	Draft guidelines on LLIN distribution, and Guidelines on IRS
Communication and Advocacy Strategy	None
Malaria Epidemic Preparedness and Response guidelines	No
National Malaria Policy	No
Strategic Plan for Malaria Control	Draft
M&E Plan	Draft to be completed after the strategic plan.

4.1.5 Human Resources and capacity development

The current NMCP organogram includes the Head of the Program, the head of case management, IEC, Surveillance, Monitoring and Evaluation and focal points for LLINS, IRS and Entomology. However, there in no defined organogram as the entire MOH organogram is still under review. Some of these positions (M & E focal point, entomology staff and logistician) are being paid for by partners as a short-term, stop-gap measure. The NMCP and MISAU directors should lobby the relevant departments to ensure that the appropriate numbers of staff with the required qualifications and experience are posted to the NMCP at the central level if the programme is to cope with the changing and complex world of malaria control. The review has suggested the

organogram in Fig 4.x that could be adopted by MISAU. There is a need to develop appropriate TORs for all the identified positions.

Figure 4.1 Proposed NMCP Organogram



To fill the above organogram, the NMCP will need 6 more staff at central level as follows ; data manager (1), M & E (1), drugs management(1), laboratory (1), and Entomology (2).

At the provincial level, the NMCP has appointed Provincial Malaria Managers who are biologist and mostly coordinate vector control activities especially IRS. He/she has terms of reference, however, they need to be updated. They lack clout to effectively supervise other staff at provincial or district level that may be more qualified and experienced than they are. Clearly, there is a need to review this position in terms of required qualifications and experience. In addition, the capacity of the existing biologists should be expanded to include malaria diagnostics, management which could be achieved by undertaking the basic malariology course. Although the programme has delegated supervision of malaria

case management to the provincial medical chiefs, they are often too busy and overloaded by other responsibilities to pay close attention to malaria control. In addition, they are often poorly resourced (transport and operational funds) to effectively coordinate and supervise malaria case management at these levels.
There are no district level malaria focal points.

Training of Health Workers

There is inadequate collaboration between the NMCP and the department of Human resources in the MISAU with regard to pre-service and in-service training. In addition, the Department of Human Resources (HRD) is not always consulted when the various programmes including NMCP develop training curricular for in-service training and when selecting trainees and trainers. In addition the programmes do not keep an adequate database of people trained that can be shared with HRD. Collaboration with health training institutions with regard to pre-service training is limited. The Health Training Institutions are a useful source of trainers and potential post-training supervisors. The NMCP should organize regional training workshops for health training institutions and to share updated guidelines so that malaria-related control issues are incorporated into the pre-service curricular.

Training needs assessment for NMCP staff at central and provincial levels should be determined so that they acquire the sufficient capacity to cope with the changing malaria and partnership coordination landscape. Some long-term training programmes conducted in collaboration with established educational institutions leading to award of Diplomas, Masters Degrees as well as PhDs may be justified. However, the NMCP is commended should for ongoing collaboration with Faculty of Medicine Eduardo Mondlane University when training health workers on malaria case management.

The priority training areas include:

- Management – projects, planning, timing, leadership
- Cases management
- Entomology
- Research
- Surveillance, Monitoring & Evaluation
- BCC – collaboration with DEPROS, ICS –; collaboration with the network of journalist against malaria

Office Space

At Central level, NMCP have only three small rooms; 1 room for the Program Manager and two for the technicians. The rooms, equipment and furnishings are inadequate; the programme has two phone lines, a copy machine and two black and white printers. The Programme has 7 desktop computers and no laptop although individual staff have personal laptops. The program still requires an A3 color printer, a fax machine, a Scanner. There is still a need for more work room and a store for some materials

currently scattered in the offices. At provincial level, all the malaria focal points are equipped with a desktop computer.

The NMCP should strengthen collaboration with CMAM and Centro de Abastecimento (CA) with regard to commodity management especially related to expected deliveries, quantities to deliver to the provinces and districts as well as the timing of deliveries according to the malaria season. This would mitigate the frequent stock outs as well as ensuring that commodities are adequately stored when they arrive in the country and are transported on time at the point of use.

4.1.6 Planning for Malaria Control

Mozambique has recently initiated a process of decentralization with the districts as the main planning, operational and coordination level. The planning process entails the MOH holding meetings with the provinces and districts, presenting the priorities for the year using the guidelines of the Ministry of Planning and Development. There is however limited interaction between the provinces and the districts with the NMCP to ensure that malaria control priorities are clearly reflected in these plans. There is a need to strengthen the collaboration with the relevant planning department in MISAU to ensure that the provincial and district plans are in line with the malaria strategic plan. The NMCP should lobby and ensure visibility at the annual National Planning Meeting that among other objectives, aims at harmonizing the plans of different sectors and levels.

Similarly, the NMCP drafts its annual plan and budget (based on the Strategic Plan of the NMCP and all other policy documents), forwards it to DNSP and this in turn, to NDPH (National Director of Public Health) . The Economic and Social Plan (ESP) of the MOH, is then sent to the Ministry of Planning and Development, and is later discussed in Session in the Council of Ministers before being submitted to Parliament according to an agreed schedule. Once approved, the NMCP is informed of the available budget for the following year, and makes the necessary adjustments to its plan, taking into account the available budget.

Cross-border initiatives

Mozambique has a large border and is bound by six countries namely, Swaziland, South Africa, Zimbabwe, Malawi, Zambia and Tanzania. Mozambique is a founding member of the Libombos Spatial Development Initiative (IDEL (LSDI), a tripartite program of malaria control which covers Mozambique, Swaziland and South Africa. LSDI was established with a view to protect areas of tourism and economic importance, constituting a good example of the kind of collaboration and coordination within the FRM initiative. Currently LSDI works in 6 of 8 districts of Maputo province, and was expanded in 2006 to Gaza Province in 8 out of 12 districts.

Following the encouraging results achieved by LSDI, the MOH decided to replicate this initiative in Zambezia. The goal is not only accelerating the control of malaria in this province, but also creating a greater national capacity to combat malaria, with a view to its expansion to other parts of the country.

The drawback with these initiatives/projects is the creation of parallel structures for managing and implementing with expenses on salaries, infrastructure and others instead of strengthening the already existing malaria control system in each province. However certain aspects of the initiatives such as staff capacities, management structures and (data base) systems used could be replicated throughout the country.

4.1.7 Financing of Malaria Control.

The main sources of funding include the State Budget, PROSAÚDE and others of vertical nature of which we highlight GFATM, PMI, USAID, UNICEF and the WHO.

By 2007, the FG was incorporated into the PROSAÚDE and, from 2008, it already appears separate but enters through the Ministry of Finance through the United Treasure Account.

Although investing in health is essential for sustainable development of any country, taking into account that the development of a country requires a healthy population, it is still difficult to allocate to this sector 15% or more of the state budget in Mozambique (this being currently about 12% for 2010). Moreover, it is not possible to know from the little budget that the health sector in Mozambique receives, how much is allocated to malaria control, the main public health problem, because the financing of the sector is not prepared per programs, however, this disease is listed on government priorities.

MoH has over the years provided a total of $ 10 million to the malaria programme for the procurement of insecticides (about $7-8m) and for supervision, training and equipment (about $2m) for the IRS activities in the country. The other interventions are mainly financed by partners highlighted above. On the medicines requirements of the sector, only about 40% of the requirements were funded in 2010 and only 20% in 2011. This excludes the GFATM as a funding source.

4.1.8 SWOT Analysis

Table 4.3 SWOT Analysis

STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
Strategic reforms in the health sector,	Lack of skilled Human resources at all levels	Great political commitment	Poor staff motivation
Government Directives for the Health Sector	Lack of guiding documents approved and disseminated	Great support from government and cooperation partners	Conflict of priorities
Weekly and monthly coordination meetings that are already in existence	Limited presence of the private sector in the support to the health sector	- Increased number of partners interested to collaborate	Difficulties in the harmonization of strategies with some partners.
Annual review and planning meetings with the provinces	Poor control of NMCP supplies	Unprecedented support from major funding agencies	Issues related to sustainability of the programme
Existence of technical sub-committees that meet	Coordination of activities within the programme		Frequent changes in management of the

on an adhoc basis			programme
	Lack of a comprehensive malaria policy		Inadequate clarification of the roles of the various partners
	Inadequate tracking of funds especially from GFATM causing delays in release of funds		
	Inadequate cross border collaboration for better malaria control		
	Weaknesses in the PSM leading to frequent stock-outs of malaria commodities		
	Inadequate collaboration between NMCP and other MoH units		
	Lack of harmonized approaches for work		
	Over emphasis on IRS with little complementation of other interventions		

4.1.9 Issues and Challenges

Progress has been made in establishing a functional NMCP with staff and equipment at the national and provincial levels. However, the country lacks a comprehensive malaria policy, some pivotal guidelines that are either in draft form pending completion or are non-existent. As a result, there is a scarcity of guidelines at the operational level.
The human resources situation at the NMCP has improved. However, there is need to reinforce the capacities at national and provincial levels if the programme is to cope with the prevalent partnership environment. There is great need to strengthen the existing partner coordination and collaboration mechanisms.

Also, quality control and impact of malaria control activities across the country must be maintained through training, supervision and monitoring as well as national periodic reviews and evaluations.

4.1.10 Action Points

- Develop a malaria policy that could be incorporated into the national Health Policy once the latter is completed.

- Finalise the proposed NMCP organogram that includes the recommended competencies, with clear roles and responsibilities for all the staff. The linkage between the NMCP and the provincial malaria governors to be strengthened.

- Strengthen the capacity of the provincial malaria coordinators through provision of regular training on their responsibilities, supervision as well as providing resources for supervision of malaria control activities at the district and facility levels.

- Revamp the partnership coordination mechanisms including defining TORs, frequency of meetings and membership. This will include reactivating, the National Commission of Fight against Malaria (CNLCM) with revised terms of reference and clear schedule of meetings. Similar revisions should be made regarding the modus operandi of the monthly stakeholder's meeting, and the malaria technical working groups.

- Improve collaboration, coordination and communication with other MISAU departments/agencies such as RH, HR, CMAM and CA to enhance efficient delivery of malaria control activities and commodities.

- Strengthen the capacity of the provincial malaria managers through provision of regular training on their responsibilities, supervision as well as providing resources for supervision of malaria control activities at the district and facility levels.

4.2 Procurement and Supply Chain Management

1. **Specifications of the basic product**

- **Antimalarials:**

The Ministry of Health has recently revised its policy and protocols for treatment of malaria, keeping Artemether/lumefantrine (AL) as the 1st line treatment for uncomplicated malaria and Artesunate / Amodiaquine (ASAQ) as alternate for a limited number of cases in which the use of (AL) is not appropriate. In the case of severe malaria the program introduced the parenteral Artesunate as first line treatment with parenteral quinine as the alternate medicine.

- **Rapid Diagnostic Tests:**

The WHO recommends using the test with sensitivity levels above 95% in the detection of parasite densities > 100 parasites per micro liter of blood. ICT - HRPII-chromatographic immunoassay test – **PROTEIN-2 HISTIDINE RICH (HRP-II)** due to their stability have been selected for use in Mozambique.

- **Long Lasting insecticide-treated mosquito nets:**

The preference has been for LLINS approved by WHOPES with dernier fiber above 100 threads with more than 25 holes/cm2. They should be preferably light blue in color and rectangular with a preferred size of 160cm x 180cm x 210cm.

- **IRS Insecticides and Pumps**

The selection criteria for insecticides include baseline entomologic and vector susceptibility to insecticide studies as well as WHO standards. The main groups of insecticides used are: pyrethroids. Carbamates and DDT are used in some districts of the provinces of Maputo and Gaza where resistance to pyrethroids has been noted. The Hudson X-Pert pumps which comply with WHO specifications are preferred.

2. **Estimates and quantification of the needs**

- **Antimalárials and Rapid Diagnostic Tests (RDTs):**

Following numerous challenges associated with the previous quantification methods for malaria commodities, the method has been modified. Previously, quantification was based on consumption data complimented by morbidity data. But the two sources of data were always conflicting due to incomplete reports that were used. As a result, NMCP led a team composed of experts from key Malaria program partners such as the CMAM, WHO, UNICEF, USAID/PMI, USAID | DELIVER PROJECT, SCMS and Malaria Consortium, to agree on a method that takes into account the current situation . It is hoped that this revised system (described in detail in the following sections) would alleviate the chronic medicine stock-outs that were primarily due to the procurement of inadequate quantities.

This method uses assumptions that were previously not used in an effort to better forecast the malaria situation. Some of the assumptions include:

- Estimated access to services by the general population,
- Estimated number of severe and uncomplicated malaria cases,
- Expected impact on use by the scaling up of the various preventive interventions,
- Introduction of RDTs and therefore reductions in treatment used.

The chart in Fig 4.2 summarizes the model used for the quantification of the 2011 requirements, while table 4.4 shows estimated medicines for 2010-2015.

Fig 4.2 Methodology used to estimate number of treatments needed per year

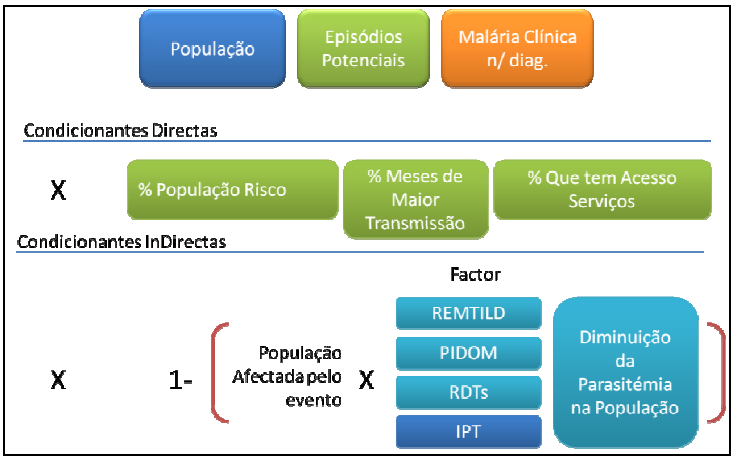


Table 4.4 Estimates of medicines for the next 5 years

	2010	2011	2012	2013	2014	2015
KITS US/APE						
artemether-lumefantrine 20MG+120MG/TABLET TAB 6	1,695,960	1,803,240	1,950,120	2,096,400	2,129,400	2,086,200
artemether-lumefantrine 20MG+120MG/TABLET TAB 12	975,960	1,094,940	1,263,420	1,431,300	1,485,900	1,464,300
artemether-lumefantrine 20MG+120MG/TABLET TAB 18	975,960	1,094,940	1,263,420	1,431,300	1,485,900	1,464,300
artemether-lumefantrine 20MG+120MG/TABLET TAB 24	2,415,960	2,511,540	2,636,820	2,761,500	2,772,900	2,708,100
Via Classica						
artemether-lumefantrine 20MG+120MG/TABLET TAB 6	764,303	702,679	574,337	542,393	554,404	501,009
artemether-lumefantrine 20MG+120MG/TABLET TAB 12	1,148,450	1,056,025	869,012	822,518	842,930	764,647
artemether-lumefantrine 20MG+120MG/TABLET TAB 18	713,039	676,248	618,272	621,499	680,620	666,906
artemether-lumefantrine 20MG+120MG/TABLET TAB 24	1,454,617	1,368,882	1,238,731	1,230,647	1,332,764	1,304,884
Artesunate/Amodiaquine 100mg+270mg 3 tabs	84,922	79,788	71,508	70,802	76,376	74,212
Artesunate/Amodiaquine 25mg+67.5mg 3 tabs	5,260	4,836	3,952	3,732	3,815	3,448
Artesunate/Amodiaquine 50mg+135mg 3 tabs	23,346	21,692	18,525	17,931	18,853	17,642
Artesunato Sódico 60 mg + ampola de diluente	1,662,023	1,731,435	1,795,364	1,937,743	2,053,672	2,046,592
Quinino inj 600mg/2ml inj	751,447	787,601	837,098	914,503	982,351	996,622
Quinino 300mg tabs	10,080,090	10,550,155	11,149,825	12,147,665	13,009,658	13,145,501
Sulfadoxina 500mg+Pirimetamina 25mgTabs	7,972,420	8,880,560	9,809,237	10,782,531	11,794,109	12,088,844

Although there is a detailed calculation on the requirements for AL, inadequate guidance has been provided for the procurement of RDTs and the alternative first and second line anti-malarials. At the same time, in order to accurately come up with the requirements of these commodities, there is need for constant collaboration of the clinical services and logistics management departments.

Regarding the RDT requirements, the need were calculated based on the implementation of the universal "test before treat" goal. The assumptions to calculate the needs included the number fever cases likely to require a malaria diagnostic test, rural and urban population, the increasing access to diagnostics over the years. In addition, it was assumed that microscopy was intended for the main health units and RDTs for health units without laboratories.

Quantification of the needs and supply plan

After quantification a procurement plan is developed in which existing stocks are determined for each formulation at central and provincial level (District Information will soon be accessible), the expected consumption of each drug, the stock levels required to maintain the system functional (High, Low and buffer stock) which determines the shipments required depending on requirements (See Report of Quantification October 2010 and tables 4.5 and 4.6).

Table 4.5 Stock on Hand at the Provincial Level

Descrição do Produto	Forma de Contagem	Niassa	Cabo Delgado	Nampula	Zambézia	Tete	Manica	Sofala	Inhambane	Gaza	Maputo
Arteméter - Lumefantrina (AL), (20+120)mg	Tratamentos, carteiras (6x1)	11,880	150	0	51,330	15,150	40,290	450	9,900	9,120	1,228
Arteméter - Lumefantrina (AL), (20+120)mg	Tratamentos, carteiras (6x2)	10,650	1,100	24,090	79,449	22,230	40,740	420	13,320	5,760	360
Arteméter - Lumefantrina (AL), (20+120)mg	Tratamentos, carteiras (6x3)	7,050	0	0	33,930	0	0	0	150	0	361
Arteméter - Lumefantrina (AL), (20+120)mg	Tratamentos, carteiras (6x4)	26,820	12,600	24,680	88,050	15,930	39,900	420	17,630	13,440	898
Total de Tratamentos de AL		56,400	13,850	48,770	252,759	53,310	120,930	1,290	41,000	28,320	2,847
Artesunato + Amodiaquina (AS+AQ), (50+153)mg	Tratamentos, carteiras (3+3)	1,008	0	1,400	0	25,330	63,690	42,100	46,000	28,600	12,600
Artesunato + Amodiaquina (AS+AQ), (50+153)mg	Tratamentos, carteiras (6+6)	6,450	0	3,380	0	10,280	32,540	21,050	23,000	14,600	6,300
Artesunato + Amodiaquina (AS+AQ), (50+153)mg	Tratamentos, carteiras (12+12)	4,050	140	0	0	20,100	67,450	42,100	46,000	28,600	28,810
Total de Tratamentos de AS+AQ		11,508	140	4,780	0	55,710	163,680	105,250	115,000	71,800	47,710
Quinino 300mg, comp.	Comprimidos	7,000	86,000	673,000	182,000	27,000	0	100,000	36,000	120,000	13,000
Quinino 600mg/ 2mL, injectável	Ampolas	4,690	23,700	13,000	9,200	95,173	11,090	1,690	900	26,500	4,530
SP (500+25)mg, comp.	Comprimidos	0	0	0	0	0	0	0	0	0	0
Testes de Diagnóstico Rápido de Malária (TDR´s)	Unidades	29,450	3,000	s/inf	16,200	168,750	1,000	450	0	500	20,275

Table 4.6 Stock on Hand at the Provincial and Central Level

Descrição do Produto	Forma de Contagem	ARMAZENS PROVINCIAIS	ARMAZ. CENTRAIS		TOTAL Geral
			Zimpeto	Beira	
Arteméter - Lumefantrina (AL), (20+120)mg	Tratamentos, carteiras (6x1)	139,498	440,280	0	**579,778**
Arteméter - Lumefantrina (AL), (20+120)mg	Tratamentos, carteiras (6x2)	198,119	1278060	24,000	**1,500,179**
Arteméter - Lumefantrina (AL), (20+120)mg	Tratamentos, carteiras (6x3)	41,491	0	0	**41,491**
Arteméter - Lumefantrina (AL), (20+120)mg	Tratamentos, carteiras (6x4)	240,368	1,632,480	24,960	**1,897,808**
Total de Tratamentos de AL		619,476	3,350,820	48,960	**4,019,256**
Artesunato + Amodiaquina (AS+AQ), (50+153)mg	Tratamentos, carteiras (3+3)	220,728	63,000	0	**283,728**
Artesunato + Amodiaquina (AS+AQ), (50+153)mg	Tratamentos, carteiras (6+6)	117,600	108,850	0	**226,450**
Artesunato + Amodiaquina (AS+AQ), (50+153)mg	Tratamentos, carteiras (12+12)	237,250	362,772	0	**600,022**
Total de Tratamentos de AS+AQ		575,578	534,622	0	**1,110,200**
Quinino 300mg, comp.	Comprimidos	1,244,000	2,925,400	0	**4,169,400**
Quinino 600mg/ 2mL, injectável	Ampolas	190,473	1,141,400	569,900	**1,901,773**
SP (500+25)mg, comp.	Comprimidos	0	0	0	**0**
Testes de Diagnóstico Rápido de Malária (TDR´s)	Unidades	239,625	1,092,775	0	**1,332,400**

Software for determining the shipments: PipeLine Program Version 4.0.8f

Pipeline is software developed by the project DELIVER – JSI which uses consumption data previously entered (actual and estimated) to generate the procurement plan: dates, quantities and proposed funders.

- **Long Lasting insecticide Treated Nets :**

The main assumption used to date (for Global Fund proposal Round 9 for example) has been to take the population in Mozambique where IRS is not being conducted to estimate the population which should receive LLINs through universal coverage campaigns. It was

then estimated that this population would need ~ one LLIN for every two people. For routine LLIN distribution through the ANC care visit, 5% of the population was estimated to be pregnant yearly and one LLIN would be distributed to each pregnant woman at the time of the first ANC visit. Over 84% of pregnant women access the health care system during their pregnancy. It is also assumed that LLINs have a life span of three years.

- **Insecticides:**

In planning quantities for insecticides the following are taken into account: Type of insecticides to be used, Weight per sachet, Total area in square meters (m^2) to be strayed and existing stock at provincial level. The information for estimating IRS requirements is usually obtained through geographical reconnaissance (GR). Geographical reconnaissance provides the relevant information on the target area. The objectives of geographical reconnaissance are:

- To produce a map of the area with its boundaries showing the location of all the foci (active, non-active, potential, cleared-up etc), hydrological features and networks (available routs to and within the area), landscape divisions, hypsometry (altitudes), roads and health facilities, all houses, breeding sites etc
- To determine the number of structures in the malaria foci:
  - Type of structures
  - Distribution of the structures
  - Target number of structures to be sprayed
  - Average size (surface area) of structures
  - Total surface area to be sprayed
  - To give the houses a reference number.

The geographical reconnaissance needs to be updated periodically.

National budget and other sources of funding

Ministry of Health contributes a total of about US $ 10 million for malaria commodities. Most of this budget is spent on the procurement of insecticides. The other commodities are mainly procured by partners with most of the money coming from GFATM. However, GFATM disbursements have been challenging partly because gaps in available information to adequately inform the process. The erratic release of funding has led to complete stock outs of anti-malarials (AL, SP) and diagnostics (RDTs). PMI in some cases has assisted in the procurement of emergency supplies. The total estimated value of pharmaceuticals and health supplies procured in 2009 by CMAM is USD 60 million. For 2010 this figure was expected to increase, however, use of the GFATM VPP facility has in fact led to a decrease in funds managed by CMAM due to the direct procurements being undertaken.

3. Procurement

Two major systems are used for the procurement of anti-malarial medicines - *Via Classica* and PME Kits *Via classica* – Tenders are launched every year or every six

months, according to the needs and availability of funds. Deliveries are made to the existing two central warehouses (Maputo and Beira)
PME Kits**:** Is launched as annual tender. Deliveries are made in the main ports (Maputo, Beira, Quelimane and Nampula) and from there distributed to the Provincial Medical Stores (DPMs)

Procurement procedures are based on the prevailing national procurement framework and legislation. In 2005 the government enacted the Procurement Law (Regulamento) which covers procurement for government agencies under the central government as well as local authorities. From the guidance provided by this "Regulamento", the government has proposed the following as the institutional framework to guide the process:

- Establishing the Unidade Funcional de Supervisão das Aquisições - Functional Supervision Unit for Procurement (UFSA), the procurement monitoring body, under the MoF;
- The nomination of a "Competent Authority", i.e. a person in each Contracting Entity responsible for overseeing the procurement process (Permanent Secretary for Health – Feb 2007); and
- Establishing the Unidades Gestoras Executoras das Aquisições (UGEAs), units in charge of managing the whole procurement process, in support of and under the Competent Authority.

The government issued a number of decrees in its Gazette of standard bidding documents (SBDs) for works (large and small), goods and non- consulting services (average and small), pharmaceuticals and medical supplies and consulting services. CMAM mainly uses the public tender system, which is open to national and international bidders. Bidders are expected to only provide ARVs, ACTs and anti-tuberculous medicines which are pre-qualified by WHO. All other pharmaceuticals procured by CMAM should be registered in the country in compliance with the Pharmaceutical Department policies.

For the procurement policies and systems CMAM has developed specific Standard Operating Procedures (SOPs) with support from USG funding, and are currently being finalized. For the other processes, SOPs will also be developed. CMAM has received technical assistance in the area of procurement, quantification, warehousing, MIS, etc since 2008. SCMS has been working with CMAM, and has recently worked closely with its procurement unit.

Emergency supply in case of stock-outs
The guidelines have made three provisions for this situation. There are:

- Direct purchases (with the approval of the Minister), depending on availability of funds.
- Support from partners, depending on agreed on arrangements for disbursement of funds
- Support from Countries in the Region. MOH partners such as WHO, CHAI and SCMS support in contacting organizations that provide these donations.

International support to the MOH

Several partners support this area. These include:

- USG - PMI/DELIVER
- Global Fund
- World Bank
- UNITAID / UNICEF (by later 2009)
- Donations from the Government of China
- USG - PSI (for Nets)

The systems in place for procurement of the malaria commodities were found to be adequate.

4. Storing and Distribution

System of storage and distribution antimalarials and RDTs

Different mechanisms are used at each distribution level.

- The **Central Level**, represented by the CMAM of which distributes to the Central Stores of Maputo and Beira, which supply the Central Hospitals, General Hospitals and the Provincial Depots.
- The **Provincial level**, represented by Provincial Depots, which supply the Provincial Hospitals, the Specialized Hospitals and District Depots, in some cases also supply some Rural Hospitals and Health Centers
- The **District Level**, represented by the District Depots which supply the Rural Hospitals and Health Centers
- The **Primary Level** represented by the Health Centers
- The **Community Level** represented by the APEs which are supplied by the District Depots or nearest Health Centers.

There are three methods of drug supply in the National Health Service namely: *Via Classica*, the PME Kits and complimentary Kits.

Via Classica

This is used at the central, provincial and district/general/rural hospitals as well and is also used to compliment the kits medicines supplied to health units at primary level. This system is based on preparation of a requisition for the supply of necessary drugs based on average consumption and buffer stocks in relation to quantities in stock. Via classica requisition also can be used in emergency when a drug reaches the emergency point (to avoid the risk of stock out) or during the following situations:

- When stock of a given product is below the buffer Stock;
- When there is anticipated over consumption, e.g. epidemics, outbreaks, accidents, etc.
- When a particular product in Kit runs out;

- When the skills of clinical staff at the HF allow for the use of drugs of a level higher than those normally included in the kit, to cater for certain conditions. When one of these situations happens, the head of pharmacy in coordination with the responsible clinician makes a request in accordance with the requirements, to the depot provider requesting reinforcement or additional supply of medicines.

Programmed Supply of Kits
The process of programmed supply of kits is aimed at ensuring the regular existence of essential drugs in the primary level HFs, improve the use of drugs and the conditions of storage and distribution of drugs at this level therefore improving the supply of medicines to the population.

A kit is a pack containing essential medicines designed to treat a certain number of patients on the basis of pre-defined epidemiological patterns. The distribution is carried out by provincial and district depots which does not require a request but only evidence of the outpatient visits performed in the preceding period. The type of kit supplied to each HF is determined by the qualifications of the medical staff present and the average number of monthly outpatient visits expected. There are 2 types of kits, including Kit US and Kit APE as shown in table 4.7.

Table 4.7 Types of Medicinal Kits

Type Of Kit	**Number Of Outpatients**	**Level Qualification Of The Clinical Staff**
Kit US	1000	• Doctors • Clinical Officers • Agent of Agents • General Nurse • Basic Nurse • Maternal/Child Health Nurse
Kit APE	250	Community Health Agent (APE) and First Respondents

It is important to note that in order to receive the kits Health Facilities are required to complete the appropriate forms that are sent to the higher supervision level for the calculation of the right number of kits to be requested.

Complementary Kit for malária:
The AL, due to its packaging in blister form is voluminous and does not allow its inclusion within the space available in the PME KIT. Moreover the procurement mechanism for AL tends to fall outside the normal government procurement mechanisms. Thus the AL is procured, assembled and distributed separately. The CMAM, supported by USAID | DELIVER PROJECT, prepares the kits for malaria and manages their distribution to all provinces. These are sent with PME kits to the HF and APEs and the distribution cycle is the same and is not affected by seasonality.

Composition of the AL Kit is shown in table 4.8.

Table 4.8 Composition of the AL kit.

Formulação	Kit Malaria US	Kit Malaria APE
Artemether-Lumefantrine 20MG+120MG TAB 6 (1x6)	60 Tratamentos (2 caixas de 30)	30 Tratamentos (1 caixas de 30)
Artemether-Lumefantrine 20MG+120MG TAB 12 (2x6)	30 Tratamentos (1 caixas de 30)	30 Tratamentos (1 caixas de 30)
Artemether-Lumefantrine 20MG+120MG TAB 18 (3x6)	30 Tratamentos (1 caixas de 30)	30 Tratamentos (1 caixas de 30)
Artemether-Lumefantrine 20MG+120MG TAB 24 (4x6)	90 Tratamentos (3 caixas de 30)	30 Tratamentos (1 caixas de 30)

This fixed composition of Kits AL, like the PME kits can lead to stock-outs or accumulation of stocks of some medicines. However, its management should follow the same procedures of requisition VC and return, respectively to overcome this potential risk.

Bed Nets Storage and Distribution System

To date there is no established MISAU system for LLIN procurement, warehousing, transportation and distribution. Malaria partners have been fulfilling this function for MISAU. This has included the removal of the LLINs from the port, renting warehousing space at a central and provincial level and providing transportation from the central level to the provincial level.

Currently, the only partners procuring LLIN on behalf of the NMCP are UNICEF and PMI. Both agencies hand over all LLINs to the DPS on arrival, however, in some provinces PMI uses an interim warehouse prior to transfer. From the provincial warehouses, distribution takes place to the district warehouses for further distribution to health facilities. The conditions of the provincial and district warehouses range from excellent to poor, and some of them need renovation. The **LLIN** transport and distribution chain to ANC clinics after purchase is basically as follows;

- Purchase on basis of delivery as per the INCO term applicable, at one of 3 ports of entry to Mozambique (varies depending of province of deployment – these are Maputo, Beira and Nacala)
- Import formalities
- Transport per container to central provincial warehouse in the provinces
- Storage at provincial level until requirement at district level is ascertained
- Distribution to district level by MOH transport by provincial trucks

- Distribution by district vehicles to health facilities, along with medicines

LLIN transport and distribution for campaign activities have been delivered to rented warehouses in the target province, then taken to pre-established distribution points identified by the provincial and district health authorities. Nets will not be stored at these points, but will be taken there only after definite plans for campaign distribution activities.

Insecticides Storage and Distribution System

Insecticides are procured at a central level and arrives to Mozambique via the 3 main ports. From there, it is transported to regional warehouses in Maputo, Beira and Nacala. Then they are transported to the provincial warehouses and then to the district level where IRS takes place.

Insecticide for use in IRS follows a defined schedule to arrive in one of the 3 ports of entry, like the LLINs. From there, insecticide is distributed to provinces according to the distribution plan drawn up by the NMCP. This plan is based on the target coverage of the province and the number of households to be reached within this target. IRS activities run from August to September annually, therefore insecticides are scheduled to arrive at least two to three months prior to the start of activities. The major challenge identified is the inadequate storage space of these commodities and also inadequate distribution plans from the provincial to the lower levels.

5. Quality control

For quality assurance of other pharmaceuticals and health products, the PD has put in place a policy framework to ensure that the set regulations on registration and importation are complied with.

The National Laboratory of Quality Control of Medicines (LNCQM) was established in 1991, as a subordinate institution of the then National Directorate of Health Promotion and Disease Control (DNPSCD) – under the National Directorate of Public Health of MoH. Its mandate is quality control of medicines to ensure adherence to established international quality standards.

Since March 2009, the LNCQM has been closed as the unit moved from old premises to a new site that is currently under construction. It is expected that this will continue up to mid 2011 and, upon completion of the Physical structure, additional funds will be required for equipment for the LNCQM to function at international standards in the testing of all products imported.

During this phase, when there are medicines requiring quality analysis, samples are analysed at the water analysis laboratory by LNCQM technicians. When it is not possible to test the medicines in-country, they are sent to laboratories overseas, for example MEDS (Mission for Essential Drugs and Supplies - WHO prequalified quality control Laboratory) in Kenya and LEF (Laboratory of Pharmaceutical Studies - GMP and GLP

compliant) in Portugal. For products procured by GF, these have to comply with GF Quality assurance Policy.

Before closure of the LNCQM, each lot of products procured was tested before release into the system; since its closure, only suspicious products are being sent to the laboratory for testing. This is an area that needs to be worked on to ensure that quality products are imported into the country. There is currently no system in place for quality control of the insecticides.

6. Control of stock and reporting

- **Antimalarials and Rapid diagnostic tests:**

A number of management models were designed to control and monitor stocks. Among them are:

- **Delivery Note**
- **Stock Form** (Allows: Control the amount of existing products; Controlling the validity of the product; Control safety stock, Calculate the required quantity of products, control the movements of products, Increase transparency in the management of products)
- **Inventory vs. Balance/Requisition**

Note – all these instruments were designed with the following aims:

- Allow a correct re-supply based on data/information supplied
- Obtain data for further quantification and supply plan follow up.
- For purposes of Monitoring and Evaluation of the system

The poor filling of these forms can lead to a series of consequences such as stock-outs or accumulation of stock; poor prioritization of funds, etc. After introduction of AL as a first line treatment for malaria, another form was introduced to allow for better control of stocks. These are the - **Consumption sheet of AL in HF:**
This monitors the cases of malaria registered in the HF and the number of treatments given. This data is used for quantification of needs and program evaluation. In terms of supply chain information, this follows a paper-based system from the HF and APEs, to the District (DDMs) and then Province (DPMs). Currently, in order to improve the management of products and information management thereof, efforts have been made to computerize the central and provincial levels. Thus, two computer systems are being implemented, namely:

Central Level: MACS (Warehouse Management Information System)

The MACS system in Zimpeto is a stand alone system, and surprising evidence suggests it currently functions well. There were some start-up problems with the MACS system. However, upon analysis, it was found that problems were mainly caused by operator

error and staff not following Standard Operating Procedures, rather than deficiencies in the MACS system.

Beira is currently undergoing a major clean up and reorganization exercise with STTA from SCMS, which includes gaining control of stock, organizing in palettes and dealing with significant volumes of expired stock, accumulated over the past 5 years. This is the first SCMS TA to the Beira warehouse and this clean- up is seen as a precursor to the implementation of MACS in this warehouse.

The SCMS office is well resourced and has good MIS/IT skills in-house. It also enjoys good technical logistics support. With SCMS's side by side mentoring, CMAM staff in Zimpeto also are gaining confidence in the use of MACS. The planned roll out of MACS to the Beira warehouse, expected in the beginning of 2011, is therefore not envisioned to require much external support beyond some technical assistance from MACS.

The implementation of MACS started in April 2009. A very simple MACS version was first implemented in the CMAM warehouse in Matola/Adil to monitor stocks in that warehouse and to enable movement of products to new warehouse in Zimpeto (operational since November 2009). MACS is also used to in stock management of products in the warehouse. MACS will be installed in the central warehouses in Beira (central region) in 2010, and in Nampula (northern region – funded by USAID) when the warehouse is ready. In the PLMP it is proposed that a computerized system be implemented at district level as well. The first version of this tool will be implemented at provincial level in all provincial warehouses.

Generally under this system, the information flow is regular with monthly reports being compiled between the districts and health facilities, from which manual reports are sent in hard copy to provincial level. The information is compiled at provincial level and transmitted to central level mainly via email or fax. Information on consumption is reported manually through input from requisition forms from the districts up to DPM on a monthly basis. Specifically for Artemether-Lumefantrine, a daily register was implemented at health facility level in June 2010. DPM submits quarterly requisitions based on the needs of the districts to CMAM. From July 2010 on, all information related to pharmaceuticals and RDTs will be computerized on the new tool to be sent via internet to the central level.

Provincial Level: SIMAM (Medical Stores Information Systems)

In June 2010 SCMS trained 40 Ministry personnel and PEPFAR advisors on the use of this new tool and in populating each provincial database with historical data. In December 2010, the SIMAM system is implemented in all provinces and are satisfactory operational in 8 provinces. During 2011, the system will be implemented in 30 districts and principal hospitals.

This computerized management information system is still under implementation and it's been improved according to the needs. At this point in time, it has been implemented in

all provinces of the country at the level of DPMs and becoming operational, retrieving information regarding the use and stock availability automatically to the Central level.

Later on it will also be implemented at the level of DDMs. An identical module is designed for the Central Hospitals. The same module will be used for any other HF in the country with the capacity to use it.

Bed Nets treated with Long Lasting Insecticides:

The monitoring of bed nets follows the same procedures for other products in the NHS, i.e. control by Control Cards and Distribution Sheet.

Insecticides for IRS:

There is a system of stock control where the spray operators report at the end of each day the amount of insecticide used and returns the wrapping. The final PIDOM activity report includes a stocks component. The information systems that are planned will be adequate when implemented. The challenge will be in ensuring that these are routinely updated so that the information generated will be useful.

7. Training modules

There are training modules for management of medicines and other health products. However, these are more for pharmacy professionals and the training needs to be extended to other cadres as well. Training in general, is conducted on procedures for managing and dispensing medications at provincial level in collaboration with the implementing partners. Specific modules have been prepared that address:

- AL consumption sheet at HF (specific for malaria program)
- Manual of procedures (serves for all products which integrate the VC)

This area will need to be explored and implemented jointly with the various stake holders.

8. Supply plan

PipeLine Software developed by DELIVER PROJECT was used to carry out the supply planning and quantification, providing each supplier a procurement plan to be executed in order to secure the availability of the drugs in all the country supply chain.

The following parameters were considered for the development of the supply chain:

- Length of the pipeline (15 months): six months maximum at the central level, five months for provincial level; two months for district level, two months for facility level and (APE).
- The forecast results were entered into PipeLine software taking in consideration the seasonal incidence of malaria and the continuous kiting operation for APE and primary Health Units

The background information on each type of product (number of treatments by shipping carton, treatment price), was also entered into PipeLine.

The stock on hand for each product and expected shipments for 2011 to 2012 were also entered into PipeLine. The Desired Month of Stock level in the pipeline is 14 months (the first line drugs AL's arrives in country with 18 month shelf life).

With the current stock on hand and shipments expected to arrive in 2011, the total number of treatments needed for first line drugs is estimated at 15 millions of treatments of AL to keep the adequate levels of stock in the supply chain (delayed shipments during 2010 exhausted the country buffer and functional stocks). The implementation of injectable Artesunate as main drug for severe malaria treatment will be conducted during 2012 after the inj. Quinine stocks are used.

Table 4.9 Quantification estimates of all medicines and commodities for diagnosis and treatment of malaria.

Product	Supplier	2011	2012
Artesunate 60mg 1 Vial (With solvent)	UNKNOWN		3,943,998
Coartem 1x12	GF R6ph2 VPP	1,130,520	
	UNKNOWN	896,640	2,172,960
	USAID | DELIVER PROJECT	1,193,760	
Coartem 1x18	GF R6ph2 VPP	565,248	
	UNKNOWN	740,640	2,005,440
	USAID | DELIVER PROJECT	2,135,040	
Coartem 1x24	GF R09	538,799	558,509
	GF R6ph2 VPP	1,931,274	
	UNKNOWN	1,496,640	3,371,731
	USAID | DELIVER PROJECT	1,995,360	
Coartem 1x6	UNKNOWN	872,640	2,578,560
	USAID | DELIVER PROJECT	2,453,280	
Insecticide-treated nets (ITNs)	GF R09	4,344,943	
	GF R6ph2 VPP	2,200,000	
	USAID | DELIVER PROJECT	500,000	
	WB HSCP /UNICEF		1,500,000
RDT (Malaria Rapid Diagnosis Test)	GF R09	8,536,586	8,536,586
	GF R6ph2 VPP	2,608,700	
	UNKNOWN	6,639,143	10,681,255
	USAID | DELIVER PROJECT	5,000,000	
Sulfadoxine-Pyrimethamine 500mg+25mg Tablet	USAID | DELIVER PROJECT	11,000,100	

The unknown shipments represents the ones planned but without a committed supplier, the available funds from the PMI MOP11 and World Bank project HSDP will cover the majority of the 2011 and 2012 GAP for the ACTs and RDTs.

9. SWOT Analysis

Table 4.10 SWOT Analysis of PSM

STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
Access of kits by all health facilities (HF), including community (APEs)	Poor management and filling of required forms by health workers	PLMP (Strategic Plan for Pharmaceutical Logistics Master Plan) being developed or existing.	Inadequate funding for malaria commodities
Multi-disciplinary committee constituted for the quantification of malaria medicines (MOH and Partners)	Low storage capacity at all levels	Preparation for drafting the Proposal for Round 11 of GF	Weak standardization of GF activity Reports vs. Treatment Provided vs. Disbursement causing delays in funding
Information system developed (routine)	Vertical distribution of AL Kits (Logistics)		Conditionality / Bureaucracy for access to funds from partners
Integrated Distribution (VC)	Inadequate systems for quantification of RDTs		Inadequate funding for AL (Coartem - USG)
Greater coordination in clinical and logistics areas	Inadequate logistics for transportation of malaria commodities		Long procurement processes
More staff trained in pharmacy			

Main issues and challenges

There has been marked improvement in this area that has led to the establishment of systems for the better management of malaria commodities. These systems are not yet fully functional but it is expected that when they become fully operational, they will greatly improve supply chain management of malaria commodities. For this to happen there is need for adequate training at all levels. Also, issues related to inadequate quantification, together with availing adequate financing are needed to prevent stock-outs that are currently experienced.

The main challenge has been that the supply of commodities depends on availability of funds. In particular for the component of rapid tests and mosquito nets, funding has been

far below the requirements so that the targets are often not met. The other challenges are the following:

- The scarcity of resources and mismanagement of baseline products of malaria make the question of supply a major challenge for the NHS.
- Information management and tools for collecting data from Community on consumption are not available. Therefore this information is not included in the quantification of the requirements hence this maybe a major contributor to the frequent stock outs.
- Inadequate flow of quality information from the Community and HF levels. Also the tools for reporting to GF are inadequate leading to delays in the release of funds.
- The management of rapid tests is still weak. Although they are integrated in the Via Clássica (VC) system, each is based on requisitions managed by the pharmacy, and yet in many places this responsibility is assigned to the laboratory.
- Inadequate guidance on the quantification of the first and second line alternative anti-malarials.
- The quality control of products of malaria is an issue that should be given more attention and the rational use of these products.
- Lack of focal point in the team at NMCP to monitor and track malaria commodities in coordination with CMAM
- Information sharing between the NMCP and the agencies concerned with PSM. For example, the staff should be bale to liaise with the GFATM support unit, CMAM and CA to ensure that all PSM issues are handled correctly and timely.

Action points

- Improve logistics and supply chain management systems for malaria commodities and tracking of these commodities by the NMCP
- Provide guidelines on the ordering and quantification of the alternate anti-malarials both for treating uncomplicated malaria and severe malaria.
- Improve coordination between the clinical and logistics areas for quantification of commodities based on data to avoid expiry/accumulated medicines or stock-outs.
- Improve on submission of progress reports to ensure continued funding from the Global Fund by including the required indicators such as tests performed and resulting positives and treatments administered.
- Study ways of including anti-malarials (especially AL) in PME kits, paying attention, however, to their funding as they currently come as a donation in kind.
- Ensure that the RDTs are included in the Via Classica supply chain through discussions with the pharmacy department.
- Periodic supervision at all levels.

4.3 Malaria Vector Control

4.3.1. Malaria vector bionomics

Vector behaviour

Anopheles gambiae s.s., *An. arabiensis*, and *An. funestus* are the main malaria vectors in Mozambique. *Anopheles merus* plays a secondary role. The vectors occur throughout the country in varying densities and composition. For example, *An. gambiae s.s.* predominates in the northern provinces, *An. merus* in the central region, *An. arabiensis* is found mainly in southern Mozambique and *An. funestus* is predominant in the south (Table 4.11 & Fig 4.3 and 4.4).

Studies in the country have consistently shown that *An. gambiae s.s* and *An. arabiensis* breed generally in small sunlight temporary pools without vegetation whilst *An. funestus* breeds in clear vegetation shaded waters which are permanent or semi-permanent and *An. merus* thrives in brackish waters. Several studies in the country have also shown that *An. gambiae* and *An. funestus* feed and rest indoors while *An. arabiensis* and *An. merus* feed and rest both indoors and outdoors. This indoor feeding behaviour of the vectors renders them amenable to IRS and LLINs. All the vectors bite at night and *An. gambiae* and *An. funestus* feed on humans while *An. arabiensis* and *An. merus* feed on both humans and animals.

Sentinel sites for monitoring entomological indicators

The first sentinel site was established by LSDI in 2000 in Maputo province and followed by one in Gaza in 2006. At the same time in 2006, RTI and Innovative Vector Control Consortium (IVCC) established one in Zambezia province. With support from WHO, the NMCP established three sentinel sites, one in each region (North, Central and South). The WHO project also supported the strengthening of the NMCP and INS entomology infrastructure and capacity. The monitoring and evaluation of entomological indicators at sentinel sites is supported by three insectaries in Zambezia, Maputo city and southern Maputo. However, the insectary in Zambezia is underutilized due to inadequate capacity.

Table 4.11. Distribution of malaria vectors by province in Mozambique

Province	*An gambiae s.s.*	*An arabiensis*	*An merus*	*An funestus*
Maputo				
Gaza				
Inhambane				
Sofala				
Maica				
Tete				
Zambézia				
Nampula				
Niassa				
Cabo Delgado				

Fig 4.3. Distribution of *An. gambiae*

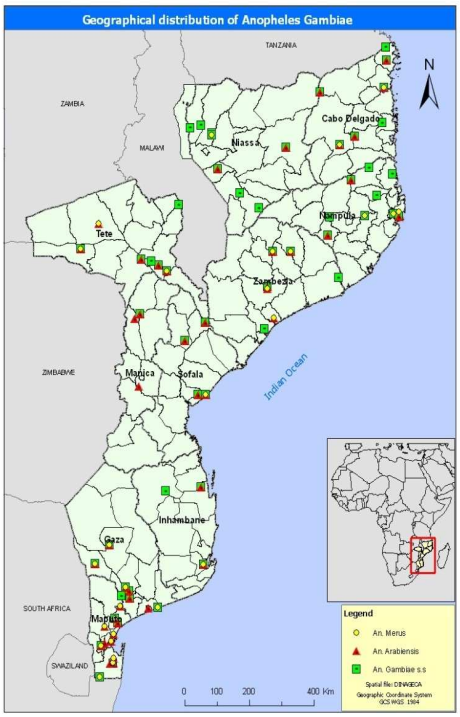
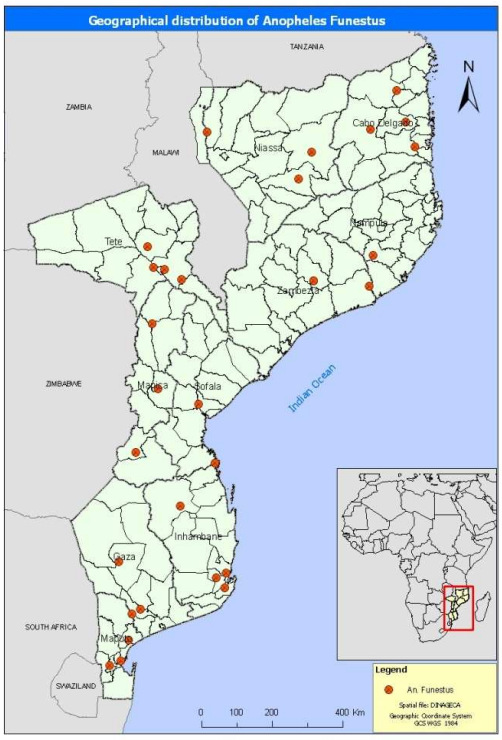


Fig. 4.4 . Distribution of *An. funestus*



Susceptibility studies

Lambdacyhalothrine, deltamethrin, DDT and bendiocarb are used for IRS in Mozambique. As part of insecticide management, monitoring of insecticide resistance is a component of the program. Studies in southern Mozambique showed pyrethroid resistant *An. funestus*. In the same area, evidence of low level resistance to pyrethroids in *An. arabiensis* was also reported. However, in other parts of the country all vectors are susceptible to DDT, lambda-cyhalothrin, deltamethrin and bendiocarb. Further studies may be needed to confirm the possibility of resistance to DDT in the city of Pemba where 93% mortality was recorded (Table 2).

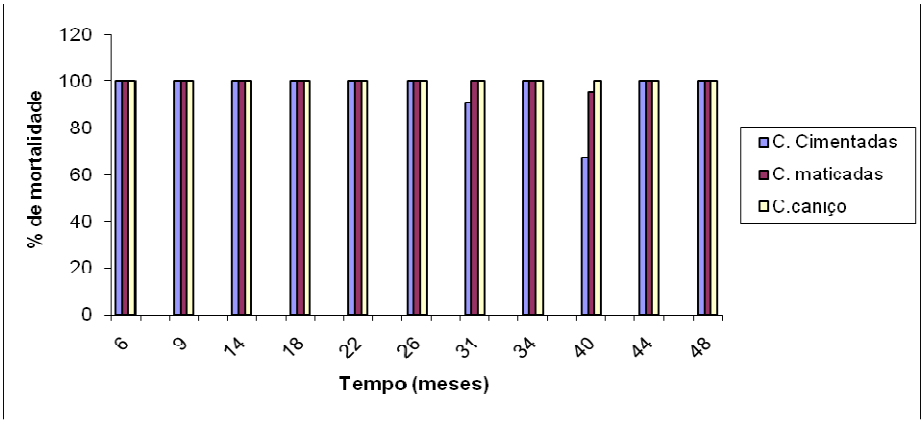
Table 4.12, Malaria vectors susceptibility to major insecticides 2009.

PROVINCE	VECTOR	DDT 4%	LAMBDA-CYHALOTHRIN 0,05%	DELTAMETHRIN 0,05%	BENDIOCARB 0,01%	PROPOX 0,01%
Cabo Delgado	*An gambiae*	93%	100	100	100	100
Inhambane	*An arabiensis*	100	100	100	100	Not tested
Gaza	*An funestus*	100	100	Not tested	100	Not tested
Tete	*An funestus*	100	100	100	100	Not tested
Nampula	*An gambiae*	100	100	Not tested	100	Not tested
Manica	*An gambiae*	99	100		99.4	Not tested
Gaza	*An gambiae*	100	100	100	100	Not tested
Tete	*An gambiae*	100	100	100	100	Not tested

Sporozoite rates
Studies conducted between 2000 and 2009 in southern provinces showed sporozoite rates ranging between 1% and 6% for *An. gambiae* and *An. funestus* species and 1% and 4% in central provinces between 2006 and 2010 for *An. gambiae* and 0-2% for *An. funestus*. Studies on entomological inoculation rate (EIR) are rare due to ethical constraints of the methodology used. However, a single study in Matola in 2000 showed that the EIR was 27% for both *An. arabiensis* and *An. fuenestus.*

Contact bioassays
Bioassays conducted in provinces that apply IRS show that the residual effect of bendiocarb is less than 6 months on walls plastered with cement and mud. DDT was effective in all walls for more than six months after application demonstrating good residual effectiveness of DDT on all types of sprayed surfaces (Fig 2). DDT is therefore the ideal insecticide in Mozambique where malaria transmission is perennial and where a single application with DDT is sufficient.

Fig 4.5 . Results of bioassays in houses sprayed with DDT in Boane district



4.3.2 Vector control delivery

Policy and guidance
WHO recommends integrated vector management (IVM) approach for the control of vector-borne diseases including malaria. Mozambique has not yet developed IVM guidelines to guide the implementation of vector-borne diseases control. There are separate guidelines for IRS and LLINs. IRS guidelines, Training Manual, and IRS data collection tools are available and used in IRS implementation. LLINs guidelines are still in draft form. The NMCP and provinces that implement IRS produce annual plans and reports. The draft National Malaria Control Strategic Plan for 2010 to 2014 outlines the new national LLINs distribution policy which focuses on universal coverage for the entire population at risk of malaria in areas not covered by IRS and a continued distribution to pregnant women through ANCs.

Malaria vector control standards and SOPs
The National Malaria Control Program uses WHOPES approved insecticides that are registered in the country for IRS. There is a single annual spraying cycle except in provinces covered by LSDI where there are two spraying cycles per year. The NMCP uses WHO recommended Hudson X-Pert pumps for IRS. The NMCP manages insecticide resistance through routine monitoring, rotation and / or the mosaic approach. IRS commodities and LLINs are purchased centrally and sent to the provinces. No quality checks of commodities are done.

The NMCP recommends the purchase of only LLINs that are approved by WHOPES. Both conical and rectangular LLINs are distributed in the country and the majority is light blue in colour. Currently, DawaPlus®, NetProtect®, Olyset® and PermaNet® are distributed in the country. The NMCP has modified the global standard model for mass distribution of LLINs. LLINs guidelines are still in draft form.

Malaria vector control organization
The NMCP Manager heads the malaria control program. At central level, the Manager is supported by three Biologists, one for IRS, the other for LLINs and the third one is responsible for malaria entomology. At provincial level is a Provincial Malaria Program Manager who coordinates malaria control in the districts. Inhambane has two Provincial Malaria Managers. At operational level are teams of 10 spray operators and community health workers for community mobilization and distribution of LLINs. Each IRS team is headed by a team leader. For four teams is a supervisor. This structure slightly differs from PMI and LSDI in Maputo, Gaza and Zambezia provinces. The three national Biologists are not trained Entomologists. The Provincial Manager lacks assistants and fails to cope with supervision especially during the spraying and LLINs distribution campaigns.

Malaria vector control capacity and training
The Malaria Vector Control Focal Point at national level coordinates IRS training for provinces in collaboration with partners. The Provincial Malaria Managers coordinate training in the districts. District managers are trained as trainers and cascade training to their personnel at different levels within their districts. The district managers with support from the province and partners train spray operators in spraying techniques, safety operation, handling of spraying equipment including the insecticides and community health workers annually in community mobilization for IRS and LLINs uptake. At least 132 Trainers and 4,606 spray operators were trained between 2001 and 2010 (Table 4). The training and capacity development is funded by the NMCP and partners.

Table 4.13 Spray operators trained by the province over the past three years

PROVINCE	2008	2009	2010
Maputo City	265	275	255
Maputo Province	754	583	823
Gaza	470	470	451
Inhambane	114	114	200
Sofala	315	422	364
Manica	178	273	249
Tete	215	251	247
Zambezia	1107	846	1188
Nampula	280	346	346
Cabo Delgado	230	232	290
Niassa	130	136	174
Total	2957	3948	4606

In order to decentralize entomology-related infrastructure and capacity, the NMCP with support from partners established three entomology laboratories in Cabo Delgado, Zambézia and Gaza provinces. The entomology laboratories are not fully functional because of inadequate human resources. PMI and WHO/Gates supported the upgrading of the central entomology laboratory and insectary at the INS. The upgraded and re-equipped laboratory and insectary support identification of mosquito species complexes, ELISA testing for malaria-infected mosquitoes, ELISA- and PCR-based monitoring for insecticide resistance, susceptibility bioassays, and insecticide efficacy monitoring for IRS and LLINs. However, the collaboration between the NMCP and INS is weak.

With the expansion of IRS, the capacity of the program also correspondingly increased. 39 trucks and 1500 bikes, 80 containers of 40 feet to improve the storage conditions of insecticide and diverse material for IRS, 65 tents and 700 camp beds for spray operators were purchased.

Partnership for malaria control is strong. The LSDI, a trilateral program malaria control among the governments of Mozambique, South Africa, and Swaziland supports large-scale IRS in Maputo and Gaza Provinces. PMI has supported spraying in Zambezia province since 2007. UNICEF, PSI, World Vision support LLINs distribution and IEC and BCC. The Ministry of Coordination of Environmental Affairs and the Ministry of Agriculture are involved in the IRS campaigns to monitor environmental compliance and spray quality standards.

4.3.3 Progress towards achieving targets

The NMCP set out to achieve the following objectives:

- To achieve increased levels of IRS coverage to 80% in selected districts
- To achieve access of at least two mosquito nets per household in the districts without IRS

IRS delivery

IRS remains a priority and the backbone of malaria vector control intervention in Mozambique. The Mozambique government has sustained IRS since 1946 initially covering only peri-urban areas until 1970 to 1990 when it was interrupted. It resumed in 1994 targeting suburbs until 2001 when it expanded to cover rural areas. Mozambique is bordering with South Africa, Zimbabwe, and Zambia who implement large-scale IRS programs using dichlorodiphenyltrichlorethane (DDT).

Spray operators are locally recruited with support from community leaders. Spray operators are trained for 10 days using a national IRS Training Manual. The number of spray operators for a given area is determined by the number of the population and number of houses to be protected. IRS starts in September and finishes in November each year. This allows protection of the target population during the peak malaria transmission period. Malaria vector populations are at their peak densities during the rainy season – November to April. However, in 2009 spraying started in mid July. This timing of the initiation of IRS was of concern. To maximize efficacy of pyrethroid insecticide, spraying should start closer to the peak malaria transmission season. The production and provision of IEC materials for the IRS has been going on through the good will of the partners. The NMCP invests very little on IEC.

Supervision is critical for the success of IRS. LSDI and PMI-led programs are well supervised. Transport and capacity are available. However, supervision in NMCP-led IRS program is weak. The provincial and district supervisors are involved in other activities and do not spend enough time in the field. Inadequate transport is also a challenge for effective routine supervision.

IRS program coverage

For the 2009 IRS campaign, NMCP-led program sprayed 2 million structures, protecting an estimated 6.2 million people. In total, in 2009 the NMCP, LSDI and PMI covered 10 provinces, protecting about 42% of the population. The number of spray operators increased from 2,957 in 2008 to 4,606 in 2010 (Table 3) and IRS expanded from 34 districts in 2001 to 57 in 2010 which is 39.5% of all districts (57/144) (Fig 3). Annual average operational coverage has remained above 85%. The NMCP with support from partners constructed three entomology sentinel sites, 3 insectaries and adequate storage facilities for IRS commodities. However, regular monitoring of entomological indicators at the sites is not done because of shortage of staff. .

Figure 4.6 Map of districts covered with IRS from 2000 to 2010.

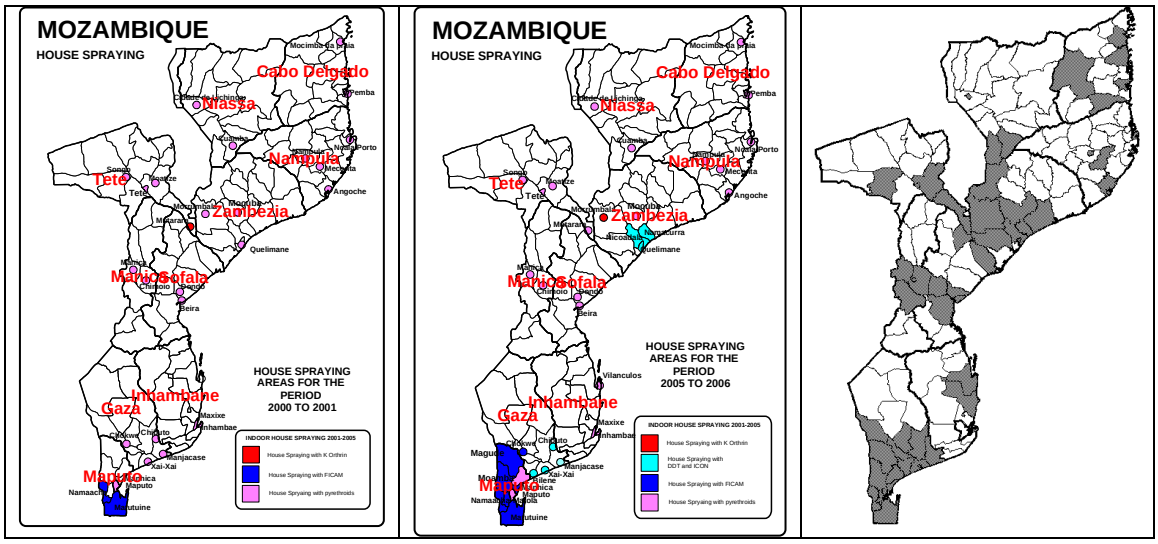
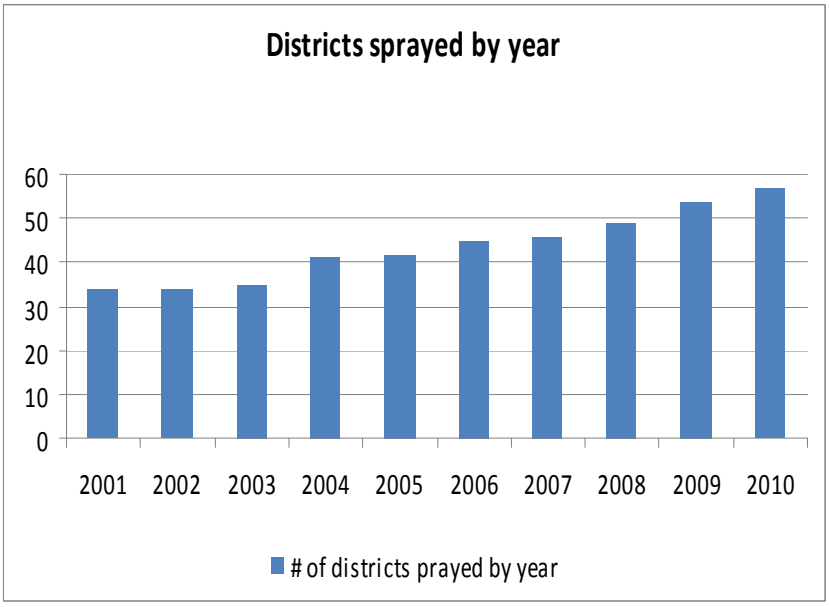


Figure 4.7 Districts sprayed by year: 2001-2010



LLINs delivery

Since 2000 Mozambique has targeted children less than five years old and pregnant women for ITN distribution. The groups are reached either through mass campaigns targeted to children less than five years old or delivered to pregnant women during ANC visits. Vulnerable children (OVC) and people living with HIV / AIDS receive ITNs through programs coordinated by the Ministry of Women and Social Action. The draft LLINs guidelines focuses on universal coverage for the entire population at risk of malaria in areas not covered by IRS. Targeted distribution to other vulnerable populations, such as orphans and vulnerable children and people living with HIV will be discontinued as the universal coverage campaigns will reach these populations. In the

Global Fund Round 9 proposal, NMCP will procure and distribute 10 million LLINs starting in early 2011 for universal coverage campaigns over the five-year duration of the grant. Distribution will be conducted through NGOs. As the strategy shifts to universal coverage, the focus on domestic capacity building at a provincial and district level will need to increase.

LLINs coverage

According to NMCP data, UNICEF and partners distributed approximately 5.2 million LLINs between 2007 and 2009. PMI procured almost 3 million of these. PEPFAR resources were used to procure 367,000 LLINs for persons living with HIV/AIDS, orphans, and vulnerable children from 2006 to 2008. In 2009, 183,778 LLINs procured with PEPFAR funds were distributed. According to the NMCP 2009 Annual Report, a total of 1,292,159 LLINs were distributed directly to beneficiaries in 2009 of which 838,130 went to pregnant women. In 2009, UNICEF procured 368,000 LLINs; 267,053 were distributed through campaigns and through ANCs. NMCP procured 1 million LLINs in 2009 using funding from Global Fund Rounds 2 and 6 as well as Government funds. Besides the partners that are mentioned above, organizations such as the Mozambique Red Cross, ICAP, Agha Khan, etc., made the distribution of mosquito nets on a small scale in different provinces. These distributions were made without the coordination of the NMCP.

DPSs and UNICEF conducted district-level campaigns for children less than five years old in Zambézia, Niassa, Cabo Delgado, and Inhambane. A province-wide distribution in Nampula in 2008 during the national measles–Vitamin A–deworming campaign distributed 800,000 LLINs. PMI provided 720,000 of the 800,000 LLINs and provided significant financial and technical support for the distribution. PMI also supported an LLIN universal coverage pilot campaign in four districts in Sofala Province in late 2009 and early 2010 distributing 140,000 LLINs to approximately 60,000 households. Table 5 shows the number of LLINs that were distributed from 2008-2010.

Table4.14. LLINs Distribution to Provinces: 2007–2009

Province	2007	2008	2009
Cabo Delgado	294,051	131,075	197,657
Gaza	66,195	39,237	171,672
Inhambane	191,157	159,861	107,611
Manica	20,386	106,755	248,324
Maputo Province	132,346	64,350	116,520
Maputo City			60,000
Nampula	228,578	1,045,901	94,018
Niassa	161,121	38,811	254,577
Sofala	47,923	76,150	38,029
Tete	82,675	231,604	273,752
Zambézia	282,043	192,624	66923
Total	1,506,475	2,086,368	1,629,083

(Source: UNICEF, PSI, MISAU**)**

To facilitate equity in LLINs distribution, NGOs or UNICEF were allocated provinces to assist the DPSs in the distribution of LLINs. PSI was responsible for Zambézia, Maputo

Province, and Maputo City; UNICEF for Niassa; Tete and Gaza; and Malaria Consortium for Inhambane, Cabo Delgado, Nampula, Manica, and Sofala (Table 4).

Table 4.15 Distribution of LLINs distributing partners by province

PROVINCE	IMPLEMENTING PARTNERS	FINANCING PARTNER
Maputo City	N/A	N/A
Maputo	PSI	PMI
Gaza	UNICEF/Medicos do Mundo/WV	UNICEF/CEE/WV
Inhambane	Malaria Consortium	DFID
Manica	Malaria Consortium	DFID
Sofala	MOH	PMI
Zambezia	PSI/World Vision	PMI/WV
Tete	UNICEF	UNICEF
Nampula	Malaria Consortium	DFID
Cabo Delgado	Malaria Consortium	DFID
Niassa	UNICEF	UNICEF

PMI supported communications activities focused on increasing demand for LLINs in rural communities in Zambézia, Nampula, and Sofala Provinces. PSI also conducted a survey to better understand barriers to LLIN use in the three provinces. In collaborated with Together Against Malaria (TAM) and the Inter-Religious Campaign Against Malaria (PIRCOM) PSI trainned religious leaders to mobilize communities around the use of LLINs. UNICEF and Malaria Consortium also supported BCC during LLINs distribution campaigns.

Mozambique has a population of 21.5 million people, of which roughly 40% live in urban or peri-urban areas which are normally targeted with IRS. Excluding the population covered by IRS, 12.9 million people remain as the target for universal coverage. The NMCP laid out a plan in the Global Fund Round 9 proposal to achieve universal coverage (Table 5). However, LLINs guidelines limit smooth planning and implementation of LLINs distribution for universal coverage.

Table 4.16. Estimated LLIN Need and Gap in Global Fund Proposal Round 9

LLIN VARIABLE	2010	2011	2012	2013	2014
Country target	7,539,764	1,006,556	1,030,108	8,081,383	1,078,494
Other sources other than GF	2,801,135	1,006,556	1,030,108	2,737,550	1,078,494
Gap for Global Fund	4,738,629	0	0	5,343,833	0

4.3.4 Strengths, Weaknesses, Opportunities and Threats

Table 4.17 SWOT Analysis

STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
High political commitment to IRS	No qualified Entomologists in program	Government regular annual budget for IRS	Natural disasters e.g. floods are risk factors
There are well established and functioning vector control program at national, provincial and district levels.	Inadequate provincial vector control personnel	Existence of IRS, LLINs and Entomology focal points at central level	Insecticide resistance
The national IRS annual plans, guidelines and training manual in place.	Geographical reconnaissance not done	GF Rd 9 to expand IRS and LLINs from 2011.	Sustainability of IRS gains in provinces supported by partners
Three Biologists at central level for IRS, ILLNs and Entomology and provincial Malaria Managers	Limited collaboration between NMCP and INS	Continued funding partners e.g. GF, PMI. UNICEF and WHO	Low uptake of LLINs by communities
LSDI and PMI support IRS	No IVM guidelines	Existence of draft LLINs guidelines for universal coverage	LLINs program donor and partner dependence
PSI, LSDI. PMI, RTI, WV, MC, private sector, FDC, AgaKan Foundation, CISM	No guidelines for LLINs distribution towards universal coverage	Upgraded and re-equipped INS molecular biology laboratory	Delay in GF disbursements for LLINs
Upgraded and re-equipped INS molecular biology lab	LLINs program donor and partner dependence	Existence of modern insectaries in three provinces	
3 insectaries, 6 sentinel sites and storage facilities.	Inadequate transport and storage facilities	Effective insecticides against local vectors	
Donors - GF Rounds 2, 6.,9 and PMI, UNICEF, WHO	No full-time technicians for the field insectaries	Cross border malaria control initiatives	

4.3.5 Key issues and challenges

- The NMCP is scaling up interventions that require more staff with appropriate skills. The existing entomological capacity within the NMCP is inadequate at all levels. There is no trained Medical Entomologists in the program
- There are no guidelines for LLINs distribution to guide partners in distribution of LLINs. Currently, LLINs are distributed to targeted groups and not to the general population. The NMCP has also not put in place strategies to distribute LLINs towards universal coverage.
- There are reports of transport shortages to transport LLINs to districts and to supervise IRS operations. This challenge compromises IRS quality and stock outs of LLINs at ANC clinics.
- There is limited NMCP contribution to IRS in provinces that are supported by partners. This threatens IRS sustainability in these provinces.
- The NMCP does not collect entomology indicators on a regular basis including insecticide resistance from sentinel sites.

- The IRS program does not conduct geographical reconnaissance to guide planning quantification and calculation of program performance in terms of operational coverage and proportion of population protected.
- There is no full functional collaboration between NMCP and National Institute of Research.
- The scaling down of DDT use is unfortunate because DDT remains the most cost-effective insecticide in the country which experiences perennial malaria transmission. Only one spray round would be needed when using DDT.
- There is no collaboration between NMCP and the NTDs control programs

The NMCP has made considerable progress in scaling up IRS and LLINs. However, inadequate entomological skilled human resources at all levels remains a challenge. The LLINs distribution lacks guidelines to guide distribution to achieve universal coverage. There is need to engage the support of the National Research Institute and partners to develop entomological capacity which is adequate in quality and quantity and to develop and implement IVM guidelines.

4.3.6 Action points

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- The MoH, in collaboration with INS, should develop and strengthen entomology capacity at central and provincial levels.
- The NMCP should develop guidelines to distribute LLINs towards universal coverage to protect the general population at risk of malaria.
- The MoH should consolidate and expand IRS in the country and to sustain the gains in provinces currently supported by partners.
- The NMCP in collaboration with INS should establish provincial entomology teams to monitor entomological indicators at sentinel sites and to monitor quality and efficacy of IRS and LLINs using bioassays.
- Insecticide residual efficacy and peak malaria transmission period should guide the timing to start and to finish IRS for optimal protection
- NMCP to establish a system to monitor quality and quantity of vector control commodities
- In view of WHO recommendation for countries to consider integrated vector management as an approach for vector-borne diseases control, there is need to develop IVM guidelines which includes guidelines for IRS, LLINs and larval control to control malaria and neglected tropical diseases (NTDs).
- NMCP to conduct geographical renaissance to provide information for planning and enhance accurate measurement of programme performance
- Data collections tools for IRS need to be standardised to provide accurate data on population coverage
- MoH to provide adequate transport for LLINs from provinces to districts and for IRS supervision to ensure IRS quality and minimal stock outs of LLINs at ANC clinics
- In view of the perennial malaria transmission in the country, the NMCP may need to consider the continued use of DDT which requires one spraying cycle per year.

4.4 Malaria diagnosis and Case Management

Malaria case management is one of the key interventions implemented by the malaria control programme. One of the main objectives of the strategic plan is the provision of effective case management to the majority of the population at risk of malaria.

The main strategic direction currently of the programme is the expansion of laboratory diagnostic capacity while improving the quality of laboratory diagnosis and malaria treatment in the health units and at community level. In addition, efforts are underway to guarantee the supply of effective drugs, materials, and laboratory reagents to health units and community health workers (APEs) and to ensure quality management for both uncomplicated and severe cases of malaria at all levels.

4.4.1 Policy and guidance

Development of the treatment policy has been guided by the results of therapeutic efficacy testing since 2000. Studies that were conducted between (2000/2001) showed that adequate clinical cure (ACR) for chloroquine (CQ) of 60% and that of sulphadoxine-pyrimethamine of 81%. The efficacy of amodiaquine and artesunate was 92% and 100% respectively. The combinations of CQ/SP and AQ/AS, all had an efficacy of 100%.

The first consensus meeting to discuss these results was convened in 2002 with the participation of clinicians, RBM partners and NMCP staff. The results of the various efficacy studies were reviewed and a consensus to change the first line treatment for malaria reached. Because of the limited availability and the high cost of the artesunate combinations at that time, AQ + SP combination was adopted as an interim first line antimalarial. The same meeting recommended that AS+SP was the definitive first line, Artemether + Lumefantrine (AL) was second line and quinine(QN) was maintained as third line for the management of severe malaria. The AQ+SP was implemented for only 2-3 years followed by the implementation of the definitive combination of AS+SP. The main reason for this change was the low acceptance of use of AQ by the health professionals and the consumers.

The implementation of this new policy of AS+SP was launched in 2004 and by May of 2006, was officially implemented in all the country. Malaria treatment guidelines were developed in 2005.

In 2009, the NMCP, initiated yet another revision of the anti-malarial policy due to information on the increasing contraindications to use of SP in a setting of large scale use of cotrimoxazole for prophylaxis in HIV-infected individuals, SP use of IPTp and the increased use of Niverapine with known drug interactions with SP. In addition, the increased levels of SP resistance was of concern. Thus in 2009 AL was selected as the first line malaria treatment and AS + AQ as an alternative drug. For severe malaria, parenteral quinine was the medicine of choice. These guidelines also introduced for the very first time the concept of pre-referral treatment of cases of severe malaria.

The 2009 drug policy update, although adequate, lacked consensus of the different stakeholders since the information was not widely disseminated. Guidelines for the management of malaria were updated in 2009 and shared in a consensus meeting of the clinical Departments of Pediatrics, Medicine and Gynecology and Obstetrics of the Eduardo Mondlane University, Faculty of Medicine, and later submitted for approval to Pharmaceutical Department. This was finally signed by the Minister of Health. These guidelines were approved in November 2010 and are currently in- print.

The current guidelines recommend the first line for treatment of uncomplicated malaria as AL with AQ +AS as the alternative, and for treatment of severe malaria is parenteral AS; the alternative parenteral QN. The prefered pre-referral treatment at lower health units in patients with severe symptoms of malaria is rectal artesunate, although parenteral AS and quinine can be used as alternatives. Although SP was maintained for use in IPTp, this policy needs to be revised as a result of frequent reports of increasing resistance of malaria parasites to SP. These new policy changes on malaria treatment have been adopted by the IMCI programmes, although the policy documents of IMCI still need updating to reflect these changes.

In 2009, in recognition of the malaria burden, a ministerial decree was issued that all malaria treatment is free of charge in public health facilities. In addition, in recognition of the low access to health care by most of the population, the policy recommended the use of AL and RDTs at community level as part of the community malaria management programme. However, it was recognized that there is need to create data collection and analysis system for all malaria interventions at the community level.

The impact of these frequent policy changes have led to a few challenges, namely:

- Although training was provided in all changes made, its quality in many cases was inadequate as it did not cover most of the health workers due to inadequate financing.
- No supportive post-training supervision was done to allow for adequate implementation of these interventions
- In practical terms what resulted was the weak knowledge regarding malaria guidelines leading to poor clinical practices and individualized malaria treatments by the clinicians, in particular in the private sector.

4.4.2 Organization of case management services

The organization of the case management services are mainly at four levels.

National level

At the national level, there is a designated officer for malaria case management within the NMCP who is in-charge of all the services related to laboratory, medicines and malaria in pregnancy. There is no case management sub-committee to provide oversight on malaria case management. Some technical support is also provided by partners with expertise in

case management. Thus, the creation of this committee and respective TOR is imperative in order to improve case management at the NMCP.

Provincial level
At provincial level, there is a provincial malaria manager who is a biologist by training and is in charge of all malaria activities, except case management. Moreover, some have only just been recently deployed and at times lack experience to guide all malaria control activities excluding case management. The chef de medicine at this level oversees all case management activities in the province. However, since the chef de medicine has several other responsibilities, they are unable to devote sufficient time to the supervision of malaria case management activities.

District Level
At district level, there is no specific person charged with this activity. However, a focal person responsible for malaria, HIV and AIDS has been appointed. These focal persons lack clear terms of reference with regard to malaria control and often have other responsibilities limiting the amount of time dedicated to malaria control interventions.

In terms of service delivery systems, there is a five tier system with National referral hospitals, district and provincial hospitals that manage most of the cases referred with outpatient facilities, and the health centers provide similar services depending on the level (personnel and facilities). Access to formal health services is extremely limited in the country's rural areas. Community-based diagnosis and treatment are appropriate and strategic alternatives for reducing malaria-related morbidity and mortality. In addition to ACTs and RDTs that are already available and distributed through the Kit C at the community level, the full package ideally should include pre-referral treatment with rectal artesunate.

Factors related to the low utilization of formal health services in rural areas include among others, the following: long distances of travel, lack of knowledge of malaria symptoms, or cultural habits that cause delays in seeking health service and/or reliance on traditional medicine as their first source of care. Thus, scaling-up use of RDT to community is considered the next step provided all APEs have received training in their correct use and proper data management and supervision are assured.

In the health facilities, all the clinical health workers routinely diagnose and treat malaria. The different categories of human resources in these facilities are: Medical (GPs and specialists), medical assistants (técnicos de medicina) Agents, and different level nurses. At the community level, CHW known as (APEs) handle mainly health education but are also provided with a medicinal kits and are responsible for the diagnosis and management of uncomplicated malaria cases in the communities and referral of those with signs of severity.

4.4.3 Human resources, training and capacity development

The NMCP developed a training plan covering all health workers in the country, prepared and carried out a plan of training of the health workers after developing and disseminating training manuals. The training was carried out at three levels, beginning at the National level trainers were trained and those trained the provincial level who then trained the district level. Those trained at the district level are responsible for training at peripheral level. The training involved clinicians, laboratory personnel and pharmacy staff. However, because of the frequent changes in treatment policy, the overall impact was that health professionals received conflicting information on current malaria treatment.

The current system of training of the health professionals carried out after introduction of the new treatment policy is far from ideal to achieve impact. The system which is mainly cascade training, is economically viable but is qualitatively poor, with noted reducing of quality at every subsequent level of training. An alternative system of having a pool of certified or accredited trainers up to the district level is expected to improve training outcomes. The other major challenge has been the lack of supportive supervision at the various levels following the training.

In addition, there are marked shortages of health personnel both in terms of quantity and quality at all levels of health care. To reach the objectives of adequate management of malaria cases, adequate training of the health professionals is crucial. Furthermore, there is no system for supervision of those trained to ensure adherence to treatment guidelines and hence, assurance of quality of care.

4.4.4 Malaria Diagnosis

For a long time, treatment based on clinical diagnosis was the norm in Mozambique. Even after the introduction of the policy of parasitological diagnosis (initially microscopy and afterwards RDTs since 2005) for all suspected malaria cases, clinical diagnosis is still the norm leading to over-diagnosis and over-treatment of fever cases as malaria. Currently, capacity for microscopy continues to be limited to a small number of health facilities; of the 1,249 health facilities in the country, only 254 have laboratories (20%). Another limitation is the insufficient number of laboratory technicians and agents to meet the demand for services. In addition, there are serious concerns regarding the quality of laboratory results limiting clinicians' confidence in laboratory results.

For microscopy, the results are usually presented using the positive signs. The current recommendations in the new treatment guidelines and in the malaria diagnosis manual are that results should be reported in terms of parasite density especially when requested for by clinician managing severe malaria. However, to effect reporting according to parasite density, there is need for adequate training of both the laboratory staff and clinicians who may not be very familiar with this approach. There are challenges in availing adequate laboratory consumables, especially: Giemsa reagent, methanol and oil immersion leading to frequent stock outs. Even when available, the quality of these consumables is not always assured.

The introduction of RDT in Mozambique placed an additional challenge for the diagnosis of malaria as there are still unclear guidelines concerning criteria for their use along with low quality training and lack of quality control systems. Even with these efforts of improving diagnosis of malaria, the continued treating of fevers as malaria can be attributed to inadequate guidance on what to do with a negative result. But even when this is provided, the performance of these tests greatly depends on the training of the providers and conditions in distributing and storage especially of RDTs.

It is therefore felt that the completion of the malaria diagnosis manual will be able to contribute to improving the quality of training of the laboratory technicians in the country.

The procurement of RDTs is done by the Pharmacy Department with little or no technical input by the laboratory department. This causes technical challenge as the pharmacy department may not be able to adequately advise on the products that are procured. The selection of the RDTs is the responsibility of NMCP. To date however, there has not been a clear system for the quantification and procurement of these RDTs which leads to inadequate supplies and thus, the frequent stock-outs.

There was a system for quality assurance of microscopy but due to drying up of funding the system collapsed. Thus, in order to improve malaria diagnosis, a system of quality assurance needs to be developed. There are efforts underway for the rehabilitation of the National Laboratory Reference of the Malaria (LNRM), as an initial step for revamping the quality assurance scheme. In addition, there are proposals for training of additional technicians together with provision of supportive supervision by technicians of known competence levels. To improve this component a manual for supervision has been developed and submitted to the Minister for final approval.

4.4.5 Malaria Treatment

Although the malaria treatment policy has been revised, implementation of this policy has been a challenge. Some of challenges relate to the case definition of malaria, availability of drugs, and access to health care and adequate diagnosis. Treating malaria a complete package of care requires a good supply of medicines both in terms of quantity and quality and as near as possible to the patient.

Mozambique has always had challenges of adequate supplies of the anti-malarial medicines due to scarcity of resources. Inadequate supply management chain further complicates the situation leading to frequent anti-malarial drugs and consumable stock-outs.

One of the major achievements in the treatment of malaria in Mozambique is the policy of having all malaria interventions free in health facilities within the public health system. However, this policy was not equally applied in the private sector, where there are inadequate quality antimalarial drugs, poor supervision and inspection resulting in poor adherence to treatment guidelines. This leads to the use of medicines as monotherapies

given at the patient's request, which may lead to rapid development of artemesinin resistance in the country.

The other challenge is that most patients seen in the private sector receive the prescribed AL from the public sector. However these patients are not adequately recorded and are therefore not reflected in the overall records on malaria. This leads to discrepancies noted in ACT consumption figures observed in the public sector. Therefore, a monitoring and legislative framework needs to be developed not only to regulate the use of antimalarial drugs in the private sector but also to strengthen the recording of malaria cases treated in the private sector as needed.

4.4.6 Management of malaria in the communities

The concept has just been re-introduced in the country. This is an attempt to reach the populations that are far from the health facilities with anti-malarial treatment. Although this strategy ensures quick access to the diagnosis and treatment of malaria, the major challenge has been in providing communities with adequate supplies of both RDTs and anti-malarials drugs. Inadequate registration of patients diagnosed and treated in malaria at this level has been cited as a major weakness. Thus the NMCP has developed new data collection tools to capture malaria treatment data at community level. This will however require training together with supportive supervision for proper implementation.

Pharmacovigilance programme was introduced and was implemented successfully as a pilot in Maputo province and Maputo city during 2004 to detect and report adverse drug reactions with an initial special focus on malaria pharmaceuticals. It was subsequently expanded to HIV-related and other health programmes. The programme has been unable to expand due to limited human and financial resources. During 2008 little training in the Southern region resulted in dramatic improvement of rates of notification of adverse drug reactions.

A large national training for each region is now in the process of expanding capacity to comply with notification requirements as well as strengthening the overall reporting system. The pharmacovigilance programme manages the national notifications database and participates in the WHO collaboration centre for international drug monitoring (UMC).

In order to better manage the various aspects of malaria case management, there is need to have designated officers focusing on treatment and diagnosis so that these two aspects can be given due focus.

4.4.7 Malaria prophylaxis

There are clear recommendations in the new guidelines that focuses mainly on non-immune travelers.

4.4.9 Performance indicators and targets

Table 4.18 Performance indicators for malaria case management.

INDICATOR	VALUE	SOURCE	YEAR
Percentage of febrile children under 5 years old tested for malaria (microscopy or RDT)	19%	MIS	2007
Percentage of febrile children under 5 years old who received treatment within 24 hours	36.3%	MIS	2007
During the previous 2 weeks, percentage of children under 5 years old with fever who were given ACT treatment at the HF within 24 hours of fever onset	7.3%		
Percentage of patients hospitalised for severe malaria who received correct treatment at the HF	79%		
Percentage of children under 5 years old with confirmed malaria who were given antimalarial drugs in the manner prescribed by national policy within 24 hours of symptom onset	59%		
Percentage of HF with malaria diagnostic equipment	51%		
Percentage of HF with no interruption in the supply of first line antimalarial drugs for longer than a week in the last 3 months	20%		
Percentage of persons receiving first line antimalaria treatment in the manner prescribed by national policy	20%		
Anaemia in children aged less than 5 years (haemoglobin <11g/dL)	67.7%	MIS	2007
Severe anaemia in children aged less than 5 years (haemoglobin <8g/dL).	11.9%	MIS	2007
Parasitemia in children 6 to 59 months old (microscopy)	38.5%	MIS	2007
Parasitemia in pregnant women (microscopy)	16.3%	MIS	2007
P falciparum prevalence	97.7%	MIS	2007

4.4.10 SWOT Analysis

Table 4.19 SWOT Analysis

STRENGTHS	WEAKNESSES
• Availability of treatment guidelines • Policy on definitive diagnosis of malaria in health units and communities • Existence of a case management facilitator group • Availability of first-line co-formulated treatment • Plans in place for quarterly purchases • Antimalarial drugs and malaria diagnosis provided free of charge • Expansion of diagnostic coverage using RDT • Prior experience with RDT in the province of Maputo • Broad implementation of the IMCI strategy throughout the country • Ministry revitalisation of community involvement through the inclusion of CHW	• Clinical diagnosis still a common practice • Non-adherence to the treatment guidelines • Absence of a therapeutic advisory committee on management of malaria cases • Absence of mechanisms for systematic testing of the efficacy of the medicines to use before their introduction • Unavailability of first-line treatment in the private sector • Inadequate documentation of the use of antimalarial drugs; need to circulate this information in DIS, CMAM, and the NMCP • Shortage of laboratory technicians and agents for microscopic diagnosis • Turnover and inconsistent supervision of laboratory technicians and agents • Inconsistent training and supervision of clinicians on all aspects of malaria case management • Lack of a logistics management system for RDTs • Lack of quality assurance system for microscopic diagnosis and RDT • Use of oral artemisinin monotherapy in the private sector
OPPORTUNITIES	**THREATS**
• Additional financial resources available through the GF • Presence of several partners with interest in malaria with increased financial support • Political commitment on malaria control • Orientation programmes for pharmacies on the appropriate sale of antimalarial treatments • Expansion of diagnostic capacity of HF in marginal areas and communities • Collaboration with other departments such as IMCI on in-service training and supervision • Expansion of diagnosis and correct treatment at the community level • Development of a policy on the training of CHW	• Inadequate knowledge regarding the management of the malaria • Inadequate resources for the management of cases and supervision of health workers • Short shelf life of the first line treatment • Abandonment of microscopic diagnosis and lack of confidence in laboratory results • Inappropriate prescription/ use of drugs • Incorrect use of antimalarial drugs by patients • Self-medication with antimalarial drugs • Few treatment options available in the event of resistance

4.4.11 Successes, best practices and facilitating factors

There has been increased resources for the malaria case management both external and Internal. Although the government contributes mainly in defining policies on malaria case management, most of the financing for the activities is essentially external. The government contribution is mainly in the payment of direct costs for cases admitted.

Most other costs are indirect like on the costs of health workers and medicines especially for the management of severe malaria. The government policy on free treatment for malaria has also been a strong facilitating factor.

4.4.12 Issues and challenges

Malaria case management using ACTs is currently being implemented in all health facilities and is being rolled out at community level. The actions are in line with the policy that was revised in 2009 that recommends parasitological confirmation of all cases of suspected malaria before treatment.
However, there have been challenges in rolling out the new treatment policy due to financial constraints and worsened by the previous frequent changes in treatment policy. As a result there has been low adherence to the policy by health workers. Quantifying the requirements for both health facility and community levels as well as reaching health workers with the appropriate training and supervision package remains a major challenge. In summary, the key challenges include:

- Frequent stock-outs of medicines and RDTs and other laboratory consumables
- Absence of a national plan for pre- and in-service training and supervision, for all of the health professionals
- Inadequate management of malaria case management activities and national funds to procure antimalarial drugs
- Lack of legislation to control the sale of artemisinin monotherapies in private pharmacies
- Weak operational and supervisory capacity to implement and oversee new DPS and DDS policies
- Poor management and logistics in the handling of drugs at all levels
- Failure to take full advantage of the potential benefits offered by the IMCI strategy
- Lack of clarity on the use of RDT at community level
- Absence of incentives for recruiting CHW and lack of financial resources to offer them
- Delay in approval of the new strategy for enlisting community involvement

4.4.13 Action points

- Establish adequate training, retraining and supervision systems focused on frontline health workers to improve the quality of care
- Strengthen supervision to ensure adherence to guidelines
- Strengthen quality assurance and quality control systems for malaria diagnosis
- Establish a timetable for regularly conducting drug efficacy tests
- Establish two posts in the NMCP to enhance the capacity of case management within the NMCP: a laboratory focal point and a clinical services focal point.

- MOH should ensure adherence by private practitioners to the monotherapy ban in collaboration with regulatory authorities.
- Improve coordination between the NMCP, CMAM, DNAM, and partners in planning and budgeting for antimalarial drugs, RDT, and other supporting diagnostic methods
- Training APEs and key health personnel in each HF in the management of uncomplicated and severe malaria cases

4.5 Advocacy, BCC, IEC and Social Mobilization

IEC/BCC is an important component of the Malaria Control Program. Although the majority of the Mozambican population is aware that malaria is a preventable disease and not most of the control measures, this has not been matched by high coverage of the key interventions.

4.5.1 Policy and Guidance

The Malaria program does not have an IEC/BCC policy guidelines and community mobilization strategy. MOH has developed and approved a community involvement strategy. The main objective of the strategy is to "involve community in actions aiming at improving health status conditions and development". The malaria components of this strategy should be updated to take on board the current knowledge and practices with regard to malaria.

4.5.2 Organisation and Human Resources

At central level, there is a Department of Health Promotion (DEPROS) that is responsible for all cross-cutting health promotion activities. Within the NMCP, an IEC/BCC/Advocacy focal point has been appointed with functional linkages with DEPROS. There sis an IEC/BCC/Advocacy working group responsible for coordinating activities. The meetings are irregular and there is need to revamp it through review of TORs and refreshing the membership.

Each province has a DEPROS focal point that coordinates BCC/IEC for all diseases at the provincial level. However, there are malaria IEC/BCC focal points in Maputo, Gaza (supported by LSDI) and Zambezia (supported by RTI). They work in close collaboration with the DEPROS focal point. The provinces without Malaria IEC/BCC focal points rely on DEPROS focal points to implement the Malaria IEC/BCC activities. They do not have sufficient time to devote to malaria IEC/BCC activities given the numerous other programmes they work for.

At community level, the APEs where available are also involved in malaria IEC/BCC activities within the communities. The APEs are based at the PHC level near villages and communities. APEs are selected by the community and trained by the health system or

NGOs to provide promotional, preventive and curative services to their respective community.

However, the number of APEs is still very low with only a few communities covered. Even where they exist, supervision of their work and updating their skills is irregular. The MOH has a plan to train many more APEs to cover the country. The curriculum for training has been completed and includes malaria. The NMCP should engage with the responsible department of the MOH to ensure that the key malaria messages are passed on to the APEs during training and supervision.

Each province has got a Community Leaders Council which supports the implementation of community based activities. This Council has been fully involved in malaria control.

There is earmarked funding for IEC/BCC and social mobilization. The funding level is not adequate to cover all components at national and provincial level. The funding level varies according to the Government Annual Operational Plan. The only funding source for IEC/BCC is the Government.
The NMCP does have information of the funds by other partners for health promotion.

4.5.3 Annual Planning

The NMCP develops on annual basis a work plan. The IEC/BCC focal person develops on an annual basis the IEC/BCC work plan for central level. The three provincial IEC/BCC focal points develop their respective IEC/BCC work plan also on an annual basis. The planning and reporting systems are not synchronized between central and provincial levels. For example, at Provincial level (Maputo Province) reports are prepared on weekly, and monthly basis, and sometimes per activity. At central level, the IEC/BCC component elaborates its activity reports on quarterly basis which is then incorporated in the overall NMCP. For commemorative days, the theme agreed on is common to all the provinces.

4.5.4 Service Delivery Outputs and Outcomes

Overall, Mozambican communities seem to be aware that malaria is a preventable disease and that there is available treatment for malaria. However, their level of knowledge has not been marched by uptake of the malaria control interventions. The malaria programme should take into account the above-mentioned socio-cultural dimensions when developing its strategic interventions.

Advocacy and Awareness Creation

The Head of State in his public speeches and addresses exhorts the population to prevent and control malaria. The Office of the 1st Lady, launched, in 2007 a National Campaign entitled "*Children without Malaria*", campaign that headed by the 1st Lady.
In 2006, the Inter Religious Malaria Program, headed by Bishop of Diocese dos Libombos - Dom Denis Sengulane, was established. The Program involves all religious congregations and disseminates several messages emphasizing the need for all believers to get involved in malaria control activities.

Malaria days (World Malaria Day & SADC Malaria Day) are commemorated every year at national level. These days are used to conduct awareness creation on malaria issues. Each Provincial Directorate of Health organizes in collaboration with Partners and other Government sectors, the commemoration of malaria days, and conducts several activities.
Fig 4.8 BCC Messages

BCC
The key messages for behaviour change include the following :
a) Generic:
"All people are at risk of contracting malaria!"
b) Diagnoses & Treatment:
"Suspecting of malaria? Go to the nearest Health Facility! "
c) ITNs/LLINs:
"Sleep in a mosquito net every night."
d) IRS:
"House pulverized house protected, House free of malaria."
e) Environmental Management:
"Eliminate standing water where mosquitoes multiply."
f) IPT:
"The SP is safe and effective in preventing malaria."

Community Mobilization
Although there is no updated community mobilization strategies to guide malaria control activities, most of the activities are implemented in an integrated manner in collaboration with other programs. The APEs are involved in malaria control activities in each community.

The media is involved in malaria prevention activities through the ,''*AMMREN* – African Research Network of Journalists against Malaria"[1].
IEC/BCC activities are conducted in all provinces prior and during IRS at community level. Activities are also conducted around LLINs distribution.

Health Education
Health workers conduct health education sessions at health facility level on several health issues including malaria.

[1](An entity fully recognized by Mozambican Government law, since 16 June 2008 affiliated to the African Malaria Media Research Network) with headquarters in Accra, Ghana.

IEC/BCC Malaria Materials

The programme has developed several materials such as: posters, charts, pamphlets, banners, Out-doors, Brochures, T-shirts, "*Spots*" and radio television programs, books and cartoons. The programme has developed IEC materials particularly for IRS.

Media channels

Radio, television, press, community radio, cultural and sports activities, promotional expeditions, religious leaders and health education at health facilities are the main channels used to disseminate key messages.

Research on IEC/BCC and Community Mobilization

A national KAP study on "prevention of Malaria in pregnancy: an analysis of implementation barriers and progress in Mozambique" was conducted.

Some institutions such as National Institute of Health have collaboration linkages with the Malaria in Pregnancy Consortium. Mozambique's participation in the Consortium focus on two main areas: prevention (SP & IPT) and Pharmaco-vigilance (monitoring of side effects of antimalarials).

4.5.5. SWOT Analysis

Table 4.20 SWOT Analysis of BCC, IEC and Advocacy

STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
Political Commitment Existence of a Health Promotion department at MOH Existence of an IEC/BCC focal point at central level. Commemoration of World and SADC Malaria Days Existence of a community involvement (Health) Strategy.	Low involvement of other political leaders in malaria control at Central, & Provincial level. Lack of local adaptation of IEC materials. Some Provinces do not yet have focal point at Provincial, District, Health facility & community level. Poor coordination of commemorative days. Communication and advocacy strategy not finalised and approved Lack of equipment,	Existence of many political leaders that could be recruited to advocate for malaria control. Several NGOs, civil society organizations, donors, private sector have shown great interest Existence of CBOs - & NGOs. Interest shown by several Civil Society organizations, NGOs, Donors, Private sector & other Government Ministries Utilization of schools, faith groups, community leaders, etc, as entry	Conflicting messages due to weak coordination. NGOs do not produce materials, if there is no coordination. Non compliance by some NGOs of activities agreed upon by MOH & its Partners. Sustainability of community involvement

	transport and other means to conduct social mobilization. Difficulty in involving all interested parties in the planning process	points for community related activities	

4.5.6 Successes, Best Practices and Facilitating Factors

The NMCP uses community radios to reach out to the target group. The NMCP has developed key messages on all malaria IEC/BCC sub-components that are aired on the Community Radios. These community radios have a good reach to rural populations and broadcast in local languages that are understood by the majority of the population. For example, community radios were used to mobilize the population to participate in IRS in Maputo province with a resultant decline in malaria cases.

The programs also use outreach activities such as Mobile Cinema to disseminate malaria messages and conduct social mobilization campaigns during the commemoration of the malaria days. Spray men have also been trained to dramatize challenges with implementing malaria control interventions at community level. This approach has worked well and seems to be well accepted by communities.

The MOH organizes periodically ‘‘*Health Fairs”*, that are a good opportunity for the NMCP to promote healthy life styles. A public debate on health issues is conducted prior and after the health fair with full involvement of the communities.

Churches and religious group are involved in malaria prevention and control activities. Religious activities have been used to facilitate dissemination of malaria related messages. However, it is to be noted that best practices are not documented on regular basis.

4.5.7 Key Issues and Challenges

Although the NMCP works closely with DEPROS, it is critical for all MOH programs and initiatives to be involved in the strategy development process. This will ensure from the start of the process coordination and integration of actions, notably with Nutrition, IMCI Strategy, EPI, HIV/AIDS and Safe Motherhood.

Overall, planning of health promotion activities is not done on an inclusive manner by all concerned partners who play an important role in malaria prevention and control. This is

mainly due to lack of funding, which interferes in monitoring activities as well. Health Promotion activities are the backbone for the success of the program.

Fine-tuning of IEC/BCC interventions is dependant on behavioural research on people's perceptions of malaria issues, malaria prevention and treatment. The research would promote an understanding of how, when and where to target individuals, and communities for efficient malaria control during advocacy, communication, BCC, and social mobilization. Currently, there is limited up to date research data to inform proposed IEC/BCC activities.

It is therefore urgent that MOH develops a communication strategy with a budget to promote healthy behaviours. Such strategy should focus mainly on a social marketing approach with a strong community involvement component and be in line with the Health Promotion Strategy. The IEC/BCC component needs to have a substantial budget to make it sustainable.

Other issues and challenges include:

- Low prioritization and inadequate founding of IEC/BCC;
- Lack of norms and standards, as well as lack of coordination mechanisms between MOH and partners on issues related to IEC/BCC.;
- Lack of a common understanding on the concepts of community involvement particularly by health workers working at primary health care level;
- Uncoordinated interventions with common objectives leading to duplication and ineffectiveness of the strategy;
- Teachers are not involved in malaria control, despite the fact that they have the potential to disseminate information to their students;
- There are no trainers of community mobilisers;
- Available financial resources are not sufficient to cover all Health Promotion, IEC/BCC, and community mobilization activities;
- There are no IEC/BCC materials (particularly for IPT);
- The communication and advocacy strategy has not yet been finalized and approved;
- IEC/BCC materials are not available at the health facilities;
- Inadequate evaluation of health promotion activities for feedback

4.5.8 Action Points

1) To ensure that additional financial resources are allocated for malaria information education and communication / behavior change communication. The NMCP should take advantage of existing funding initiatives such as the GFATM and PMI to fund the NMCP IEC/BCC budget.
2) There is need to finalize, approve and implement the advocacy and communication strategy, and implement the community involvement strategy and empower communities on health, malaria issues and environmental management. The strategy should be informed by behavioural research findings. Where the data

are old, there is need to commission new studies that would enable fine-tuning of the BCC/IEC interventions and activities.

3) Identify and work with partners to facilitate community interaction (e.g. schools, groups, religious groups, and Community based organizations). These entities have ready access to these target groups that are often missed by the established health facilities.
4) To improve coordination of IEC/BCC activities, the NMCP should strengthen linkages with DEPROS and use the Community Leaders Council to support the implementation of Malaria community based activities. In addition, the NMCP should explore the possibility of establishing an IEC/BCC technical working group. This would enhance planning for IEC/BCC, harnessing the technical expertise available among partners and potentially contribute to additional resource mobilization.
5) There is need to develop (using the results of KAP surveys) and disseminate IEC materials and training materials and evaluate the efficacy of IEC materials. IEC/BCC materials should be available and displayed;
6) Implement innovative health education activities with full involvement of target groups to promote positive behaviours on personal protection and treatment seeking;
7) Promote and stimulate positive attitudes/behaviours such as: sleeping under mosquito net; recognition of symptoms & immediate health seeking behaviour;

4.6 Malaria in pregnancy

Mozambique is still endemic for malaria and children under five and pregnant women (especially primigravidae) are at high risk of developing the disease. MIP activities have been implemented in Mozambique since 2006, as part of routine ANC within the package of services recommended for pregnant women. Intermittent preventive treatment in pregnancy (IPTp) and LLINs are the key prevention interventions for malaria in pregnancy.

4.6.1 Policy and Guidance

MIP is part of key intervention of Malaria national strategic plan 2006-2009 and it has a three pronged approach: intermittent preventive treatment of malaria in pregnancy (IPTp); provision of LLINs and effective diagnosis and treatment.

IPTp policy was approved in January 2005 and officially launched in April, 2006. The IPTp strategy is based on administration of SP in therapeutic doses after 20 weeks of pregnancy. Due to the high prevalence of HIV in Mozambique, the recommendation was to have three doses during pregnancy, each given four weeks apart during ANC. Each of these should be directly observed treatment (DOT). In June 2006, the programme started training of trainers (TOT) as part of the implementation process, followed by cascade training of the clinicians and nurses in all provinces and districts.

There is a draft policy of LLIN distribution which includes universal coverage. There is proposed "catch –up" distribution which currently is implemented as part of ANC.

On treatment of malaria in pregnant women, guidance is included in the National Malaria Treatment Guidelines 2009. Accordingly, treatment is given based on parasitological confirmation with either RDT or Microscopy. For treatment of uncomplicated Malaria:

- QNN oral is recommended during the first trimester
- AL Second and third trimester

For the management of severe malaria, parenteral QNN is recommended. Parenteral artesunate is recommended too in severe malaria during the second and third trimester as an alternative to parenteral QNN. Both the distribution of LLINs, provision of IPTp and treatment of malaria during pregnancy are provided free. Challenges have existed in the monitoring of this policy especially as there is only limited supervision at all levels of health care.

LLINs have been distributed through the ANC for several years. MoH has adopted the strategy of universal coverage that is now being implemented in a phased manner in a few districts. Both IPTp and LLINs are part of the FANC package. Department of Reproductive Health recommends five visits for FANC with a minimum of four visits. During each of these visits there is a package of interventions recommended for the pregnant women. These services include: HIV and syphilis screening, anaemia screening, tetanus immunization and iron sulfate supplementation.

4.6.2 Organization of MIP service delivery

All HF with ANC services are providing MIP services (IPT and LLIN distribution). The collaboration between the Malaria programme and the Reproductive Health programme was mainly during the finalization of the policy on MIP. However, at the implementation level, there is inadequate collaboration thereby resulting in some of the challenges. In the next phase, this is an area that will require strengthening especially in defining clear roles and responsibilities of each programme. Joint planning of implementation of activities will go a long way in improving delivery of these services.

4.6.3 Human resources, training and capacity development

There is a training manual on malaria case management that includes MIP, developed in 2009. At the introduction of the new policy about 9000 health workers were trained all over the country in 2009 in malaria case management including use of RDT. This training was more focused on health workers that manage malaria. Similar training should be organized as part of the in-service training of midwives and other health orderlies that run ANC services. Some of these new recommendations are not adequately addressed in the pre-service training curriculum.

4.6.4 Performance indicators and targets

Table 4.21 MIP performance indicators

MALARIA INDICATORS	MIS 2007 (%)	MICS 2008 (%)	INSIDA 2009 (%)
Proportion of pregnant women who slept under an ITN the previous night	7.3	N/a	N/a
Proportion of pregnant women who slept under any net	19.3	n/a	n/a
Proportion of women who received two or more doses of IPTp during their last pregnancy in the last two years	16.2	43.1	33

Pregnant women attending ANC at least once is estimated at 92% (MICS 2008) though most of those attending come late. The proportion of pregnant women who received 2 or more doses of IPTp has increased from 16.2 % (MIS 2007) to 43% (MIS 2008).
Although the IPTp uptake through ANC is increasing, it is still far below the 80% target.

This is made worse by frequent stock-outs of SP and LLINs which leads to missed opportunities for these services. Several reasons have been fronted for this ANC late attendance. They include: misconceptions about the usefulness of SP in pregnant women who are not sick, reluctance by pregnant women to be attended to in ANC by male or young female HCWs and sometimes the long distances that pregnant women are required to travel to these health units where ANC is provided.

Data on ITN use by pregnant women was only available in the 2007 MIS estimated at 7.3%. Given the large number of ITNs distributed over the last 3 years, it is estimated that ITN use by pregnant women is much higher.

The MIS 2007 estimated parasitaemia in pregnant women of 16.3% with range of 14.0% in the central region and 17.1% for northern and southern regions. Anaemia prevalence among pregnant women was estimated at 48.1% and was found highest among primigravidae and second pregnancy (52,8%) compared with women with more than three pregnancies 42.8%. The subsequent surveys did not estimate these two indicators which are not routinely collected using household surveys due to the small sample size of pregnant women expected.

4.6.5 Service Delivery outputs and outcomes

MIP indicators are not captured with HMIS system although MoH is in the process of revising the SIS. This is an area worth discussing with the relevant department to ensure constant monitoring of some of the indicators to guide programme implementation. Results of the MIS 2007 showed that only 7.3% of pregnant women had slept under an ITN the night before the survey. The IPTp 2 coverage was 20.3% but doubled to 43.1%

according to the MICS 2008. This remarkable progress is noted although it is still below the target of 80%.

The MIS 2007 showed that parasitaemia prevalence among pregnant women ranged between 14 % in the central region and 17.1% in the northern and southern regions. Moreover, anaemia was 48.1% with primigravidae (52.8%) more affected than multi-gravidae (42.8%). This level of parasitaemia and anaemia should be addressed as part of a focused antenatal package that included IPTp, ITNs, antihelminthics and hematinics. Given that FANC is housed by the reproductive health department, this calls for better collaboration in policy and strategy setting, procurement and provision of commodities as well as joint supervision and monitoring.

4.6.6 SWOT Analysis

Table 4.22 SWOT Analysis

STRENGTHS	**WEAKNESSES**
• Free access to anti- malarial medicines • Provision of nets and antimalarial medicines free of charge to pregnant women • Provision of MIP services as part of FANC • Updated guidelines on malaria in pregnancy • High ANC coverage, at least for the first antenatal consultation	• There is limited routine data coming out of ANC on interventions related to prevention and treatment of malaria in pregnancy • Irregular availability of LLINs and SP to pregnant women during their routine ANC visits • Weak supervision and monitoring system at all levels • Inadequate mobilisation of pregnant women to come in for a second ANC • Lack of an ongoing training and supervision programme for staff delivering ANC /MIP services • Weak distribution and control of stocks Weak coordination between the Malaria and Mother and Child health programmes
• **Opportunities**	• **Threats**
• Possibility to integrate MIP indicators in the HMIS under revision • Possibility of including MIP package in the curriculum of the training institutions • Existence of channels of collaboration with reproductive health department in the development of IEC materials for behavior change • Possibility of integrating data collection forms with the revised women's health forms • Technical groups from each programme enlisted to strengthen coordination • Plan in place for the integration of training with women's health services	• Community attitude towards malaria • Late attendance to antenatal clinic • Inadequate financial resources for malaria in pregnancy activities • Distance to access the health facility • Increasing resistance to SP • Misconceptions about the usefulness of SP in pregnant women who are not sick

4.6.7 Successes, best practices and facilitating factors

Major successes to date have been the provision of ANC services free of charge. In addition, MIP interventions being included as part of ANC is of great benefit. This provides an opportunity of working with the reproductive programme for better implementation.

4.6.8 Issues and challenges

There is inadequate information on MIP service delivery, outcomes and impact to inform implementation. Currently, there is no clear mechanism for capturing data on MIP and therefore the true burden of malaria in pregnant women remains unknown The most recent data was captured by the MIS 2007 and the MICS. However, for monitoring of implementation it is preferable to use routine systems such as the BES and SIS to capture data on delivery and uptake of services at health facility level. For example, Zambia recently revamped it's HMIS that also included indicators on MIP that are received quarterly at national level.

- Inadequate training on MIP activities and supervision
- Inadequate collaboration between Reproductive Health and NMCP especially in the implementation of activities although for policy level this is happening.
- Frequent stock-outs of malaria commodities used in routine ANC
- Late attendance of ANC causing low uptake of IPTp and late usage of LLINs.

4.6.9 Key actions

- The NMCP should discuss with SIS to include more indicators for malaria in pregnancy
- Use the APEs to promote MIP activities at community level aimed at encouraging pregnant women to attend ANC at the nearest health facility.
- NMCP to lobby for inclusion of MIP in training curriculums of health institutions
- Improve coordination between the NMCP, CMAM, Mother-Child Health (MCH) programme and partners on planning and budgeting supplies of SP and distribution of LLINs To strengthen delivery of these services, there is need for closer e coordination of the key programmes that is, Malaria, Mother-Child Health and CMAM to ensure ease of implementation and constant supply of the commodities.
- Strengthen logistic distribution of commodities
- Improve training and supervision of MIP activities ensuring their full integration in the Mother-Child Health services

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4.7 Surveillance, Monitoring, Evaluation and Operational Research

4.7.1 Policy, Guidance, Coordination

The National Malaria Monitoring and Evaluation Plan is in line with the National Health Sector monitoring and evaluation plan. The M&E Plan was developed as a condition precedent to GFATM requirements for grant signature through a consultative process with various stakeholders. Afterwards the draft M&E plan was reviewed to align it with the 2010-2014 national malaria strategic plan and will be completed in June 2011 taking on board key findings of the MPR. The malaria monitoring and evaluation activities are coordinated by NMCP Malaria M&E working group and the major stakeholders are USAID/PMI, UNICEF, WHO, DFID, World Bank, European Union, NGOs, the DPC Global Fund Unit and other bilateral agencies, research and training institutions and the private sector.

4.7.2 Malaria country profile, risk mapping and stratification

Mozambique is a high transmission country. However, there is no up to date malaria stratification map and so the country relies on the MARA map to determine malaria risk. The MAR map developed in 2000 used climate suitability index to determine malaria transmission intensity. Given that several interventions have been scaled up in the country and that other more accurate indices such as parasite prevalence are the preferred method of determining transmission intensity, this map can no longer suffice.

The NMCP has received mapping software that has been used to develop maps on coverage of ITNs and IRS as well as estimates of malaria incidence using morbidity and mortality data from the BES. These maps have been developed with support of WHO but cannot replace standard endemicity maps. Apart from the parasite prevalence data collected during the MIS 2007, no fresh data has been collected to feed into this process. Clearly, there is a need to actively plan and collect data on parasite prevalence across the country that will feed into updating the malaria stratification map.

4.7.3 Human resources, training and capacity development

With support from PMI through FHI the NMCP has a Monitoring and Evaluation Officer who oversees all M & E processes. FHI has also supported a Data Manager for the NMCP. These 2 officers work 100% for the NMCP under the leadership of the NMCP manager. These seconded officers have contributed to strengthening the M & E unit although their contracts are time-limited and will expire soon. Plans are underway to renew the contracts while the NMCP seeks long-term solutions from the MOH to fill these positions permanently.

At provincial level there are BES and SIS departments which also collect malaria indicators. There are no specialist staff focusing on malaria M & E at these levels. The Provincial malaria managers who are mostly biologists focus most of their efforts on IRS, ITNS and other vector control activities. With additional capacity development, they could contribute to strengthening malaria surveillance, monitoring and evaluation through regular collection of data, analysis, production of reports and providing feedback to lower levels. They could also ensure that malaria data at these levels is rapidly.

4.7.4 Routine Information Systems

For collection of routine information on malaria Mozambique has the weekly surveillance system (BES) and the Health Management Information Systems (SIS). These two systems are parallel systems and do not share information or talk to each other.

The BES has been designed to collect data on 11 priority diseases including malaria. The system records OPD cases and deaths from the health posts, health centers and districts hospitals. The information is collected from the various levels on special forms provided by BES and passed on from the health post to the health center then to district level. The districts then send this information to the provincial level where it is entered into a computer database before being transferred electronically to the national level. The transfer health center – district level – provincial level – national level has a weekly time lag. This means that the information will only arrive at national level three weeks later at the earliest.

The Health Information System (SIS) located in the Planning Department of the Ministry of Health, collects data on inpatient conditions at all rural hospitals, provincial hospitals and general hospitals in the country. The data is entered into the computerized system at provincial level and then sent to the MOH. It also collects management information including logistics and drug supplies. The information is received on a monthly basis from provinces. The SIS receives and analyses this information by province even though the information is received by district and province. Periodically the data manager of NMCP collects information from the Basic Module of SIS and updates the NMCP copy of the database. This data is mostly archived and not analysed for use in real time to make management decisions.

The two systems collect data on malaria form different levels of the health system. Although the data are analysed, there is no systematic feedback to the lower levels.
Currently, there are ongoing discussions with DIS to incorporate more malaria indicators that can be collected by this system.

4.7.5 Sentinel Surveillance Systems

The NMCP have been running 4 sentinel sites – 2 supported by Malaria Consortium in Moatize (Tete) and Angoche (Nampula), and while Montepuez (Cabo Delgado) and

Massinga (Inhambane) were being supported by PMI. The sentinel sites were established to collect quality information on morbidity and mortality due to malaria for monitoring of impact of malaria interventions. Each sentinel site has a data manager responsible for collecting data from daily records and producing weekly, monthly, quarterly, semi-annual and annual analyses for decision making at the district level and local staff. This data is then sent to the MOH. These sentinel sites are useful because they allow collection of additional information and supplement the SIS and BES. Due to some difficulties the two sentinel sites run by PMI are unlikely to continue in 2011.

4.7.6 Monitoring and Evaluation Plan

The National Malaria Control Programme has a Malaria Monitoring and Evaluation Plan (2010-2014) that spells out the key functions and actions of the malaria M&E system in accordance with the National Malaria Strategic Plan (2010 -2014). The plan provides the foundation for measuring progress through the identification of goals, objectives and indicators across malaria intervention strategies. The Malaria M&E plan also outlines the available and desired data sources, the strategies for quality control and validation of data and identifies the role of key malaria stakeholders in M&E. This plan has been developed to ensure accountability of all stakeholders on their activities and conforms to the "Three Ones" where the NMCP is the centre of malaria control in Mozambique. For this role to be performed the NMCP needs a solid M&E team to implement key activities and coordinate work implemented by partners. Adjustments to the draft will be made in line with the findings and recommendations of this review. .

4.7.7 Malaria Surveys

The Malaria M&E plan outlines the important role of surveys in malaria to compliment data collected by the routine systems. The key periodic surveys are the DHS, MICS, and MIS. These are population based surveys can potentially collect all indicators including anaemia, parasitemia, ITN/LLIN possession and usage, IPTp, and case management. The most recent surveys done are the DHS 2003, MICS 2008 and the last MIS was done in 2007. The results from these surveys have enabled the NMCP to track progress made since 2000. The data have also been used for global reporting to WHO and other international organizations working in Mozambique. For Mozambique it is expected that every 2-3 years a population based survey that includes key malaria indicators will be conducted. The next DHS is 2011 and the MICS in 2013. Given that there is an expected scale up of interventions e.g. the planned universal coverage ITN campaign, the NMCP must take advantage of these surveys to collect updated data on coverage of interventions. Special care must be taken when adapting the questionnaires and study approaches to ensure that quality data are collected. The M & E technical working group is expected to play a leading role in the adaptation of tools, field work and possible involvement in writing the final report.

Health facility surveys are also conducted in Mozambique in collaboration with the Child and Adolescent Health Unit and these surveys are used to determine the quality of the delivery of and services. The most recent health facility survey was conducted in [year], had a national/sub-national coverage and collected data on quality of case management. With the latest change in the antimalarial drug policy, another health facility surveys together with support supervision will provide insights on implementation. However, at the moment, there seems to be no immediate plans for conducting the health facility survey.

4.7.8 Malaria Reporting

The NMCP activities are reported quarterly, biannually and annually. The annual reports are shared with all partners in malaria control and on request the other reports can also be shared. However, information on activities such as workshops, planning and review of provincial and district activities are not shared in these reports.

4.7.9 Malaria database and informatics system

The NMCP (office at central level) is equipped with sufficient computers and other accessories. All computers are connected to wireless internet using non-institutional providers due to the limited service of the institutional email service. The wireless service also allows sharing of accessories such as printers, scanners and other electronic devises.
At the provincial level, provincial malaria focal points have a computer and a printer. The provincial managers use the *Internet* services of the Provincial Health Department.
On the website *of* the Ministry of Health (www.misau.gov.mz), the NMCP has s space containing malaria information. However, this website is not regularly updated since the updating cannot only be done by a designated person even when updated information is available. (http://www.misau.gov.mz/pt/programas/malaria). This results in huge delays in posting this information.

Has the programme ever used the WHO malaria database?
What database software is used and what has it been able to deliver?
What about the mapping software that was provided by UNICEF? How has this been used?
Any linkages to the SIS and BES databases for retrieving data?
Any linkages with the ITN and IRS databases? How this data is collected, collated, analysed and used for programme management?
What are the problems currently experienced with database and informatics that we could recommend are rectified later?

4.7.10 Progress towards achievement of targets

According the Strategic Plan 2006-2009 the Mozambique NMCP has achieved marked progress as shown in table xx.

Table 4.23 **Malaria Indicators in Mozambique: Data from 2007 MIS, 2008 MICS, 2009 INSIDA**

Malaria Indicators	**2007 MIS %**	**2008 MICS %**	**2009 INSIDA %**
Proportion of households with at least one ITN	15.8	30.7	NA
Proportion of children less than five years old who slept under an ITN the previous night	6.7	22.8	NA
Proportion of children less than five years old who slept under a bed net the previous night	15.7	42.1	48.7
Proportion of pregnant women who slept under an ITN the previous night	7.3	NA	NA
Proportion of pregnant women who slept under a bed net the previous night	19.3	NA	42.1
Proportion of women who received two or more doses of IPTp during their last pregnancy in the last two years	16.2	43.1	33
Proportion of targeted houses adequately sprayed with a residual insecticide in the last 12 months	52.4	NA	47.8
Proportion of children less than five years old with fever in the last two weeks who received treatment with an antimalarial within 24 hours of onset of fever	17.6	22.7	NA
Proportion of children less than five years old with fever in the last two weeks who received treatment with an ACT within 24 hours of onset of fever	4.5	NA	NA

The 2007 Malaria Indicator Survey (MIS) carried out in June–July 2007, at the end of the rainy season, showed that 15.8% of households had at least one ITN, but only 7.3% of pregnant women and 6.7% of children less than five years old had slept under an ITN the previous night (see table below). This represents no improvement in use of ITNs compared with the 2003 DHS (data not shown).

Fifty-two percent of those houses targeted for IRS had been sprayed and 16% of pregnant women had received two or more doses of IPTp. Only 4.5% of children less than five years old with fever had received an ACT within 24 hours of onset of symptoms.

The 2008 MICS shows an improvement in ITN use and treatment with an antimalarial within 24 hours of onset of fever as compared to the 2007 MIS (see table below). Also, the proportion of women who received two or more doses of IPTp during their last pregnancy also increased from 16.2% to 43.1%.

An AIDS Indicator Survey (INSIDA) was carried out in July 2009 with limited number of questions on bed net use, IPTp, and IRS. Results show improvement in the use of bed nets compared to prior surveys for both pregnant women and children less than five years old. The trend was reversed for IRS and IPTp.

4.7.11 Key Achievements

Mozambique has made tremendous progress in malaria control especially in tracking progress made in malaria control.

a) Having focal points at provincial has enabled easy contact and transfer of information from province to NMCP on a regular basis, especially on indicators that are not routinely collected by BES and SIS.
b) Collaboration with partners has enabled use of partner capacity in NMCP. This has enabled the NMCP to timely track implementation and progress in malaria control. be able to keep up to date on the activities and progress made in malaria control intervention implementation.
c) Data from sentinel sites are discussed on a quarterly basis at the site of collection with the decision makers and all staff at the health facility.
d) Technical support has been provided by partners who posted staff with te requisite skills to the NMCP.
e) The NMCP and its partners have defined and agreed on the key indicators and activities to be conducted in surveillance, monitoring and evaluation in line with the national strategic plan and compiled a Malaria M & E plan subscribed to by all partners in the spirit of "Three ones".

4.7.12 SWOT Analysis

Table 4.24 SWOT Analysis of SME

STRENGTHS	WEAKNESSES
1) Partners recognize the importance of surveillance, monitoring and evaluation and they have been able to provide support for the NMCP where it was lacking in M&E. 2) Existence of an epidemiological surveillance system that provides weekly data on the malaria burden and the SIS that provides monthly data on patients (both health units at primary and secondary) 3) Supervision component of IRS is well established that can be a basis for integrated supervision sessions 4) Existence of provincial malaria managers in all 11 provinces (biologists) 5) Existence of an IT assistant at the central level of the NMCP	1) Although the M&E plan has been developed it was developed based on requirements of the GFATM and may not have been embraced by the NMCP and partners as an M&E plan for the strategic plan. 2) Weak capacity in the malaria community in monitoring and evaluation, SIS at all levels of management and service delivery levels. 3) Lack of skills in monitoring and evaluation by managers in malaria control especially in the MOH structures. 4) Limited experience of existing staff to implement monitoring and evaluation activities. 5) The central M&E unit in the MOH is not aligned with monitoring and evaluation unit in the NMCP. 6) There is poor practice in definitions of indicators even though the M&E plan has attempted to do this. 7) Low-quality data from routine systems, both BES and SIS. 8) Weak capacity of the NMCP in integrating data from different sources 9) Lack of a plan for studies of malaria to be carried out

	10) BES collects data from peripheral units who cannot easily communicate with the districts and other higher levels while the hospitals with better capacity and facilities only report monthly.
Opportunities	**Threats**
1) Current political context strongly in favour of monitoring and evaluation in the public sector 2) Increased interest by implementing partners to support the NMCP in monitoring and evaluation 3) Existence of a central unit for M&E in the national planning and cooperation Directorate (MOH), which began to coordinate the overall process of M&E 4) More funds available for M&E (particularly the GFATM, PMI, WHO) 5) Existence of partners, including national research centers, with capacity to support the NMCP in the implementation of operational research. 6) Upcoming proposal to review and update the HMIS. The NMCP can take advantage of this process to include key malaria indicators.	1) Weak information culture at all levels of the system. 2) The current human resource crisis in all areas of the public sector 3) Staff are not motivated due to work overload and weak incentives 4) Multiplicity of reporting systems 5) Poor coordination between NMCP and partners (particularly in terms of sharing information / data)

4.7.13 Issues and challenges

The review identified several issues in the area of epidemiology, surveillance, monitoring and evaluation and operational research:

a) There is limited capacity within the NMCP to coordinate and implement activities of well-established M&E unit. Currently, the 2 personnel responsible for M & E within the NMCP are seconded to the programme by a partner. The contracts of the 2 staff will soon come to an end. There is no guarantee that the partner will continue to pay their salaries and the MOH has not yet initiated arrangements to either absorb them or replace them with established MOH staff.
b) The various funding initiatives especially the Global Fund has included several indicators that cannot be measured by the BES and SIS, Some of these indicators could be incorporated into the BES and SIS during the revamping of these systems that is currently ongoing.
c) Data collected by BES and SIS is not comparable .The data quality in terms of diagnosis and completeness is questionable and does not allow confident analysis of the trends.
d) Inadequate personnel to follow up on malaria data at the various levels in an environment of scarce human resources resulting in low timeliness, completeness and surveillance supervision which ultimately affects quality of the data.
e) Inadequate supplies of paper forms, log books, records, computer applications and data integration. No forms for collection and transfer of some information related to malaria control interventions
a) Weak use of data for decision making and inadequate training and human resource development in malaria surveillance, monitoring and evaluation. There are also delays in data submission to the central level.
b) Indicators are generated by province, not district, although data by district is available.

c) Data is not readily available for the managers for their use and the quality of the data is low. There are weak linkages between the MOH and research institutions resulting into limited operational research on malaria.
f) No copy of national M&E plan at provincial level
g) No feedback from all levels.

4.7.14 Action Points

The following recommendations can be drawn.

1) There is need to clearly define the roles and responsibilities of the malaria surveillance, monitoring and evaluation unit with respect to routine surveillance systems and the partnership.
2) There is need to define an operational research agenda and strengthen partnerships with institutions able to assist in operational research.
3) The case definition of malaria should be standardized to allow standardized reporting on malaria. Since not all health facilities can confirm malaria there needs to still continue to report on both confirmed and suspected malaria.
4) Improve on coordination between levels and sharing of information.
5) Need to strengthen data transmission and analysis for decision making at all levels.
6) Data reports should be sent disaggregated by health facilities from district to provincial level rather than consolidated. Review of reporting forms is needed to address this issue.
7) Build capacity in focal points to follow up on data and information issues including providing them with relevant tools
8) The NMCP should take advantage of the upcoming surveys and ensure that the key malaria indicators are included.
9) NMCP to strengthen data management through adopting the malaria database as well as integrating other databases to ensure that there is a single repository for all malaria data.
10) With the planned closure of 2 out of 4 sentinel sites, there is a need for the M & E working group to critically review the usefulness of maintaining the sites. In addition timely reporting and use of the analysed data at site of collection and national level devised.

5. Conclusions

The Mozambique malaria control programme is performing relatively well although most targets have not been achieved. These achievements are attributed to the excellent political and financial support from the government as well as technical and financial support form key partners. Although data show that the burden of disease may be decreasing, there has not been a documented significant shift in malaria epidemiology with most of the country still experiencing moderate to high malaria transmission. This review concludes that with sustained scale up of interventions as throughout the country, including areas that were previously thought to have very low-transmission, more progress could be achieved in the next 5 years.

Annexes

Annex 1 Review Teams

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8. Driver (Provincia – PSI)
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2. Rosália Mutemba (NMCP)
3. Dulcisária (NMCP)
4. Rosa Chambisse (M. Defesa Moz)
5. Inocencio Quive (Provincial malaria focal point)
6. Driver (Provincia)
7. Driver (Provincia)
8. District focal point

Team for Gaza Province

1. Simon Kunene (NMCP Swazilandia)
2. Lisa Matlombe (central hospital)
3. Bonifacio Manjate (NMCP)
4. Guilhermina Fernández (NMCP)
5. Ana Cristina (Malaria Consortium)
6. Ines Juleica (provincial malaria focal point)
7. Driver
8. Driver
9. District focal point

Central team Maputo

1. Josephine Namboze (WHO/ICST/AFRO)
2. Nathan Bakyaita (WHO/Brazzaville)
3. Nurbai Calu (NMCP)
4. Eva de Carvalho (WHO/CO)
5. Teotónio Fumo (NMCP)

Annex 2 People Interviewed during the MPR

2.1 Central Level

2.2 Provincial and District Levels

Annex 3 Schedule of Visits

Mozambique MPR Phase 3 – Detailed Agenda

Day/Date	Time	Activities	Responsible
Saturday 27 Nov 2010		Arrival of external reviewers VIP Hotel Review of Agenda and Logistics (evening – coordinator and WCO)	
Sunday 28 Nov 2010	0900	▪ Coordination Meeting	
	0930	▪ Welcome and Introductions ▪ MPR objectives, outputs and outcomes	
	1000	▪ MPR Phases and Steps ▪ Overview of Phase I of the Review ▪ Process Overview of Phase 2	
	1030	**TEA BREAK**	
	1100	▪ Overview of policies and structures of the national health system ▪ Program Management	
	1300	**LUNCH BREAK**	
	1400	Case Management	
	1600	**TEA BREAK and END OF DAY**	
Monday 29 Nov 2010	0800	Vector Control	
	1000	**TEA BREAK**	
	1030	▪ Epidemiology, Monitoring and Evaluation ▪ Surveillance and response	
	1230	Advocacy IEC and BCC	
	1300	**LUNCH BREAK**	
	1400	Advocacy IEC and BCC (continues)	
	1500	**TEA BREAK**	
	1530	Procurement and Supplies Management	
		Briefing and consultation with Minister of Health and Permanent Secretary	
		Briefing and consultation with Director of Primary Health Care and Permanent Secretary MLG	
		Briefing and consultation with departmental and divisional heads in MoH	
		Briefing and Consultation with partners in research and academic institutions and other RBM stakeholder	
		Visit to the NMCP	
		Preparatory Meeting for teams going to the provinces and districts	
Tuesday 30 Nov 2010		Formation of thematic working groups for Phase 3	
		Work in thematic groups – definition of priority issues, success, gaps	

		in the NMCP	
		Adapt data tools	
		Preparatory Meeting for teams going to the provinces and districts	
	1430	Briefing with WR	
		Briefing and consultation with Minister of Health and Permanent Secretary	
		Briefing and consultation with Director of Primary Health Care and Permanent Secretary MLG	
		Briefing and consultation with departmental and divisional heads in MoH	
		Briefing and Consultation with partners in research and academic institutions and other RBM stakeholder	
		Visit to the NMCP	
Wednesday 1 Dec 2010		Travel to provinces	
		Visit to Provincial Health Team Visit Provincial Hospital Visit District Health Teams	
Thursday 2 Dec 2010		Visit health centre and community	
Friday 3 Dec 2010		Debriefing at Province HQs	
Saturday 4 Dec 2010		Travel back to Maputo	
Sunday 5 Dec 2010		Compilation of field reports By Monday each team should present field findings, SWOT by thematic areas, success and best practices by thematic areas, challenges, solutions and recommendations by thematic areas and areas visited	
Monday 6 Dec 2010	▪	▪ Presentations of Key findings, Challenges, Solution and recommendations by provinces visited ▪ Work by thematic areas: Task 1 – compile SWOT, achievement success, best practices and lessons learnt from central and field visits. Task 2: compile challenges, solutions and recommendations from central and field visits. ▪ Thematic areas presentations: key findings, challenges, solution and recommendations	
Tuesday 7 Dec 2010		▪ Refine report, conclusions and recommendations ▪ Prepare Aide Memoire and PowerPoint presentation	
Wednesday 8 Dec 2010		▪ Technical committee meeting ▪ Stakeholders meeting	
Thursday 9 Dec 2010		▪ Meeting with Top Management ▪ Revisions of Aide Memoire ▪ Work on MPR Report	
Friday 10 Dec 2010		▪ Aide Memoire Signature ▪ Finalise Draft Report	
Saturday 11 Dec 2010		**Departure of External Team**	

Annex 4 Aide Memoire

Ministry of Health

Mozambique Malaria Programme Performance Review

Scaling up for Universal Access to Malaria Control Interventions

December 2010

Aide Memoire

I. Purpose

A strategic and performance review of the Mozambique National Malaria Control Programme was conducted to assess progress and performance of the programme. The review is expected to strengthen planning and resource mobilization for scaling up delivery of malaria control services. The major findings and proposed actions from the review are summarised in this aide memoire. The aide memoire is not legally binding but a consensus statement on the key findings and proposed actions. It expresses the commitment of partners to work together for the implementation of the review findings.

II. Background

In October 2010, the Ministry of Health Mozambique decided to undertake an in-depth review of the national malaria control program. This decision was made in the context of an observed decline in malaria incidence and deaths in Mozambique as a whole. The overall objective of the review was to assess the current strategies and activities with a view of scaling up implementation. The specific objectives of the review were: a) to review the epidemiology of malaria in Mozambique; b) to review the structure, organization, and management framework for malaria control within the health system and the national development agenda; c) to assess progress toward achievement of national targets; d) to review the current program performance by intervention thematic

areas and service delivery levels; and e) to define the next steps for improving program performance.

The review was conducted in three phases. In Phase 1 the NMCP held discussions within the Ministry of Health and partners and gained consensus on conducting the review. A proposal was developed to mobilize funding and technical support. In Phase 2, teams were set up to conduct thematic desk reviews using published and unpublished reports on malaria in Mozambique. This phase was concluded in a national MPR retreat to gain consensus and finalize the thematic reports. These reports were then shared with the external team. In Phase 3, the observations of the national team were validated by a joint internal and external team through document reviews, key informant interviews at national, provincial and district levels, and rapid field assessment of selected health facilities and focus group discussion at community level.

III. Key Objectives and 2006-2009 Malaria Strategic Plan Achievements

The main objective of the Malaria Strategic Plan 2006-2009 was to reduce morbidity and mortality due to malaria in the population in particular in pregnant women and children under five, including poor population groups. The strategic plan identified four main targets: a) at least 60% of those at risk of malaria infection should benefit from the most appropriate combination of personal and community protection measures by 2010; b) at least 60% of all pregnant women have access to intermittent preventive treatment IPT); c) at least 60% of malaria cases have prompt and correct low-cost treatment within the first 24 hours of onset of symptoms; and, d) improve the quality of malaria diagnosis from 25-30%, to 60% by 2010.

Available data from SIS and BES indicate that the malaria incidence rate has declined from 315 per 1000 population in 2006 to 202 per 1000 population in 2009. Mozambique has also increased the number of districts sprayed by IRS from 34 districts in 2001 to 57 in 2010. The 2008 MICS found that 23% of children under five had slept under an ITN the night before the survey. In 2009 available data shows that 64% of women received IPT 2. Also, 22.7% of children under the age of five who had fever in the preceding two weeks received treatment within twenty-four hours of onset of fever. The MIS 2007 estimated the malaria prevalence to be 38.5% in children under the age of five.

IV. Key Findings and Action Points

1) Malaria Epidemiology

Malaria is endemic throughout Mozambique and transmission is perennial but with seasonal peaks mainly between December and April. It is still the major cause of morbidity and mortality in Mozambique and accounts for 44% of all outpatient consultations and 29% of hospital deaths. The 2007 Malaria Indicator Survey found that parasitemia prevalence in children 6 to 59 months old was 38.5%. Data from the

epidemiological surveillance system indicates that on average there are 5.8 million cases of clinically diagnosed malaria annually with decreasing trends.

The main malaria vectors are *Anopheles gambiae s.s, An. funestus* and *An arabiensis* whose distribution varies across the country. *Plasmodium falciparum* accounts for more than 90% of all malaria infections, with *P. malariae* (9%) and *P. ovale (1%)*. There is no stratification and risk map for malaria in the country apart from the MARA map which was produced about a decade ago.

Action points

1) To conduct a detailed analysis and triangulation of the various data sources to determine the current epidemiological situation in Mozambique from which decisions on scaling up malaria control interventions could be based.

2) Policies, Programme Management and Resource Mobilization

The NMCP has benefited from high political commitment both within Mozambique and SADC. The programme is well-established with designated officers for most areas of interventions at central level and malaria manager at provincial level. Office space and computer equipment has been provided at both central and provincial levels. Government has secured funding from partners but has also invested heavily in procuring IRS chemicals. The human resources situation at the NMCP has improved to 12 staff in 2010 although some 3 positions are supported by partners in the short-term pending establishment of substantive posts by MISAU. Although there is neither a national health policy nor a malaria policy most technical guidelines are available which guide implementation of activities.

There is a marked increase in funding for malaria control by government and partners. The current financial arrangements through the SWAps and other mechanisms have enabled the scale up of malaria interventions. Key partners in malaria control in Mozambique are Global Fund, the United States Government, DFID, UNICEF, WHO, World Bank and Roll Back Partnership, The Global Fund disbursement challenges of 2009 are slowly being addressed with the creation of a support unit in MISAU. Several partners are involved in malaria control in Mozambique. The Terms of Reference, membership and modus operandi of the established malaria advisory and technical working groups are due for review and streamlining.

Action Points

1) Develop a malaria policy that could be incorporated into the National Health Policy once the latter is completed.
2) Finalize the proposed PNCM organogram that includes the recommended competencies, with clear roles and responsibilities for all the staff. The linkage between the PNCM and the provincial malaria coordinators should be strengthened.

3) Revamp the partnership coordination mechanisms including defining Terms of Reference, frequency of meetings and membership.
4) Establish a malaria advisory committee to advise on policy and implementation. The committee will operate with subcommittees in main technical areas as required by the main committee.
5) Improve collaboration and communication with other MISAU departments/agencies such as Reproductive Health, Human Resources, the Central Medical Stores (CMAM) and Central Medical Supplies Unit (CA) to enhance efficient delivery of malaria control activities.
6) Strengthen the capacity of the provincial malaria coordinators through provision of regular training on their responsibilities, supervision as well as providing resources for supervision of malaria control activities at the district and facility levels.
7) Cross border initiatives should be strengthened where they exist and established where appropriate.

3) Behavior Change Communication and Community mobilization

Significant achievements have been made in maintaining malaria high on the political agenda as evidenced by involvement of the Head of State, the First Lady, key government and religious figures. Mozambique also commenrates Malaria Days (SADC and World Malaria Days) where influential figures take part to voice their support for malaria control. The NMCP has a IEC/BCC designated officer and develops and disseminates malaria information through various channels including the radio, television, newspapers and others. There is evidence that malaria awareness is increasing. However, the uptake of some of interventions such as ITN, health seeking behaviours and IRS acceptance remain low. Health education on malaria issues is conducted at health facility level. IEC and social mobilization activities are also conducted prior and after IRS and LLINs distribution.

In an effort to improve delivery of IEC/BCC activities NMCP is developing a national advocacy and communication strategy. The current funding level for behavior change communication activities for malaria is inadequate and earmarked funds are mainly for IEC/BCC activities for IRS. Although KAP surveys have been conducted by the programme and partners there is limited use of the findings to guide and prioritize IEC/BCC interventions.

Action points

8) To finalize, approve and implement the advocacy and communication strategy.
9) To ensure that additional financial resources are allocated for malaria information education and communication / behavior change communication.
10) Findings from studies conducted should be used to inform IEC/BCC interventions.

4) Entomology and Vector Control

The main malaria vector control method in Mozambique is indoor residual spraying (IRS) which was introduced in 1946. The NMCP has currently a dedicated IRS focal point and two entomologists at central level. With support from partners such as RTI and LSDI IRS has expanded from 34 districts in 2001 to 57 districts in 2010. IRS guidelines, training manuals, data collection tools are available. In addition, the NMCP and partners distribute LLINs to pregnant women through ANC, children under five years of age and in-patient are provided with LLINs. To monitor entomological indicators and program performance, three sentinel sites and three insectaries were established.

However, the capacity to conduct key entomological activities is inadequate in terms of numbers and skills. This affects program planning, implementation, supervision and monitoring of entomological activities. Furthermore, there is limited collaboration between NMCP and the INS which has capacity to conduct some of the activities. There are no guidelines for LLINs distribution. LLINs are distributed to targeted groups and not to the general population.

Action points

1) The MoH, in collaboration with INS, should develop and strengthen entomology capacity at central and provincial levels
2) In collaboration with partners the NMCP should develop integrated vector management (IVM) guidelines. The NMCP should provide guidance on transition from targeted distribution of LLINs to universal coverage. The MoH should consolidate and expand IRS in the country and to sustain the gains in provinces currently supported by partners.
3) The NMCP in collaboration with INS should establish provincial entomology teams to monitor entomological indicators at sentinel sites and to monitor quality and efficacy of IRS and LLINs using bioassays.
4) The NMCP should consider insecticide residual efficacy and the peak malaria transmission period when determining the timing of IRS operations.
5) Data collection tools for IRS need to be standardized to provide accurate data on population coverage. NMCP to conduct geographical reconnaissance to provide information for planning and enhance measuring programme performance.

5) Epidemic Preparedness and Response

Mozambique is susceptible to floods and cyclones which occurred in 2000, 2001, 2007, and 2008 in Inhambane, Tete, Zambézia, Sofala, Manica and Nampula. The floods led to some serious malaria epidemics. The NMCP detected outbreaks using surveillance data from the health information system, sentinel posts, and the weather forecasting system. Timely and effective response to malaria epidemics in disaster zones includes retaining capacity for timely response to malaria epidemics and working with the National Disaster Management Institute (INGC) established in 2000, to coordinate national and

international support and the CENOE that responds to disasters. The response to malaria epidemics includes indoor residual spraying, distribution of LLINs, treatment of malaria cases, and active surveillance. There are no epidemic preparedness and response guidelines and plans at all levels.

Action Points

1) The NMCP should develop malaria epidemic preparedness and response guidelines and ensure development of EPR plans in identified districts
2) Strengthen collaboration with INAM and BES in the areas of prediction, forecasting and early detection of disasters and the resultant malaria epidemics.
3) Strengthen collaboration with INGC and CENOE with regard to the malaria epidemics arising from natural disasters including joint planning, coordination and pre-positioning emergency malaria control commodities.
4) Regularly update health staff responsible for disaster management living in potential 'disaster' zones, on malaria epidemic preparedness and response.

6) Malaria Diagnosis and Treatment

Malaria case management has improved in terms of adequate treatment policy, diagnosis and financial and human resources allocation. Malaria diagnosis and treatment is free of charge. Due to low access to health care by the majority of the population, malaria treatment is also provided through community agents. The NMCP has finalized implementation guidelines on treatment, diagnosis and supervision to be released early next year.

Mozambique has changed the drug policy three times in the last five years leading to poor adherence to treatment policy by health workers. Capacity to confirm all suspected malaria cases remains weak and quality control and quality assurance systems are still not functional. Therapeutic efficacy studies are still irregularly conducted. The weak supply management system has led to frequent stock outs of both medicines and RDTs. There are inadequate skilled human resources and inadequate training and supervision plans to refresh health providers. In addition, there are limited job aids for use at health centre level for decision making. Furthermore, the introduction of ACTs and RDTs at community level has led to increased demand and worsened stock-outs. Use of monotherapy is still predominant in the private sector although this is banned by the Ministry of Health.

Action points

1) Establish adequate training, retraining and supervision systems focused on frontline health workers to improve the quality of care
2) Strengthen supervision to ensure adherence to guidelines
3) Strengthen quality assurance and quality control systems for malaria diagnosis
4) Establish a timetable for regularly conducting drug efficacy tests

5) Establish two posts in the NMCP to enhance the capacity of case management within the NMCP: a laboratory focal point and a clinical services focal point.
6) MOH should ensure adherence by private practitioners to the monotherapy ban in collaboration with regulatory authorities.

7) Malaria in Pregnancy

Implementation of malaria in pregnancy (MIP) started in 2006 as part of the key intervention of ANC. IPTp and LLINs are the key prevention interventions. The proportion of pregnant women who slept under an LLIN the night before was 42% (INSIDA 2009). The proportion of pregnant women who received at least two doses of IPT increased from 20.3% (MIS 2007) to 64% in 2009. Frequent stock outs of SP and LLINs have seriously constrained MIP activities. Community misconceptions about adverse reactions due to SP and its effect on the child as well as reluctance by pregnant women to be seen at ANC by males or young girls has negatively affected uptake. Inadequate coordination with DRH, CMAM and other partners was noted.

Actions points

1) The NMCP should discuss with SIS to include indicators for malaria in pregnancy
2) Use the APE to promote MIP activities at community level aimed at encouraging pregnant women to attend ANC at the nearest health facility.
3) NMCP to lobby for inclusion of MIP in training curriculums of health institutions
4) Improve coordination between the NMCP, CMAM, Mother-Child Health (MCH) programme and partners on planning and budgeting supplies of SP and distribution of LLINs

8) Logistics, Procurement and Supply Management

CMAM maintains systems for procurement of drugs and other related commodities for malaria control. There is an emergency supply system for resolution of stock-outs and storage space at all levels. Anti-malarials are supplied to health facilities using a kit system and by ordering required supplies and then picking them up from the provincial stores. AL, due to its presentation in a blister form, is voluminous and does not fit within the PME KIT and is therefore transported separately. In order to improve the product and information management, the central and provincial levels systems have been computerised.

However, there are significant shortcomings with quantification method used for RDTs and guidance on the quantification and ordering of alternate antimalarials and pre-referral drugs. Although these commodities are used at community level, the current monitoring and evaluation systems do not track community implementation of the strategy.

Action points

1) Improve logistics and supply chain management systems for malaria commodities and tracking of these commodities by the NMCP

2) Provide guidelines on the ordering and quantification of the alternate anti-malarials both for treating uncomplicated malaria and severe malaria.
3) Improve coordination between the clinical and logistics areas for quantification of commodities based on data to avoid expiry/accumulated medicines or stock-outs.
4) To improve on submission of progress reports t ensure continued funding from the Global Fund by including the required indicators such as tests performed and resulting positives and treatments administered.

9) Surveillance, Monitoring and Evaluation and operational research

The NMCP has developed a draft Malaria Monitoring and Evaluation Plan in line with the draft National Malaria Strategic Plan 2010-2014 based on "The Three Ones". The NMCP has a Monitoring and Evaluation focal point supported by FHI while awaiting permanent recruitment of the M&E officer. Mozambique has two systems for collecting malaria morbidity and mortality data from health facilities. The BES has been designed to collect data on 11 priority diseases including malaria. It records out-patient cases and deaths from the health posts, health centers and districts hospitals. The information is then sent from the health post to the health center and to the district level before being sent to the provincial level where it is captured electronically and sent to the central level. The Health Information System (SIS) collects data on inpatient conditions at all rural hospitals, provincial hospitals and general hospitals in the country. It also collects management information including logistics and drug supplies on a monthly basis, however drug consumption data is not readily available. Mozambique has a few sentinel sites which collect information on morbidity and mortality due to malaria for monitoring of impact of malaria interventions. Mozambique also conducts community, facility surveys and other surveys on a regular basis for collection of coverage and delivery of care data information. Provincial malaria focal points are in place in all provinces for follow up of malaria control implementation including collection and use of malaria data. Other malaria information such as on IRS and LLINs is collected using the NMCP system..

The review noted that there is inadequate regular updating of malaria epidemiology using available data by district. It was also noted that there is capacity that can be used in malaria operational research in collaboration with the NMCP. The BES and SIS function in parallel and generate data of variable quality that is hardly used. Surveillance data are aggregated by province, not district nor health facility. There is weak linkage between the NMCP and research institutions resulting into limited operational research on malaria. In addition, there is no forum for research findings dissemination. At lower levels national guidelines are not available and feedback is inadequate. In general, data collection, analysis and use are inadequate resulting in data of variable quality, completeness and timeliness. Community level malaria control and treatment are expanding, however, data at this level is not captured by the NMCP.

Actions

1) NMCP needs to lead the coordination of malaria monitoring and evaluation efforts in the country. There is need to fill up the posts of monitoring and evaluation unit and retain them. Meanwhile, partners should complement the effort of NMCP in this transition period to ensure the activities of monitoring and evaluation.
2) Staff working in malaria control at national and provincial levels needs to be trained in surveillance, monitoring and evaluation including use of the data for decision making and supervision.
3) There is a need to define the operational research agenda, strengthen partnership with research institutions and establish a regular forum for dissemination of results for use as needed
4) Given the inadequacies of BES and SIS the NMCP needs to work with partners to establish a short term system for data collection, analysis and use while BES and SIS are being strengthened.
5) The NMCP needs to establish a malaria database at national and provincial levels which should be regularly shared with stakeholders.
6) Data reports should be sent disaggregated by health facilities from district to provincial level rather than consolidated.
7) NMCP should avail key guidelines to staff at lower levels in order to standardize procedures and analysis in M&E. There is need to design and implement Standard Operating Procedures for data collection, transmission, analysis and use. Find ways of transmission and use of community data in reporting and decision making.

V. Conclusion

The Mozambique National Malaria Control Programme has made good progress in implementing most malaria control interventions and achieving targets. Data from the routine surveillance systems and other sources indicate that morbidity and mortality is declining. This trend varies from one province to the other. This review concludes that Mozambique needs to strengthen its delivery of interventions in order to achieve universal coverage of all malaria interventions. In addition, there is need to improve data collection and use to inform programme decision making.

VI. Commitment

We, the Ministry of Health and partners, commit ourselves to the implementation of the action points recommended by this review and the scaling up of malaria control interventions for universal access and continued reduction of morbidity and mortality due to malaria in Mozambique.

Signed on behalf of the Government of Mozambique and Development Partners:

_____
Name
Minister
Ministry of Health

_____
Name
World Health Organization Representative
Mozambique

_____
Name
Director
USAID Mozambique

_____
UNICEF Representative
Mozambique Country Office

_____
Name
Head of the Health SWAP
Mozambique Health Donors Group

_____
Name
Director
World Bank Mozambique

In Maputo, Mozambique Friday 10th December 2010

Annex 6 MPR Tools

Checklist of People/Institutions seen

National Level

	Checklist	Details
1	N-One: Checklist for Top Ministry Officials	1) Principal Secretary 2) Director of Public Health 3) DPC (Planning and Cooperation Director)
2	N-Two: Checklist for Other Government Departments and Partners	1) IMCI 2) Rep Health 3) HMIS (BES and SIS) Environment
3	N-Three: Checklist for the Malaria Programme Manager	Dr Nurbai Calu
4	N-Four: Checklist for the National Malaria Entomologist	Maria Pondja
5	N-Five: Checklist for the National Malaria Case Management Focal Point	Dr Rosalia Mutemba
6	N-Six: Checklist for the Drug Regulatory Authority	Dr Tania Sitole
7	N-Seven: Checklist for the National Public Health Laboratory/Laboratory Focal Persons	
8	N-Eight: Checklist for the Central Medical Stores (CMS)	Dr Noemia Muissa
9	N-Nine: Checklist for the Epidemic Preparedness and Response Focal Point	Teotonio Fumo
10	N-Ten: Checklist for the Health Education and Promotion Focal Point	Sergio Tsabete
11	N-Eleven: Checklist for the Surveillance, Monitoring and Evaluation Focal Point	Teotonio Fumo

Regional/Provincial Level

	Checklist	Details
1	Provincial/Regional Health Team	

District Level

	Checklist	Details
1	District Health Management Team	

Hospitals and other health facilities

	Checklist	Details
1	DPH-One: Checklist for the Hospital Management Team	
2	DPH -Two: Checklist for the Hospital Out Patient Department (OPD)	
3	DPH -Three: Checklist for Antenatal Care Clinic (ANC)	
4	DPH -Four: Checklist for In-Patient Wards (both Adult and Paediatric)	

5	DPH -Five: Checklist for Maternity Ward	
6	DPH -Six: Checklist for the Laboratory	
7	DPH -Seven: Checklist for Pharmacy	
8	DPH -Eight: Checklist for Clinics and Health Posts	

Community Level

	Checklist	**Details**
1	Focus Group Discussion (community level)	