



Republic of Zambia  
MINISTRY OF HEALTH  
National Malaria Control Centre

ZAMBIA NATIONAL MALARIA PROGRAM  
**PERFORMANCE REVIEW 2010**  
(MPR-ZAMBIA 2010)



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## ACRONYMS AND ABBREVIATIONS

ACT	Artemisinin-based Combination Therapy
ANC	Antenatal Care
DMMU	Disaster Management and Mitigation Unit
KAP	Knowledge, Attitudes and Practices
BCC	Behaviour Change Communication
CBMPCP	Community Based Malaria Prevention and Control Programme
CBoH	Central Board of Health
CHAZ	Churches Health Association of Zambia
CHW	Community Health Workers
COMBOR	Community Malaria Booster Response
CSO	Civil Society Organization
DDT	Dichlorodiphenyltrichloroethane
DHO	District Health Office
DHS	Demographic and Health Survey
ECZ	Environmental Council of Zambia
EHT	Environmental Health Technologist/Technician
EPR	Epidemic Preparedness and Response
FNDP	Fifth National Development Plan
GFATM	Global Fund to Fight AIDS, Tuberculosis, and Malaria
GRZ	Government of the Republic of Zambia
HMIS	Health Management Information System
HMM	Home Management of Malaria Programme
HQ	Headquarters
HRH	Human Resources for Health
HRHSP	Human Resources for Health Strategic Plan
HSSP	Health Services and Systems Program
IDSR	Integrated Disease Surveillance and Response
IEC	Information, Education, and Communication
IPTp	Intermittent Preventive Treatment in Pregnancy
IRS	Indoor Residual Spraying
ITN	Insecticide-treated Net
KAP	Knowledge, Attitudes, and Practice
LCMS	Living Conditions and Monitoring Survey
LMIS	Logistics Management Information System
LMU	Logistics Management Unit
M&E	Monitoring and Evaluation
MDGs	Millennium Development Goals
MOH	Ministry of Health
MSL	Medical Stores Limited
MTEF	Medium-term Expenditure Framework

NDP	National Development Plan
NGO	Non-governmental Organization
NHC	Neighbourhood Health Committee
NHSP	National Health Strategic Plan
NMCC	National Malaria Control Centre
NMCP	National Malaria Control Programme
NMSP	National Malaria Strategic Plan
OPD	Out- Patient Department
PHO	Provincial Health Office
PMI	President's Malaria Initiative
PSU	Procurement Supplies Unit
PV	Pharmacovigilance
RBM	Roll Back Malaria
SADC	Southern Africa Development Community
SAG	Sector Advisory Group
SP	Sulfadoxine-pyrimethamine
STGs	Standard Treatment Guidelines
SWAp	Sector-wide Approach
SWOT	Strengths, Weakness, Opportunities, and Threats
TDRC	Tropical Diseases Research Centre
TWG	Technical Working Group
U5	Children Under the Age of Five Years.
UNHCR	Office of the United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
UNZA	University of Zambia
USAID	United States Agency for International Development
WHO	World Health Organization
ZMK	Zambian Kwacha

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## FOREWORD



Malaria has for a long time remained the leading cause of morbidity and mortality in Zambia. However, recent statistics suggest that, whilst on one hand malaria is still the leading cause of morbidity, on the

other hand, it has moved down to be the second leading cause of mortality, surpassed only by HIV and AIDS. Malaria is endemic throughout the country, with minor seasonal and geographic variations. In 2008, a total of 3.2 million cases of malaria (confirmed and unconfirmed) were reported countrywide, with 3,871 deaths. Malaria accounts for up to 40% of all infant mortality and 20% of all maternal mortality in Zambia, and represents a major socio-economic burden on the country, particularly on the communities living in malaria endemic areas (MOH Annual Report, 2008).

Our vision is “A Malaria-Free Zambia.” In pursuit of this vision, we are committed to successfully combating and eliminating malaria throughout the country, and attaining the national, regional, and global objectives and targets on malaria, particularly Millennium Development Goal Number 4 (MDG-4), the Roll Back Malaria (RBM) targets, and the targets set out in the Southern African Development Community (SADC) Malaria Strategic Plan. In this regard, as a country, we have prioritised malaria in the national socio-economic development agenda, particularly in the National Health Strategic Plans (NHSPs) and National Development Plans (NDPs). We have also developed a comprehensive National Malaria Strategic Plan for 2006 to 2010 (NMSP 2006/10), to provide for a coordinated approach to the fight against malaria.

Over the past 5 to 10 years, we have significantly intensified our efforts against malaria by initiating and scaling up the implementation of internationally accepted strategies and best practices for prevention, treatment, and care for malaria. These include: vector control, through indoor residual spraying (IRS) and the promotion of ownership and correct use of insecticide-treated bed nets (ITNs); intermittent preventive treatment in pregnancy (IPTp); prompt and effective malaria case management; Coartem<sup>®</sup> use; and the introduction and scaling up of Rapid Diagnostic Tests (RDTs) in health facilities that do not have microscopy services.

We believe in harnessing, harmonisation and coordination of all the available resources, to maximize the benefits from synergies. In this respect, we have successfully established strong partnerships with the communities, other government line ministries and departments, the faith-based health sector under the coordination of the Churches Health Association of Zambia (CHAZ), the private sector, civil society, and the global community. Strong, effective, and coordinated partnerships have been established with the global community, through the RBM Partnerships, leading to significant technical, financial, and logistical support.

In this respect, I wish to acknowledge, with thanks, the strong support that we have continued to receive from all our cooperating partners, particularly, the World Health Organisation (WHO), the United Nations Children's Fund (UNICEF), the World Bank, the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM), the President's Malaria Initiative (PMI), and the Malaria Control and Evaluation Partnership in Africa (MACEPA), a programme at PATH.



These partnerships have resulted in significant leveraging of technical, material, and financial resources, which have significantly impacted on the malaria burden.

The Zambia National Malaria Programme Review 2010 (MPR 2010) therefore presented us with a unique opportunity to review the appropriateness, implementation, and performance of our various anti-malaria strategies against the national, regional, and global targets for malaria. It also presented an opportunity to establish and confirm the recent trends in malaria epidemiology and to draw appropriate lessons and conclusions, which would influence the policy and strategic directions for the fight against malaria. We are therefore pleased that the MPR 2010 has indeed lived up to these expectations and has made encouraging conclusions and recommendations, which have strengthened our optimism that, with more targeted efforts, our long term vision of “A Malaria-Free Zambia” can soon be a reality.

Indeed we have successfully started to reverse malaria in the country. However, we are mindful of the fact that we are still far from achieving our cherished national vision.

We therefore need to further strengthen our joint and collaborative efforts to ensure continued appropriate, consistent, effective, and efficient responses, based on the available evidence, so as to remain on course. We are confident that, together, we shall fight and conquer malaria and save our people and the country from the devastating socio-economic consequences of this disease.

I wish to end by thanking you all, for finding time to read this report and to commend all those who contributed to the achievements made in the fight against malaria. I also wish to thank all the local and external reviewers, and the partners who contributed to making this MPR a major success. I sincerely hope that this report will present you with a comprehensive update on the malaria situation in the country and appropriate, evidence-based options on the way forward.

God bless you all.



**Honourable Kapembwa Simbao, MP**  
**MINISTER OF HEALTH**

## ACKNOWLEDGEMENTS



It is with great pleasure that I wish to acknowledge that the MPR 2010 has come to a successful conclusion. It is my considered view that this process was well-planned and coordinated,

making it one of the major successes in our calendar of important events for this year, within the health sector. The process has culminated with this report, which presents a comprehensive evidence-based review of the performance of our national malaria programme and appropriate conclusions and recommendations, which are expected to significantly influence our national policy and strategic directions in the fight against malaria.

I also wish to acknowledge that this success has been made possible due to the significant commitment and support from various partners, including individuals and institutions, who contributed to this process through technical, material, financial, and logistical support. I therefore wish to commend all those who contributed to making this process a success. In particular, I wish to acknowledge, with thanks, the following partners, for their active participation and support to this process:

- Cooperating partners and civil society organizations (CSOs), who provided technical, financial, and logistical support and actively participated in this process, through the following representatives: Dr Fred Masaninga, National Programme Officer (NPO) for Malaria at WHO Zambia, who provided valuable technical support and played a pivotal role on this project; Dr Rodgers K. Mwale, UNICEF Zambia; Dr Allen Craig and Dr Oliver Lulembo, United States Agency for International Development (USAID)/President's Malaria Initiative (PMI); Dr Boniface Mutombo, John Miller and Todd Jennings, MACEPA/PATH, Zambia Office; Boniface M. Chiluba and his team from the Churches Health Association of Zambia (CHAZ); Masela Chinyama, Malaria Consortium; Felton Mpasela, Society for Family Health (SFH); and Rabson Zyambo, USAID/Deliver Project.
- Government ministries and departments, represented by: Overseas A. Mwangase, Meteorological Department; Cecilia Shinondo, University of Zambia (UNZA) School of Medicine; Victor Chalwe, Tropical Diseases Research Centre (TDRC); and Morden Mayembe, Zambia National Information Services (ZANIS).
- Members of the external review team and their respective institutions, led by Dr Kalu Akpaka, WHO Kenya, for their participation and technical leadership. The team included Dr Rick Steketee, MACEPA; Dr Rory Nefdt, UNICEF/ESARO Nairobi; Dr C. Paluku, WHO IST/ESA Zimbabwe; S. Kunene, National Malaria Control Programme (NMCP) Swaziland; C. Misereti NMCP Ethiopia; and Kentse Moakoafhi, NMCP Botswana.
- The local review team, led by Alex Nondo Chikwese, a local consultant who played the role of MPR Coordinator.



The reviewers were drawn from the Ministry of Health (MOH)/ National Malaria Control Centre (NMCC), other government ministries and departments, CHAZ, Cooperating partners, and the civil society.

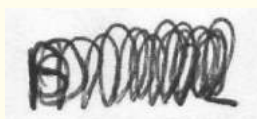
- The editing team at PATH, Seattle Office, USA: Cristina Herdman, Laura Newman and Manny Lewis.

Finally, I wish to congratulate the Directorate of Public Health and Research at the MOH, particularly the NMCC, for this major achievement. Special acknowledgements to Dr Victor Mukonka, Director of Public Health and Research; Dr Mulakwa Kamuliwo; Deputy Director of Public Health and Research responsible for coordinating the NMCC; and the entire management and staff of the NMCC, for initiating and championing this process. Particular thanks to Pauline Wamulume, Principal Information Education Officer; Busiku Hamainza, Principal Operations Research Officer; Chadwick Sikaala, Principal Indoor Residual Spraying (IRS) Officer; Cecilia Katebe, Principal

Insecticide-Treated Nets (ITN) Officer; Wambinji Kapelwa, Ag. Chief Entomologist and Epidemiologist; Mercy Mwanza Ingwe, Surveillance and Information Officer; Hawela B. Moonga, Chief Parasitologist; Isaac Mwase, Monitoring and Evaluation (M&E) Officer; David Chabala Katulwende, Research Assistant; Pascalina Kapata, PSRO MOH; Makomani Siyanga, Pharmacy Regulation Authority (PRA); and several other officials from MOH/NMCC who supported this process.

A complete listing of the individuals and institutions who actively participated in the MPR process is provided in Annex 1.

Once again, I thank you all and commend you for a job well done.



**Dr. Peter Mwaba**  
**PERMANENT SECRETARY**  
**MINISTRY OF HEALTH**

## EXECUTIVE SUMMARY

### A. Introduction

In Zambia, malaria is a major public health problem, with significant socio-economic consequences at household, community, and national levels. The national vision is to be “malaria-free” by 2030.

Over the past 5 to 10 years, the country, together with its partners, including the local communities, the Churches Health Association of Zambia (CHAZ), the private sector, the civil society and the global community, have significantly strengthened and scaled up appropriate interventions against malaria. These efforts are guided by a comprehensive National Malaria Strategic Plan for 2006 to 2010 (NMSP 200610), which is integrated into, and forms part of the National Health Strategic Plan for 2006 to 2010 (NHSP 200610), the Fifth National Development Plan for 2006 to 2010 (FNDP), and the national Vision 2030. As a result of these efforts, significant achievements have been reported, highlighting trends towards major reductions in the malaria burden across the country.

In 2010, the Zambian government, through the Ministry of Health (MOH), and in collaboration with its main partners, successfully conducted an in-depth Malaria Programme Review (MPR). The decision to conduct this review was made in the context of the observed decline in malaria transmission and disease burden, variations in parasite prevalence across the country, improving coverage of interventions, and the global drive to achieve universal coverage for populations at risk with malaria control interventions by 2010. The other reason for conducting the MPR was the fact that the existing malaria strategic plan ended in December 2010, hence the need to conduct a comprehensive review of the performance of

the programme, to inform and feed into the malaria policy and strategic directions.

This report presents the background, objectives, methodology, findings, and recommendations of the MPR for Zambia, conducted in 2010. The report is accompanied by an Aide Memoire summarizing the MPR process, main findings, recommendations, and the commitments and action points for the malaria partners.

### B. Purpose And Objectives

The MPR is a periodic joint programme management process for reviewing progress and performance of country programmes within the national health and development agenda, with the aim of refining or redefining the strategic direction and focus, to improve performance.

In this respect, the main objective of the review was to assess the performance of the current malaria strategies and activities in Zambia, in order to feed into and influence the process of strengthening the malaria control programme and health systems used in the delivery of malaria control services.

### C. Methodology and Approach

The MPR was organized in four phases: (1) consultations with partners to agree on the need and scope of the review and development of implementation plan; (2) desk reviews, leading to the production of the thematic reports across the spectrum of activities in Zambia's malaria control work; (3) central level consultations with senior management at the MOH, the National Malaria Control Centre (NMCC), representatives of partner agencies, and other main stakeholders.

This phase also included field visits to provinces and districts to validate the findings of the desk reviews and preparation of the draft version of this MPR report; and (4) finalization of the MPR report and will also involve follow-ups on the implementation of the recommendations the report.

The MPR was structured and coordinated in a manner that promoted broad participation of all the main stakeholders, at different levels. It also involved the participation of external reviewers, who were drawn from the WHO Kenya and Zimbabwe, UNICEF regional office in Kenya, MACEPA, and the national malaria control programmes of Swaziland, Ethiopia, and Botswana.

## D. Main Findings

### D.1 Progress in Malaria Control in Zambia

Over the last decade, there has been remarkable documented progress in malaria control in Zambia. All parts of the country are reported to have benefitted from these reductions in malaria burden, with some areas benefitting more than others. Many lives have been saved, illnesses and infections prevented, and social and economic benefits have accrued. Compared to neighbouring and other African countries, Zambia has been a leader in achieving high coverage with effective interventions, and demonstrating progress

### D.2 Malaria Epidemiology

In the past, malaria was broadly endemic across Zambia and its transmission, illness, and mortality were determined by existing climatic, geographic, and biological features of the vectors, humans, and parasites. However, over the last decade, particularly the last five years, the malaria control programme work has re-engineered Zambia's malaria epidemiology.

Emerging evidence from routine information systems, national surveys, and focused studies consistently show declining malaria trends, with possible epidemiological transition in some parts of the country.

Based on this evidence, Zambia can be stratified into three malaria epidemiological zones,

- **Zone 1:** areas where malaria control has markedly reduced transmission and parasite prevalence is <1% (Lusaka city and environs).
- **Zone 2:** areas where sustained malaria prevention and control has markedly reduced transmission and parasite prevalence is at or under ~10% in young children at the peak of transmission (Central, Copperbelt, North-Western, Southern, and Western Provinces).
- **Zone 3:** areas where progress in malaria control has been attained, but not sustained and lapses in prevention coverage have led to resurgence of infection and illness, and parasite prevalence in young children exceeds 20% at the peak of the transmission season (Eastern, Luapula, and Northern Provinces).

The organizational strength and progress in malaria control in Zambia is most evident at the national level and there is a consensus that extension of support, capacity strengthening, and hard work at provincial, district, community, and household levels will be a critical requirement for progress in the coming years. The plans for this movement towards strengthening provincial, district, and community support will need to address the three different epidemiologic settings, highlighted above, with differing transmission intensity and prevention coverage.

The challenge of achieving “a malaria-free



Zambia” is to incrementally expand the current progress to attain malaria-free areas within the country through focused and targeted scaled up actions in all epidemiological zones.

### **D.3 Malaria Programme Management, Policies, and Strategies**

Malaria control is a national priority. The National Malaria Control Programme (NMCP) is strategically placed within the Directorate of Public Health and Research at the MOH. It has a well-established national coordinating body, the NMCC, with technical Working Groups providing planning and implementation technical support in specific thematic areas. The programme has a number of steady and long term partners who provide technical assistance and funding for malaria interventions.

Zambia has put in place strong policies and strategies for malaria control, which are consistent and coordinated. These include a comprehensive strategic plan for 2006 to 2010, policy guidance for the key interventions and support services, including, information, education, and communication and behaviour change communication (IEC-BCC), monitoring and evaluation (M&E), and budgeted annual work plans. There is wide recognition and appreciation of the progress that has been made to date, the accomplishments of the NMCP in engaging partners, and the progress with donor partners in resourcing the tools and commodities. A new costed Malaria Strategic Plan for 2011 to 2015 (NMSP 2011-15) is being developed to support the new vision of “A malaria-free Zambia.”

The conclusion of the MPR is that the MOH/NMCP and its partners at provincial, district, and community levels currently lack adequate human resource capacity to fulfill its mandate. At the national programme level,

there is the need to assess and fill the human resources gaps, and to undertake planning, procurement, logistics, training, and technical support to peripheral levels. At provincial and district levels, there are either only part-time designated malaria focal point persons to coordinate activities are none at all.

The distribution system for malaria commodities is imperfect, but has grown in capacity and sophistication, and now suffers most from the intermittent external supply of commodities leading to frequent stock-outs of nearly all commodities. Budgetary allocations from the government are also inadequate to cover the financing needs for malaria control interventions, and there is heavy reliance on donor partner support.

Taken together, these weaknesses hamper full implementation of malaria control activities.

## **D.4 Malaria Intervention Tools**

### **D.4.1 Malaria Diagnosis**

With improved malaria control in Zambia, universal coverage of malaria diagnosis, using rapid diagnostic test (RDT) kits and quality slide microscopy has become a critical need. This is both for the purpose of directing the identification of illnesses that are due to malaria or not, so that they can be treated properly (care and treatment), as well as for identifying malaria infection, so that surveillance and response can accurately track transmission, contain it, and chart progress (surveillance and transmission containment).

While “diagnosis and treatment” are typically linked in the language of malaria control, it is emphasized here that Zambia is now in a position where universal diagnosis is both possible and needed, in order to progress in the next steps in malaria control.

### **D.4.2 Malaria Treatment**

In 2003, due to the emergence of chloroquine resistant malaria, the country changed its first-line treatment for uncomplicated malaria from chloroquine to artemisinin-based combination therapy (ACT; artemether-lumefantrine AL or Coartem®). Since then, guidelines on case management have been developed and most of the health workers have been trained in the new treatment protocol. However, both the access to diagnostics and coverage of ACT for management of malaria are still too low in the country. By the 2009/2010 transmission season, the majority of children in Zambia with malaria symptoms who were treated with an anti-malarial drug, received AL. However, the lack of universal diagnosis and stock-outs in artemisinin-based combination therapy (ACTs) have led to confusion about full progress towards achieving targets in proper and prompt management of malaria.

#### **D.4.3 Prevention of Malaria in Pregnancy**

The malaria control programme has developed a well-defined Malaria in Pregnancy (MIP) policy, which includes the provision of free intermittent preventive treatment in pregnancy (IPTp), with at least two doses of sulfadoxine-pyrimethamine (SP) during pregnancy; free insecticide-treated mosquito nets (ITNs); and prompt diagnosis and free treatment of clinical disease. This malaria control package is implemented as part of routine antenatal care (ANC).

The current high ANC attendance in the country and a long-standing consistent policy have resulted in high uptake of IPTp, which currently stands at 86% for the first dose (IPTp I) and 69% for the second dose (IPTp II). Use of ITNs among pregnant women currently stands at 46%, up from 2% in 2002.

While this progress should be celebrated, further discussions with the Integrated Reproductive Health programme are needed

to identify the factors that can fill the remaining gaps to exceed targets for full IPTp coverage and ITN use.

#### **D.4.4 Vector Control**

The main interventions for vector control in Zambia are the use of ITNs (specifically long-lasting ITNs, or LLINs) and indoor residual spraying (IRS). The ITN policy initially targeted young children and pregnant women but has since been extended to covering sleeping spaces in all households to fully address transmission reduction using two main distribution methods: district-wide distribution and an ANC-based malaria in pregnancy ITN scheme, with both methods distributing free nets. As a result of these efforts, 64% of households in Zambia own at least one ITN, though this varies by region, ranging from 75% in Western Province to 57% in Luapula Province. IRS has been successfully implemented in 36 districts up to 2009, and 54 districts in the 2010/2011 transmission season, with the continued goal of attaining operational coverage of over 90% of the targeted structures.

Across Zambia, 73% of households reported either owning an ITN or having had their houses sprayed this past year. From studies conducted from 2003 to 2004, malaria vectors were documented to be fully susceptible to the insecticides used for vector control in Zambia. However, recent focused studies have raised concerns that insecticide resistance may be appearing and this is being investigated further.

#### **D.4.5 Advocacy, Communication And Social Mobilization**

Advocacy and communication has created demand for malaria control interventions and utilization of services. However, advocacy and communication activities for behaviour change have not been able to reach all populations in need.

The emphasis of full coverage interventions

and the continued scale up of ITNs to all household members and IRS to an increasing number of districts, the need to extend effective communication to all sectors of society has increased. The launch and roll-out of the directed malaria control based on epidemiologic characteristics and the emphasis on community engagement is an opportunity of effectively implementing community-based advocacy and communication for behaviour change. The major challenge to this will be the lack of a clear policy on the coordination of advocacy and communication activities at provincial and district levels.

#### **D.4.6 Surveillance, Monitoring and Evaluation, and Operations Research**

The MOH/NMCC, together with partners, have developed a comprehensive surveillance, and M&E plan that is in line with the national malaria strategic plan. The integration of malaria indicators into population-based national surveys and the health management information system (HMIS) has allowed for tracking of disease control progress over the last decade. In 2009, the HMIS was revised (now called the District Health Information System, DHIS) and includes additional relevant malaria information and has strengthened routine data collection, use, and dissemination. Zambia has substantial data on programme progress and the current epidemiologic situation, and publishes an informative quarterly M&E newsletter.

However, information weaknesses still persist at district and community levels. Operations research activities have been undertaken by MOH staff, in-country research institutions, and academic and operational partners.

The main programme challenges in operational research include the lack of a

forum for dissemination and appropriate uptake of operational research findings.

Epidemic preparedness and response (EPR) has been an element of the malaria strategy in Zambia. However, with the improvements in malaria control and the planning for stronger surveillance and response, Zambia is moving to a place where each case requires a response. Thus, the EPR work should join with the spectrum of surveillance and M&E processes in districts and communities.

#### **D.5 Governance and Sustainability**

The growing experience with malaria control scale-up in Zambia and elsewhere has demonstrated that strong national leadership is critical to success, and that a solid and predictable resource base is absolutely required for effective planning and programme action.

Recent concerns in Zambia, regarding financial management within the health sector have led to the suspension of some external funding, beginning from 2009. Commodity availability including ITNs, rapid diagnostic tests (RDTs), and ACTs, in particular, has been affected. In addition, the Malaria Indicator Survey (MIS) 2010 shows substantial drops in household ownership and use of ITNs in several provinces (especially Luapula and Northern Province), and the resultant resurgence of malaria infection rates, cases, and hospitalizations (and probably deaths). This now includes a growing gap in vector control coverage in advance of the coming transmission season.

There is an urgent need to resolve the issues and revert to strong partnership resourcing in malaria control in Zambia in order to take the next critical steps in sustaining impact and advancing on further transmission reductions. The MPR team recognizes that this is being addressed.

In the near term (for the coming transmission



season), the MOH and cooperating partners should urgently seek ways to ensure that prevention gains achieved over the past years are not lost. In the longer term, serious discussions on mechanisms for sustained resourcing must be held so that the malaria control impact remains and additional gains can be achieved. Such discussions should be based on reviewing full financing needs for universal prevention coverage and for the actions to be proposed in the NMSP 2011/2015.

## E. Key Recommendations

In line with the main findings discussed above, the following strategic directions are recommended for the Zambia NMCP for the next five years:

- i) Develop, update, and assemble relevant strategic documents for malaria control in Zambia, including any relevant policy reviews and the development of NMSP 2011/15.
- ii) Scale up and direct interventions based on current epidemiological evidence of three malaria transmission zones in the country.
- iii) Strengthen malaria surveillance and response as an active effort to reduce transmission, to address the epidemiological differences across the country, and to utilize the evidence for

ongoing refinement of policy and strategy.

- iv) Establish and maintain malaria-free communities in low transmission zones.
- v) Build and extend malaria control operational strengths at provincial, district, and community levels, in line with national policies on decentralized programmes.
- vi) Strengthen partnerships and performance management to address human and financial resource needs, commodity requirements, and programme action.

## F. Conclusions

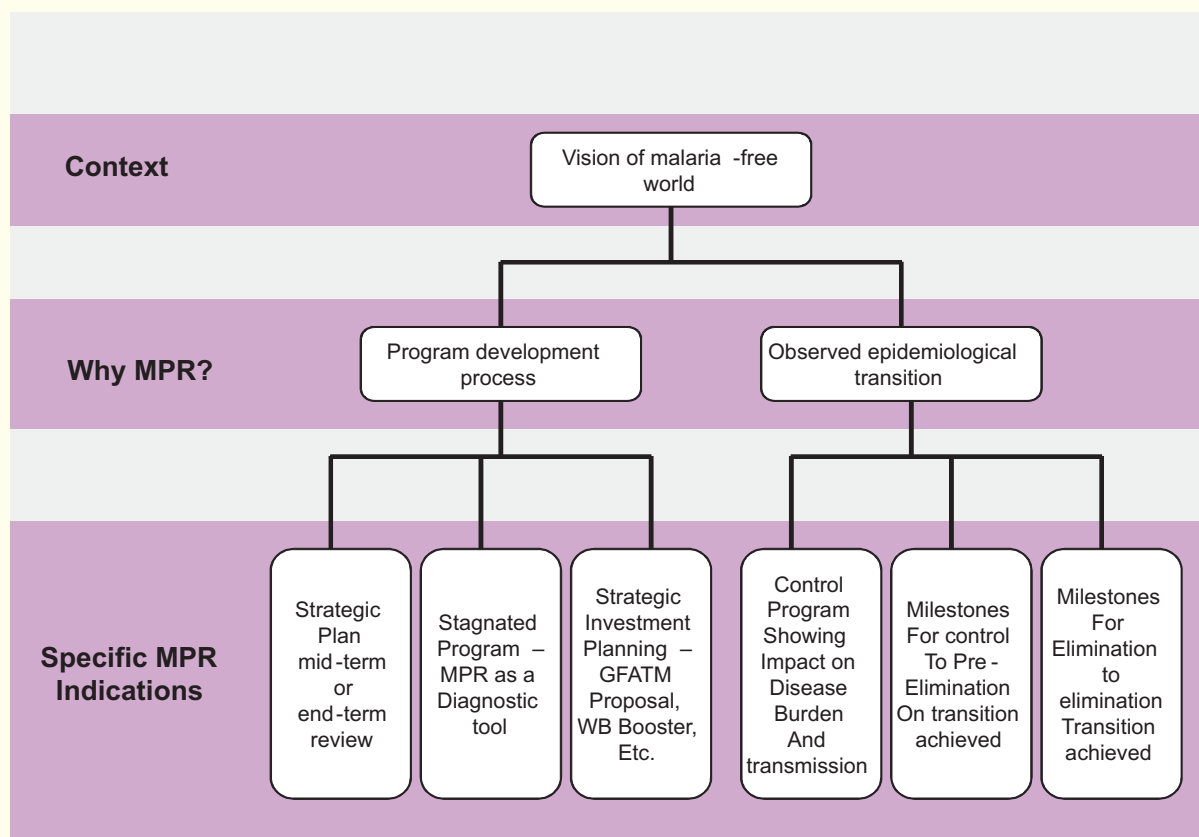
The Zambia National Malaria Programme has achieved remarkable progress in the past five years. The MPR 2010 provided important findings regarding the changing epidemiology of malaria, the policy and programming framework, and performance and progress in the delivery of the key technical and supportive interventions which are expected to positively contribute to the malaria policy and strategic directions. Implementation of the recommendations of the review will place Zambia firmly on the path to a malaria-free future.

## 1.1 Background

### 1.1.2 Justifications for the MPR

Justifications for an MPR differ from country to country, based on the status of performance of the respective national malaria control programme, and the level of success in respect of the key outcomes and impact. In the case of Zambia, the MPR was justified by the need for a better understanding of the emerging performance trends, in order to establish the status of implementation of the NMCP, and appropriately refocus the strategic direction and future investment. Figure 1 below illustrates the logical framework of the main programmatic and epidemiological reasons that could prompt an MPR.

**Figure 1. Indications for MPR**



Programmatically, the current Zambia National Malaria Strategic Plan (NMSP 2006-10) is ending in December 2010. At the same time, the life span of the National Health Strategic Plan (NHSP 2006-10) and Fifth National Development Plan (FNDP), for the period from 2006 to 2010, are about to come to an end. Thus, there is ongoing work on the review and development of the subsequent national health strategic plan and national development plan for the period from 2011 to 2015. In this respect, the need to develop a new national malaria control strategy, based on evidence, justified the launch of the Zambia MPR 2010, which will provide critical inputs into the strategic planning process.

The other major factor which prompted the need for the MPR was the observed changes in malaria epidemiology in Zambia. There is an ongoing epidemiological transition in the country, as evidenced by the decline in malaria incidence by 39% between 2006 and 2008, and a more than 60% decline in in-patient malaria cases between 2001 and 2008, in both the under-5, and 5-to-15 year age groups. Parasite prevalence among children under-five in Zambia declined from 22% in 2006 to 16% in 2010, with the country split into three epidemiological zones:

- North/Eastern high transmission zone (Eastern Province, 22.6%; Northern Province, 24.3%; Luapula Province, 53.5%).
- North-Western/South-Central low stable transmission zone (Western province, 5.8%; North Western Province, 7.8%; Southern province, 5.7%; Central Province, 11.2%; Copperbelt Province, 13.1%).
- South-Eastern low to nil transmission zone (Lusaka Province, 0.4%).

Concurrent to the reduction in malaria

parasite prevalence across the country was the reduction in anaemia prevalence from 15.8% in 2006 to 9.8% in 2010, with the provincial distribution mirroring the malaria prevalence patterns. There are even suggestions that malaria control may have substantially contributed to the decline in under-five mortality rate, which dropped from 168 per 1000 live births in 2002 to 119 in 2007.

These developments necessitated the need to carry out an MPR, so as to facilitate better understanding of the emerging performance trends, to establish the phase of development of the NMP in Zambia and appropriately refocus the strategic direction and future investment.

## 1.2 Objectives of the Malaria Programme Review

The main objective of the MPR was to engender stakeholder dialogue around malaria control policies, strategies, and systems, with the aim of enhancing national ownership and leadership, aligning the actions of all stakeholders to jointly defined national priorities, and harmonizing the operations of all stakeholders for a result-based, mutually accountable national malaria control programme.

The specific objectives were:

- Review malaria epidemiology.
- Review the policy and programming frameworks, organization and management structures, and capacities for national malaria control, within the context of the health system and the national development agenda. Assess progress made towards achievement of national, regional, and global targets, particularly the Roll Back Malaria (RBM) targets and Millennium Development Goal number 6 (MDG-6).



- Review the current programme service delivery systems, performance, achievements, and challenges, by intervention in thematic areas and by service delivery levels.
- Define the steps to redefine the strategic direction and focus, including revision of policies and strategic plan, in order to improve programme performance.

### 1.3 Methodology of The MPR

The review process was conducted during the period from January to September 2010, and represented a broad-based evaluation of the NMP, based on the MPR methodology

recommended by WHO, which included participation of the key stakeholders and external reviewers. In this respect, the key stakeholders included relevant line ministries and government departments, the private sector, cooperating partners and civil society organizations (CSOs).

The review process included adaptation of the tools for data collection and field visits, data collection, desk reviews, field visits, preparation and presentation of the findings and recommendations to the key stakeholders, and the preparation and submission of this final report. In this respect, the review was conducted through the following four stages:

PHASE	KEY ACTIVITIES	DURATION 2010
Phase 1	Planning, consultations, and preparations for the MPR	Jan-Feb
Phase 2	Thematic desk reviews	March-July
Phase 3	Field reviews and observations, presentation of findings	August
Phase 4	Final report and follow-ups on recommendations	September

<sup>1</sup> MDG-6: To halt by 2015 and begin to reverse the incidence of malaria and other major diseases .

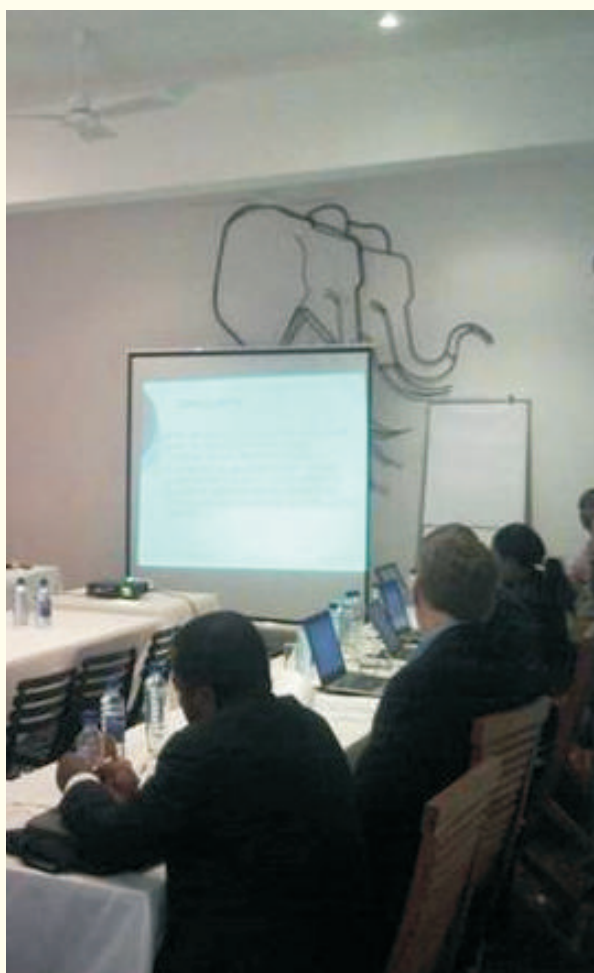
## Phase 1: Planning, Consultations, and Preparations

This phase included the following main activities: building capacity for the MPR, including establishment of the secretariat, task team, and appointment of the MPR coordinator; defining MPR objectives and work plan; selecting national, provincial, and district sites for field work; identification of internal and external reviewers, and seeking confirmations of their participation; development of terms of reference for the reviewers; development of a costed MPR plan and proposal; and planning and mobilization of the required resources and logistics.

## Phase 2: Thematic Desk Reviews

Phase 2 involved conducting desk reviews covering all the thematic areas, including: programme management; vector control, which includes insecticide-treated nets (ITNs) and indoor residual spraying (IRS); malaria case management and malaria in pregnancy (MIP); epidemic preparedness; procurement and commodities management; advocacy and information, education, and communication (IEC) and social mobilization; and monitoring and evaluation (M&E), surveillance, epidemiology and operations research. The second part of this phase involved the participation of external reviewers, who provided technical guidance and an independent review of the thematic reports. These external reviewers included those drawn from WHO Kenya, WHO IST/ESA Zimbabwe, UNICEF/ESARO, MACEPA-PATH, and the National Malaria Control Programmes (NMCPs) of Swaziland, Ethiopia, and Botswana.

The outputs of this phase included the draft thematic reports, reviewed by the external reviewers, copies of reference materials used, and checklists of identified gaps, to be filled



during the field visits and central level interviews with key stakeholders. The thematic reports were guided by a standard MPR reporting format. The main documents, which were used in this process and formed the evidence base, included: policy, legislative, strategic and operational plans, progress and past review reports, and M&E documents, at national and programme levels.

They also included regional and global policy and strategic frameworks on malaria, including the RBM and MDGs, the Abuja Declaration on Health of 2000, and the Southern Africa Development Community (SADC) Malaria Strategic Plan.



### Phase 3: Field Reviews and Observations

Following the completion of the desk review sessions, the review team, comprised of local and external reviewers, was sub-divided into the following groups for field visits.

**Central level review team:** This team conducted central level interviews with key stakeholders, including: MOH and other Government Ministries and departments; NMP managers and focal point persons; Churches Health Association of Zambia (CHAZ); Civil Society Organisations (CSOs) involved in supporting the NMP; cooperating partners and other identified stakeholders.

**Provincial level field review teams:** which were each assigned a province to visit, as follows:

- Copperbelt Province (Chingola District);
- Eastern Province (Katete District);
- Luapula Province (Mansa District); and
- Southern Province (Kazungula District).

Each of these teams included at least one external reviewer, who provided technical leadership.

The selection of field sites was based on the following criteria: areas of high, moderate, and low malaria incidence levels; and good, moderate, and poor performing areas. The classification of these provinces and districts is presented in Table 1.

#### Field Visits

##### Southern Province



##### Copper Belt Province



##### Luapula Province



##### Eastern Province





**Table 1: Classification of the provinces and districts selected for field visits**

S/N	Province/District	Prevalence	Performance
1.	Copperbelt Province (Chingola District)	Moderate	Good
2.	Eastern Province (Katete District)	High	Moderate
3.	Luapula Province (Mansa District)	High	Poor
4.	Southern Province (Kazungula District)	Low	Good

The main focus of the visits was to observe the performance of the malaria control programme at provincial, district, facility, and community levels through meetings and interviews with the structures responsible for policy, regulation, implementation, and M&E.

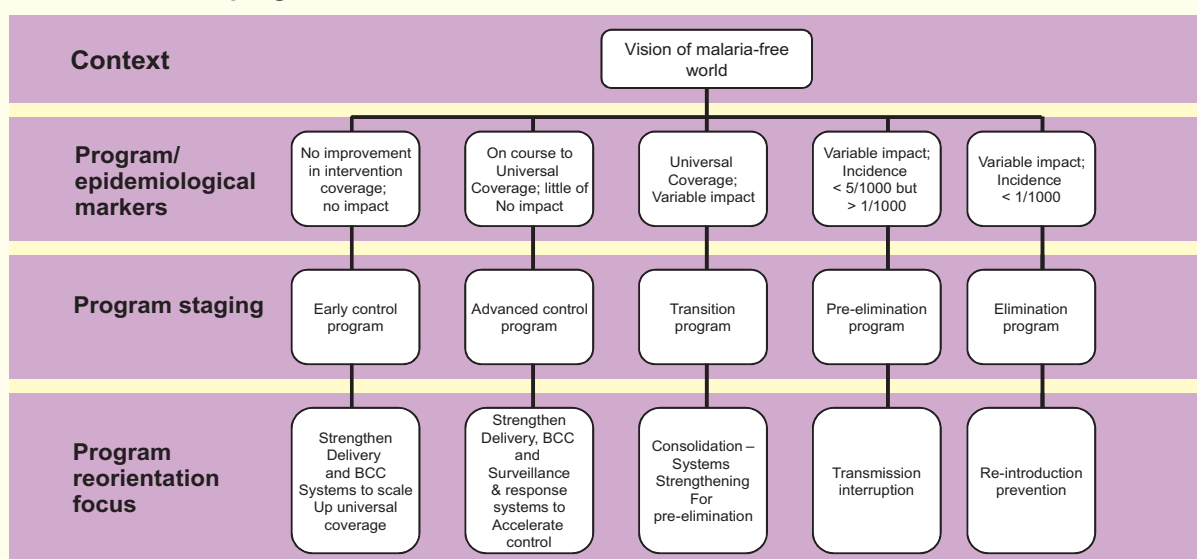
These included MOH, CHAZ, private sector, communities, partners, and the civil society. The other purpose of the field visits was to obtain the information required to fill the data gaps identified during the preparation of the thematic reports.

The main outputs of this phase included field review reports, copies of key reference documents, and presentation of field findings to all the reviewers at a plenary meeting. A list of the stakeholders interviewed is provided in Annex 2.

#### Phase 4: Final Report and Follow-up on Recommendations

This phase represented the final part of the MPR process. It is comprised of two main parts, namely, the finalisation of the MPR Report and follow-up on implementation of the recommendations.

**Finalization of the MPR Report:** At the end of this phase, all the data and reports were analysed and the staging and re-orientation of the Zambian national malaria control programme (NMCP) was done, based on the framework presented in Figure 2. A final report was developed, with key recommendations. Further, an Aide Memoire was developed and signed by the MOH and its main development partners supporting the NMP.

**Figure 2: Framework for operational staging and reorientation of national malaria control programmes**

**Follow-up on recommendations:** In order to ensure successful implementation of the recommendations of the MPR, a framework for follow up formed part of the recommendations made in this final MPR Report. This framework is expected to facilitate effective and efficient monitoring of implementation of all the recommendations of the review, which will be done through the existing systems for policy, planning, organization, coordination, implementation, and M&E.

## 1.4 Outline of the Report

This report is structured to cover the following areas:

- Context of malaria control in Zambia, including the background, historical milestones, the place of malaria control within the national development agenda, place of malaria control within the health sector strategic Plan, organization of the NMCP, key strategies for malaria control, key players, and linkages and coordination.
- Epidemiology of malaria in Zambia, including geographical distribution, population at risk, malaria stratification, and risk map.
- Programme performance by thematic areas: programme management; procurement, and supply chain management; malaria vector control; malaria diagnosis; case management including malaria in pregnancy; advocacy, IEC, social mobilization; and malaria surveillance and M&E.
- Conclusions.
- Key recommendations.

## 2. CONTEXT OF MALARIA CONTROL

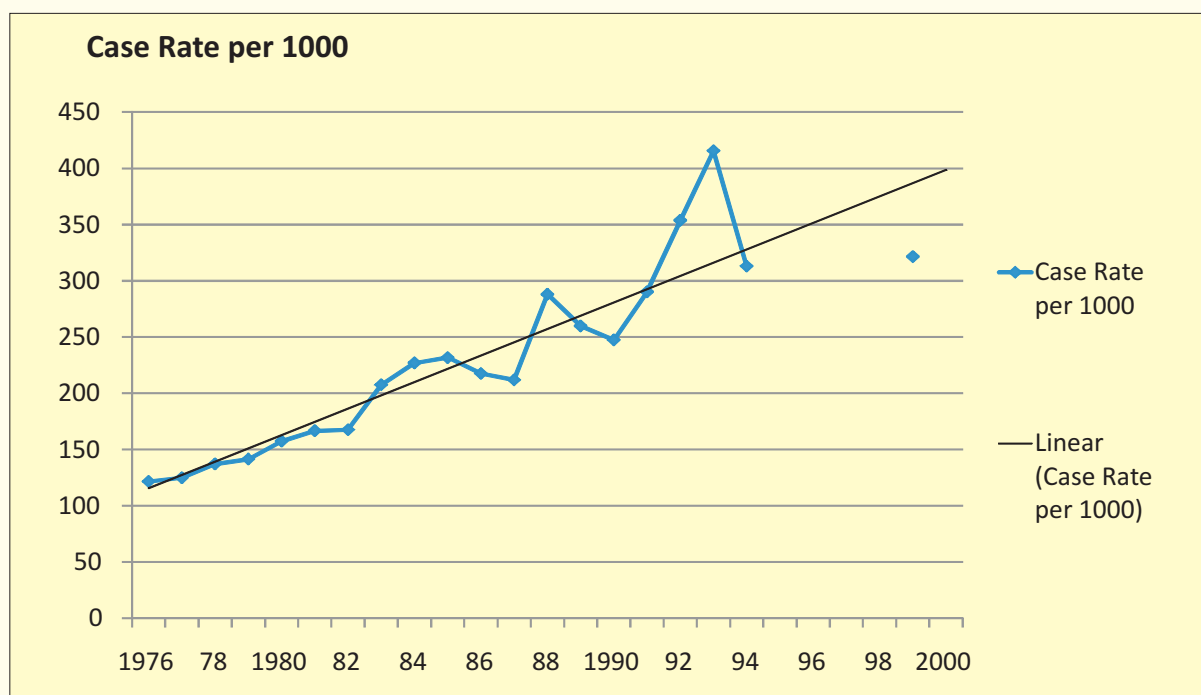
### 2.1 Historical Milestones in Malaria Control

#### 2.1.1 Evolution of the National Malaria Control Programme

Over the past 50 years, malaria control has been introduced at various times and then either strengthened or neglected. From 1980 to 2000, relatively limited malaria prevention existed in Zambia and much of the activity was focused on the treatment of people sick

with malaria. With limited prevention in place, cases rose steadily (see Figure 3) and, by 1999, approximately 3.46 million cases were recorded for a population of 10.8 million inhabitants.

**Figure 3: Zambia: Malaria case rates per 1000 population from 1976 to 1999 (cases of malaria diagnosed by the public health clinics; data missing for 1995-1998)**



Source: Zambia: Ministry of Health, 2010



The case rate was typically four- to five-fold higher in children under five years of age, compared to those over five years of age (1999 rates by province ranged from 700 to 1100 per 1000 children under five and from 80 to 220 per 1000 population for people above the age of five years). Malaria accounted for 8.8% of hospital admissions in 1976, but by the early 1990s this had increased to over 20%. Further, malaria case fatality rates in hospitalized patients were initially low in 1976 (10.6 deaths per 1000 malaria admissions), but increased dramatically from 1984 to 1994 (to 51 deaths per 1000 malaria admissions in 1994).

While there may be differences in health practice (e.g., changes in criteria for hospitalization) or reporting (e.g., changes in case definitions or changes in reporting frequency and completeness), during this time, it is reasonable to suggest that malaria was getting worse in Zambia in the 25 years prior to 2000.

In the most recent decade, malaria prevention has been re-introduced and strengthened, consistent with the global effort in RBM and using proven prevention and treatment interventions. Substantial increases in the available external funding began in about 2004 and increased further in 2005 to the present, with resources from the MOH, the Global Fund to Fight AIDS, Tuberculosis, and Malaria (GFATM), the World Bank Malaria Booster Program (WBMBP), the President's Malaria Initiative (PMI), MACEPA, and support from other bilateral and multilateral donors and partners, including WHO, UNICEF, Japan International Cooperation Agency (JICA),

Malaria Consortium, Society for Family Health (SFH) and others.

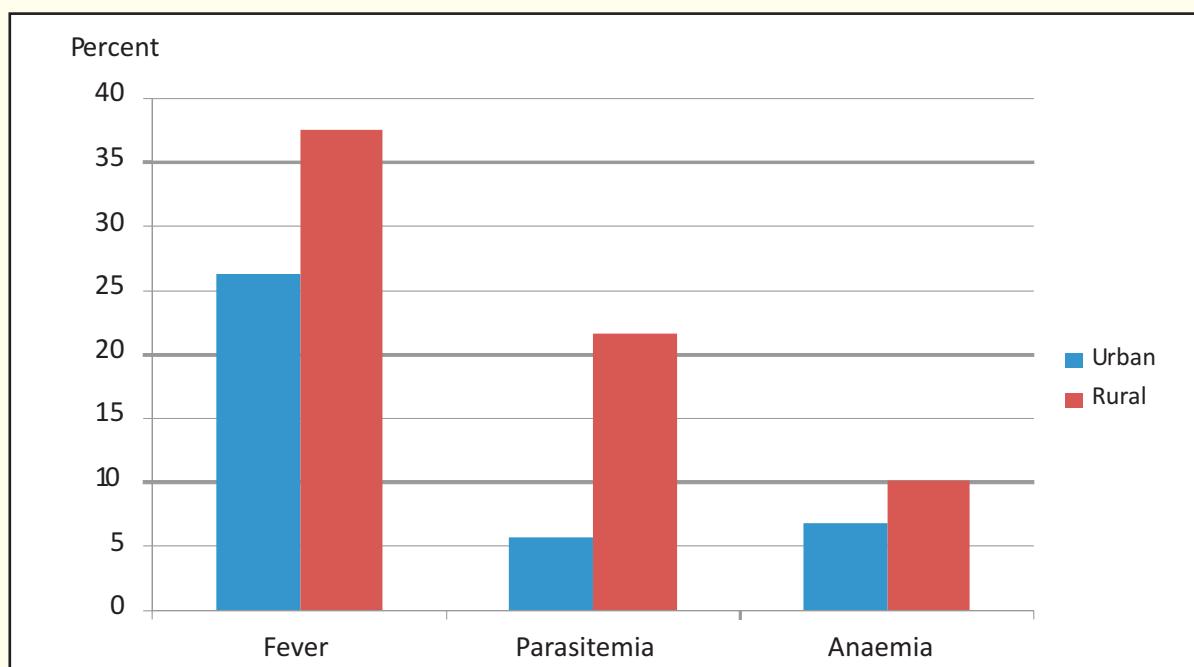
Prior to 2000, malaria epidemiology was largely established by existing geographic, climatic, and social features of Zambia. Subsequent to the increased funding and support for malaria prevention and control, evident after 2005, this epidemiologic picture was altered by the nation-wide introduction of a package of malaria control interventions: ITNs; IRS; prevention of malaria in pregnancy (MIP) with ITNs and intermittent preventive treatment during pregnancy (IPTp); improved and expanded diagnosis, using both microscopy and RDTs; and improved treatment with the adoption of artemisinin-based combination therapy (ACTs), with artemether-lumefantrine (AL) or Coartem<sup>®</sup>.

### 2.1.2 Equity in Distribution of Disease and Services in Malaria Control

**Equity in malaria service delivery (urban-rural and wealth quintile):** Malaria and malaria related burden, such as anaemia, are not equitably distributed in the population. They predominate in the rural and poor populations (see Figures 4 and 5). However, in the distribution of malaria prevention services, equitable distribution for the most part has led to equitable coverage and utilization across the prevention and treatment services.

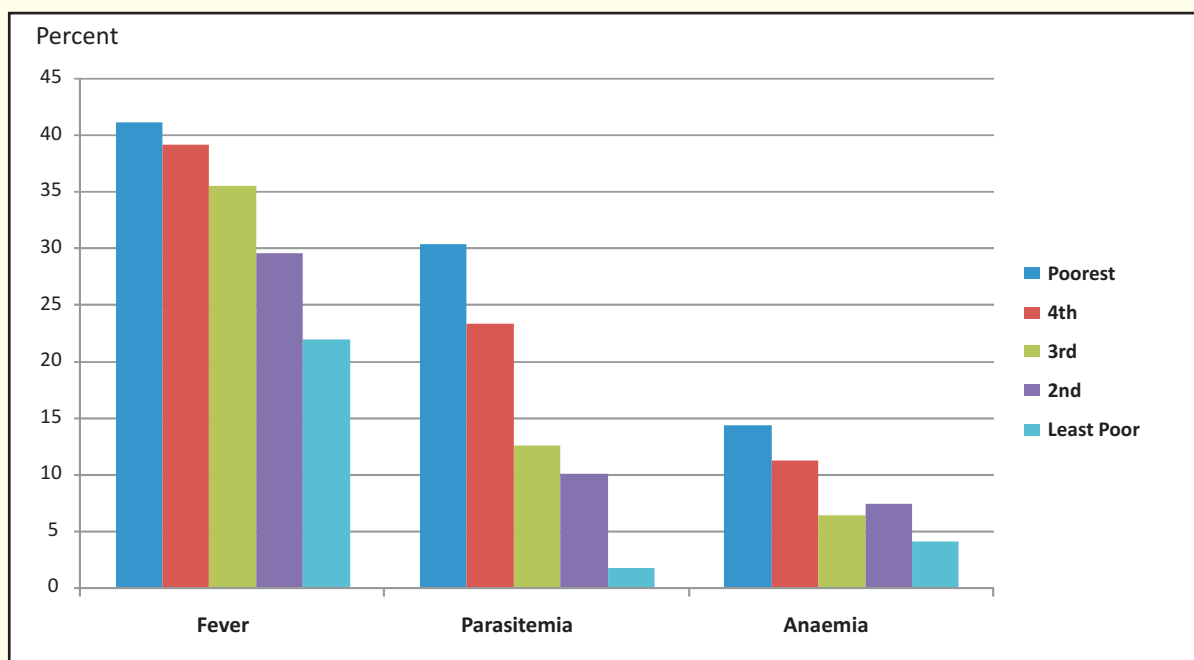
These aspects are shown in the figures below and relevant exceptions are noted. All data came from the most recent national population-based survey, the Zambia Malaria Indicator Survey 2010 (MIS 2010).

**Figure 4: Equity: urban and rural distribution of reported fever, parasitaemia, and anaemia in children under five years of age**



Source: Malaria Indicator Survey (MIS) 2000

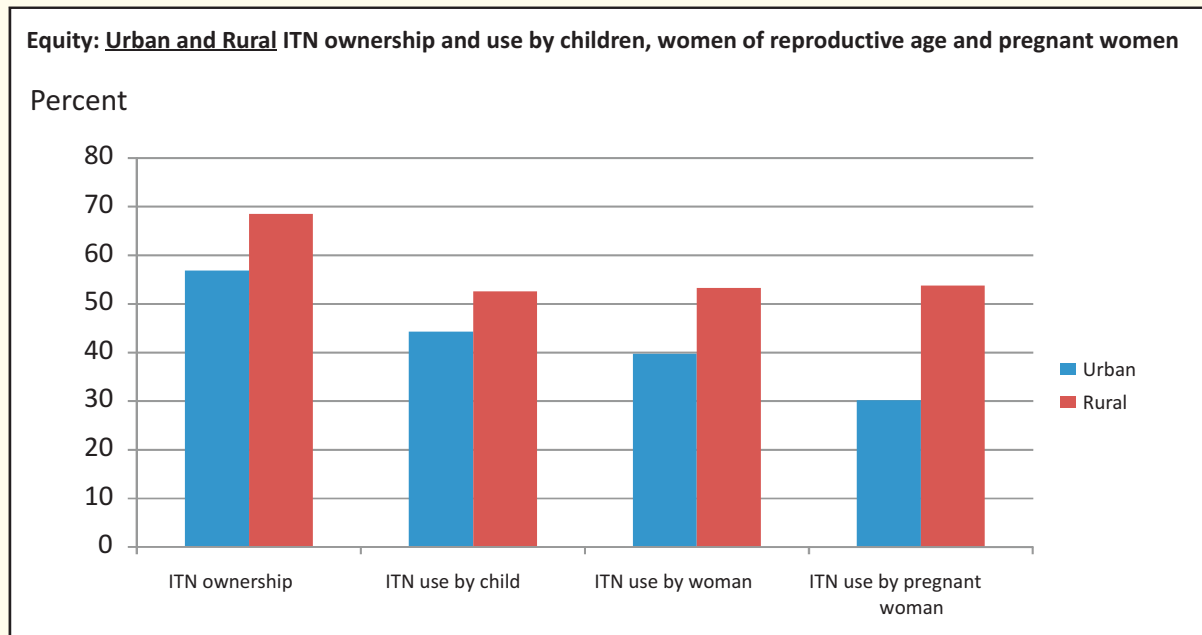
**Figure 5: Equity: wealth quintile distribution of reported fever, parasitaemia, and anaemia in Children under five years of age**



Source: Malaria Indicator Survey (MIS) 2010

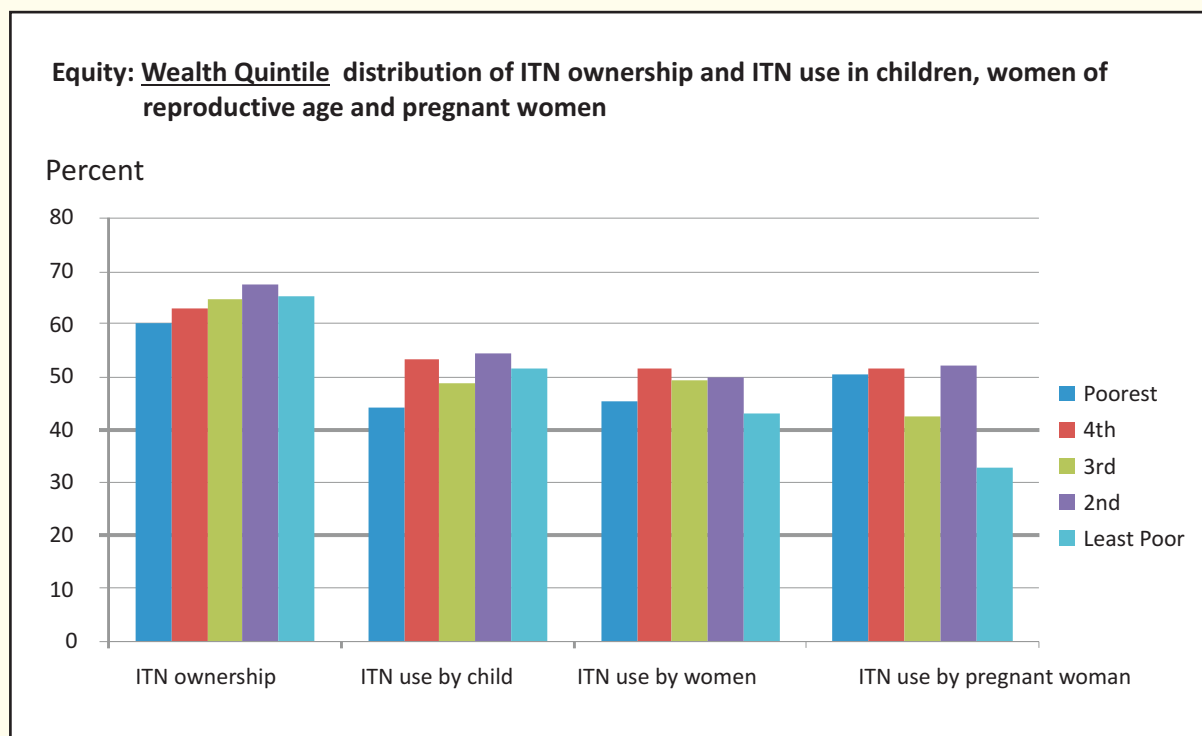
**ITN ownership and use now equitable:** ITN ownership and use are higher in rural and poor populations (see Figures 6 and 7).

**Figure 6: Equity: urban and rural ITN ownership and use by children**



Source: Malaria Indicator Survey, 2010

**Figure 7: Equity: wealth quintile distribution of ITN ownership and use**





By design, IRS is targeted at urban and peri-urban settings, thus urban-rural and wealth quintile comparisons show this inequity. In general, application of other interventions is reasonably consistent across urban and rural settings, and across all wealth quintiles. For IPTp, rates are slightly higher among women living in urban areas (77% versus 65%, respectively) and in least-poor households when compared to poorest households (80% versus 60%, respectively), but these are generally high rates in all groups. Treatment of young children with fever with an anti-malarial was similar in urban and rural settings (35.4% and 35.6%, respectively) and across wealth quintiles (33% in the poorest households and 39% in the least-poor, respectively). However, the use of diagnostics was slightly higher in urban areas than in rural (21% versus 15%, respectively) and across wealth quintiles (13% among the poorest and 31% among the least-poor, respectively).

#### **Equity of service delivery by province:**

Services were not evenly applied across the provinces. As noted above, household ownership (and consequently use) of ITNs has varied with distribution procedures. In this regard, falling levels have recently been observed in Luapula and Northern provinces. IRS has been applied to a growing number of districts, but still approximately 18 districts are not receiving IRS (of note, these are the more rural districts with a higher proportion of house construction that is less conducive to the use of IRS). Receipt of two or more doses of IPTp by pregnant women varied between provinces, from 58% in Luapula to 84% in North-Western Province. Use of diagnostics in febrile children varied from 8% in Northern Province to 28% in Copperbelt Province. Anti-malarial treatment rates in febrile children varied from 15% in Central Province to 68% in North-Western Province.

## **2.2 Malaria Control Within The National Development Agenda**

Malaria control is adequately placed as a priority within the national development agenda. There is high level political commitment by the Zambian Government, as evidenced by the signing of the Abuja Declaration of 2000 and reaffirmation, through the Maputo Declaration (2005), where all African leaders assented to the agreement. Further, Zambia is an active partner of the RBM Partnership, and Honourable Kapembwa Simbao, Minister of Health of Zambia, is the current chair of the Partnership's Board of Directors.

Malaria control in Zambia is also included in non-health sectors, such as agriculture, tourism, defence, environment, and local government and housing. Malaria's economic impact in Zambia has not yet been quantified, but is likely to be substantial, with regional estimates suggesting a deficit of 1.5% gross domestic product growth. It is a leading cause of school and workplace absenteeism and contributes to high household expenditures (about 25%). The Zambian government is aware of the serious socio-economic impact of malaria, and has, together with its partners, intensified efforts and investments aimed at attaining the vision of "a malaria-free Zambia."

## **2.3 National Health Policy**

Since 1991, the most comprehensive and overarching national health policy has been the National Health Policies and Strategies of 1991 (NHP&S-91). This policy was developed and launched to provide a new strategic vision and framework for health sector development, after the 1990 change in government and socio-economic direction.

The NHP&S-91 also formed the basis for initiation and implementation of the significant health sector reforms, which have been implemented since 1991 to date. Critical to this MPR process is that this policy document also identified and prioritized malaria and included it among the health goals. However, whilst this policy framework has remained relevant, it has not been updated since 1991, to take into account the changing health sector situation in Zambia. The legal framework for implementing this policy framework was provided by the National Health Services Act of 1995, which established the Central Board of Health (CBoH) and provided for decentralization of health services in the country. However, this Act was later repealed in 2005 and has not yet been replaced. As a consequence, the CBoH and District Health Management Boards have been abolished.

In view of the foregoing, it can be observed that, currently, there is no comprehensive and overarching National Health Sector Policy in Zambia. However, various pieces of policies, strategic frameworks, and guidelines have been developed to cover specific aspects of health, including malaria. Further, currently, there is no comprehensive and overarching national malaria policy document. However, notwithstanding this fact, the malaria programme is supported and guided by the strong strategic planning frameworks, individual pieces of policies and legislation, adherence to international norms, and a strong base of approved protocols and guidelines. In this respect, the key health policies and legislation relevant to malaria control are as provided in Table 2.

**Table 2: Zambia: health policies and legislation relevant to malaria control**

<b>Policies</b>	<b>Legislation</b>
<ul style="list-style-type: none"> <li>• The National Population Policy of 2007, which has a chapter on health.</li> <li>• The National Decentralisation Policy, 2002, which provides for decentralization of sectors, including health.</li> <li>• The Basic Healthcare Package, which seeks to define minimum packages of basic health services at different levels.</li> <li>• The Environmental Health Policy.</li> <li>• The National Environmental Protection Policy.</li> <li>• The Medicines Policy, 1977.</li> <li>• The National Reproductive Health Policy, 2008.</li> <li>• The National Child Health Policy, 2008.</li> <li>• The National School Health and Nutrition Policy, 2006.</li> </ul>	<ul style="list-style-type: none"> <li>• The Mosquito Extermination Act, 1964.</li> <li>• The Public Health Act Cap 295.</li> <li>• The National Environmental Protection Act.</li> <li>• The National Drugs and Poisons Act.</li> <li>• The Pharmaceuticals Regulatory Act.</li> </ul>

<sup>1</sup> National Health policies and Strategies, 1991, Chapter 3.1 (ii i) To reduce morbidity and mortality from common illnesses and communicable diseases to improve individual productivity and survival, (a) Reduce malaria morbidity and mortality.

These pieces of policy and legislation apply to various aspects of the NMCP, but are not exhaustive. In addition, there are sets of guidelines which have been developed and are being applied in specific areas of malaria control. These are discussed in the various chapters of this report, which focus on specific thematic areas.

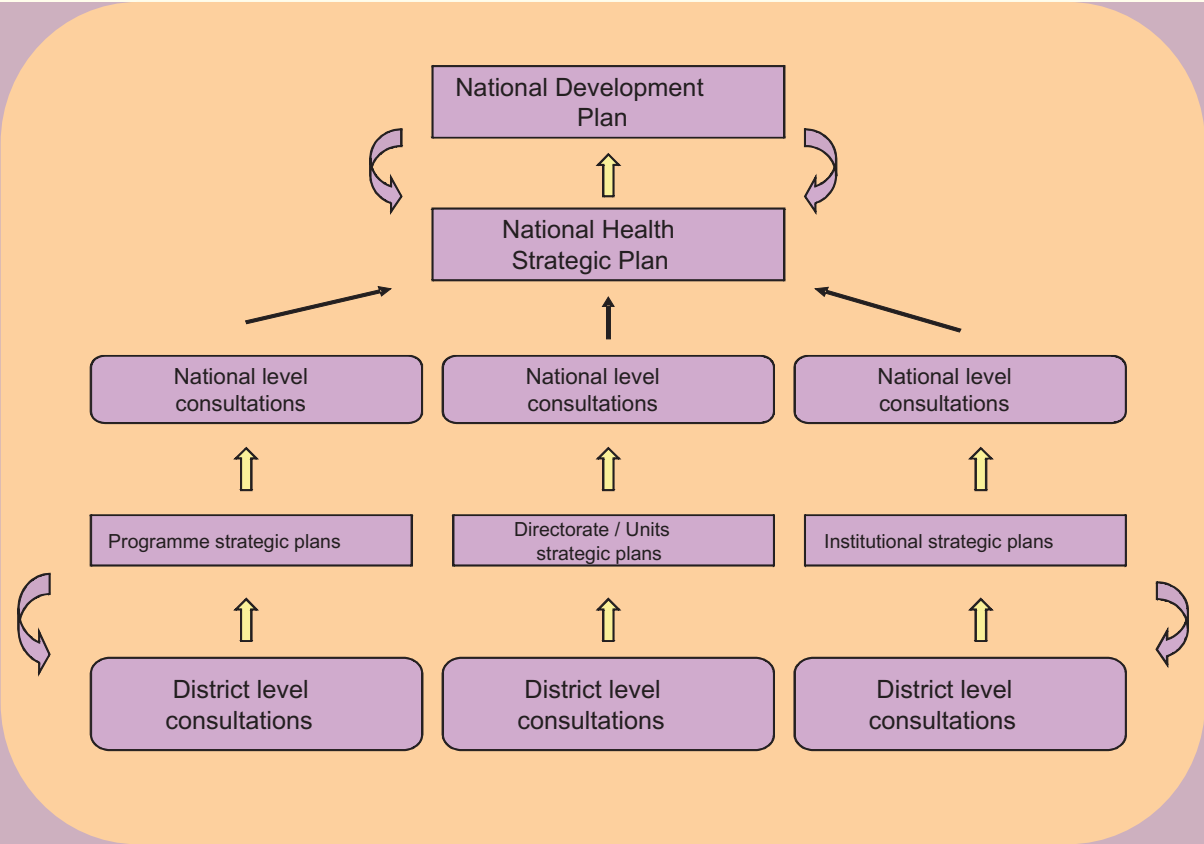
## 2.4 National Health Sector Strategic Plan

The country has developed the NHSP 2006-2010, which focuses on attaining the national vision of “equity of access to assured

quality, cost-effective and affordable health care services, as close to the family as possible” and the health-related MDGs. Malaria remains a priority in the national health system, as evidenced by a dedicated chapter in the current NHSP. Further, Chapter 4.5 of the NHSP identifies malaria among the national health priorities.

Within the context of the bottom-up approach to strategic and operational planning practiced in the health sector, which is illustrated in Figure 8, the National Malaria Control Centre (NMCC) actively participates in the sector strategic, medium-term and annual operational planning and reviews.

Figure 8: National Health Sector Planning System



Source: National Health Strategic Plan 2006-10

<sup>1</sup> Refer to Annex 1: National Health Priorities and Objectives



## 2.5 National Development Plan

Currently, Zambia's national socio-economic agenda is guided by the strategic framework, which includes: National Vision 2030, aimed at transforming the country into a middle-income prosperous nation by 2030; and the FNDP, from 2006 to 2010, aimed at contributing to the attainment of this vision. The FNDP ended in December 2010 and the process of developing a new one for the period from 2011 to 2015 has reached an advanced stage. Malaria control is prioritized in the health chapter of the FNDP and the malaria performance indicators have also been included in the FNDP Performance Assessment Framework (PAF).

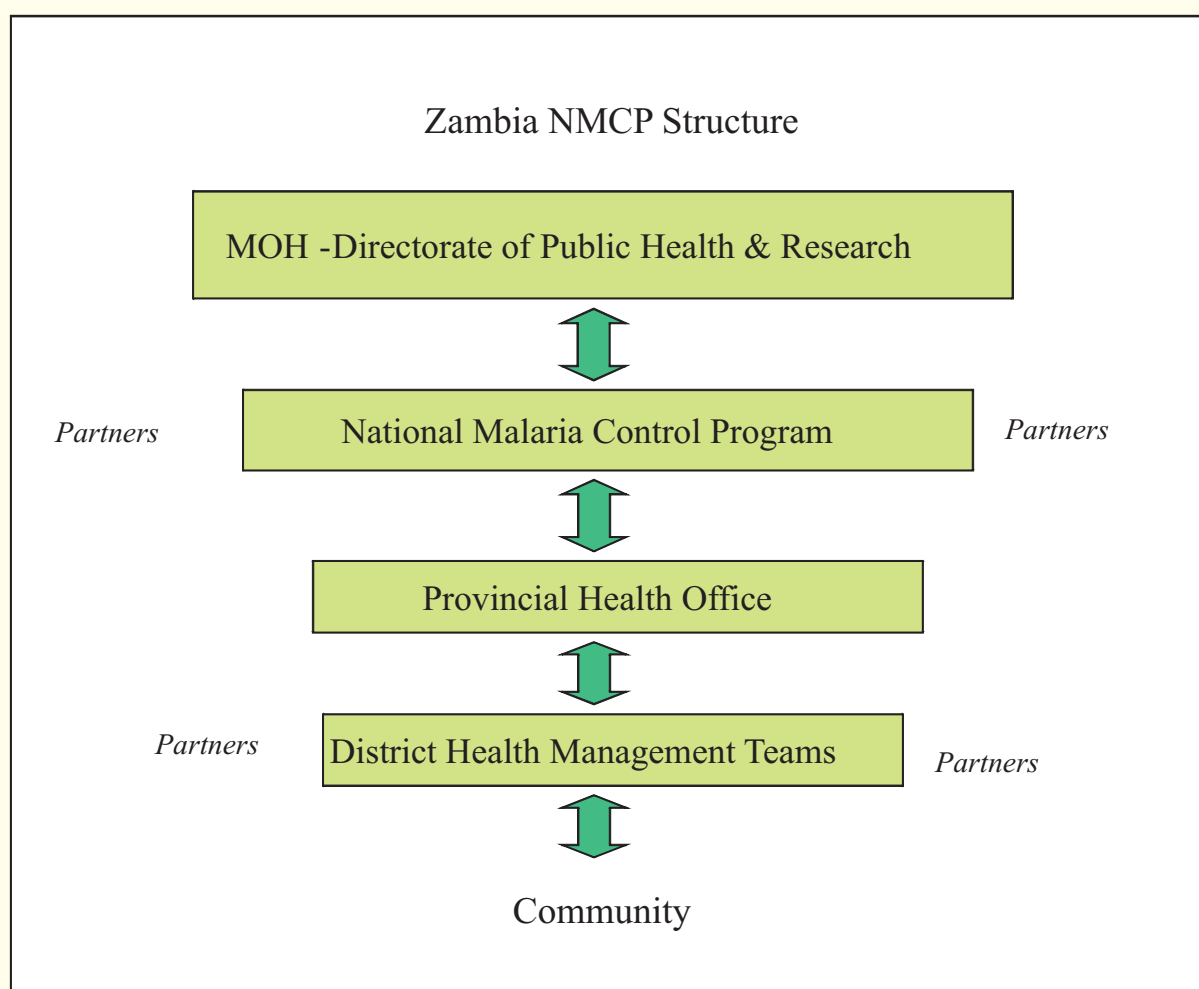
## 2.6 Organizational Structure For Malaria Control

Malaria control is highly prioritized within the MOH organizational structure. In this respect, the NMCC is headed by a Deputy Director of Public Health and Research who reports to the Director of Public Health & Research-MOH. The Deputy Director is supported by a complement of technical officers in the thematic areas: integrated vector management; malaria case management; operations research; M&E/surveillance; IEC/behaviour change communication (BCC); and epidemic

preparedness and response.

Currently, most of the technical positions in the thematic areas have been filled, except for that of Case Management Specialist. The recent restructuring of the MOH, including the NMCC is expected to cater for all human resource needs and development capacity.

Decentralization of the implementation of the NMP forms the main approach to the organization and management of malaria control in Zambia. It is being applied to ensure participation of all the key stakeholders in the planning and delivery of malaria control services to communities. In this respect, the decentralized and popular participation approach is aimed at promoting meaningful participation and local priority setting by the partners, including communities. Further, since the launch of the RBM initiative in 1998, the government has been working closely with the RBM partnership in the implementation of the NMCP. In this respect, in-country partnerships and multi-sectoral coordination mechanisms have been developed at various levels, which have supported coordination and implementation of the national programme. Figure 9 presents the main levels in the decentralized organization for malaria control management in Zambia.

**Figure 9: Zambia: levels of organization and coordination of the NMP**

The following institutional structures and partnerships (2.6.1 through 2.6.4) are involved in the implementation of the malaria control programme at national, provincial, district, and community levels.

### 2.6.1 National Level

**Ministry of Health:** The MOH is responsible for policy, legislation, planning, coordination, management, and M&E of the health sector, including the NMP. It is also responsible for resource mobilization and providing technical support to the NMCP and other structures under it. In addition to the formal organizational structure and establishment, MOH has also established the

Sector Advisory Group (SAG), which is the forum for policy dialogue and coordination of health sector partners, at the national level.

**National Malaria Control Centre:** At the national programme level, MOH has established the NMCC, which is a department under the Directorate of Public Health and Research (DPH&R) responsible for programming and implementation of the NMCP. The NMCC has the technical responsibility of providing technical guidance, leadership, coordination, and control of malaria control in the country, including the coordination of control activities of the various RBM partners. NMCC also serves as the Secretariat for RBM

activities and links the service delivery points with the national RBM partners. In addition to the formal structures, NMCC also depends on the decentralized structures and partnerships at national, provincial, and district levels, such as the malaria task forces, technical working groups (TWGs), malaria focal point persons, and community health partnerships:

**The national malaria task force:**

Members of this task force are comprised of deputy ministers from all line ministries concerned, WHO, and UNICEF. This task force is chaired by the Deputy Minister of Health and reports to the Vice-President and the cabinet, through the Minister of Health. It provides a platform for higher level political commitment and monitoring of the implementation of the NMSP. The NMCC facilitates and plays the role of secretariat to the bi-annual meetings of this task force.

**NMCC technical working groups:** NMCC has established TWGs in the following areas: vector control, case management, IEC, M&E, operations research. Membership to these TWGs includes MOH/NMCC and RBM partners from the civil society, public, and private sectors. The TWGs meet monthly to provide guidance in the implementation of the programme, monitor progress and assist in the development of various policy and technical guidelines. The chair of each TWG is appointed from among the members.

## 2.6.2 Provincial Level

At this level, the Provincial Health Offices (PHOs) are responsible for providing technical support, oversight and monitoring of the implementation of malaria interventions. Coordination of malaria control activities is under the responsibility of the Provincial Public Health Unit of the PHO. PHOs conduct quarterly performance assessments and consolidate information on

the health management information system (HMIS).

## 2.6.3 District Level

The district health office (DHO) is responsible for the planning, coordination, management, implementation, and monitoring of all health programmes in the district. The malaria control aspect falls under the District Public Health Unit. Health workers within the DHO have been appointed as district malaria focal point persons. However, they are not dedicated solely to malaria services but are given this as an additional responsibility. The district focal point person is often an environmental health officer (EHO) or a public health nurse who has other public health responsibilities, apart from malaria responsibilities.

District malaria task forces have been established in all the 72 districts, which function as part of the DHOs, providing the necessary malaria control related technical support. Members of the task force include all government departments, relevant non-governmental organizations (NGOs), private sector and other stakeholders involved in malaria activities at district level. District malaria task forces are chaired by the district medical officers and are responsible for planning, overseeing, and monitoring the implementation of malaria activities at the district level.

Hospital advisory committees, health centre advisory committees, and neighbourhood health committees (NHCs) have also been established, to provide formal linkages between the health delivery systems and the population within the given district.

## 2.6.4 Community Level

NHCs have been established at the community level. These committees consist of community representatives from surrounding villages (at least three villages)



and are responsible for facilitating linkages between the communities and the health system at the community level. Their responsibilities include dissemination of information on public health issues, and mobilization of communities to participate in health sector planning, management, and M&E.

Community health partners including community health workers (CHWs) have also been appointed, who are key in providing guidance, sensitization and assistance to community members on basic healthcare interventions, including malaria. These are community volunteers who are trained in basic identification, prevention and referral methods for common illnesses. In addition, community project committees, with assistance from CHWs, malaria agents, and traditional birth attendants (TBAs), are responsible for the implementation of demand-driven malaria prevention and control activities. However, various health sector reviews have observed that the community health partners are not receiving adequate support to motivate them in their work. In this respect, a study on community health partners was conducted in early 2010 and the report is pending.

## 2.7 Key Strategies For Malaria Control

The main strategies deployed for malaria control in Zambia include:

- Vector control, using IRS, and promotion of ownership and use of ITNs.
- Malaria case management, using effective diagnostics and lifesaving drugs ACTs.
- Control of malaria in pregnancy, through MIP/IPTp strategy.
- IEC/BCC strategies.

These strategies are based on internationally accepted standards, and employed in a planned and coordinated manner, in

accordance with the national strategy on malaria control.

## 2.8 Key Players In Malaria Control

Strong partnerships have been established with key stakeholders, including the other line ministries and departments, communities, CHAZ, private sector, cooperating partners, and CSOs. In this respect, the key partners include the WHO, UNICEF, the GFATM, the World Bank, USPMI, MACEPA, and Malaria Consortium.

## 2.9 Linkages and Coordination

There is no formal coordinating body where all the advisory technical committees meet in the NMCP. However, there is a core group of partners, consisting of WHO, UNICEF, PMI, the World Bank, MACEPA, CHAZ, and NGOs, who meet on an ad hoc basis. Zambia is part of the Trans-Zambezi Malaria Initiative or Trans- Caprivi-Kazangula, a cross border initiative which includes Angola, Botswana, Namibia, Zambia and Zimbabwe. The country participates in all WHO and RBM sub-regional annual reviews and planning meetings.

Donor coordination is done through the sector-wide approach (SWAp), which is governed by the SAG. The SAG meets every six months and comprises of representatives from the MOH, CHAZ, CPs, CSOs, and other relevant line ministries and departments (e.g., finance, education, local government and housing, and community development and social welfare). The SAG structures include the main committee, policy committee, and sub-committees in specialist areas. The policy committee meets monthly, while sub-committees have their own terms of reference and meet regularly (MOH Midterm Review 2008). Sector cooperating partners are led by the lead donor and other members of the

troika of partners. The NMCP maintains a list of RBM partners.

## **2.10 Conclusions And Recommendations**

### **2.10.1 Conclusions**

Malaria control occupies a prime place in the national and health sector development agenda. Malaria is the highest priority disease in the country and malaria control is among the health priorities identified in the NHSP 200610 and the FNDP. The head of the NMCP is at the third level in the hierarchy of the MOH, counting from the Permanent Secretary. This is a pre-eminent position to influence policy and resource allocation. However, at provincial and district levels, which are the implementation levels, malaria focal point persons do not have the same power.

Over the last decade, there has been remarkable documented progress in malaria

control in Zambia. All parts of the country are reported to have benefitted from these reductions in malaria burden, with some areas benefitting more than others. Many lives have been saved, illnesses and infections prevented, and social and economic benefits have accrued. Compared to neighbouring and other African countries, Zambia has been a leader in achieving high coverage with effective interventions, and demonstrating progress

The major constraint identified at national level is the lack of a comprehensive unified national malaria policy, to provide a holistic, comprehensive, and consolidated policy instrument to guide for overall malaria control.

### **2.10.2 Recommendations**

It is recommended to develop and implement a formal, comprehensive and overarching policy, covering all the areas of the NMCP.



### 3. EPIDEMIOLOGY OF MALARIA

#### 3.1 Geographical distribution of malaria

The epidemiology of malaria in Zambia is the result of two major forces: the geographic, climatic, and social features of the country that establish factors conducive or restrictive to malaria in Zambia, and the introduction and scaling up of malaria control interventions across the country, which alter transmission and the consequent infection, morbidity, and mortality rates associated with malaria.

Zambia is a land-locked country, bordering eight malaria endemic countries: Angola; Botswana; the Democratic Republic of the Congo (DRC); Malawi; Mozambique, Namibia; Tanzania; and Zimbabwe. The population of Zambia is at about 13 million people<sup>4</sup> living in 72 districts, which are grouped in nine provinces. At the time of the review, the process of conducting a national census of population had already reached an advanced stage. The population is unevenly distributed with higher densities in urban settings, particularly, Lusaka, Ndola, Kitwe, and Livingstone. Approximately 35% of the population lives in urban areas and this is increasing annually at about 1%. The country has a land area of 752,618 square km, with an overall population density of 17.3 persons per km<sup>2</sup>. Infant mortality is estimated at 70 per 1000 live births, under-five child mortality is estimated at 119 per 1000 live births, and maternal mortality is at 591 per 100 000 live births (Zambia Demographic and Health Survey (ZDHS) 2007). The total fertility rate is approximately five births per woman. The map in Figure 10 shows the district boundaries, major towns, lakes, and rivers and international boundaries, while Figure 11 shows the population density estimates across the nation.

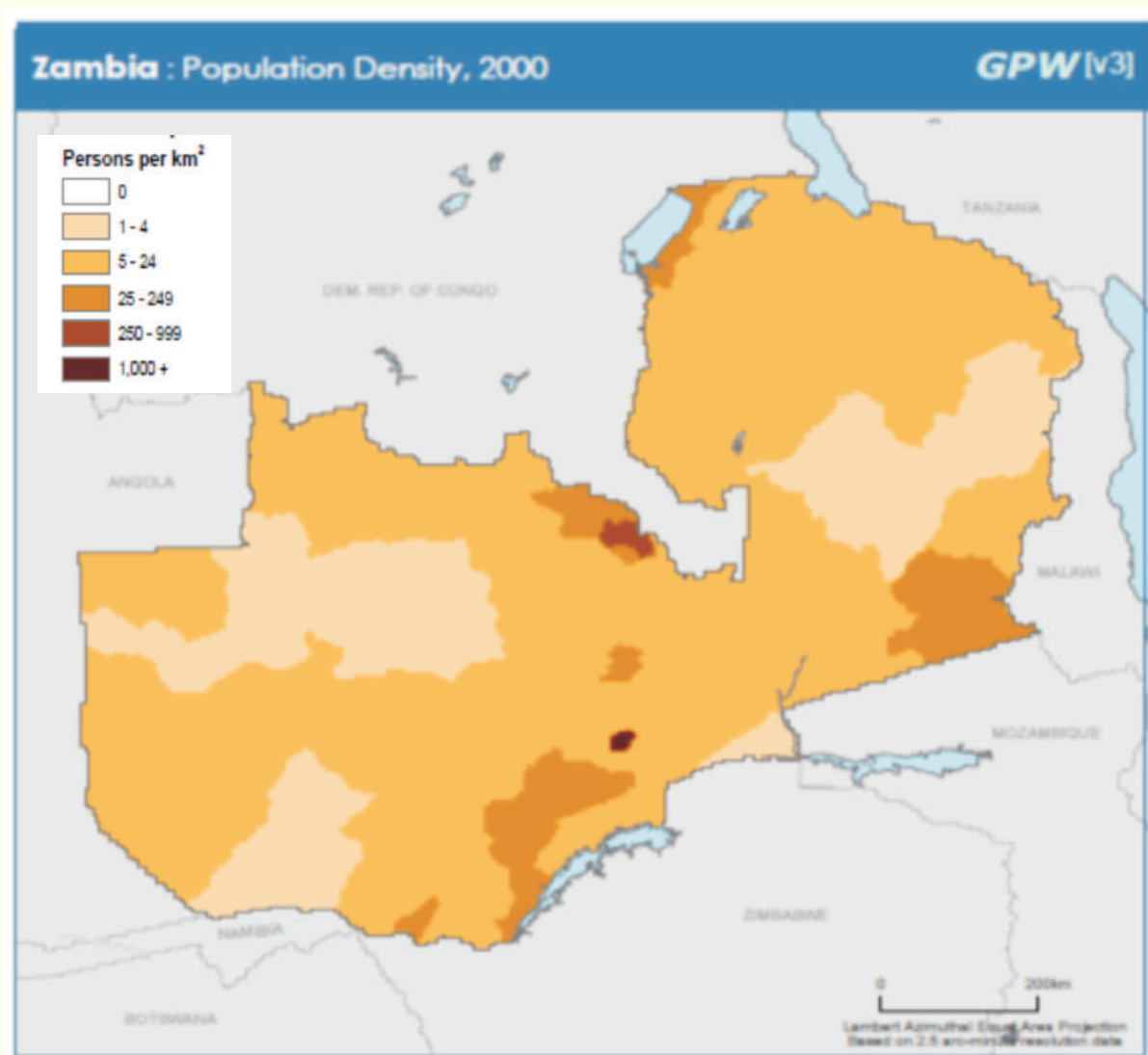
Figure 10: Map of Zambia



<sup>4</sup> The most recent CSO population projections report shows the projected population for Zambia for 2010 is 13,272,553 ([www.zamstats.gov.zm/media/vol\\_82\\_2009\\_the\\_monthly\\_january\\_2010.pdf](http://www.zamstats.gov.zm/media/vol_82_2009_the_monthly_january_2010.pdf)). Plans are underway for the 2010 census of population and housing was conclude in October 2010.



Figure 11: Zambia: Population Density

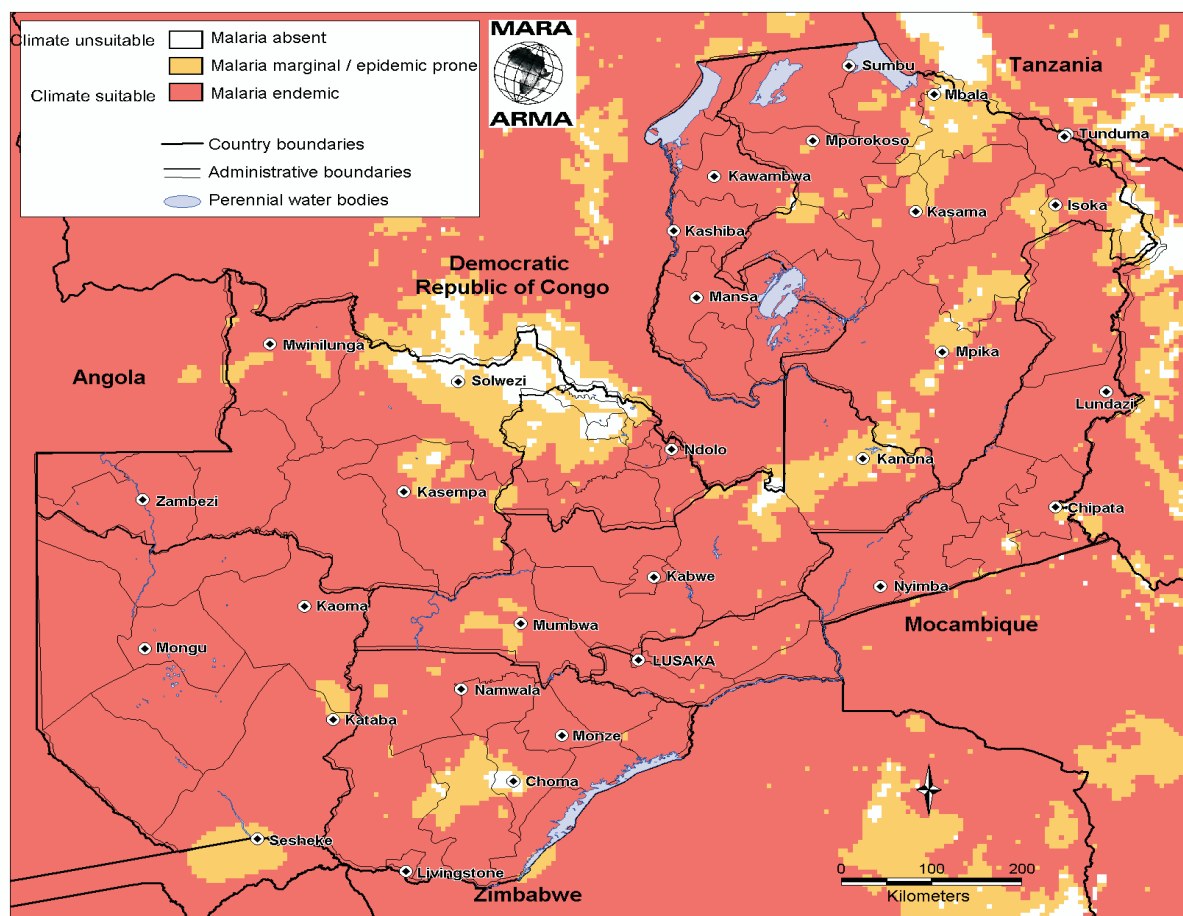


The country lies at an elevation of 1000 to 1500 meters above sea level and has many rivers and lakes. It is estimated that approximately 98.4% of the total area of the country is land, while 1.6% is covered by water. The nation experiences three distinct seasons, with a November/December-April/May rainy season (malaria transmission season), a cold season in late May through August, and a dry hot season from September to November. The vast majority of malaria transmission potential is

in the rainy season, as mosquito vectors are less capable of transmission in the cold and hot-dry seasons.

The map in Figure 12 (MARA, 2000) shows the geographic boundaries and the malaria transmission potential, based on geographic and climatic features, and essentially demonstrates the universal malaria transmission potential across the country and the contiguous parts of neighbouring countries.

Figure 12: Malaria Endemicity in Zambia

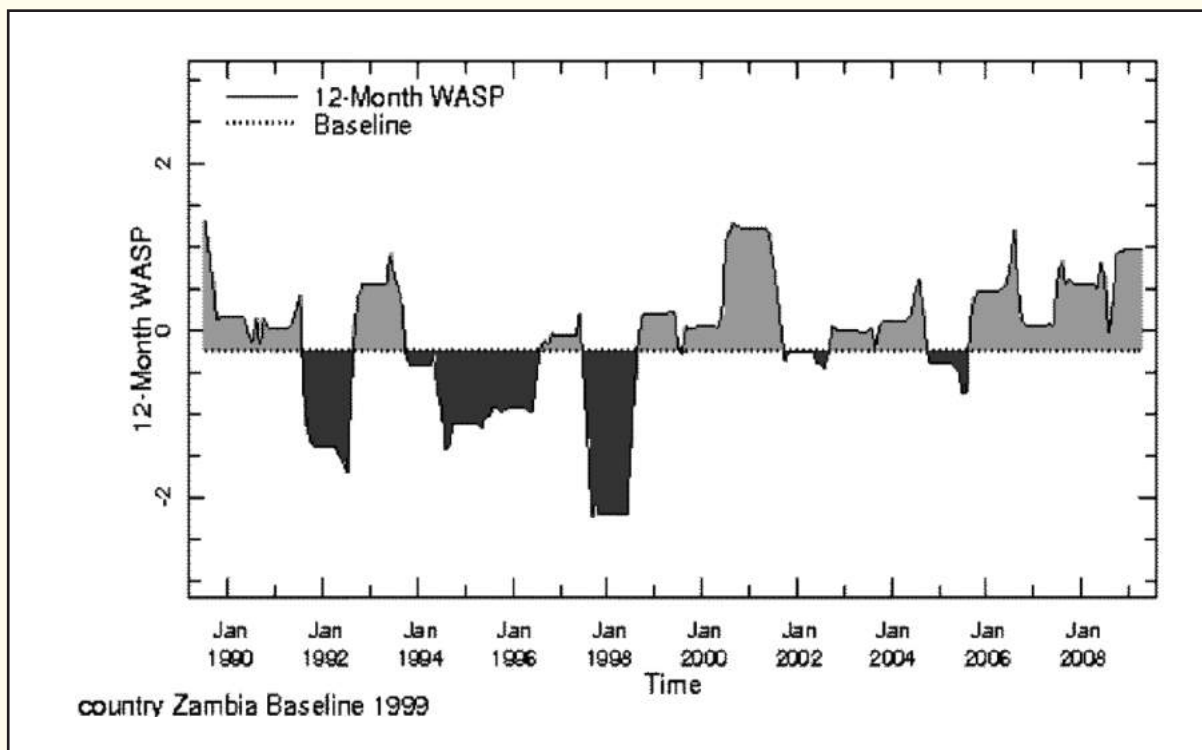


Information on the average annual rainfall in Zambia was reviewed using information collated by the International Research Institute for Climate and Society of Columbia University, New York. This is typically presented as Weighted Anomaly Standardized Precipitation (WASP) that allows for comparisons over time of the total rainfall being above or below the standard for

the time interval.

In Figure 13, the Zambia WASP indicates the seasonal nature of rainfall and suggests that there was a drought in 1998 (brown area below the line) but that in general, the annual rainfall in the most recent decade has been “good” and generally above the average for the past 20 years.

**Figure 13: Zambia climate timeline, 1990 to 2009<sup>5</sup>.**



Source: International Research Institute for Climate and Society of Columbia University, USA

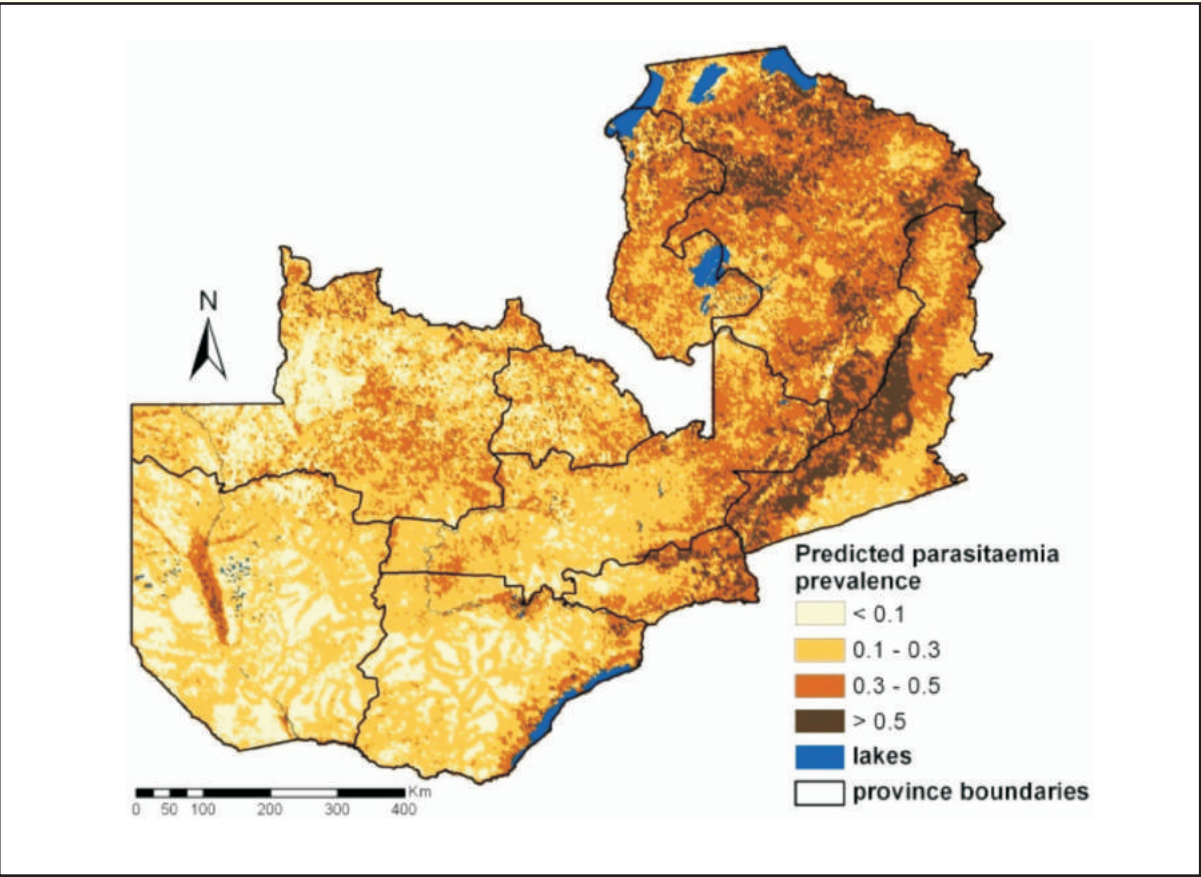


### 3.2 Malaria parasite prevalence

National population-based estimates of parasite prevalence in children under five years of age are available from the MIS reports for 2006, 2008, and 2010. In 2006, at a time when limited efforts were underway in

malaria prevention, parasite prevalence in under-five children was 22%. The modeled national parasite prevalence distribution for this age group at this time is shown in Figure 14.

**Figure 14:** Predicted parasitaemia risk map for children under 5 years of age in Zambia in 2006



Source: Malaria Indicator Survey 2006, Zambia

With malaria control scale-up progressing nationally, from 2006 through 2010, parasite prevalence decreased substantially to roughly 10% in 2008. By 2010, parasite prevalence remained low in most provinces,

but an increase was observed in two provinces (Luapula and Northern), and a reversion to previous rates was observed in one province (Eastern). The other five provinces had low parasite prevalence in

<sup>6</sup> Of note, ITN ownership and use had fallen in Luapula and Northern provinces between 2008 and 2010; ITN coverage and use remained high and stable in the other provinces.

children under five years of age (Lusaka = 0.0%, Southern = 5.7%, Western = 5.1%, Northwestern = 6.1%, Central = 9.4%, and Copperbelt = 12.1%). The changes for each of 2006, 2008, and 2010 are shown in Table 3.

These changes over time have led to the current situation, where malaria parasite prevalence varies substantially across the country, with higher rates in the three provinces in the northeast and east part of the country, and low and stable rates elsewhere.

**Table 3. Parasitemia and anaemia (Hb<8gm/dl) prevalence in children under five in nation-wide surveys at the end of malaria transmission season in 2006, 2008, and 2010; Zambia**

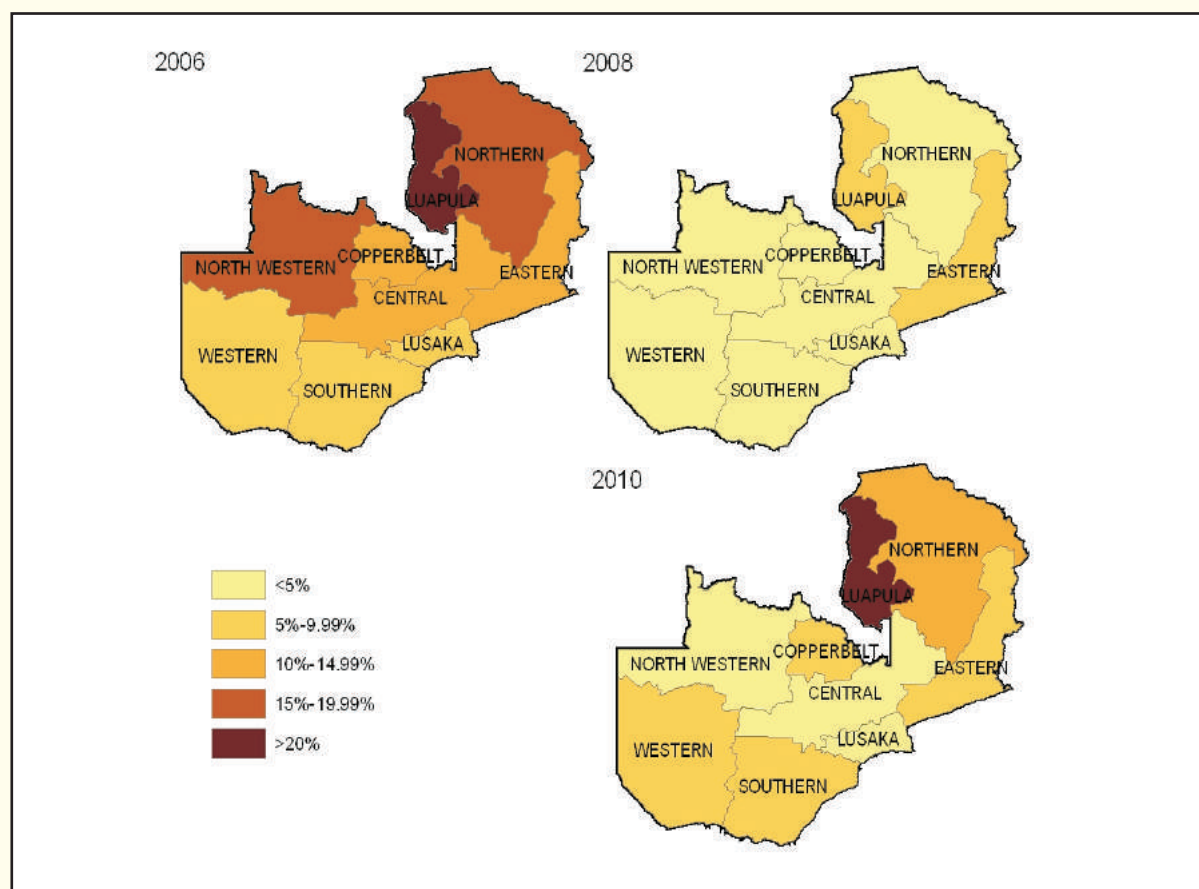
Province	Parasite prevalence in children <5 years of age			Anaemia (Hb<8gm/dl) prevalence in children <5 years of age		
	2006	2008	2010	2006	2008	2010
Central	27.7	7.9	9.4	13.4	3.2	4.1
Copperbelt	12.4	9.9	12.1	13.1	4.2	9.6
Eastern	21.0	9.3	22.0	14.1	6.2	9.9
Luapula	32.9	21.8	50.5	22.0	6.9	20.8
Lusaka	0.8	1.7	0.0	7.5	4.2	4.2
Northern	35.3	12.0	23.6	17.0	3.4	11.0
North- western	24.3	15.2	6.1	18.8	5.0	2.9
Southern	13.7	7.9	5.7	7.6	3.5	8.0
Western	11.1	2.6	5.1	6.7	1.2	7.6
<b>Total</b>	<b>22.3</b>	<b>10.2</b>	<b>16.0</b>	<b>15.8</b>	<b>4.3</b>	<b>9.2</b>

Source: Malaria Indicator Survey 2006, 2008, and 2010

### 3.3 Anaemia And Parasite prevalence in children

**Anaemia:** In young children, especially those under five years of age and even more so in children between 6 to 36 months of age, anaemia is strongly associated with malaria infection. Zambia has experienced this as well, and childhood anaemia patterns reflect malaria parasitemia patterns (see Table 3 and Figure 15, for a comparison with parasite prevalence rates in Figure 16).

**Parasite prevalence:** Overall malaria parasite prevalence in children under five years of age was 10.2% in 2008 and 16.0 % in 2010. Children in rural areas were found to have higher parasitaemia of 12.4% in 2008 and 21.6% in 2010, compared to children in urban areas, where parasitaemia was at 4.3% in 2008 and 5.6% in 2010. Provinces had variable levels of parasitaemia ranging from 0.4% to 54% (MIS, 2010).

**Figure 15: Anaemia prevalence in children <5 years in 2006, 2008, and 2010, by province**

Source: Malaria Indicator Survey 2006, 2008, and 2010

### 3.4 Population at risk

The entire population of Zambia is at risk of malaria. However priority groups include pregnant women, children under five years of age, and the chronically ill.

### 3.5 Stratification and risk map

The current malaria stratification map is based on the 2010 MIS. In the past, the malaria endemicity map showed relatively uniform endemicity across the country and malaria transmission, illness, and mortality was determined by existing climate, geographic, and biological features of the vectors, humans, and parasites. However, in

the last five years, emerging evidence from routine information systems, national surveys, and focused studies have consistently shown declining malaria trends evident in three malaria epidemiological zones in Zambia, which are as follows:

- **Zone 1:** Areas where malaria control has markedly reduced transmission, and parasite prevalence is less than 1% (Lusaka city and environs).
- **Zone 2:** Areas where sustained malaria prevention and control has markedly reduced transmission and parasite prevalence is roughly at or under 10% in young children at the peak of



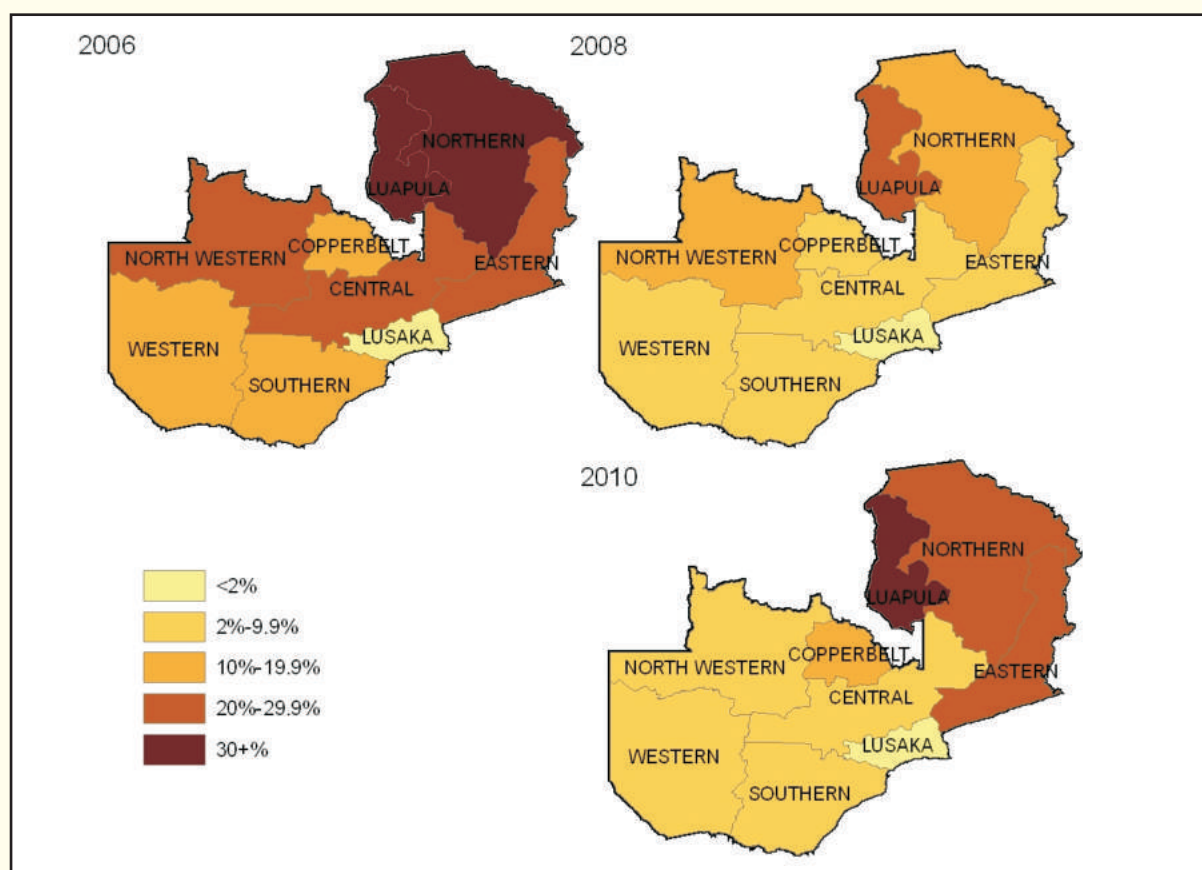
transmission (Central, Copperbelt, North-western, Southern, and Western provinces).

- **Zone 3:** Areas where progress in malaria control has been attained but not sustained and lapses in prevention coverage have led to resurgence of infection and illness, and parasite

prevalence in young children exceeds 20% at the peak of the transmission season (Eastern, Luapula, and Northern provinces).

Figure 16 presents a malaria stratification map, showing the malaria risk trends from 2006 to 2010.

**Figure 16. Parasitemia rates by Province by MIS in 2006, 2008, and 2010**



Source: Malaria Indicator Survey 2006, 2008, and 2010

Overall malaria parasite prevalence was 10.2% in 2008 while in 2010 it was found to be 16.9%. Children in rural areas were found to have higher parasitaemia of 12.4% in 2008 and 21.6% in 2010 compared to children in

urban areas where parasitaemia was found at 4.3% in 2008 and 5.6% in 2010. Provinces have variable levels of parasitaemia ranging from 0% to 54% (MIS, 2010).

### 3.6 Malaria parasites

In Zambia, *Plasmodium falciparum* accounts for more than 98% of all cases in Zambia, *Plasmodium malariae* (1%) and *Plasmodium ovale* (0.1%<sup>7</sup>). Malaria parasite infections in Zambia are almost entirely due to *P. falciparum* (approximately 95+%), with a low frequency of infections from *P. malariae* and *P. ovale*, and little or no transmission of *Plasmodium vivax*.

### 3.7 Malaria vectors

The main malaria vectors in Zambia are the *Anopheles gambiae* s.l. and *Anopheles funestus* complexes. Other *Anopheles* mosquito present in the country are *Anopheles pretoriensis*, *Anopheles rufipes*, *Anopheles squamosus*, and *Anopheles coustani*.

**Vector density:** Vector densities vary from season to season and on a regional basis. During the dry season the vector densities are low due to the limited breeding sites, whilst the opposite is the case during the wet season. However, other places that have dry season breeding refugia, such as swamps, lakes, and river areas do have a high proportion of vectors during the dry season, mainly in the north of Zambia. Recently, mosquito surveys conducted in urban Solwezi, Ndola, and Chililabombwe showed mean indoor resting densities of mosquitoes in sprayed houses to be between 10 and 43 for *An. gambiae* s.l. and 3042 for *An. funestus* per house in rural Solwezi.<sup>8</sup>

**Entomological inoculation rates (EIR), sporozoite rates, and human blood index:** Capacity to determine EIR exists in the country. Two studies conducted in Mpongwe showed 88 infectious bites per person per

year in 2006 (TDRC). Another study conducted in 2008 in the same area gave an EIR of 32.51 infectious bites per person. There has not been much work done over the past five years to establish the entomological parameters in the country. Other studies were conducted in Macha, Choma, from 2005 to 2006, where entomological inoculation rates ranged from 1.6 to 18.3, the human blood index was 0.923, and the sporozoite rates were up to 50% (Macha, Kent et al. 2007.). TDRC has determined sporozoite rates of 7.38% in 2004 and 1.7% in 2008 in Mpongwe district.

**Vector susceptibility to the main insecticides used for IRS, LLINs, and larviciding:** Prior to the implementation of IRS in the 2003/04 rainy season, susceptibility tests were conducted in Chipata, Chongwe, Mansa, Kabwe, Ndola, Lusaka, Mwinilunga, and Livingstone (NMCC/TDRC report). From that data using the WHO test kits, the results showed 100% susceptibility of *An. gambiae* s.l. and *An. funestus* to pyrethroids and dichlorodiphenyltrichloroethane (DDT). Between July 2009 and July 2010, studies from three districts (Ndola, Solwezi, and Chililabombwe) showed more than 90% DDT resistance, and up to 60% resistance recorded for Deltamethrin, Permethrin, and Lambda-cyhalothrin (ref HSSP/University of Zambia (UNZA) and TDRC). On the other hand, the mosquitoes were generally found to be susceptible to Malathion. A more robust monitoring and surveillance system is underway to assess the extent of the problem.

Mosquitoes are further exposed to insecticide pyrethroids via ITNs such as deltamethrin. A study is underway by TDRC in 12 districts of the country to determine insecticide persistence on the nets and durability of LLINs. Although larviciding is part of the

<sup>7</sup> Moonga. H, 2008-Unpublished; MoH Drug Efficacy Report, 2006

<sup>8</sup> Source: Health Services and Systems Program [HSSP]/Tropical Diseases Research Centre (TDRC)

Integrated Vector Management (IVM) included in the national strategic plan, it has only been implemented in few areas by the private sector. Bti, larvex and Agnique MMF have been used or are currently being used for larviciding.

**Updated vector maps:** There are no maps of malaria vectors at a national scale. However, since 2001, the Macha malaria project in Choma, Southern Province, has been collecting data and mapping vector and mosquito populations at the local level.<sup>9</sup> For the rest of the country, there are known pockets of vector species, from which maps could be developed. More recently, there were areas where insecticide resistance has been recorded and were geo-coded using GPS. There are plans to also map dry season breeding sites in Ndola and other parts of the country with the possibility of larviciding, and a Geo-coder is being trained for this task.

**Breeding, biting, resting habits:** There are two main habitats that *An. species* breed in: perennial water in streams, rivers, dams, lakes, swamps, and irrigation fields, and rain-fed breeding temporary sites in depressions, hoof-prints, seasonal streams, swamps, and dams. *An. funestus* prefer vegetated water body banks and tend to breed throughout the year. *An. gambiae* complex breeds in sunlit pools, puddles and hoof prints which are temporary or semi-permanent fresh water habitat. *An. gambiae* and *An. Arabiensis* also breed in main perennial water bodies, but expand geographically during the rainy season when they breed in the temporary rain-fed water systems. *An. funestus* larvae are typically found in more permanent water bodies such as edges of streams or rivers and marshes predominantly with water bodies that have vegetation; the larvae prefer shaded habitats.

*An. gambiae* feeds primarily on humans (anthropophagic) and rests indoors (endophilic), while *An. arabiensis* feeds on humans and other animals and mainly rests

outdoors (exophilic). Members of *An. funestus* complex feed on both humans and other animals and prefers to rest indoors. Both species feed predominantly at night, mainly between 22:00 to 06:00 hours. Studies conducted at TDRC, UNZA, and Macha Malaria Institute on the biting and resting habits of *Anopheles* showed peak biting hours between 02:00 hours and 06:00 hours. However, vector bionomics may vary from site to site. For example, in Luangwa *An. gambiae* s.l. was noticed to be biting in the early hours of the night between 19:00 and 21:00 hours. In contrast the *An. funestus* complex species peak biting period were in the early hours of the day (ref MTC). Similarly, an assessment of the biting behaviour conducted in Chiliabombwe and Luanshya showed early vector feeding patterns outdoors between 18:30 hours and 20:00 hours with very few indoor catches during the early hours of the day. The *An. gambiae* complex feeds primarily on humans (anthropophagic) and rests both indoors and outdoors. Capacity to conduct bionomic studies exists, but is not adequate to cover all the districts of the country.

**Sentinel sites for vector bionomics:** Two sites have been identified by the MTC project to understand the biting, resting, and breeding of *An. gambiae* s.l. and *An. funestus* behaviour in Luangwa and Nyimba districts. The most comprehensive studies conducted recently have been in Macha, Choma, (Ref) where they have established sites.

TDRC has also established baseline sites in Ndola, Chililabombwe and Solwezi. At present, there is need and opportunity to obtain baselines from the 18 new districts for M&E of vector control activities.

### 3.8 Disease trends

**Malaria morbidity frequency and ranking:** Available data on the top ten causes of health facilities visits for 2006, 2007, and



2008 for all age groups, show that malaria remains a leading cause of morbidity and mortality in Zambia, although in many locations this has declined. Malaria incidence per 1000 population was 412 in 2006, 359 in 2007, and 252 in 2008. Non-pneumonia respiratory infection and non-bloody diarrhoea were the second and third highest causes, respectively. Although malaria was

still the leading cause of morbidity in all ages, the incidence had been reducing over time (39% reduction in the incidence of malaria between 2006 and 2008 per the table below). In addition, among the top ten diseases in Zambia (Table 4), the overall rate of these ten illnesses categories has dropped by 17%, largely because of the substantial drop in malaria cases.

**Table 4: The ten major causes of visitations to health facilities (for all ages combined), Zambia, 2006, 2007, 2008**

Ten Major Causes of Visitation to Health Facilities, Zambia 2006 (All ages) – 2006		Ten Major Causes of Visitation to Health Facilities, Zambia 2007 (All ages) – 2007		Ten Major Causes of Visitation to Health Facilities, Zambia 2008 (All ages) – 2008	
Disease Name	Incidence per 1,000 pop. <sup>1</sup>	Disease Name	Incidence per 1,000 pop. <sup>2</sup>	Disease Name	Incidence per 1,000 pop. <sup>1</sup>
Malaria	412	Malaria	359	Malaria	251.7
Respiratory infection: non-pneumonia	192	Respiratory infection: non-pneumonia	219	Respiratory infection: non-pneumonia	197.6
Diarrhoea: non-bloody	81	Diarrhoea: non-bloody	76	Diarrhoea: non-bloody	69.3
Trauma <sup>3</sup>	48	Trauma <sup>2</sup>	50	Trauma <sup>2</sup>	46.6
Eye infection	41	Skin infections	38	Skin infections	38
Skin infections	41	Respiratory infections: pneumonia	37	Muscular skeletal & connective tissue	32.3
Respiratory Infections: pneumonia	39	Eye infection	35	Eye infection	31.3
Ear/Nose/throat infections	26	Muscular skeletal & connective tissue	30	Respiratory infections: pneumonia	30.8
Intestinal worms	16	Digestive system not infectious	27	Skin infections	30.5
Sexually transmitted infections	14	Ear/Nose/throat Infections	26	Ear/Nose/throat infections	26.9

Source: MOH 2008 Draft Annual Health Statistics Bulletin, p14

<sup>10</sup> This is incidence for all age groups

<sup>11</sup> This is incidence for all age groups

<sup>12</sup> This includes accidents, injuries, wounds, burns, etc

Approximately 3 million clinically diagnosed cases of malaria were reported through the HMIS in 2008. This represents a more than 39% decline from 2006. This figure overestimates the number of true malaria cases at the health facility level due to frequent lack of diagnostic confirmation; it also does not count the cases at the community level which go unreported. A large number of cases continue to occur in children under five years old, a group at high risk for severe malaria.

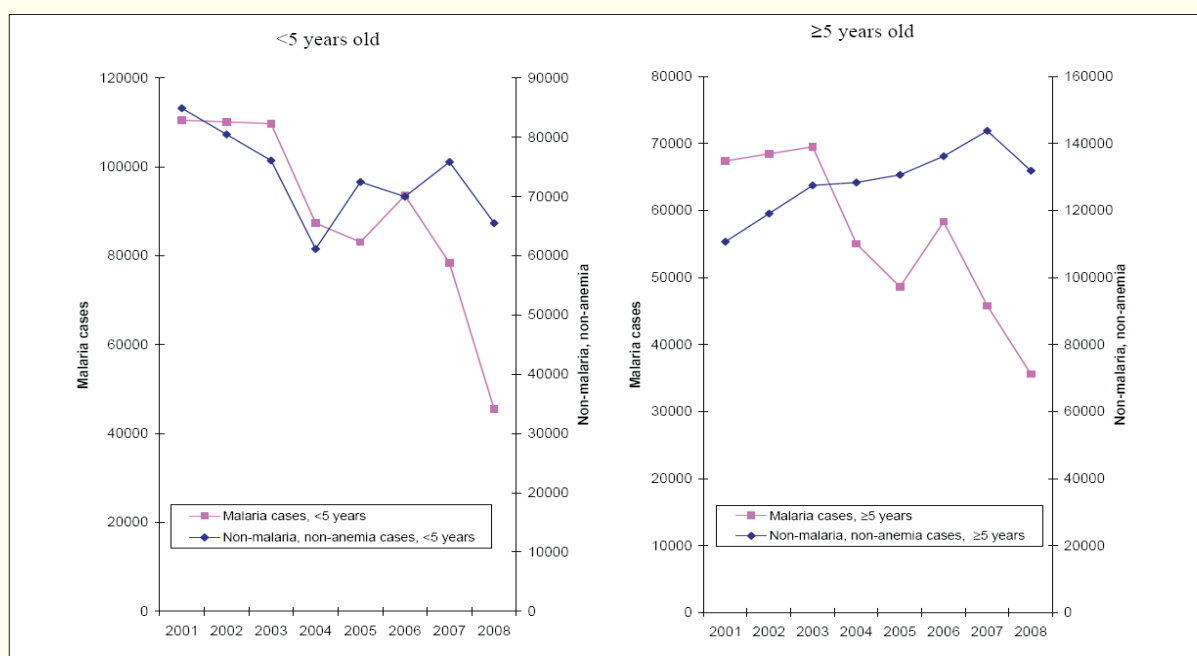
The 2010 MIS showed an improvement in malaria parasitemia compared to the 2006 MIS in children under five 16% versus 22%, and severe anemia 9% versus 14%. Luapula Province had the highest percentage of children under five with malaria parasites Luapula (54%), followed Northern (24%), Eastern (23%), Copperbelt (13%), Central (11%), North-western (8%), Southern, and Western (6%) provinces, while Lusaka had the lowest prevalence (0.4%). In the 2010 MIS, rates of parasitemia and severe anemia increased in several provinces in the east and

northeast part of the country compared to the 2008 MIS.

HMIS outpatient data demonstrated a decline in malaria incidence since 2000 (these include both clinical and laboratory-confirmed cases). Cases per 1000 population increased from 316 in 2000, to 383 in 2004, to 358 in 2007, but then decline to 252 in 2008. In a review of HMIS data from 2001 through 2008, the NMCC demonstrated a more than 60% decline in malaria inpatients in both the under five year and more than five years or older age categories (Figure 17). During the same time period, inpatient non-malaria and non-anaemia cases in the same age groups remained stable or increased.

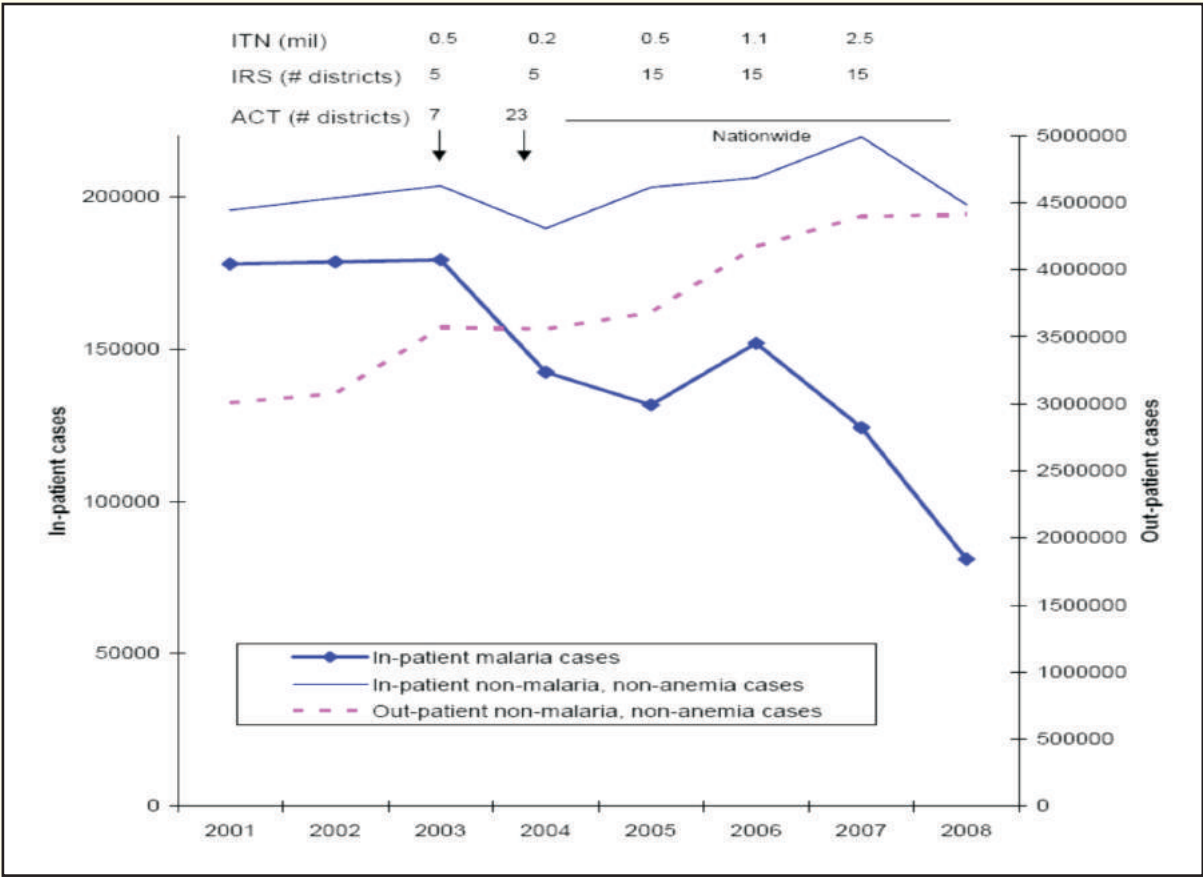
Figure 17 shows inpatient malaria cases compared to both inpatient and outpatient non-malaria and non-anaemia cases with a timeline of major antimalarial interventions during the time period under review. Likewise, Figure 18 shows a substantial decrease in malaria cases over the same time period.

**Figure 17: Trends in reported in-patient malaria and non-malaria, non-anaemia cases, 2001-2008**



Source: HMIS Reports 2001-2008, Zambia

Figure 18: Trends in in-patient/out-patient cases in public health facilities, 2001 - 2008



Source: HMIS Reports 2001-2008, Zambia

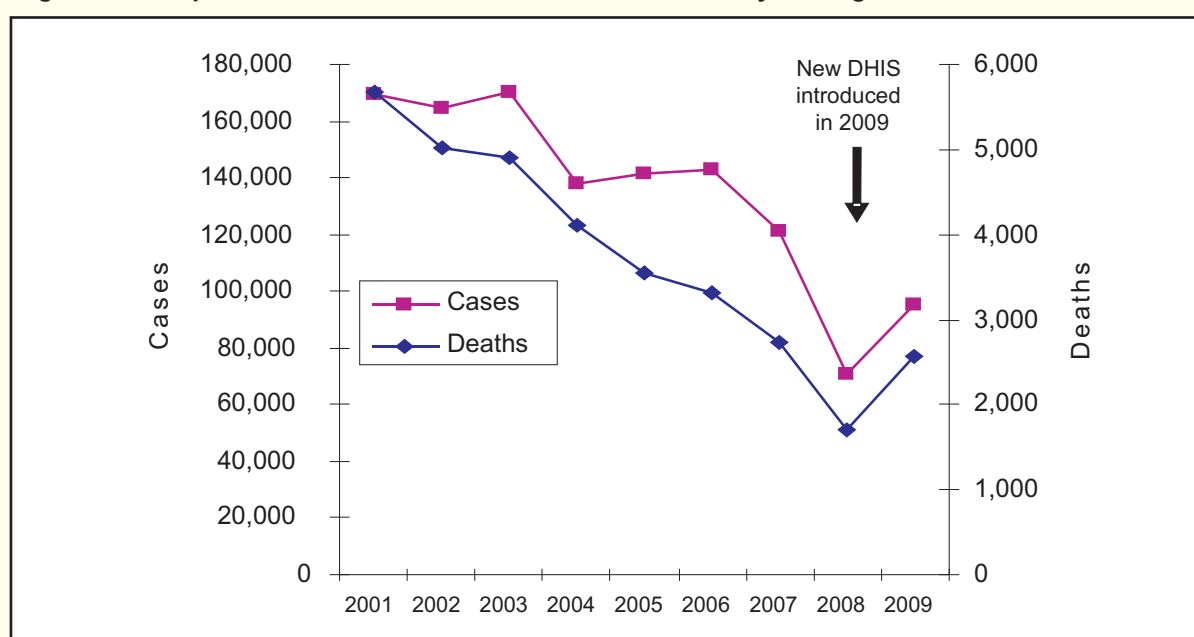
While accurate data on cause of death are lacking, information from the DHS shows that all-cause under-five mortality decreased by 29% during the approximately five-year interval from 168 per 1000 live births in 2002 to 119 per 1000 live births in 2007. There is a suggestion that malaria interventions have contributed to a substantial portion of this improvement.

This suggestion is based on the consistency of the documented improvements in malaria control in recent years and the fact that all of the mortality improvement is seen in post-neonatal infant mortality (after the neonatal period, or first 28 days of life) where there has been a 38% reduction and in the mortality of

one- to four-year-old children, also a 36% reduction. These are the age groups where one would expect malaria interventions to have their largest impact.

In 2009, a new District Health Information System (DHIS) was initiated to replace the HMIS and there was an observed 12% increase in reporting from districts in 2009 that coincided with this DHIS introduction. As a consequence, there are challenges in comparisons between HMIS 2000-2008 and DHIS 2009 and a notable increase in outpatient malaria cases and in-patient malaria cases and deaths was reported in 2009. See Figure 19.



**Figure 19: Inpatient malaria cases and deaths, children <5yrs of age, 2001-2009, Zambia**

Source: HMIS/DHIS Reports 2001-2009, Zambia

Despite this concern that an uptick of cases in 2009 may be due to bias from improved reporting with the newly introduced DHIS, it was separately noted that the increase in reported inpatient cases occurred only in Luapula, Eastern, Northern, and Copperbelt provinces, consistent with the observed increase in parasitaemia in the 2010 MIS in Luapula, Eastern, and Northern (and slightly in Copperbelt) provinces.

#### **Child mortality and malaria in Zambia:**

Malaria is known to contribute substantially to child mortality particularly to post-neonatal infant mortality and mortality for one- to four-year-old children. This effect on

all-cause child mortality is thought to be due to both direct malaria effects and indirect effects due to malaria's contribution to other conditions such as severe anaemia, under-nutrition, and its impact on the immune system leaving children vulnerable to other infections such as acute bacterial sepsis. With the recent advances in malaria intervention coverage in Zambia, there has been a coincident decrease in all-cause child mortality including an overall 29% reduction in under-five year mortality and 38% and 36% reductions in post-neonatal infant mortality and child (one to four years of age) mortality, respectively see Table 5.

**Table 5: Changes in child mortality rates 2001/02 and 2007, Zambia**

Indicator	2001/02 ZDHS	2007 ZDHS	Percent Change
Infant mortality	95	70	-26%
Neonatal mortality	37	34	-8%
Postneonatal mortality	58	36	-38%
Child mortality (1-4yrs)	81	52	-36%
Under-5 mortality	168	119	-29%

Source: Zambia Demographic Health Surveys. Mortality calculated as deaths per 1000 live births except for child mortality which is calculated as deaths per 1000 children surviving to 12 months of age.

**Malaria in pregnancy:** Pregnant women in malaria-endemic areas are known to be particularly at risk of malaria infection and its consequences of maternal anaemia, placental infection, low birth weight (due to fetal intra-uterine growth retardation and prematurity), and increased risk of abortion, stillbirth, or early infant mortality. As a consequence, regional recommendations in sub-Saharan Africa include specific prevention in pregnancy including the regular use of ITNs and the delivery of IPTp through antenatal clinic services with women recommended to receive at least two doses of sulfadoxine-pyrimethamine (SP) starting after quickening (about 16 weeks of gestation) and delivered at least one month apart. And, in settings with high prevalence of HIV infection, a relatively high proportion of pregnant women may already have HIV infection and they will benefit particularly from two or more doses of SP for malaria prevention.

A variety of studies on malaria in pregnant Zambian women have been published in scientific literature. However, some of these date back to the 1980s and recent quantification of the risk of malaria in pregnancy is limited. A list of published reports is available here and there are some ongoing studies in Luapula (personal communication, TDRC). In general it is widely recognized that women in their first or second pregnancy have the highest rates of malaria and benefit the most from prevention of malaria in pregnancy. However, in many settings, service delivery systems are easier to develop if all pregnant women are targeted to receive the IPTp intervention.

Current national coverage rates for pregnant women with ITNs and IPTp are some of the highest in sub-Saharan Africa. From the 2010 MIS, 46% of pregnant women slept under an ITN the night before the survey, 89% of women received at least one dose of IPTp and 70% received at least two doses of IPTp through antenatal care (ANC).

### 3.9 Conclusions and Recommendations

Malaria epidemiology in Zambia is in transition with three clear epidemiological zones. While in the past, malaria was broadly endemic across Zambia and malaria transmission, illness, and mortality was determined by existing climate, geographic, and biologic features of the vectors, humans, and parasites, in the last decade and particularly the last five years, the malaria control programme work has observed a changing malaria epidemiology. Emerging evidence from routine information systems, national surveys, and focused studies consistently show declining malaria trends with possible epidemiological transition in parts of the country. Today Zambia can be stratified into three malaria epidemiological categories:

- **Zone 1:** areas where malaria control has markedly reduced transmission and parasite prevalence is less than 1%. These are low to very low transmission zones, including the Lusaka province; North-western and South-Central.
- **Zone 2:** areas where sustained malaria prevention and control has markedly reduced transmission and parasite prevalence is roughly at or under 10% in young children at the peak of transmission. These are low to moderate stable areas: Western, North western, Southern, Central and Copper belt provinces; North-eastern / Eastern;
- **Zone 3:** areas where progress in malaria control has been attained but not sustained and lapses in prevention coverage have led to a resurgence of infection and illness (parasite prevalence in young children exceeds 20% at the peak of the transmission season) and control needs to be re Established and sustained. These are high

persistent transmission areas: Northern, Eastern and Luapula provinces.

This suggests that good intervention coverage works and that failure to achieve this or lapses that allow return to lower

coverage rates will be followed by malaria transmission resurgence. There is therefore need for targeting interventions based on epidemiological evidence as shown in the Table 6.

**Table 6: Variations in malaria control priorities in different Transmission Zones in Zambia**

Zone by Province	Epidemiology	LLIN	IRS	IPTp	Dx	Rx	IEC/BCC	Surveillance
Type 1	Very low level of transmission; parasite prevalence $\leq 1\%$ in young children at end of transmission season  <b>Lusaka</b>	Targeted; used for response to focal case containment	Targeted; used for response to focal case containment	No; Rely on case identification, diagnosis, and treatment	Universal diagnosis for suspected malaria	Prompt Rx with 1 <sup>st</sup> line ACT; assure every case resolves	Sensitize community to reduced malaria, case finding, their local responsibility for action	Critical intervention; passive detection from facilities; mapping and follow up and ACD in house and neighbourhood to contain transmission
Type 2	Low moderate stable transmission; (Parasite prevalence 2-14% in young children at end of transmission season)  <b>Central, Copperbelt, North-Western, Western, and Southern</b>	Achieve and sustain universal coverage of sleeping spaces or ~3 ITNs per HH on average	Achieve and sustain high coverage of IRS targeted areas	Yes Strengthen diagnosis and case management for fever during pregnancy	Universal diagnosis for suspected malaria	Prompt Rx with 1 <sup>st</sup> line ACT;	Assure high ITN use and acceptance of IRS; begin to sensitize community to reduced malaria, case finding, their local responsibility for action	Critical intervention; District level active screen and treat infections in entire populations village-by-village; initiate before transmission season & repeat 1+ times to assess focal transmission and measure incidence; strengthen facility case recording and possible home/neighbourhood mapping, follow up to contain transmission
Type 3	Moderate to high transmission (parasite prevalence $>15\%$ in young children at end of transmission season)  <b>Eastern, Luapula, Northern</b>	Achieve and sustain universal coverage of sleeping spaces or ~3 ITNs per HH on average	Achieve and sustain high coverage of IRS targeted areas	Yes	Universal diagnosis for suspected malaria	Prompt Rx with 1 <sup>st</sup> line ACT;	Assure high ITN use and acceptance of IRS; increase prompt presentation for fever illness; sensitize for diagnosis	Strengthen surveillance capability and reporting procedures at facilities; track intervention coverage and parasite and anemia prevalence



In a resource constrained environment, should there be a need to prioritize areas of investment; interventions should be focused on the zone of high persistent transmission, followed by the low stable transmission zone and finally the low-to-nil transmission zone. The first priority should be to maintain and build on current relatively high malaria intervention coverage rates where they exist and to regain high coverage in areas where this has fallen. The following actions are recommended:

**1. Targeting and scaling up to universal coverage, appropriate malaria control interventions according to the epidemiological zones:**

- a. Actively address transmission and burden in the north and east of the country:
  - Regain prevention coverage with ITNs and IRS;
  - Explore other transmission reduction opportunities and service delivery issues as transmission intensity is intrinsically highest in these areas (recognize that lapses in prevention coverage lead quickly to resurgence of infection, disease and death).

- b. Achieve further transmission reduction in provinces/districts where progress has been made:
  - Develop district-based capacity and begin district by district;
  - Consolidate to “provincial control” overtime;
  - Build/strengthen infection detection treatment and utilize surveillance as an intervention in communities and at district level.

**2. Strengthen malaria surveillance and response based on epidemiological evidence:**

- a. Improve data (OR and programme data) for decision-making.

**3. Strengthen generation and use of evidence for policy and strategy:**

- a. Address weaknesses in entomologic information and transmission measurement;
- b. Continue validation of the decline of malaria trends through routine surveillance, surveys, and data quality audits; and
- c. Monitor disease trends and regularly update the malaria epidemiological map based on evidence.

## 4. PROGRAMME PERFORMANCE BY THEMATIC AREAS

### 4.1 Programme management

#### 4.1.1 Introduction

The country's vision is “a malaria-free Zambia” and the overall goal of Zambia's NMSP 2006 - 2010 is to obtain and maintain a 75% (of the 2000 baseline) reduction in malaria incidence and a 20% reduction in all-cause mortality in children under five years of age by 2010. These malaria targets are anchored on the Abuja and RBM target which aims at reducing malaria mortality for Africa's people by half by 2010. Zambia is also a signatory to the MDGs, whose goal is to “halt and begin to reverse the incidence of malaria and other major diseases.”

The MOH has mandated the NMCC to scale up malaria control interventions and coordinate implementation of these interventions at national, provincial, district and community levels. The NMSP provides the strategic framework for strengthening the national, provincial, and district level capacities to plan, coordinate, manage the implementation and monitoring of malaria control activities.

#### 4.1.2 Policy

There is no malaria-specific policy document in Zambia but various policy statements exist in different malaria guidelines. There are implementation guidelines on all the key malaria thematic prevention and control areas: malaria case management, integrated vector management, operations research, M&E/Surveillance, IEC/BCC, epidemic preparedness and response.

#### 4.1.3 Organization

**National:** At the national level, malaria control activities are coordinated by the NMCC. The Deputy Director of Public

Health and Research is the head of the NMCC. He is assisted by scientific officers who coordinate case management; parasitology; entomology; M&E; epidemiology; IEC and BCC; IRS and ITN interventions.

**Provincial:** Malaria control activities at the provincial level are integrated into the general primary health care systems. The provinces designate one person to facilitate implementation of activities. However, the designated persons normally have other public health responsibilities within the province. In each province the designated persons vary between nursing and environmental health professionals.

**District:** Malaria control activities at the district level are also integrated into the general primary health care systems. One person, usually a nurse or an environmental health professional, is designated to facilitate implementation of malaria control activities. This person also coordinates other public health activities in the district.

In some districts the coordination is shared between two district health officers (i.e., an environmental health officer coordinating the IVM and district clinical care specialist responsible for case management). At the health facility level the NHCs are part of the health facility and health centre committee, where they play an advisory role on primary health care issues.

**Community:** At the implementation or community level, promotions of malaria control activities are facilitated by CHWs who also have other public health responsibilities.

#### 4.1.4 Guidance

In the absence of a national malaria advisory group or committee, the development,

updating, and review of policies on malaria are guided by the thematic technical working groups (TWGs). In an effort to scale up uptake of malaria control interventions, the government, as a matter of policy, has made free access to malaria commodities including LLINs, IRS, diagnosis, and treatment. Policies, laws, and regulations exist that support implementation of malaria control in Zambia. For example, legislation that supports malaria control in the country is enshrined in the Public Health Act (Public Health Act Cap 295) (Situation analysis 2000).

#### 4.1.5 Human Resources, Training, and Capacity Development

Zambia has well-established training institutions for health professionals. In general, there is a significant increase in the health professionals produced by the tertiary institutions. Like most African countries, MOH is facing a challenge in the retention of highly qualified health professionals. In an effort to address the problem of brain drain and shortages of health workers, the government is implementing the Human Resource for Health Strategic Plan (HRHSP 2006-10), with specific emphasis on the following strategies:

**Staff retention scheme:** There is on-going implementation of a HR retention initiative targeting medical doctors, nurses, and health sector tutors/trainers. A situation analysis was conducted and a retention package defined on a classification based on hardship criteria (A = cities; B = urbanized areas; C = relatively hard to reach; D = hard to reach). The retention package had other incentives such as a three-year contract with car loan, rural retention allowance [percent of basic salary], and education allowance to support education of staff children and available scholarship to the staff for further training after the three-year tour of duty.

**Task shifting in the health sector:** This is the use of a volunteer cadre of individuals

(skilled or unskilled) within communities to provide health services. MOH has developed a curriculum and national strategy for CHWs with an increased period of training to enhance capacities. Initiatives to retain these workers and incentivizing them have been decentralized to districts.

**Scaling up of training capacities at health training institutions:** Under this strategy, MOH is aiming at expanding intakes and outputs of health graduates to fill the staffing gaps identified at all the levels of the health service delivery system.

#### 4.1.6 Strategic and Annual Planning

Currently, there is a five-year NMSP (2006 - 10), which is due for review and updating after successfully conducting the MIS and MPR. The NMCP coordinates and facilitates planning of malaria control activities and facilitates effective sharing of documents with all stakeholders during quarterly and annual stakeholder meetings (Annual Reports 2006-09 and Annual Plans, 2006-10).

There is active broad-based participation of all the stakeholders (communities, development partners and civil society) in the planning, implementation, and monitoring of malaria prevention and control activities. Planning is based on the bottom-up approach, whereby the districts present their priorities and feed into the national plans. There is an annual operational development plan, which buys into the poverty reduction strategy paper, National Development Plan (NDP), NHSP, NMCSP, and the medium-term expenditure framework (MTEF) (2010-2012) at all levels of service delivery.

Coordination of partners is managed through the sector-wide approach governance structures at MOH, which include:

- The SAG, which meets every six



months and draws membership from the MOH, line ministries, cooperating partners, private sector and civil society organizations;

- Policy committee of the SAG, which meets monthly; and
- Specialized sub-committees, which provide the SAG with technical support, through TWGs.

#### 4.1.7 Financing

The NMCC is a grant-aided national programme, funded through the MOH budget. In addition, the Government of the Republic of Zambia (GRZ) works closely with a number of technical, financing, and implementing partners including: GFATM, the World Bank Malaria Booster Program, WHO, UNICEF, the US government through the United States Agency for International Development (USAID), the President's Malaria Initiative, MACEPA (with support from the Bill and Melinda Gates Foundation), JICA, CHAZ, research institutions, Zambia Malaria Foundation, the Malaria Consortium; STEPS OVC (a consortium of NGOs), and private sector business institutions (banks, oil companies, mines, agrochemical companies, etc.).

Partners' collaboration is conducted based on the NMSP. About 90% of the NMCP annual

plans are funded by the Government and partners. Over 60% of the NMCP strategic plan is funded by malaria partners and the balance by the Government. The Government budget for the NMCP only caters for personnel costs. The budget for health commodities (antimalarial-quinine-SP, diagnostics, insecticides, equipment, and ITNs/LLINs) is catered for by the partners. Zambia has successfully accessed GFATM Round 1, 4, and 7. However, given the quest for universal coverage and the fact that most of the approved GFATM grants will be exhausted by 2011, more resources will be required to attain the national targets and the MDGs.

The country has not yet reached the Abuja target of allocating 15% of the overall national budget towards financing of the health sector. However, there was a general increasing trend of health sector budget, from Zambian Kwacha (ZMK) 1.29 trillion in 2007 to ZMK 1.82 trillion in 2010 budget (ruling rate; 1 US\$=K4700)(2007 to 2010). Financing of the NMCC increased from ZMK2.9 billion in 2007 to ZMK 4.6 billion in 2008, supporting personnel costs and infrastructure (ref 2007/2008) Yellow Books. Financing gaps still exist in the GRZ budget to meet the required levels of malaria commodities, drugs and equipment. Table 7 presents an analysis of funds invested in malaria control from 2007 to 2010.

**Table 7: Amounts invested in malaria control**

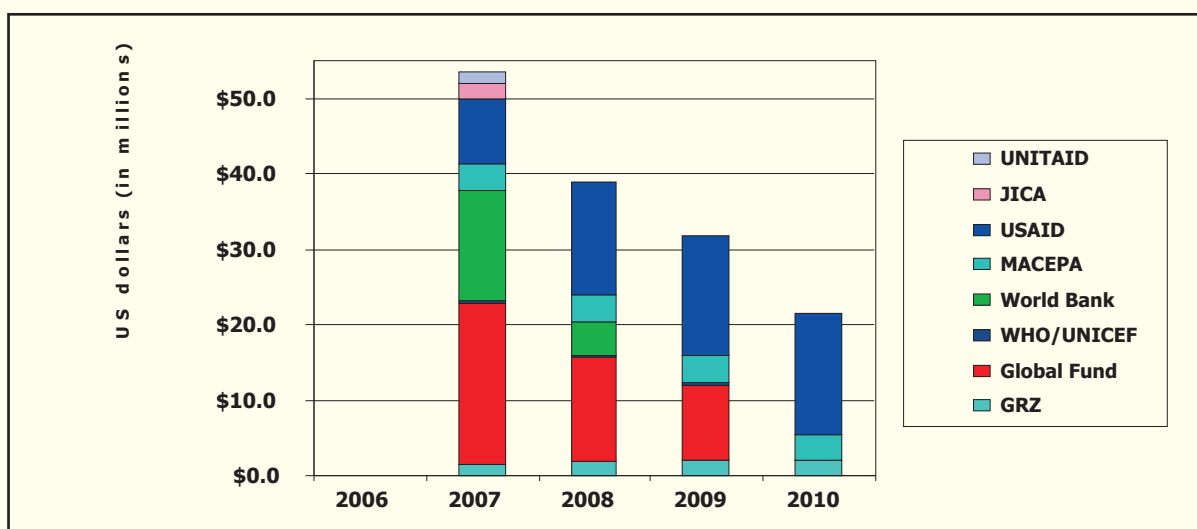
Description	Unit	2007	2008	2009	(2010)
Total national budget	ZMK' Trillion	12.03	13.76	15.28	16.72
Total health budget	ZMK' Trillion	1.29	1.59	1.82	1.36
Proportion of Health Sector Budget allocated to malaria (Gov)	%				14%
Proportion of malaria budget actually spent (Billion Kwacha)	%	2.9%	4.6%		
External funding for malaria	ZMK' Trillion				
Proportion of domestic funding of the total funding for malaria (domestic funding (4) (domestic funding + external funding)	%				

Source: MOH/National Malaria Control Centre

Notes:

1. The Yellow bookB does not clearly separate funding to complete rows 3,5 and 6.
2. NMCC only accounts for funds received at the Centre i.e. funds at the health departments are not consolidated into the NMCC figure.

In terms of availability of funding for malaria control scale-up for impact in Zambia, there has been a general decline between 2007 and 2009. Whilst for some partners funding has increased in the period under review, for others it has reduced. Figure 20 shows malaria financing in Zambia from 2007 to 2009.

**Figure 20: Malaria financing in Zambia 2007-2009**

Source: Zambia Global Fund Round 7 Application

Malaria budget is also included in the National Development Plans, the poverty reduction strategy paper, and in the MTEF.

#### 4.1.8 Strengths, Weaknesses, Opportunities and Threats (SWOT) Analysis

##### Strengths:

- Existence of a strong national malaria control programme in the country.
- Existence of a five-year NMSP and technical guidelines.
- Availability of technical working groups in key interventions.
- Existence of a budget line for malaria control.
- Existence a strong coordination mechanism.

##### Weaknesses:

- Lack of a national malaria policy.
- Lack of a database for RBM partners.
- Weaknesses in the Health Management Information System (HMIS) for reporting malaria burden.
- Inadequate supervision and follow ups to Lower levels of service delivery.
- No focal point person dedicated to malaria.

##### Opportunities:

- Strong Political will towards the programme.
- Large number of RBM partners to support the malaria control initiative.
- Increased funding for Malaria control.
- A decentralised health structure that is integrated into provincial, district, and community-level structures.
- Existence of cross-border collaboration with neighboring countries (Tanzania, Zambia, Mozambique).

##### Threats:

- Gaps in total required resources for meeting scaling up targets.
- High dependence on partnership support.
- Inadequate human resources.
- High HIV and TB disease burdens.
- Poor economic climate.

#### 4.1.9 Successes, Best Practices, and Facilitating Factors

The following could be identified as the main successes, best practices, and facilitating factors:

- **Strong political will towards the fight against malaria:** There is strong political will, as evidenced by the participation of the Head of State at the launch of the World Malaria Day in 2008. He has also participated with a number of global and African Union (AU) heads of states initiative on malaria. Currently, Zambia is chairing the RBM board.
- **Coordinated partnerships:** In recent years, there has been a significant increase in the number of RBM partners supporting the NMCP. These partnerships are well coordinated through the established sector-wide approach governance structures, as well as the NMCP partner consultation structures, such as the TWGs, planning, and performance review sessions.
- **A decentralized health structure:** The health sector has established a structure that is decentralized into provincial, district, and community-level structures. This has facilitated programme ownership and coordination at each level of the health service delivery system.
- **Existence of the NMSP 2006-10:** A five-year NMCP-SP 200610 is in place, providing an appropriate framework for implementation of malaria interventions and coordination of support and participation of the partners.
- **Establishment of the TWGs:** Availability of TWGs in key thematic areas provides an oversight responsibility



in the implementation of malaria control activities. The TWGs are responsible for ensuring there is adherence to NMSP and technical guidelines.

- **Existence of a specific budget line for malaria control:** Within the health sector budget, malaria is allocated its own budget line, demonstrating the importance attached to the fight against malaria.

#### 4.1.10 Problems and Challenges

- There is no national malaria control advisory committee to provide oversight responsibility in the implementation of malaria policy guidelines.
- High dependency on financial and technical support from the partners, which affects the consistency in supply of commodities and represents a threat to long term sustainability of the NMCP.
- Lack of fully dedicated malaria focal point persons at provincial and district levels. The provincial and district focal persons are not fully assigned to the fight against malaria have several other public health responsibilities, which reduces their availability for the delivery of malaria control interventions.
- There are gaps in the resources needed to meet universal coverage targets. For example, initially, long lasting nets were targeted only at pregnant women and children under the age of five, but are now targeted at the whole population at risk to achieve full coverage throughout the country.
- Inadequate HRH at the various levels of health service delivery, particularly during the period of restructuring of the sector, from 2005 to date. This has

adversely affected the delivery of quality malaria prevention and control interventions.

- High HIV and TB disease burdens in the country, which have overstretched the available health workers with increased workload and affected the prioritisation and resource allocation within the health sector with direct impact on the funding available to malaria prevention and control.
- The current global economic recession, which has resulted in reduced global support and funding for malaria prevention and control efforts in developing countries, including Zambia.

#### 4.1.11 Conclusions and Recommendations

##### 4.1.11.1 Conclusion

Based on the findings of this review, it can be concluded that the NMCP in Zambia has made significant progress. However, in order to ensure further progress, the programme, at all levels, needs to strengthen and prioritize human resource capacity building, partnerships, surveillance, response, and operations research.

Malaria control is a national priority. The NMCC is strategically placed within the MOH organizational and management structures and there is significant political will towards malaria prevention and control. The programme has also established strong and effective partnerships with the local communities, government line ministries and departments, CHAZ, the private sector, CSOs and the cooperating partners. These partnerships with cooperating partners have resulted in significant technical and financial support to the programme.

The country has established appropriate policies, guidelines, and strategies to support

and guide malaria prevention and control at all levels of health service delivery. These include a comprehensive NMSP, medium-term and annual plans, policies, guidelines, and legislation in specific intervention areas, including vector control, malaria case management, advocacy, operations research, and M&E. However, budgetary allocations from the Government are inadequate to cover malaria control interventions and there is heavy reliance on donor partner support.

In discussions at central, provincial, and district levels, and across the ministry and partner organizations, it was established that there is wide recognition and appreciation of the progress made to date, the accomplishments of the NMCC in engaging partners and the progress with donor partners in resourcing the tools, commodities, and the work. A new costed NMSP 2011-2015 is required to support the new vision of a malaria-free Zambia.

The NMCP at provincial and district levels currently lack adequate human resource capacity to fulfill its mandate. There are no or only part-time designated malaria focal point persons at provincial and district levels to coordinate malaria activities. The NMCC also lacks a malaria-specific unit responsible for planning, procurement, and training, which hampers full implementation of malaria control activities.

Whilst it was observed that the programme is strong at the national level and there is strong evidence of good partnerships, there is inadequate infrastructure at provincial, district, facility, and community levels. The distribution system for malaria commodities is imperfect, but has grown in capacity and sophistication and now suffers most from the intermittent external supply of commodities leading to frequent stock outs of nearly all commodities such as ITNs and diagnostics, including RDTs and medicines.

**Programming emphasis:** Progress and organizational strength in malaria control in Zambia is most evident at the national level and there is a consensus that extension of support, capacity strengthening, and hard work at the district, community, and household levels will be a critical requirement for progress in the coming years. The plans for this movement towards stronger district and community support will need to address the three different epidemiologic settings with differing transmission intensity and prevention coverage.

**Governance and sustained resource mobilization:** The growing experience with malaria control scale-up in Zambia and elsewhere has demonstrated that strong national leadership is critical to success, and that a solid and predictable resource base is absolutely required for effective planning and programme action. Recent concerns in Zambia regarding financial mismanagement in areas of health have led to the suspension of external funding to the health sector by the basket donors and the GFATM over, roughly, the past one-and-a-half years. Commodity availability (ITNs, RDTs, and ACTs in particular) has been markedly affected and the MIS 2010 shows substantial drops in household ownership and use of ITNs in several provinces, especially Luapula and Northern provinces, and consequent resurgence of malaria infection rates, cases, and hospitalizations (and probably deaths).

In the near term (for the coming transmission season), MOH and donor partners need to urgently seek ways to ensure that prevention gains are not lost. In the longer term, serious discussions on mechanisms for sustained resourcing should be held, so that the malaria control impact remains and additional gains can be achieved. These discussions should be based on reviewing the full financing needs for universal prevention coverage and for the actions to be proposed in the NMSP 2011-15.

#### 4.1.11.2 Recommendations

The following actions are recommended in this area:

##### 1. Strengthen the human resource capacity for malaria control.

- Increase the numbers of provincial and district focal point persons from one each to two, with shared responsibilities for malaria control.
- standardize training curricula for pre-service and in-service training for health workers, in collaboration with training institutions.

##### 2. Strengthen decentralization of malaria control operations to provincial, district and community levels.

- Strengthen partnerships at provincial, district, and lower levels to increase visibility of the partners, especially at the lower levels.
- Establish a system that ensures efficient and consistent supply of commodities and logistics.
- Increase numbers of staff trained in malaria prevention and control.
- Prioritize research and ensure that research findings inform programme policy implementation.

##### 3. Strengthen partnerships and performance management.

- The MOH and its partners should plan and engage in longer term discussion regarding financing and technical support needs to ensure sustained impact and appropriate progress in malaria control.
- Finalize the NMSP 2011-15 to serve as a basis for the gap analysis and budgeting, leading to the discussions of long-term sustained funding.

## 4.2 Procurement and supply chain management

### 4.2.1 Introduction

Procurement of drugs and medical supplies, including malaria commodities, for the health sector is managed by the MOH procurement and supply unit (PSU), which is responsible for procurement of pharmaceuticals, medical, and non-medical supplies for the ministry, including malaria commodities, infrastructure, and equipment. The operations of the PSU conform to the requirements of the Zambia Public Procurement Authority (ZPPA) Act No: 8 of 2008, for both national and international competitive bidding. The MOH-PSU is one of the biggest procurement units within the public sector, as it falls under Category 3, which is the highest category among government ministries, and its threshold is one of the highest.

The Head of Procurement is supported by two chief procurement officers, one of which is a pharmacist, and three senior procurement officers. Within the structures of MOH, the PSU is supported and collaborates with the pharmacy unit, the logistics management unit (LMU), and the Medical Stores Limited (MSL). The pharmacy unit falls under the directorate of clinical care and diagnostic services and provides technical assistance to the PSU.

The unit is responsible for selection, forecasting, quantification and development of procurement plans for health commodities for MOH. The unit is headed by the deputy director of pharmaceutical services, who is supported by two principal pharmacists. The LMU, based at the central medical stores, is responsible for gathering logistics management information, including information on the quantities issued or dispensed to users, stock balances, and losses/adjustments in the supply chain at each



level of the health system delivery point. Information obtained is used by the central level to programme for future procurements.

MSL is responsible for storage and distribution of all health-related commodities and overall inventory control management. In order to foster and maintain rational use of commodities, the pharmacy unit approves all requests from various health delivery points, through the technical officers based at LMU at MSL.

#### 4.2.2 Policy

The Ministry of Finance and National Planning, through the ZPPA, is responsible for establishment and enforcement of the policies, guidelines, and standards for procurement management, within the public sector.

Procurement, distribution, and administration of drugs and medical products are guided by a number of policies, guidelines and legislation. The main policy document controlling the procurement function in the public service is the ZPPA Act No: 8 of 2008. A national drugs policy exists in Zambia. Implementation of the drug policy is funded by the MOH, with support from the cooperating partners. The drug regulatory authority the Pharmaceutical Regulatory Authority of Zambia is involved in regional/international harmonization of standards.

In order to improve the pharmaceutical situation in Zambia, the Zambia Essential Drugs Programme was introduced in 1985. The aim of this programme is to improve access to essential drugs, particularly for primary health care, through the introduction of the Health Centre Kit System. In 1998, Zambia developed the national drug policy as part of the process to realize the principal health vision of “equity of access to cost-effective, quality health care as close to the family as possible.” The vision of the national

drug policy, therefore, is to “provide all Zambians with equity of access to good, quality, safe, and efficacious medicines, which are affordable and rationally used” (Assessment of Pharmaceutical Sector in Zambia, Report, 2006).

#### 4.2.3 Guidelines

Procurement of drugs and medical supplies within the health sector is guided by a number of guidelines established by the ZPPA and MOH. The main ones are the guidelines provided by the ZPPA Act of 2008 and the MOH Procurement Plans.

Malaria commodity management performance standards are well-defined. The MOH, through the NMCC, follows management guidelines which place emphasis on good management of malaria products and guides the health professionals on proper usage. There are also various job aids publications on the management of malaria commodities at all levels of health service delivery.

The MOH procurement plans provide guidelines on the procurement of drugs and medical supplies, including malaria commodities, and are implemented through the MOH-PMU in collaboration with a user department, such as the NMCC, who provides input such as specifications, in accordance with WHO guidelines. The national annual malaria procurement plan is an integral part of the NMCP logistics cycle, which forms the basis for resource mobilization. The Government allocates funds for medicines for treatment of complicated malaria, such as quinine and adjunct therapies, but ACTs, IRS, and LLINs are almost exclusively donor funded.

Domestic core health sector funds are insufficient to adequately support malaria control interventions. This limits the sustainability of the supply of malaria commodities. Delays in fund disbursements

due of donor performance monitoring requirements have also had serious repercussions on the national malaria procurement cycle, resulting in national stock

outs of essential medicines, such as ACTs and ITNs. Table 8 presents the five-year forecast for ACTs and SP, while Table 9 presents the estimated RDTs requirements.

**Table 8: Five year forecast for ACTs and SP- Annual projected number of treatment doses adjusted for age groups 2010-15**

S/N	Product	Unit	Quantities					
			2010	2011	2012	2013	2014	2015
1	AL 1x6	6tabs	1,683,000	1683,000	980,941	882,847	794,563	715,106
2	AL 2x6	12 tabs	264,000	264,000	127,355	114,619	103,157	92,842
3	AL 3x6	18 tabs	231,000	231,000	145,548	130,993	117,894	106,105
4	AL 4x6	24 tabs	1,122,000	1,122,000	671,590	604,431	515,787	489,589
5	SP	Tab	8,000,000	8,000,000	5,662,134	5,823,760	5,990,318	6,161,946

**Table 9: RDTs Requirement Estimates (One Year Period Jan 2010 Dec 2015)**

	Products	Unit	Quantities					
			2010	2011	2012	2013	2014	2015
1	RDTs	Each	5,029,845	5,308,985	5,297,465	5,297,465	4,665,168	4,371,404

In order to ensure appropriate interpretation and management of the various policies, guidelines, regulations, and systems relating to the procurement and management of malaria commodities, the NMCC has introduced the National Malaria Commodities Management Training Modules. The trainings conducted by NMCC are specific to intervention areas. A number of training modules in the area of commodity management, diagnosis, case management, and IRS focus on particular trainee targets.

Training on malaria in Zambia is institutionalized. Various research, academic, and training institutions support the malaria programme in the training of health workers and the community. These include the TDRC, the UNZA School of Medicine, biomedical, and pharmacy training colleges. Specialized trainings, such as commodity management, are conducted with support from cooperating partners.

#### 4.2.4 Registration of Products

In Zambia, registration of malaria drugs is the responsibility of the Pharmaceutical Regulatory Authority, while that for insecticides and ITNs falls under the responsibility of the Environmental Council of Zambia (ECZ).

Registration of malaria drugs is regulated under the PRA Act of 2004, which requires suppliers or manufacturers to give evidence of real-time temperature stability data on the product and accelerated data on the Lot/Batch, with respect to: evidence of successful use or good quality field trial data on the product; provision of samples for assessments and testing for easy use; agreement by the manufacturer/supplier to replace products that fail the agreed test procedures for quality and long-term viability. In addition, suppliers and manufacturers are required to submit a full dossier on product(s) requiring registration in Zambia.

Registration of insecticides and ITNs is regulated under the Environmental Council of Zambia Act.

#### 4.2.5 Specifications

Specifications for malaria drugs and commodities, including insecticides, ITNs, and RDTs, are provided by different TWGs for different commodities at the NMCC, ECZ and MOH laboratory unit, in accordance with WHO specifications. These technical specifications describe the performance, design, and general requirements for products.

#### 4.2.6 Quantifications

The NMCC and partners hold annual quantification meetings, with the participation of the MOH pharmacy unit and MSL. At this meeting, the quantities of anti-malarials (AL, SP, Quinine tablets, Quinine injections) and RDTs to be procured are estimated, and the various partners (USAID, PMI, World Bank, GFATM) commit to what they choose to support. The USAID and USG/PMI work closely with MSL to collect consumption data.

**Methodology and software for malaria commodities estimation and quantification:** Different TWGs under the respective strategic interventions usually undertake annual quantifications of the respective malaria commodities that they are responsible for. Recently, quantification was conducted for a five-year forecast for malaria commodities (ALs and RDTs). This process informs the MOH procurement plan and helps in resource mobilization. However, donor conditions, as well as seasonal and emergency situations, sometimes require the TWGs to conduct quarterly forecasts and quantification review exercises. The NMCC leads the forecasting and quantification exercises for malaria medicines (ALs and RDTs) and have a strategic plan to guide forecasting and quantification for LLINs and IRS commodities.



**Quantification methods:** Quantities for malaria commodities are estimated centrally using three main methods:

- **Consumption method:** This method focuses on the use of inventory control tools to establish usage through the quantities ordered and consumed and the duration of stock-outs for the quantification period, which is normally one year.
- **Morbidity method:** This method uses the number of malaria cases reported in the country over a given period. In this respect, HMIS reports are used to estimate the commodity requirements.
- **Demographic method:** This method focuses on the population and targeted groups, such as children under five years of age and expectant mothers.

The first two of these methods are mainly used for the estimation of malaria medicines and diagnostic commodities. The third method is typically applied to estimate IRS commodities, SP for IPTp, and LLIN needs.

#### 4.2.7 Procurement, Storage, and Distribution

Zambia operates annual and quarterly national procurement cycles and systems. The national procurement TWG is in place. This comprises of members drawn from various organizations, with various expertise, as well as the cooperating partners. The TWGs provide technical assistance on various matters of malaria commodity procurement. The procurement system comprises of the following stages:

- **Selection/identification of commodities:** The selection of commodities to be procured is based on the NMCP guidelines for Zambia. Specifications for malaria commodities

are provided by the respective TWGs for different commodity areas. Selection of malaria medicines is informed by the national malaria guidelines for diagnosis, treatment and prevention of malaria (2007), the Zambia Pharmaceuticals Act (2004), guidelines on essential medicines list, and standard treatment guidelines (STGs). The STGs provide guidelines for prescribing and dispensing the appropriate drugs, public education, and information. In addition, the PRA requires manufacturers to give proof of the following: real-time temperature stability data on the product and accelerated data on the lot/batch; evidence of successful operational use of commodities or good quality field trial data on the product; evidence of manufacturers' good manufacturing practice (GMP) systems/ISO certification; provision of dossiers and sample products for assessment and testing for ease of use.

- **Forecast and quantification:** Quantities for malaria commodities are estimated centrally, using three main methods as outlined above. Depending on the type of commodity to be procured and data sets available, an appropriate method for estimating commodity needs is employed. The TWG under the commodity strategic intervention usually undertakes an annual forecast and quantification and forecast commodity requirement estimates for a five-year period. The forecasts are reviewed on a monthly basis. This process informs the MOH's procurement plan. However, donor conditions as well as seasonality and emergency situations may require the TWGs to conduct piecemeal quantification exercises. The TWG focuses mainly on quantification of anti-malarial medicines, RDTs, and LLINs rather than diagnostic requirements, such as slides and reagents for microscopes.

- **Tendering:** The procurement of goods and services in Zambia is regulated by the ZPPA, whose mandate is to foster efficiency, effectiveness, transparency, and competition while realizing value for money in public sector procurements. Depending on the threshold for the ministry, which is set by ZPPA, the ministry can either float a tender or not. If the amount required to procure identified commodities exceeds the ministry's procurement committee threshold for procurement of commodities, it is referred to ZPPA, who in turn floats a tender on its behalf. However, in either case, tenders are conducted in accordance with the ZPPA Act No. 8 of 2008.

**National and/or MOH procurement agency:** For malaria commodities that are procured internationally, using GFATM, such as ACTs, RDTs, and LLINs, UNICEF has been appointed as the procurement agent. Domestic procurements are directly handled by the MOH through the MOH-PSU.

**National procurement tendering specification and adjudication system:** For ACTs and RDTs, it is required that these goods reach the warehouse, with not less than 80% shelf life remaining. For LLINs, it is required that the products are delivered to the communities before the onset of the rainy season (malaria peak period). This means that ITNs should be supplied much earlier.

**Provincial or state level procurement system and limitations:** The limitation in this regard is that procurement for malaria drugs and commodities has not yet been decentralized.

**Emergency national procurement system to address national stock outs:** The national programme has a well-established pipeline

monitoring system. Shipments are scheduled in line with the established max-min inventory control systems. In addition, it addresses issues of potential stock outs by adequately putting measures in place, like paying for or placing orders in advance. Suppliers are advised when to provide commodities.

**International procurement agency support and their specifications and procurement systems:** UNICEF has high international reputation in executing their services. UNICEF also provides capacity-building support to the MOH in terms of strengthening procurement systems, including sponsorship for short-term courses in procurement.

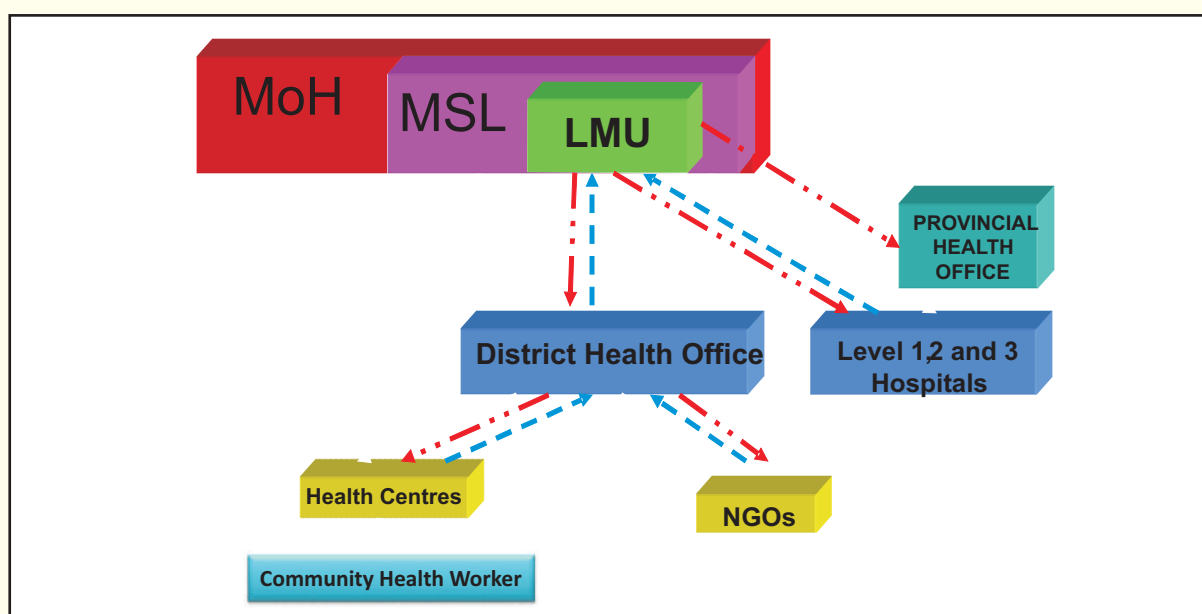
#### 4.2.8 Inventory Management

##### 4.2.8.1 Commodities storage and delivery system at district, provincial and central level

The NMCP supports malaria commodities storage and distribution systems at district, provincial, and national levels. Storage and warehousing of malaria commodities is presently undertaken by MSL, for all public health facilities and by CHAZ for designated faith-based health facilities. Distribution of malaria commodities is done by MSL and CHAZ to districts and hospitals on a monthly basis, according to the delivery schedule. Districts distribute commodities to health centres.

Commodities distributed to health centres are pulled to the facilities through reports and requisitions each month. In addition, the NMCP has trucks to distribute commodities, such as LLINs to provinces and districts. Figure 21 below presents the general national commodities and information flow pipeline.

Figure 21: General national commodities and information flow pipeline



Source: Essential Medicines Pilot Logistics System SOPs, Version A&B 2009

#### 4.2.8.2 Inventory Control Systems

**National stock control cards for commodities at storage and delivery points:** The MOH has a system for managing malaria products. The stock control system focuses on the use of computerized tools (SCMgr/Msupply) at the central level and manual tools at the district and service delivery point (SDP) levels. The tools are available at all SDPs and staff have been trained in the use of the logistics management information system (LMIS) forms, such as stock control cards, supply vouchers, reporting, and ordering forms.

**National and malaria control programme monthly and quarterly reporting on malaria commodities:** NMCC submits reports to MOH on a monthly and quarterly basis on the following:

- Stock status of malaria commodities at MSL;
- Amounts of malaria commodities distributed supplied to all delivery points;

- Planned shipments for malaria commodities.

**National procedures to address shortages or expired stocks of malaria commodities:** To avoid wastage, the First in First Out principles are used in the management of malaria commodity stocks. In addition, redistribution of commodities with short expiry periods to higher consumption areas/districts is employed. However, in the case of expiries, commodities are disposed off in accordance with PRA procedures on disposal of expired commodities.

The NMCP has a well-established monitoring system for procurements in pipeline. Shipments are scheduled in line with the established max-min inventory control. In addition, it addresses issues of shortages by putting appropriate measures in place, like paying or placing orders in advance. Suppliers are advised when to supply commodities.



#### 4.2.9 Quality Control

Quality control procedures at the national level are implemented through relevant regulatory bodies, including the PRA, ECZ, National Food and Drugs Laboratory, and Zambia Bureau of Standards.

**Quality control methods used during tendering for malaria control commodities:** There is a tender committee in MOH, comprised of pharmacy personnel and other technical personnel, who advise the committee on the requirements and specifications of the products to be procured. However, past experiences also play paramount roles in the selection of products and suppliers. Delivery periods and all other important aspects of the tender are clearly communicated to the suppliers. All bidders attend the opening of the tender boxes, as a requirement by policy and procedures of tendering.

**Batch quality control method during delivery of all malaria control commodities:** Commodities bought from pre-qualified suppliers by WHO are counter-checked for batch uniformity, using methods such as screening. Screening methods include: chemical reaction, dissolution/disintegration, and thin layer chromatography, to ascertain safety, efficacy, and quality. All products are physically checked on how they are packaged, and labeled, and the products themselves are further screened using minilabs. When delivering malaria commodities, those with shorter shelf-lives are delivered earlier than those with longer shelf-lives (First in First Out is applied where appropriate).

The national, regional, and global quality control centres being used for different malaria commodities include:

- **Pharmaceutical Regulatory Authority:** Currently, the authority conducts sampling and testing of commodities

entering the Zambian market. The PRA has mini-laboratories that are used for testing. However, the national laboratory for drug quality control will be established before the end of 2010 and is expected to become operational by the first quarter of 2010. In addition, some laboratories within the region are used for this purpose, such as the WHO prequalified laboratories. Quality control systems for malaria medicines within the PRA are still at their inception stages, and are expected to become fully operational (together with the ARVs and anti-TB drugs) when the planned National Scientific Research Centre is operational.

- **Pharmacovigilance (PV):** There are guidelines and tools for PV. These guidelines allow for zero reporting. There is no curriculum (PRA response). There is a PV system, with a designated national reference centre (Copperbelt Province), which collaborates with the WHO Collaborating Centre for International Drug Monitoring UPPSALA in Sweden.
- **Feedback mechanisms:** There is a feedback mechanism for discussing adverse drug reactions (ADRs). MOH meetings, such as during MTEF, are used for sharing information on various issues, including ADRs. Thus, there is need for provincial/district visits specifically for this purpose, i.e., sharing this information with relevant stakeholders at that level. Currently, there is no expert committee on PV that meets regularly.

#### 4.2.10 SWOT Analysis

The following were identified as the main strengths, weaknesses, opportunities, and threats in respect of the commodities' procurement systems and procedures:

##### Strengths:

- Strong leadership at MOH and NMCC levels, with clear vision for the fight against malaria.

- Existence of clear and explicit policies, guidelines, and regulations for procurement, storage, and distribution of malaria commodities, particularly the ZPPA Act No: 8 of 2008.
- Existence of a comprehensive NMC-SP 2006-10 and procurement plans for malaria commodities.
- Existence of an appropriate institutional framework for the procurement function, which includes the MOH Tender Committee, with high thresholds, MOH-PMU, MOH Pharmacy Unit, and the MSL-LMU and coordination mechanisms among these players.
- Availability of appropriate warehousing facilities and well-established distribution system at the central level.
- Existence of quality assurance systems and frameworks for pharmaceuticals and related substances, including the ZPPA Act, PRA Act and ECZ Act.

#### **Weaknesses:**

- Inadequate and unpredictable funding, leading to erratic supplies of malaria commodities.
- Non-commitment to national procurement plans, hence resorting to frequent emergency orders to mitigate situation.
- Weaknesses in the LMIS.
- Insufficient funding for infrastructure development, leading to poor transport and storage infrastructure systems (roads, buildings, etc.) at lower levels.
- Lack of a comprehensive post-market surveillance system.
- Inadequate transport for distribution of medicines from the districts to health facilities.

- Inadequate capacity for quality assurance for pharmaceutical and related substances.

#### **Opportunities:**

- Significant goodwill and support to malaria prevention and control, particularly the procurement of malaria commodities, from the global and regional communities and initiatives, including the RBM, MDGs, GFATM, USG-PMI, Abuja and Maputo declarations on health, SADC Malaria Strategic Plan, and others, leading to stronger partners' support towards procurement of malaria commodities.
- Global and regional initiatives in support of harmonization and coordination of local and external resources for high impact in health, particularly the Paris Declaration on Aid Effectiveness and the International Health Partnerships and Related Initiatives (IHP+). These initiatives present significant opportunities for strengthening harmonization and coordination of donor support towards procurement of malaria commodities.
- Good will, high-level commitment and support from the Zambian government to national malaria control, leading to the prioritization of malaria commodities within the national procurement plans for drugs and medical supplies and national budgets.
- Enabling country-level policy, legal and regulatory frameworks for management of procurements of malaria commodities, including the PPAZ Act, the PRA, and ECZ.

#### **Threats:**

- Inadequate funding, from both the government and donors, for procurement of malaria commodities.

- Over-dependency on donor funding for procurement of malaria commodities, which has implications on long term sustainability. Currently, donor funding is unpredictable and inconsistent.
- Governance challenges, particularly the recent allegations of misappropriation of donor funds in the health sector. This has led to the suspension of support to the sector by some donors and, if not appropriately addressed, has potential to significantly undermine the good partnerships with donors.

#### 4.2.11 Successes, Best Practices, and Facilitating Factors

The following were identified as some of the main successes, best practices, and facilitating factors:

- Increased human resource at the national level in supply chain management systems.
- Decreased commodity wastage.
- Development of a malaria commodities logistics system.
- Increased capacity building in commodity logistics.
- Decreased percent of stock-outs at both central and service delivery points.
- Development of trainer and participant training modules in commodity management.

#### 4.2.12 Issues and Challenges

**Infrastructure and transport:** Inadequate infrastructure and transport, such as storage facilities and motor vehicles for storage and distribution of malaria commodities (USAID: IRS Needs Assessment Report, 2010). Transportation of commodities from the districts to lower levels of service delivery is a key challenge for the district level implementers, because the same transport has to be used for various functions. Further, sustainability of funding, given that some commodities such as ACTs are procured

mostly by donor funds (GFATM, UNITAID, etc.) is a real concern.

**Lack of national/districts teams for monitoring ADR:** Currently, there is no national team for monitoring adverse drug reactions and no district team for investigation of adverse drug reactions. This attributed to inadequate funding to support these activities. There is also no formal training programme in PV.

#### 4.2.13 Conclusions and Recommendations

##### 4.2.13.1 Conclusions

Procurement and management of malaria commodities is currently handled centrally, by the MOH procurement management system and structures, in collaboration with the NMCC and MSL, and with inputs from various partners. Some procurement for malaria commodities are handled by procurement agents, particularly UNICEF.

Funding for malaria commodities, from both the Government and cooperating partners, is inadequate, leading to stock-outs. Further, the support from cooperating partners is unpredictable and inconsistent, and over-dependency on this support has implications on the long-term sustainability of the malaria programme, particularly the procurement of malaria commodities.

Health workers are currently being trained in various aspects of stock management and reporting, but distribution challenges at the district level contribute to stock-outs of malaria commodities, particularly at service delivery points. Stock management and reporting for most commodities is considered weak. The LMIS under the essential medicines logistics system, which is expected to be operational in November 2010, is expected to significantly contribute to improvements in the management of malaria commodities.



### 1.1.6.2 Recommendations

In order to improve the coordination and tracking of commodities in the NMCP:

- There is a need to set up a separate committee that looks into the commodity/supplies of the NMCP.
- Information sharing, including IEC, on commodity support should be improved; the planned monthly capturing of malaria commodity/supply management will enhance this feedback.
- Deploy a logistician at the DHOs to coordinate malaria commodities supplies management with various stakeholders.
- Address procurement at the central level and warehousing/distribution bottlenecks at the DHO level to avoid delays and stock outs at the SDP level.
- Deploy personnel dedicated to supply chain management activities at NMCC to ensure close monitoring and supervision of the procurement and supplies management system, which are critical to management of the procurement cycle.

## 4.3 Malaria vector control

### 4.3.1 Introduction

The two main vector control interventions aimed at preventing malaria transmission are ITNs and IRS. The country is aiming at strengthening an integrated vector management system that includes other supplemental interventions, such as

larviciding, biological control, and environmental management, and manipulation.

The national vision for ITN distribution is to have universal coverage, defined as ensuring that all sleeping spaces in all households are covered by an ITN. This translates into an average of three ITNs per household, which provides more than enough ITNs for 1 net per 2 people. one for every two people (5.2 people per household). In order to achieve universal coverage, various delivery methods have been adopted. These include: mass distribution campaigns; providing nets to pregnant women through ANC; the equity channel, which targets vulnerable groups (orphans, aged, chronically ill); the Community Malaria Booster Response (COMBOR); Malaria School Health Programme; and commercial distribution.<sup>14</sup> Mass distribution campaigns have been implemented since late 2005, with expected replacements after three years of use. The programme target was to achieve 80% utilization of ITNs by 2008<sup>15</sup>, but this has not been achieved. To increase utilization, the programme has developed guidelines on household distribution of ITNs.

Programmatic distribution of ITNs began in 1998, when nets were distributed through the USAID-funded Eastern Province Integrated Malaria Initiative (EPIMI) and the UNICEF-supported Community Based Malaria Prevention and Control Programme (CBMPCP). In 2003, nets were provided to all health facilities, and the equity malaria control programme was initiated. In 2001, household ownership was as low as 13.6%<sup>16</sup>. These low rates necessitated more equitable strategies and, in response, the first measles/ITN campaign was held in 2004,

<sup>14</sup> Guidelines of the distribution and utilization of ITNs for malaria prevention and control. November, 2008, National Malaria Control Centre, Ministry of Health Lusaka.

<sup>15</sup> The Zambia National Malaria Strategic Plan (2006 to 2010). 2005, National Malaria Control Centre, Ministry of Health Lusaka.

which distributed ITNs to every immunized under-five child in five districts. This was followed by the introduction of free mass distributions of ITNs in 2005, with a total of 516,999 being distributed in the third quarter of the same year. In 2006, a decision was made to distribute WHO Pesticide Evaluation Scheme (WHOPES)-recommended LLINs, which avoided the requirement of re-treating nets every six months.

IRS was re-introduced in Zambia by the private mining sector in 2000 (ref Konkola Copper Mines reports). With the successful implementation and subsequent reduction in malaria incidences in areas prioritized for IRS by Konkola Copper Mines in 2003, MOH decided to implement the programme in the public sector, initially on a pilot basis in five urban districts (Ndola, Kitwe, Kabwe, Lusaka, and Livingstone), which are all along the line of rail.

Since then, with support from cooperating partners, such as the USAID-supported programmes, the World Bank, and the GFATM, the programme was gradually scaled up to cover 8, 15, and 36 districts by the years 2005, 2007, and 2008, respectively. In 2010, the IRS programme is poised to be implemented in 54 districts, including all the provincial districts, targeting a population of 12 million with approximately 1.6 million structures or households. Local public-private partnerships exist in some selected districts, e.g., between the DHOs and: Konkola Copper Mines in Chingola, Chililabombwe, and Nampundwe (Mumbwa); First Quantum Minerals in Ndola and Solwezi; Mopani Copper Mines in Kitwe and Mufulira; and Zambia Sugar Company in Mazabuka. In Zambia, IRS is conducted as an annual event, between the months of September and November. This period is just before the peak malaria transmission period, which coincides with

the wet/rain season stretching from November to April in the subsequent year.

Currently, the insecticides used for IRS in Zambia include two classes, the organochlorines (Dichloro Diphenyl Trichloroethane [DDT]) and pyrethroids (Alphacypermethrin, lambdacyhalothrin, and deltamethrin).

## 4.3.2 Policy and Guidance

### 4.3.2.1 Policies on LLINs

The national policy is to distribute free ITNs nationwide for all populations. Initially, ordinary pre-treated ITNs were used, but these have been progressively replaced with the pre-treated LLINs. Non-treated nets are not used, and all those already within communities will require pre-treatment. Planning will take into consideration replacement of nets, through cover-up campaigns. The NMCP only distributes LLINs that have been approved by the WHOPES. On 6 October 1998, the government declared LLINs as duty free commodities. Later, in 2001, LLINs were declared tax free.

### 4.3.2.2 IRS Policies

The NMCC only uses insecticides that are approved by WHOPES and registered with the Environmental Council of Zambia (ECZ). Choice of an insecticide is based on the policy decisions made by the NMCC. These decisions further involve country insecticide management policy and hence are strictly adhered to by the national programme (annual action plans of the NMCC). Equally, only WHO-approved spray pumps are used in Zambia. The established standard is that, to be acceptable, the spray pump should be

<sup>16</sup> Zambia Demographic Health Survey. 2002.

pneumatic, made of a non-corrosive material, with a capacity of 15 litres, and with a strap. The country has been using Hudson X-pert or equivalent spray pumps (national IRS guidelines). Specific requirements are underpinned in the WHO manual for instruments used for vector control (refer to WHO/VBC/89.970).

#### 4.3.2.3 Larval Control

Although larval control is part of the IVM strategy of the NMCP, it has not been widely implemented in vector control, as much attention and resources were invested in the IRS and ITNs strategies. The lack of larval control is also attributed to the vastness and hard-to-reach breeding sites in the rainy season and difficulties in implementing this intervention in the rural areas. However, with the emergence of insecticide resistance in the country, larval control by environmental management and larviciding could provide alternative vector control. It is a requirement that the selection of larvicides must take into consideration the national insecticide resistance management policy.

#### 4.3.3 Organizational Structure

Vector control structures are organized at national, provincial, district, and community levels.

##### 4.3.3.1 National Level

At the national level, vector control activities are coordinated through specific intervention TWGs as follows:

**ITNs working group:** The mandate of this group is to coordinate the implementation of ITN activities in the country, provide technical expertise to collaborating partners as well as facilitate the development of guidelines and policies for sustainable implementation of ITN programmes. The terms of reference are as below:

- Strategic planning for ITN programme implementation by promoting partnerships at all levels, that is national, provincial, district, and community.
- Coordination of ITN programmes among the various implementing partners operating within the country.
- Development of national guidelines and policies to ensure that all implementing partners as well as those contemplating the distribution of ITNs are aware of minimal needs and requirements of ITNs, processes, and procedures needed for programming purposes.
- Conduct M&E exercises in order to determine efficient and sustainable ways of implementing ITN programmes.
- Develop strategies to educate communities' access to increase ITN coverage and utilization rates in collaboration with the IEC working group.
- Conduct vector susceptibility studies on insecticides used for ITNs in collaboration with operations research working group.
- Resource mobilization for ITN implementation.
- Providing technical support to cooperating partners.
- Improving malaria networks through collaborations with various partners.

**IRS technical working group:** There is an IRS technical committee and, more recently, an insecticide resistance management committee was formed, whose mandate is to be an advisory body to the NMCP on insecticide resistance across the country. This committee draws members from national teams from TDRC, UNZA, ECZ, local authorities, private sector, and other partners, with NMCC as coordinator. Membership is by appointment from the permanent secretary of the MOH. The main terms of reference for the IRS TWG are, to:

- Provides partnership coordination and policy guidelines for the national implementation of IRS.



- Provide guidelines on various aspects of IRS (e.g., training; storage of insecticides and equipment and environmental compliance).
- Monitor and supervise the implementation of IRS.
- Conduct needs assessments to provide for information for the annual requirements for cost-effective implementation of IRS.
- Provide criteria for the selection of areas for districts and appropriate insecticide and equipment to be used in the implementation of IRS.

#### 4.3.3.2 Provincial, District, and Community Levels

At these levels, malaria activities fall under the public health units at provincial and DHOs. Malaria focal point persons have also been appointed to coordinate malaria activities at these levels.

#### 4.3.4 Guidance

##### 4.3.4.1 ITNs Distribution

ITN distribution is supported by a number of guidelines that have been developed with support from all stakeholders and are regularly reviewed to suit prevailing situations. These include: national ITN guidelines; mass distribution guidelines; door-to-door campaign guidelines; ANC ITN guidelines 2001; and the net Re-treatment guidelines.

##### 4.3.4.2 IRS Implementation

The programme has developed a comprehensive set of guidelines to address regulatory control, proper handling, supply, transportation, application, use, and waste management and disposal of insecticides, to minimize adverse environmental effects and human exposure. These guidelines aim at ensuring that organizations and districts that are using insecticides for malaria control and

prevention protect the environment and humans from the effects of insecticides and to strictly adhere to national regulatory policies and guidelines. The guidelines also include the need to have quality assurance and strict stock control of insecticides at all levels, from the time of entry into the country to the time of use or disposal.

#### 4.3.5 Human Resources, Training, and Capacity Development

Officers, focal point persons, and units responsible for malaria vector control at community, health facility, district, provincial, and national levels include:

**National level:** the director of public health and research (DPH&R) at MOH, who is overall responsible for public health and research, including malaria control; the deputy director of public health and research, NMCC, who is the health of the NMCC; the chief entomologist; the principal IRS officer; and the principal ITN officer. In the current scenario, there are only two entomologists in Zambia at the MOH central level.

**Provincial level:** the provincial medical officers (PMOs), who are responsible for overall coordination of health service delivery at provincial level. Other key staff include: a clinical care specialist; provincial/regional entomologist; and COMBOR regional facilitators (in four provinces only).

**District level:** the district medical officers are responsible for overall coordination of health services delivery at the district level. Other key staff include: IRS managers; a malaria focal point person, an environmental health technician/technologist (EHT). Local authority and the MOH work hand in hand. Major cities have public health departments, smaller districts solely dependent on DHO.

**Community level:** malaria agents; CHWs, NHCs, and other volunteers such as church groups.

Capacity for training and re-training in vector control, including training modules: the CBMPCP Training Manual; ITN distribution orientations/Institution Manual; needs assessment orientations; COMBOR training manuals; ANC ITN (MIP) training materials have been developed and are in use. Other capacities in support of vector control include:

**Existence of vector surveillance system, including insectaries:** District staff are able to collect and identify mosquitoes. In the past year a functional insectary at the national level has been built. Insecticide susceptibility monitoring systems and contact bioassays capacity has been strengthened.

**Sentinel sites for susceptibility testing and bioassays:** 10 sentinel sites were established in 2002, but only five have been in use.

**Quality control of interventions, including bioassays:** Feasibility study has been conducted to investigate the quality of contact bioassays in Solwezi and Ndola. Results showed the possibility of carrying out such tests in the districts.

**Entomology reference laboratory:** There is no entomology reference lab in Zambia.

#### 4.3.6 Annual Planning

The NMCC conducts annual action planning for malaria control interventions, including vector control and commodities. This planning takes a comprehensive approach, covering all the areas of malaria control, and is conducted within the established national and MOH planning system, which includes:

- Development of five-year strategic plans
- Development of MTEFs, which are three year rolling plans linked to the strategic plan.
- Development of annual action plans, linked to the MTEF and strategic plan.

Planning involves a bottom-up approach and broad participation of the main stakeholders, particularly the other line ministries and government departments, RBM partners, CHAZ, civil society, and communities. Once developed, the NMCC annual action plans are incorporated into the MOH Annual Action Plan and budget, which in turn is incorporated in the national budget, for funding purposes. The plan is also used as an important tool for soliciting for partners' support to specific in areas.

To support the planning, and M&E processes, the MOH/NMCC has established important reporting systems, including routine- and survey-based systems. These include routine reporting on vector control activities, which are carried out regularly on LLIN and IRS delivery and coverage, such as:

**Routine reporting systems/reports,** such as:

- HMIS at the MOH level.
- Weekly directorate reports made by the ITN and IRS unit on all activities undertaken during the week and is submitted to the directorate head every Thursday.
- A monthly report on distributions by all stakeholders, that is to say NGO's, commercial sector, and private sector. This report outlines all major activities undertaken as well as submission of distribution plans. A template for this report has been developed by the NMCC.
- Quarterly TWG meetings used as a forum for disseminating information, coordinating activities, and progress updates. Membership extends from small NGOs to large multi-laterals.
- An annual ITN and IRS report developed by the ITN unit that consolidates all activities implemented by various partners.
- Quarterly updating of the ITN database and an annual IRS database update. These are based on consolidated monthly

submissions from partners and done at NMCC.

**Survey-based systems/reports:**

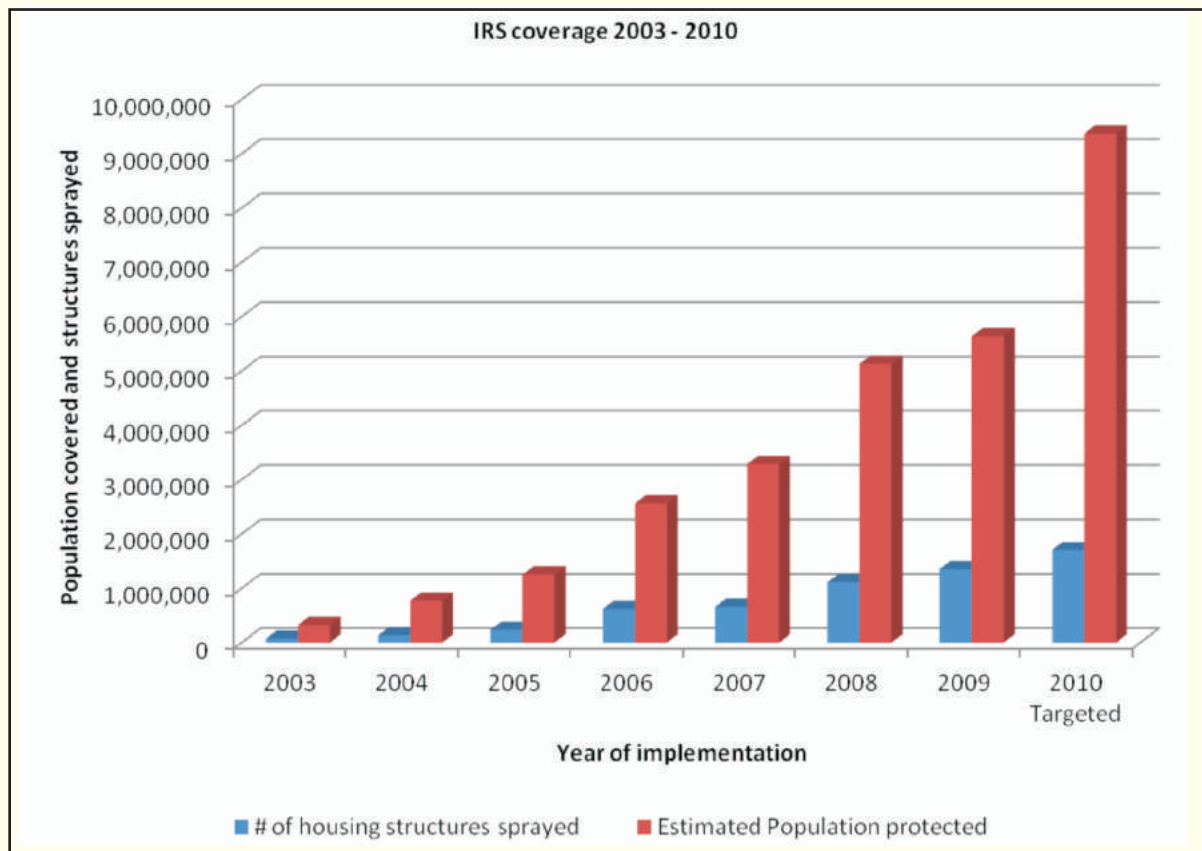
- The MIS;
- Sentinel surveys.
- Zambia DHSs.
- Mid-term and end-of-term evaluations of health sector performance.

**4.3.7 Service Delivery Outputs and Outcomes**

**4.3.7.1 Annual trends in IRS coverage**

IRS has been scaling up over the years, as shown in Figure 22 below. When IRS was re-introduced in the public sector, the main focus was to target urban and peri-urban areas, since rural areas were earmarked for distribution of ITNs. Later, considering the low utilization rate of ITNs (MIS 2006 and 2008), the focus shifted to universal coverage and the programme embarked on scaling up the intervention to include rural areas as well.

**Figure 22: Zambia, IRS Coverage 2003 to 2010**



Source: National Malaria Control Centre (NMCC), Zambia



In the next five years, the country is expected to scale up IRS coverage to all the 72 districts and enhance surveillance systems. The estimated financing requirements (for the period 2011 to 2015) to meet this target are analysed in Table 10 below.

**Table 10: Projected Total National Financing Requirements for IRS, 2011 to 2015.**

Projected requirements, 2011–2015					
	2011	2012	2013	2014	2015
Activities	\$	\$	\$	\$	\$
Enumerations of structures	30 000	60 000	30 000	20 000	20 000
Needs assessments	35 000	50 000	40 000	35 000	35 000
Technical support to districts	45 000	55 000	35 000	35 000	35 000
Commodities (pumps, insecticides, and PDAs, etc.)	2 500 000	3 000 000	3 400 000	3 500 000	2 500 000
Distribution of commodities costs	35 000	20 000	35 000	55 000	60 000
IRS guidelines, IEC materials and sensitization	100 000	50 000	60 000	70 000	70 000
Capacity building for provinces and districts	1 500 000	2 000 000	2 100 000	2 150 000	2 300 000
Refurbishments of storage infrastructure		500 000	50 000	50 000	50 000
Supervision and monitoring	45 000	50 000	45 000	45 000	45 000
Collection of IRS waste	18 000	19 000	20 000	24 500	25 000
IRS implementation	2 200 000	2 200 000	2 250 000	2 255 000	2 000 000
IRS post spray meeting	80 000	90 000	100 000	120 000	125 000
Surveillance system + Insecticide resistance monitoring		100 000	150 000	250 000	500 000
Integrated vector management (Larviciding, EM )	480 000	490 000	500 000	550 000	600 000
Strategic environmental assessment	100 000				
Baseline data collection	50 000	90 000	100 000	50 000	100 000
<b>Total</b>	<b>7 218 000</b>	<b>8 774 000</b>	<b>8 915 000</b>	<b>9 209 500</b>	<b>8 465 000</b>

Source: National Malaria Control Centre (NMCC), Zambia

#### 4.3.7.2 Annual trends in coverage with LLINs

Since 2006, Zambia has distributed 6 073 000 ITNs, the majority of which were LLINs, with an average insecticide efficacy and physical survival of three years. Table 11 below summarizes the number of ITNs distributed from 2006 to 2009, and estimates the projected total national requirements and annual number of nets required to fully fill gaps from 2010 to 2015. From these estimates around 22 million additional LLINs will need to be delivered in Zambia to ensure universal coverage of three nets per household by the

end of 2015.

The objective of the programme should be to regularize the annual distribution of ITNs. This will require a delivery of 6.3 million ITNs in 2010. If this was achieved, the following annual net requirements from 2011 would stabilize at around 3 million. The table below provides estimates that could be used to prepare the next five-year ITN plans and proposals for fund-raising.

**Table 11: Number of ITNs distributed from 2006 to 2009, and estimates of projected total national requirements and annual number of nets required to fully fill gaps from 2010 to 2015**

Year	Total Population in Zambia	Estimated ITN Need in HH Based on 1.6 Persons per ITN (for 100% Coverage)	ITNs Distributed (2006–2009)/ Required (2010–2015)	Annual ITN Gap
2006			1 218 000	
2007			2 494 000	
2008			965 000	
2009			1 396 000	
2010	12 782 000	7 988 750	1 016 800	6 336 455
2011	13 101 550	8 188 469	4 444 150	3 475 016
2012	13 429 089	8 393 180	3 475 016	2 262 903
2013	13 764 816	8 603 010	2 262 903	2 846 166
2014	14 108 936	8 818 085	2 846 166	3 804 397
2015	14 461 660	9 038 537	3 804 397	3 232 415
<b>Total ITN requirements (2010 to 2015)</b>				<b>21 957 352</b>

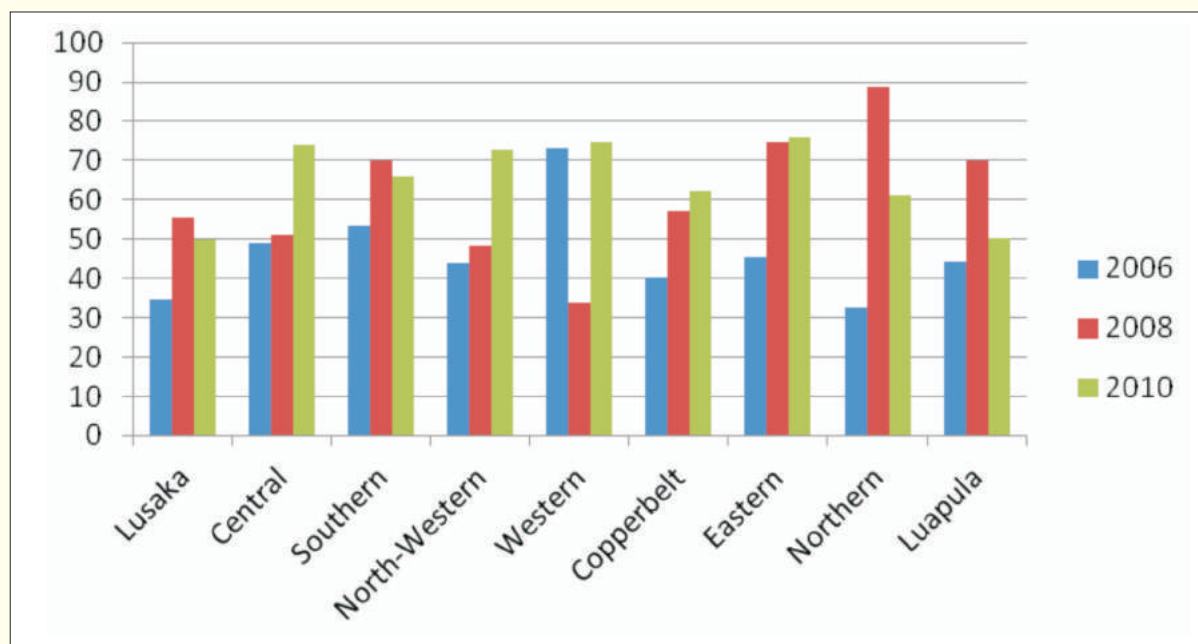
Source: National Malaria Control Centre (NMCC), Zambia

Malaria vector control scale-up has coincided with increased availability of financing for the package of malaria control interventions. In particular, prevention coverage with ITNs and IRS has increased substantially between 2005 and 2010. Prior to 2005, ITN and IRS coverage in Zambia was relatively low, with approximately 12% of households owning an ITN by 2002 (ZDHS 2001/02) and IRS only being deployed in Copperbelt Province through the mining industry. Since 2005, Zambia has achieved significant progress in scaling up malaria control interventions and in reducing the malaria burden.

As a result of this scaling up in malaria vector control interventions, more than 70% of

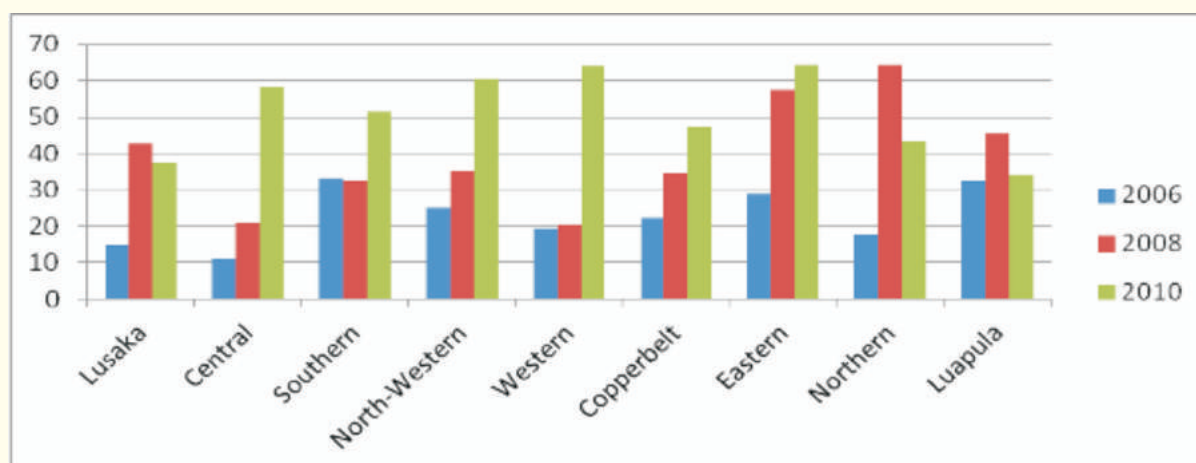
households are now protected by either ITNs or IRS. Among households with at least one ITN, nearly 70% of the children living there reported using the net the previous night. That level of prevention is expected to have dramatically altered the vector population and the intensity of malaria transmission across the country. However, by 2010, two provinces had experienced some reductions in coverage, due to shortages of ITNs for “keep-up” distribution to replace old and failing ITNs. Figure 23 and 24 demonstrate that, while most provinces had continued high coverage and increasing use of ITNs, Luapula and Northern provinces experienced declines in household ownership and reported use by young children.

**Figure 23: Households reporting owning at least one ITN in 9 Provinces, Zambia 2006-2010 (% household ITN ownership of  $\geq 1$  ITN)**



Source: National Malaria Control Centre (NMCC), Zambia

**Figure 24: Proportion of children <5 years old reporting sleeping under an ITN last night in 9 Provinces, Zambia 2006-2010 (% children <5yrs old sleeping under ITN last night)**



Source: Malaria Indicator Survey (MIS) 2006, 2008, and 2010, Zambia



In particular, the 2008 MIS results showed that 72% of Zambian households have at least one mosquito net, and 62% of households have at least one insecticide-treated net, representing an increase from 50% and 38%, respectively, compared to 2006. Forty-eight percent (48%) of all Zambian children under five years of age slept under a mosquito net the night before the survey, while among households with at least one net, 61% of children under five years of age slept under a

mosquito net. Among households within the IRS-targeted districts, more than 40% of households reported spraying in the previous 12 months, with an increasing trend in the rural, more malaria prone areas of these districts since 2006.

The 2010 MIS results for vector control are summarized in Table 12 below and show further improvements in ITN use.

**Table 12: 2010 MIS results for ITN ownership and utilization rates**

Key malaria indicator	Yes (Y) / No (N) / Not Applicable (NA)	Target	Achieved
Proportion of households with at least one ITN/LLIN	Y	80%	64.3 % (MIS 2010)
Proportion of children under five years of age who slept under an ITN/LLIN the previous night	Y	80%	49.9% (MIS 2010)
Proportion of pregnant women who slept under an ITN/LLIN the previous night	Y	80%	45.9% (MIS 2010)

Source: Malaria Indicator Survey (MIS) 2010, Zambia

The most striking thing is that, given only a slight increase in ITN ownership, there has been a substantial increase in utilization rates. The MIS 2010 showed that 64% of households had at least one ITN in 2010, only up by 2% compared to 2008, but overall under-five utilization rates increased by 9% to 50%. This suggests that sustained availability of ITNs over long periods and provision of replacement nets, increase user confidence to sleep under the ITNs. Among households with at least one net, 70% of children under five years of age slept under a mosquito net, another 9% increase compared to 2008, showing that net use has increased significantly.

Malaria prevention in pregnancy relies on the use of ITNs and the use of IPTp. The MIS 2008 reported that 45% of all women ages 15 to 49 years slept under a mosquito net, and 39% slept under an ITN. In the 2010 MIS the rate of pregnant women sleeping under an ITN increased to 46%, providing more

evidence that, over time, people are more willing to use their nets.

#### 4.3.8 SWOT Analysis

##### Strengths:

- Strong MOH and central government commitment and support.
- Availability of national ITN and IRS guidelines, communication strategy in ITN and IRS database.
- Strong partnerships at all levels national, provincial, district, and community.
- Strong NMCP team and management system, which ensures direct delivery of ITNs and implementation of IRS to the districts.
- Critical mass of trained personnel in malaria entomology at all levels of service delivery.
- Mapping of vector distribution, IRS/ITN coverage.

**Weaknesses:**

- Low ITN utilization rates.
- Weak ITN reporting systems for vector control in certain districts.
- Inadequate storage space and transport at all levels.
- Evaluation of data collection instruments for ITNs not done.
- Inadequate funding for procurement of vector control commodities according to recommended specifications, e.g., personal protective equipment (PPE).

**Opportunities:**

- Global support to the fight against malaria and availability of international guidelines on vector control.
- Strong partnerships with cooperating partners and availability of global resources to support malaria control, including GFATM, PMI, etc.
- Local political will and support.
- Increased resources due to growing private sector and NGO interest and involvement.
- Availability of a technical advisor.
- Functional insectaries for monitoring IRS are now available.

**Threats:**

- Insecticide resistance.
- Influx of untreated nets through the borders of neighboring countries and the commercial sector which leads to the presence of ITNs whose efficacy is compromised due to community ignorance on re-treatment of untreated nets, once treated.
- High cost of ITNs in the private sector.
- Abuse/misuse which reduces utilization rates.
- Lack of defined disposal plan.
- Possible resistance of vector to insecticides.

**4.3.9 Successes, best practices and Facilitating factors**

The scale-up of ITNs and IRS in Zambia has been a great achievement, one of the best in Africa. This has been made possible by the partnership between the NMCP and all stakeholders.

**4.3.10 Issues and Challenges**

- Inadequate resources to ensure continuous supply of ITNs and IRS commodities and operational support required for universal coverage.
- Declining ownership and use of ITNs in the northeastern and eastern high transmission zone. This has become a national emergency in 2010.
- Declining ITN and LLIN delivery is targeted to risk groups not universal coverage with one LLIN for two people in high transmission areas.
- Absence of a routine system of ITN replacement in the interval between mass distribution campaigns.

**4.3.11 Conclusion and Recommendations****4.3.11.1 Conclusion**

The main interventions for vector control in Zambia are ITNs and IRS. The ITN policy initially targeted young children and pregnant women, but has since changed to covering sleeping spaces in all households to fully address transmission reduction using two main distribution methods: province/district-wide distribution and ANC-based malaria in pregnancy ITN scheme; both methods distributing nets free.

As a result, 64% of households in Zambia own at least one ITN but this ranges from 75% in Western Province to 57% in Luapula Province. IRS has been successfully implemented in up to 36 Districts, attaining

operational coverage of >90% of the targeted structures. Across Zambia, 73% of households report either owning an ITN or having had their house sprayed in the past year. Baseline studies conducted in some sites in 2000/2004 showed 100% susceptibility to DDT and pyrethroids, but recent studies have shown emergence of insecticide resistance.

#### 4.3.11.2 Recommendations

There is need to sustain the gains by attained in scaling up of vector control, over the past 5 to 10 years. The following recommendations are considered appropriate:

##### 1. Targeting and scaling up vector control interventions according to the epidemiological zones.

- Low to nil transmission zone: no ITN, no IRS.
- Low stable transmission zone: scale up ITN to universal coverage and maintain, through a routine ITN distribution system that ensures routine replacement of torn or disused ITNs. No IRS (or IRS for three years to further reduce malaria burden).
- High persistent transmission zone: scale up ITN to universal coverage and maintain through a routine ITN distribution system that ensures routine replacement of torn or disused ITNs. Scale up IRS to reduce malaria burden and sustain with ITN and focalized IRS as part of surveillance response.

##### 2. Strengthening generation and use of entomological evidence for policy/strategy.

There is a need to build capacity at national and sub-national levels for entomological surveillance and insecticide resistance

monitoring. This includes addressing the issue of DDT resistance, through pre-emptive withdrawal of DDT from places where it has been in use for more than two-to-three years. Apart from DDT, any insecticide that loses efficacy should be withdrawn and replaced with a more efficacious insecticide. There is equally a need to strengthen district surveillance and response capacities in all epidemiological zones so that, based on surveillance results, respective districts could respond to clustering of malaria cases with any or combinations of ITN, IRS, and testing and treatment with ACT. All of these should be supported with BCC interventions.

##### 3. Strengthening financing and logistics for vector control.

There is a need to actively plan and advocate for sustained financing, logistics, and supply for ITNs and IRS nation-wide coverage, in accordance with the strategic directions proposed for each epidemiological zone.

## 4.4 Epidemic and emergency preparedness and response

### 4.4.1 Introduction

Preparedness and timely response to malaria epidemics is a priority in regions of unstable malaria prevalence. When low transmission is achieved, there is a high risk for resurgence and rebound associated with annual and cyclical weather and climatic factors when these occur at the same time with decreased access to and coverage of malaria control interventions. Extreme climatic events, such as drought and floods following cyclones or hurricanes, and civil disturbances lead to emergency situations in which the population is more vulnerable to malaria.

In order for an epidemic to occur, there are determinants or risk factors that must exist. In Zambia, the parasite and vector species associated with malaria epidemics are widely



spread across the country (Zambia epidemic preparedness and response (EPR) guidelines, 2007). Malaria epidemics commonly occur in unstable malaria areas. The country has a zone of unstable malaria area, comprising an epidemic prone zone<sup>17</sup>. Other areas that are likely to fall in the same category would include the Nyika and Mbala high lands.

Epidemics of malaria are also known to easily occur in emergency situations like refugee camps and among the internally displaced populations. The country used to have five refugee camps, namely Nangweshi (now closed) in Shangombo district, Mayukwayukwa in Kaoma district, and Meheba in Solwezi district for Angolan refugees. A very small population was settled in Lukwimi in Petauke district. DRC refugees have been camped in Mwange in Mporokoso district and Kala in Kawambwa district.

Ecological disturbances are also pre-disposing factors to malaria epidemics. These could be in the form of droughts or floods, displacing populations, thus rendering the affected populations homeless and making them more vulnerable to malaria-infectious bites. The period from 2007 to date has seen populations being displaced by floods in several districts, e.g., Sesheke, Kazunguala, Chama, and Mazabuka<sup>18</sup>. When there is a lapse in sustaining malaria prevention interventions or even a breakdown in control measures, this can lead to resurgences. Slight reversals in the gains achieved in lowering the malaria incidence in some districts were seen in 2009. One hypothesis being advanced is that ITN supply had not been sustained during the year. The above reasons strengthen the justifications why the country should attach significant importance to EPR.

Several estimates of the population at risk of

malaria epidemics have been made<sup>19</sup>. Currently, the population at high risk of malaria epidemics still comprises of the population in the following districts in the epidemic prone zones: Mpika (187 747), Serenje (188 395), Mkushi (158,205), Kapiri-mposhi (262 944); Kabwe (219 431); Chibombo (334 907); Kafue (195 038), Mazabuka (275 353), Monze (224 251), Choma (249 969); Kalomo (239 782), and Kazungula (94 494)<sup>20</sup>. This gives an approximate total population of 2 657 865 people, representing about 20.5% of the total population of Zambia. This estimate represents a minimum figure, as it excludes populations that would result from emergency situations and those from Nyika plateau and Mbala highlands.

Timely surveillance of epidemics and evaluation of structures for rapid response and containment are currently being conducted. The review summarizes progress and performance, key issues, challenges, risks and problems. It also highlights the proposed solutions, strategies, and activities for improving epidemic preparedness and rapid response in the malaria control programme, aimed at ensuring effective management of epidemics and containment of malaria resurgence.

The MPR process critically examined both published and unpublished reports on the risk factors and risk areas for malaria epidemics and emergencies, the methods for forecasting them and the steps for ensuring preparedness.

#### 4.4.2 Policy and Guidance

Prevention and control of malaria epidemics is part of the Zambia integrated disease surveillance and response (IDSR) system. This emphasizes the importance the country

<sup>17</sup> Refer to the MARA Map, Figure 12, Zambia: Malaria Endemicity, under the epidemiology section in this review

<sup>18</sup> Ref: 2007 Impact of Floods (adapted from: Zambia Vulnerability Assessment Committee (VA C), DMMU – Office of the Vice President

attaches to malaria epidemics. All case definitions for uncomplicated and complicated, severe, suspected and confirmed malaria are provided in the IDSR guidelines. Procedures for diagnosis and confirmation of malaria are also specified in the same guidelines. The IDSR guidelines also require that any suspected or confirmed malaria outbreak at the community level (health facility) must be reported to the DHO using designated forms. The DHO is then required to report to the PHO, as well as the national level (MOH Head Office and NMCC). The national malaria control guidelines recommend measures to implement to control malaria epidemics.

Malaria is listed as a notifiable disease under diseases of public health importance<sup>21</sup>. However, even though malaria is a notifiable disease, not every case is reported. The reporting only happens if set thresholds (district HMIS service delivery self assessment and the IDSR health facility thresholds) are exceeded. The objective for EPR for Zambia is to reduce mortality and morbidity due to malaria epidemics to less than 5%.

Malaria epidemic response is an important component of the RBM strategic plan. The Abuja Heads of State declaration of 25 April 2000 gave targets under disease surveillance, epidemic preparedness and response for responding and handling of malaria epidemics i.e. malaria epidemics to be detected within two weeks of onset and controlled within two weeks after onset. This declaration was further reaffirmed by the African Union (AU) during the Africa Malaria Elimination Campaign, at the third session of the AU Conference of Ministers of Health, held from 9 to 13 April 2007, in Johannesburg, South Africa, under the theme

“Fight malaria: Africa goes from Control to Elimination by 2010.”

One of the specific objectives and targets of this conference was:

*To reach global, continental, regional and national targets by 2010, by reducing malaria morbidity and mortality by 50%, compared to the 2000 level and to reach MDGs, by reducing malaria morbidity and mortality by 75%, compared with 2000 levels, in all endemic countries through universal access to malaria prevention and control interventions.*

Specific to malaria epidemics, under Item 'c', it was stated that, by 2010, all malaria epidemics should be detected and responded to within two weeks; and that the frequency of epidemics would be reduced by 50% by 2015. At country level, the FNDP chapter on the health sector has identified the following objective for malaria and epidemics: to significantly improve public health surveillance and control of epidemics<sup>22</sup>.

In order to guide the implementation levels for districts and health facilities, in 2003 the NMCC launched the epidemic preparedness guidelines. In 2007, the same guidelines were further revised and updated, after which, in 2008/2009, they were distributed to the provincial offices, targeting all the public health facilities in the respective provinces. Support for the printing of the guidelines was obtained from UNICEF and the World Bank Booster Project. In their current state, these guidelines contain most of the relevant information to tackle malaria outbreaks and emergencies. Copies of these guidelines were

<sup>19</sup> WHO/HTM/MAL/2004.1098; Zambia EPR guidelines, 2007

<sup>20</sup> CSO, 2000 Census of Population and Housing, Population Projections Report)

<sup>21</sup> IDRS: Technical Guidelines for Zambia, Ministry of Health, 2002

found at the provincial health offices during the field visits, which were conducted as part of this MPR process.

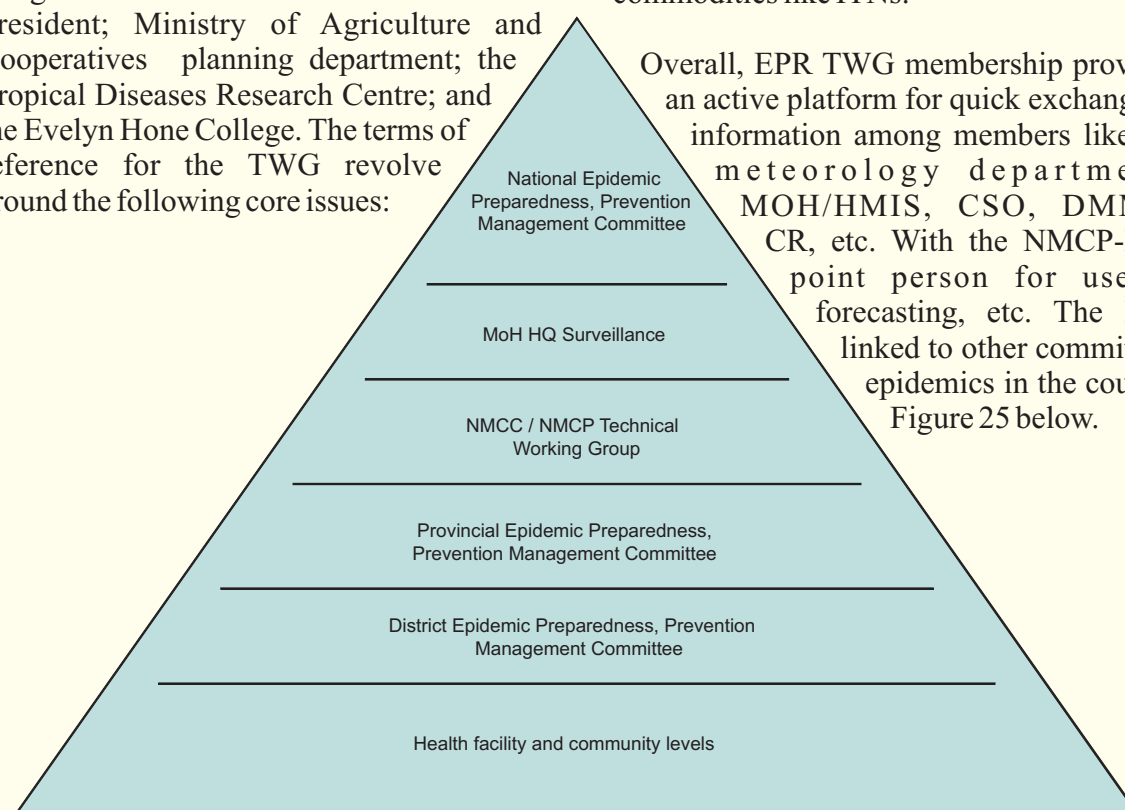
#### 4.4.3 Organizational Structure

The epidemic preparedness and response (EPR) TWG has been in existence for over ten years now and draws membership from several institutions and organizations. Currently membership include the representation from the following: NMCC, acting as secretariat/chair; the Zambia meteorological department; the National Food and Nutrition Commission; WHO; UNICEF; the MOH surveillance officer; the Central Statistics Office, the Zambia Red Cross Society; the Office of the United Nations High Commissioner for Refugees (UNHCR); the disaster management and mitigation unit at the Office of the Vice President; Ministry of Agriculture and Cooperatives planning department; the Tropical Diseases Research Centre; and the Evelyn Hone College. The terms of reference for the TWG revolve around the following core issues:

- NMCC/MOH, WHO, and UNICEF for standards, policy, and strategic guidance.
- Availability of expertise in dealing with disasters, emergencies, and epidemics.
- Expert specialists providing information and data relevant to early detection, forecasting, and control of epidemics.
- Potential funding agencies.

The TWG meets once in a quarter. However, when there are emergency situations reported and confirmed, the TWG meets to propose remedial measures to avert a malaria epidemic. Usually, an appeal is drafted for the approval of the MOH<sup>23</sup>. Once approved, the appeal is circulated to potential cooperating partners for possible humanitarian assistance as well as emergency malaria control commodities like ITNs.

Overall, EPR TWG membership provides an active platform for quick exchange of information among members like the meteorology department, MOH/HMIS, CSO, DMMU, CR, etc. With the NMCC-EPR point person for use in forecasting, etc. The EPR linked to other committees epidemics in the country Figure 25 below.



Source: National Malaria Control Centre (NMCC), Zambia

**Figure 25: Levels of implementation for EPR**

<sup>22</sup> Fifth National Development Plan 2006–2010, Ministry of Finance and National Planning, 2006

<sup>23</sup> Refer to the 2007 Emergency Appeal for flood victims in Chama and Kazungula districts



The above pyramid depicts the structures available for handling not only malaria outbreaks but indeed any other disease outbreak. The functional responsibilities of each level are outlined in the national EPR guidelines, 2007. The NMCC EPR focal point person is a member of the national epidemic prevention, preparedness and management committee. In addition, the focal point person liaises with the MOH epidemiologist and the national surveillance officer within the MOH. At the provincial level there is contact with the provincial surveillance officers while at the district level contact is maintained with the district malaria focal point persons and health information officers.

At the provincial level like at the district level, membership of the epidemic preparedness committees includes various stakeholders. The District Commissioner is the chairperson of the district committee while the provincial Permanent Secretary chairs the provincial committee showing a high level of political commitment. In addition to addressing possible epidemics of malaria, the committee also addresses other disease outbreaks as well. The other function of the provincial and district committees are resource mobilization. The district levels have district rapid response teams (DRRTs) capable of instituting control measures for most disease outbreaks. However, if these teams are to handle malaria as well they would require an orientation course although, as already mentioned, most districts would have an IRS team on stand by.

#### **4.4.4 Human Resource, Training, and Capacity Development**

At the NMCP level, there is an officer dedicated to EPR activities, who reports directly to the Deputy Director of Public Health and Research (DDPH&R) responsible

for the NMCC. The focal point person liaises with relevant officers at the MOH/HQ.

At the provincial level, epidemic preparedness activities are handled by provincial chief environmental officers and, where available, provincial surveillance officers as well as provincial data officers. These officers also handle other diseases of epidemic potential including other duties. The overall supervision is done by the PMO. Malaria focal point persons, district health information officers and EHTs are the personnel attending to malaria epidemics. Again, the overall supervision is the responsibility of the district medical officer. Most districts now have DRRTs.

The officer in-charge at the health facility level assumes the responsibility of handling malaria epidemics. However, where EHTs are available at a health facility, these can also assist in the handling epidemics. At the community level, reliance especially for reports (important to epidemic surveillance) is often left to CHWs and the neighborhood health committee. Most staff from health facilities, district, and provincial level initially receive their training in EPR from pre-service training.

Training of provincial and district personnel to strengthen malaria surveillance focusing on epidemic detection has not been fully realized. Apart from the recent training conducted in 2009/2010<sup>24</sup>, the provincial, district, and health facility staff have not undergone any training relevant to malaria epidemic preparedness, prevention, and control. Where DRRTs exist, again, they have not received any training or orientation in malaria epidemic preparedness, prevention, and control. The goal of the first NMCP strategic plan was to have all the DRRTs in epidemic prone districts trained in EPR<sup>25</sup>.

<sup>24</sup> MOH/NMCC Strengthening malaria Surveillance training report, 2010

<sup>25</sup> Draft strategic plan for Rolling Back Malaria in Zambia 2000 – 2010, RBM Task Force, 2001

Eighteen people participated in the EPR and strengthening malaria surveillance workshop drawing two participants per province. These were to train the district staff. In addition, district malaria focal point persons were also trained in EPR and strengthening malaria surveillance from four provinces, namely Eastern, Southern, Western, and Luapula covering a total of 30 districts out of 72 in the country. Funding for the trainings was made available through the World Bank Booster Project<sup>26</sup>.

The capacity for preparedness and planning for malaria epidemics is still a weak area as there are no malaria stand-alone plans at the provincial and district levels. Evidence from the field visits during this review indicates that at the district and provincial levels, there are epidemic updated plans every year as part of provincial and district action plans. However, these plans are not malaria specific but are integrated disease epidemic plans. Malaria epidemic-prone districts are no exception.

The national level has for a number of years been advocating for buffer stocks of anti malarial drugs and diagnostic materials, vector control equipment, insecticides, LLINs, and ITNs for use in case of a confirmed outbreak. Commodities to mitigate the impact of a malaria epidemic are

always planned for and budgeted for. However, very few partners fund the procurement of these commodities. In short, due to lack of funding, there is no pre-positioning of epidemic stocks either at national, provincial and district levels. This is confirmed by the evidence collected from the field in all the four provinces visited.

In terms of forecasting, the capacities at the district and provincial levels are still weak. Forecasting malaria epidemics usually involves the monitoring of environmental, entomological epidemiological, and vulnerability indicators simultaneously. Environmental especially seasonal rainfall forecasts and entomological indices would provide long term forecasting. Epidemiological monitoring can be useful in early detection of epidemics. Monitoring of vulnerability indicators determines the disease severity if and when an epidemic occurs. There is minimal or no collaboration between the department of meteorology and the PHOs and DHOs. Medium term forecasting is done by close monitoring of the HMIS data. At the central level, data from 1997 to 2001 was used in calculating malaria epidemic threshold values in epidemic prone districts. Graphs were drawn as shown in the example for Mpumba health facility in Mpika district (Refer to Figure 26 and Table 13).

<sup>26</sup> MOH/NMCC, Epidemic Preparedness and Response, Strengthening malaria Surveillance training report, 2010

<sup>27</sup> Malaria Early Warning Systems, concepts, indicators and partners, A Frame work for field Research in Africa [WHO/CDS/RBM/2001.32]

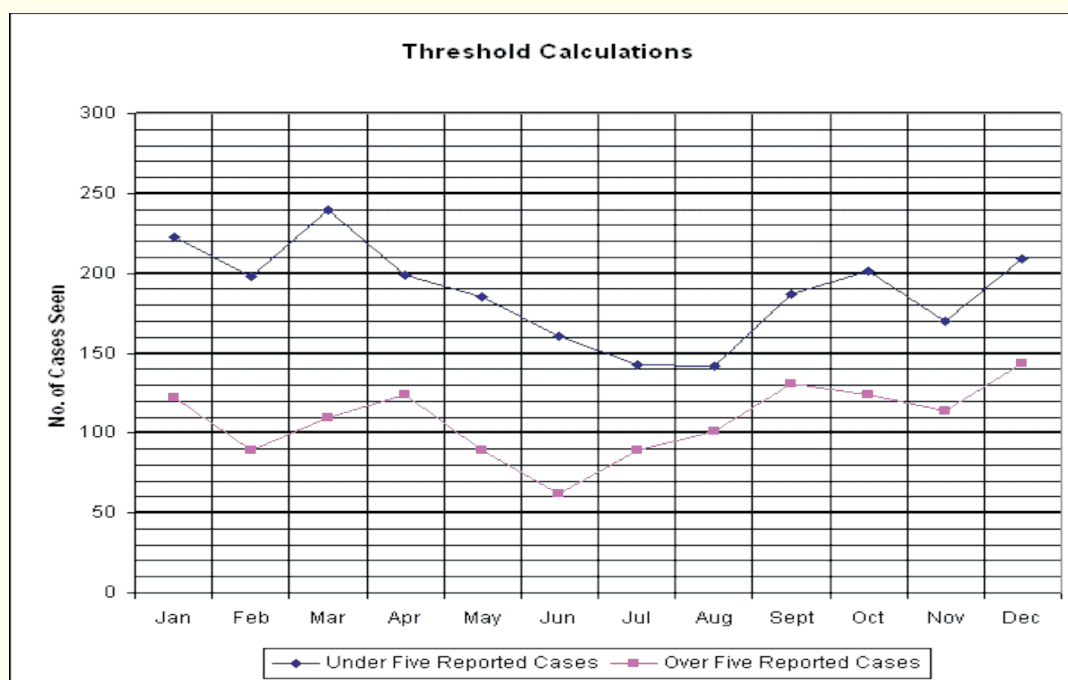
<sup>28</sup> Field guide for malaria epidemic assessment and reporting, WHO/HTM/MAL/2004.1097; Zambia IDSR Technical guidelines, 2002

**Figure 26: Malaria Epidemic Threshold Calculations**

27.01.03

Mpumba - Mpika

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Under Five Reported Cases	223	198	240	199	185	161	143	142	187	201	170	209
Over Five Reported Cases	122	89	110	124	89	62	89	101	131	124	114	144



Source: National Malaria Control Centre (NMCC), Zambia

Note: The threshold value is based on the mean + 2 standard deviations. If the value for either the under 5 year or above 5 year olds or both for a month exceeds the threshold value, this should be reported to the DDH for further investigation and action

Graphs were either for OPD or IPD or both where a health facility had an IPD.

**Table 13: Number of sentinel health facilities with thresholds calculated in the epidemic zone**

District	Number of health facilities given graphs
Mpika	8
Serenje	9
Kapiri - mposhi	10
Chibombo	13
Mazabuka	9
Monze	12
Choma	21
Kalomo	15
Livingstone	12
Luangwa	9*
* Luangwa district was included then because the district was recording high incidence rates in the country and monitoring was felt necessary.	

Source: National Malaria Control Centre (NMCC), Zambia



From 2004, when monitoring started, no district reported any upsurge beyond the threshold value. Due to lack of funding for EPR activities, there was no supervision and monitoring to ascertain whether the health facilities staff was using the threshold graphs given to them. Recent evidence from the provinces, districts, and health facilities show that the component of forecasting malaria epidemics requires strengthening. There is minimal or no collaboration between the provincial and district departments of meteorology and the provincial and DHOs.

The capacity for early warning and surveillance of malaria epidemics can be said to be satisfactory due to the fact that most districts are compelled by the HMIS to report malaria data on a monthly basis. Thresholds currently used are part of the HMIS requirements as part of the health facility and district self assessment. Provinces, districts, and health facilities analyze their malaria data on a monthly basis and produce graphs. The graphs are used for trend analysis.

Evidence from the field showed that both the provinces, districts, and health facilities analyzed their data and interpret the results. In southern province, both the provincial and district offices were able to know which districts and facilities respectively were recording more than average number of malaria cases expected for that particular time. The health facilities were also capable of data analysis.

The capacity for early detection of malaria epidemics is hence available at both the provincial, district, and, to a lesser extent, the health facility levels. The constraint with health facility level data analysis is lack of equipment and skilled manpower to perform simple analysis.

The goal of early warning has been to detect epidemics within two weeks of onset. This goal has so far not been feasible as facilities and districts analyze and report data on a

monthly basis according to HMIS. Evidence from the field showed that, at times, reported information from facilities end up at the district and provincial levels which do not pass on the information to the NMCP/NMCC.

The capacity to rapidly respond to malaria epidemics should they occur exist. However, the response will be delayed by the unavailability of buffer stocks like diagnostic materials and extra stocks of treatment drugs. Even for prevention, there are few stocks (IRS insecticides, LLINs, larvicides) that are kept specifically for emergencies. Operational funding in the light of declining financial allocation to this 'sector' would have to be mobilized to get prevention and control activities implemented. Transport and temporal relocation of human resource to cater for inadequacies are some issues likely to delay rapid response to malaria epidemics in the country. In short, the desired response is likely to be late given the current scenario, hence, the standard of 90% malaria outbreak alerts reported to be detected and responded to within two weeks of onset may not be practical in the country at the moment.

#### 4.4.5 Annual Planning

EPR is a critical component of the NMSP 2006-10. Annual malaria action plans has had a component of EPR over the same period.

EPR is part of the yearly malaria control action plan. A review of the previous year's planned activities status is undertaken noting completed and ongoing activities. For planning purposes, a TWG meeting is usually convened to obtain consensus on the following year's activities. Information for planning purposes is also readily available from the members. An annual plan draft is produced which becomes part of the overall NMCP action plan for the year. The action plan draft is presented to the malaria control RBM partners in the country for review, consensus agreement, and possible pledges.

Once accepted by the stakeholders, the draft is sent for consideration and approval by the MOH/HQ. Once approved, the document becomes the official NMCP action plan for the year. To help the provinces and districts plan in line with the national level, technical updates for each component in the action plan are prepared and these are used as reference materials during the provincial and district planning workshops.

#### 4.4.6 Service Delivery, Outputs, and Outcomes

Several outputs have been achieved over the period under review. Notable among these are the following:

- Epidemic prone districts and areas have been mapped (refer to MOH/NMCC, EPR, guidelines, 2007).
- With the financial support from UNICEF and World Bank, development/revision, printing and distribution of EPR guidelines to all the health facilities in the country by 2008.
- Maintenance of the TWG on EPR involving key stakeholders as well as holding scheduled meetings on a quarterly basis and when emergencies occur. Strengthening partnership and coordination for EPR.
- Assessment and investigation of outbreaks: rapid assessment of emergency situations involving floods in 2007 and 2008 (Mambwe, Chama, Kazungula, Namwaala, Mazabuka) (*Assessment reports available*) and refugee camps (Mayukwayukwa in 2007) (*Assessment reports available*). This allowed the NMCC to discuss measures with the concerned provincial and district staff on what measures to implement to avert malaria outbreaks (e.g., establishing a health post and provision of ITNs).
- Opportunity of carrying out post mortem assessment of the emergency (flood) situation to assess impact on malaria carried in Chama, Kazungula, and

Mazabuka districts (*postmortem reports for 2008 and 2009 available*).

- With support from WB training in EPR and strengthening malaria surveillance was conducted for 18 (two participants per province) provincial TOTs and 30 district staff at the rate of one participant per district.
- EPR has been part of strategic plans 2001 to 2005 and 2006 to 2010 and the availability of costed annual plans for EPR.
- Mobilization of resources through appeals circulated to stakeholders for emergency supplies for the IDP resulting from flash floods and floods resulted in ITNs being made available to victims in camps.

Some of the major outcomes would include:

- Availability of trained manpower in EPR.
- Improved access to information through the guidelines.
- Better coordination of EPR-TWG activities.
- No major outbreaks of malaria were recorded over the review period.

#### 4.4.7 SWOT Analysis

##### Strengths:

- NHSP and NMC-SP and malaria control guidelines in place.
- Availability of preparedness logistics: Prepositioning drugs; Vector Control commodities; and human resources. Training of health providers in the use of thresholds and calculations has been conducted in four provinces. Partnership with private sector/public sector and civil society.
- MEWS regularly updated malaria epidemic preparedness plan of action for each malaria epidemic-prone district.
- Written national malaria EPR policy/guidelines or plan.

- Availability of operational funds for emergencies and outbreaks/plans.

#### **Weaknesses:**

- Inadequate funding to procure the logistics, resulting into stock-outs.
- Inadequate transport for service delivery and for supervision of malaria epidemics.
- No minimum stock levels of malaria epidemics, logistics, and emergency commodities are maintained.
- Lack of advanced equipment, such as computers for data capture, analysis, and reporting.
- Lack of coordinated response across borders when malaria epidemics occur.
- Lack of well defined malaria epidemics and preparedness teams.
- The teams do not get annual refresher courses, no annual reports, malaria epidemics, and logistics not in place.
- Trained staff turnover.
- No weekly surveillance system in high risk districts and months.

#### **Opportunities:**

- Partnerships with other stakeholders, including cooperating partners.
- Availability of vector control trained staff at the district level from IRS and ITN programmes.
- Early detection.
- Expansion of threshold use up to the health facility level.
- Districts can still utilize limited resources from their district basket funding.
- Contributions from stakeholders from the district epidemic preparedness committees.

#### **Threats:**

- Reduced stakeholder participation.

- Malaria deaths.
- Malaria emergency funds and stocks are not available at national and district level
- No System for tracking weekly changes in meteorological indices such as temp, rainfall, wind.
- Poor communication link.
- Settlements in swampy areas.
- Late and untimely funding and response to outbreaks and epidemics.
- National Malaria Emergency fund not in place.

#### **4.4.8 Successes, Best Practices, and Facilitating Factors**

The main success during the period under review is that Zambia has recorded very few major epidemics of malaria due possibly to the following best practices and facilitating factors:

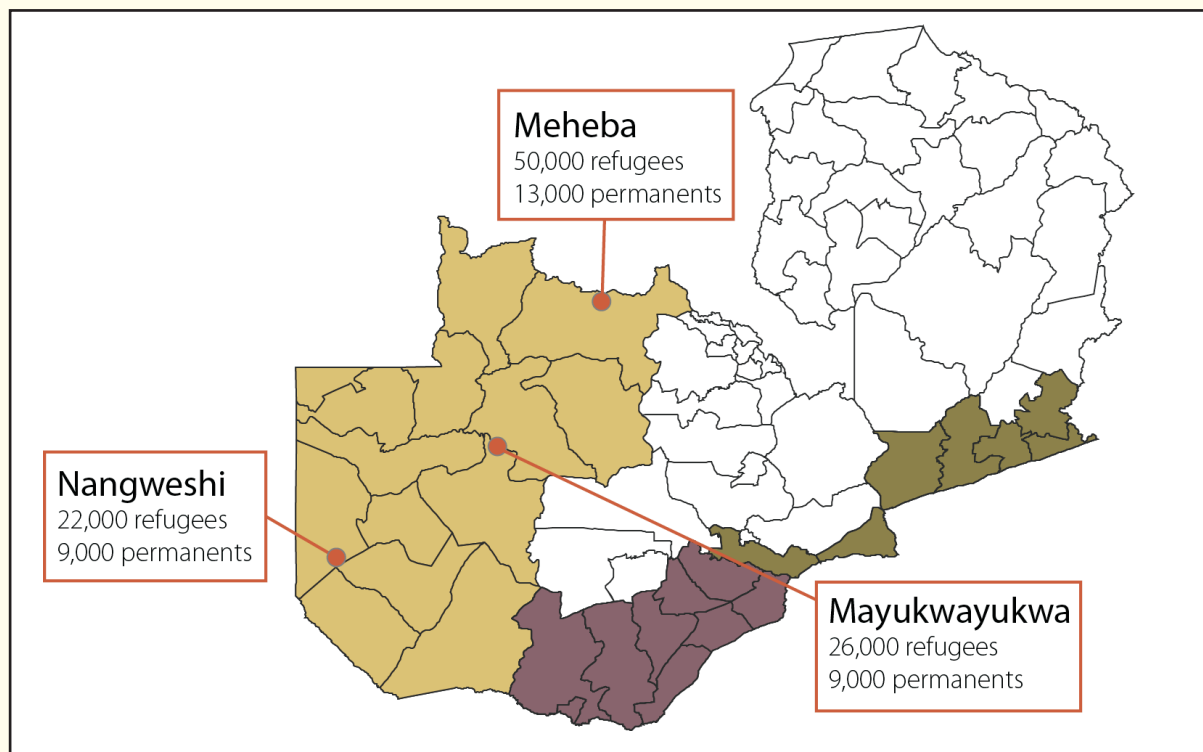
- Most of the mapped epidemic prone districts have an IRS programme running with the exception of only 2 out of an estimated 10 districts. The spraying always commences before the peak transmission season.
- All the epidemic prone districts have an ITN programme(s) complementing the IRS programme.
- The emergency situations (refugee camps) follow the national policies for malaria prevention interventions. From 2001/02, Angolan refugees at Meheba, Mayukwayukwa, and Nangweshi camps were recipients of ITNs<sup>29</sup> (refer to Figure 27). In Mwange refugee camp (2001) DRC refugees, IRS occurred at three- to four-month intervals. It was noted that even the parasite rates were very<sup>30</sup>. Prevention interventions have continued in the refugee camps to date, though some refugees have left through voluntary repatriations.

<sup>29</sup> UNICEF, ECHO Emergency Assistance to Angolan refugees and their host communities; Dr. R. Nefdt, Personal communication

<sup>30</sup> MOH/NMCC report, Rapid Assessment of Malaria in emergency situations in Zambia, 2001



**Figure 27: UNICEF distribution of LLINs among Angolan refugees, 2003**



Source: National Malaria Control Centre (NMCC), Zambia

- When areas have been affected by natural calamities and most common of these in Zambia having been floods displacing populations, it has been very common to find health posts established in the camps and malaria prevention interventions

being implemented (e.g., distribution of ITNs as shown in figures below to flood-affected victims displaying the ITNs received and a camp inmate fitting an ITN inside a tent)<sup>31</sup>.

**Figure 28: Mbiya camp Mazabuka displaying an ITN and Magoye - Mazabuka camp inmate fitting an ITN inside a tent.**



#### 4.4.9 Issues and Challenges

- Inadequate funding for the procurement of logistics for emergency/ epidemic preparedness.
- There are delays in release of funds from World Bank to complete as scheduled the World Bank-supported activities to strengthen EPR and malaria surveillance.
- Inadequate funding to fully operationalize the MEWS.
- Short-listed health facilities as possible sentinel sites for collection of data for MEWS were not assessed (needs assessment) due to funding constraints.
- No particular Knowledge, Attitudes, and Practice (KAP) studies have been conducted in the past few years documenting knowledge, attitude, behavior, and practices regarding malaria epidemics and emergencies. However, in case of an epidemic, IEC would play an important role in community sensitization and motivating communities to participate in epidemic control activities. Key messages in the prevention and control of malaria epidemics and emergencies would include (Southern African Malaria Control, ICTS, epidemic response poster):
  - ✓ Importance of cooperating with spray operators.
  - ✓ Explaining to communities about the epidemic to allay fears about the evolution of the epidemic.
  - ✓ Press releases at regular intervals.
  - ✓ The media, including community radio stations and community health talks.
- Funding partners for EPR are few and thus the resources are limited to fully undertake planned activities.
- There must be an increase in funding to

support planned activities such as preparedness in terms of logistics and commodities for epidemics, strengthening the early warning system and provision of emergency funding

- EPR should be rated high on the priority list of the malaria control programme interventions especially as the programme evolves from control to elimination.

#### 4.4.10 Conclusion and Recommendations

##### 4.4.10.1 Conclusion

Epidemic preparedness is an important component of the overall malaria surveillance system. To safeguard the gains achieved so far in the scaling up of the malaria intervention process, epidemic surveillance should be prioritized. The malaria incidence levels across the country are not uniform. Where disease incidence is still high epidemic preparedness should be part of the malaria control strategy to safeguard and mitigate against resurgences. However, where malaria incidence have been reduced in some districts to single digit figures, the use of thresholds will not be very helpful. Instead there is a need to turn to surveillance principles which will be able to detect very few cases triggering response that may eventually lead to identification of persistent foci and possible parasite elimination in the foci.

At this stage in the evolution of the control programme in Zambia, it must be recognized that there are areas where EPR and surveillance should be strengthened and areas where surveillance alone should be strengthened. It is only logical that when incidence levels have been reduced to less than 5% then surveillance will replace EPR.

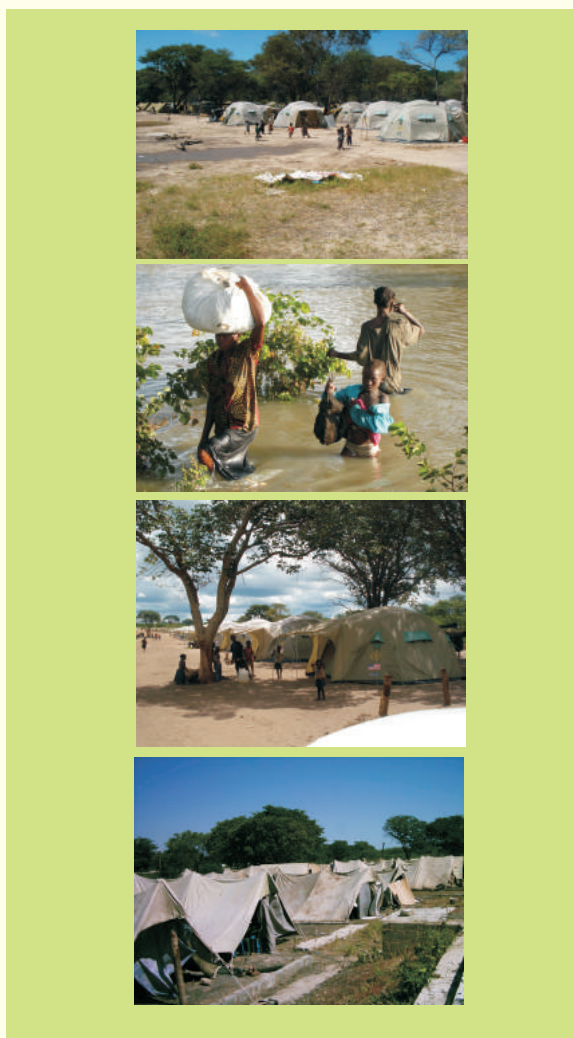
<sup>31</sup> (MOH/NMCC, Postmortem report on flood affected populations in the Zambia, 2008,2009)



#### 4.4.10.2 Recommendations

1. Build capacity in provinces and districts for EPR.
2. Procure commodities and logistics as buffer stocks for EPR at national and provincial levels, especially for those in the epidemic zones.
3. Provision of funding for supervision, monitoring, and investigation of reported outbreaks.
4. Provision of operational funding for epidemic control in case of confirmed outbreaks.

**Figure 29: Victims of floods in Kasaya 2008, Sesheke district, Western Province**



## 4.5 Malaria Diagnosis and Case Management

### 4.5.1 Introduction

Zambia introduced a new malaria treatment policy with first line therapy of ACTs using Coartem® in 2003. And, the country more recently in 2008 to 2009 adopted a policy of universal laboratory diagnosis of suspected malaria infection. These are detailed in the Zambia national malaria treatment guidelines.

Significant progress has been made is increasing access to malaria treatment in Zambia. All public health facilities offer ACTs free of charge to the end users. In 54 rural districts, all health services are free to end users since 2006 (presidential statement on removal of user fees). Private providers, however, offer malaria diagnosis and treatment at a fee, though, only a small percentage of the population in the urban areas mostly access services from private providers (MIS, 2008, 2010). Currently the NMCP is undertaking pilots to test feasibility of subsidizing RDTs and ACTs in the private for-profit sector (World Bank, 2009). Most of the population access malaria treatment from a government health facility.

Between 2008 and 2010, the percentage of children under five years of age with fever in the two weeks preceding the survey, accessing anti-malarial drugs from government health facility or government health worker, has increased from 70% to 81%, respectively (MIS 2008; MIS 2010). The consumption of ACTs is low in districts where compliance to treatment guidelines are good (NMCC M&E Bulletin, 2010: 3). As a consequence, the number of children under five years of age with fever in the two weeks preceding the survey, and among children with fever, who took anti-malarial drugs and who took the drugs the same or next day has been gradually increasing as seen in the MIS (2006, 2008, 2010).



While the malaria case rates are declining, a high proportion of the reported cases are still based on clinical assessment and only a portion are laboratory confirmed with either microscopy or RDTs. On the other hand, 24 districts have capacity to diagnose and treat malaria at the community level (Home Management of Malaria Training report, 2008 & 2009). In Zambia first antenatal coverage is high, the 2007 DHS showed that the percentage of women aged 15 to 49 years attended to at least once by a skilled health provider during pregnancy was 94%. The prevention of malaria in pregnancy is integrated with the reproductive health programme. Intermittent presumptive treatment of malaria is delivered through the focused ANC strategy. Currently, the second dose of IPTp (IPTp II) has increased from 62% in 2006 to 70 % in 2010 (MIS, 2006, 2010). Zambia has exceeded the Abuja target on IPTp of offering at least 60% of eligible pregnant women IPTp II.

Drug efficacy studies have been done over many years in Zambia to evaluate the drugs under current use and those that would be considered for use if replacement was needed. As of August 2010, Coartem® is still effective in treating uncomplicated malaria in Zambia. On the other hand, for SP, according to the MOH/NMCC 2006 drug efficacy report, the PCR corrected ACPR for SP was found to be 77% and SP can no longer be relied upon as primary treatment for uncomplicated *P. falciparum* malaria in most parts of the country and studies in 2006-2008 have shown that two doses of IPTp with SP is beneficial for both HIV-positive and HIV-negative pregnant women. Thus, SP is still used for IPTp in Zambia.

#### 4.5.2 Policy and Guidance

A diagnosis-based treatment policy is in place except where there are no diagnostic tools (RDTs or microscopy). The import of diagnosis has been demonstrated by the

findings that in Central Province, Livingstone and Kazungula, malaria cases go down when RDTs are available, and when they are out of stock, the number of malaria cases recorded shoot up (impact of RDTs use on antimalarials consumption, 2009, unpublished). The treatment guidelines have been updated and only await printing and dissemination. Quality assurance guidelines have been developed and phased implementation is being rolled out.

#### 4.5.3 Organization of Case Management Services

The Ministry of Health in Zambia has an estimated 1730 facilities in which malaria diagnosis and treatment is carried out to varying levels. Within the establishment of the MOH, each level is managed by the appropriate cadre of health workers. The World Health report of 2006, reported that Zambia has 50% of its establishment in place.

Within the NMCP, there is a specific position for a case management specialist who reports to the deputy director of public health and research for malaria. Further within the NMCP are a chief parasitologist and a principal laboratory technologist who also report to the deputy director of public health and research for malaria.

Under the RBM Partnership various stakeholders support the NMCP team through the TWG on case management. The national case management TWG formulates policy and guidelines and supports sub-national programme implementation. The national TWG includes a paediatrician, obstetricians, a pharmacist, and several general physicians.

At the provincial level a clinical care specialist supports the functions of malaria case management among others. Further, the new MOH structure has established a position of infectious diseases control specialist at the provincial level. At the

district level a clinical care officer, who is part of the DHO, supports malaria case management functions. In the various health centres in each district trained health workers (mostly clinical officers, nurses, and EHTs) offer malaria diagnosis and treatment services. Health centre-based staff, in addition, provide supervisory support to CHWs involved in malaria case management.

#### 4.5.4 Human Resources, Training, and Capacity Development

Health workers at the health facility and community levels are trained in clinical and laboratory diagnosis of malaria and treatment of various classifications of malaria. Some aspects of logistics and inventory management as well as quality assurance are also taught to health workers. The main types of health workers at the district level include nurses, EHTs, laboratory technologists, clinical officers, classified daily employees, and CHWs. Some of the training tools available include; IMCI manuals, the integrated technical guidelines, the home management of malaria training manuals, the laboratory diagnosis manual, standard operations procedures for the laboratory diagnosis of malaria, bench aids, and various job aids. Health workers are trained as pre-service and in-service through workshops as well as through outreach training support supervision. Pools of trainers of trainers in various areas of malaria case management have been created.

The GRZ and partners significantly contribute to funding malaria diagnosis and treatment. The human resources that deliver all services related to diagnosis and treatment at the national and district level are employed by the government. In addition there are several government-supported statutory institutions within the health system structure that contribute to malaria diagnosis and treatment. The government has an essential drugs budget line and some anti-malarials and

diagnostic tools are procured from that budget line. A number of partners contribute both technical and financial support toward malaria diagnosis and treatment in Zambia. Currently all ACTs and RDTs are entirely procured through partner support this threatens programme sustainability.

**Knowledge, Attitude, Behaviour, and Practice on diagnosis:** Studies have been conducted on community knowledge, attitude, and behaviour on malaria in general, but a specific KAP on diagnosis has not been conducted yet (MIS, 2006; 2008; 2010). In addition, routine capacity-building has been focused on knowledge, attitude, and practice for diagnosis and treatment of malaria among health workers. Despite the capacity-building efforts for health workers on diagnosis, evidence from 10 districts shows that health workers' compliance to results of RDTs is low (Moonga, 2010). Malaria case management is benefiting from the ongoing staff retention scheme.

#### 4.5.5 Annual Planning

There is annual integrated planning every year. The case management working group meets quarterly which involves officers from institutions of higher learning, implementing partners and MOH officers. NMCC is the secretariat for the coordination.

#### 4.5.6 Malaria Diagnosis

**Microscopy:** Only about 12.5% (217) of the 1,730 health facilities in Zambia have diagnostic capacities (2004 malaria diagnosis manual). This situation is compounded by the acute human resource shortage in Zambia. Availability of laboratory human resources is further constrained by the non-gazetting of the district position of microscopist. To improve and maintain microscopy quality, some facilities with a high number of blood slides that have few laboratory trained workers are allowed to use RDTs in the OPD, IPD to

reduce the work for the laboratory staff to have quality assured microscopy results. These RDTs are performed by health workers other than the laboratory staff who have been trained.

**RDTs:** RDTs are available in the country for use in health facilities where microscopy services are absent and not available 24 hours a day and at the community level under the Home Management of Malaria (HMM) programme (Draft Training Manual for Laboratory Diagnosis of Malaria in Zambia 2010). Currently only those CHWs who have been trained in the use of RDTs are allowed to test and prescribe ACTs as there are strict measures required to maintain safety and accuracy of the malaria diagnosis and treatment.

**Quality assurance of malaria diagnostics and anti-malarial medicines:** There is an established national system for quality control for malaria microscopy and rapid testing which is currently functional in 46 selected facilities in all the provinces. This system will be rolled out to all facilities in the country in a phased manner. This system is based on the standard WHO Malaria Microscopy Quality Assurance Manual.

In addition, the quality of rapid testing is assured through selection of high quality RDTs from WHO pre-qualified manufactures. Before deployment of any quantity of RDTs external (at a WHO Regional site) and internal (in-country), lot testing is conducted. Plans are underway to collect some RDT kits in the provincial, district, and health facility stores for quality testing at the central level.

There is a mechanism in place to test the quality of drugs being imported into Zambia at the pre-shipment point and at the point of entry. The bi-annual performance assessment

is another method used for quality assurance at the district level for malaria diagnosis and treatment. The 2004 malaria health facility survey in 10 sentinel sites checked on the quality for diagnosis and treatment of malaria. Further, the IMCI facility survey of 2008 also looked at quality of case management including malaria.

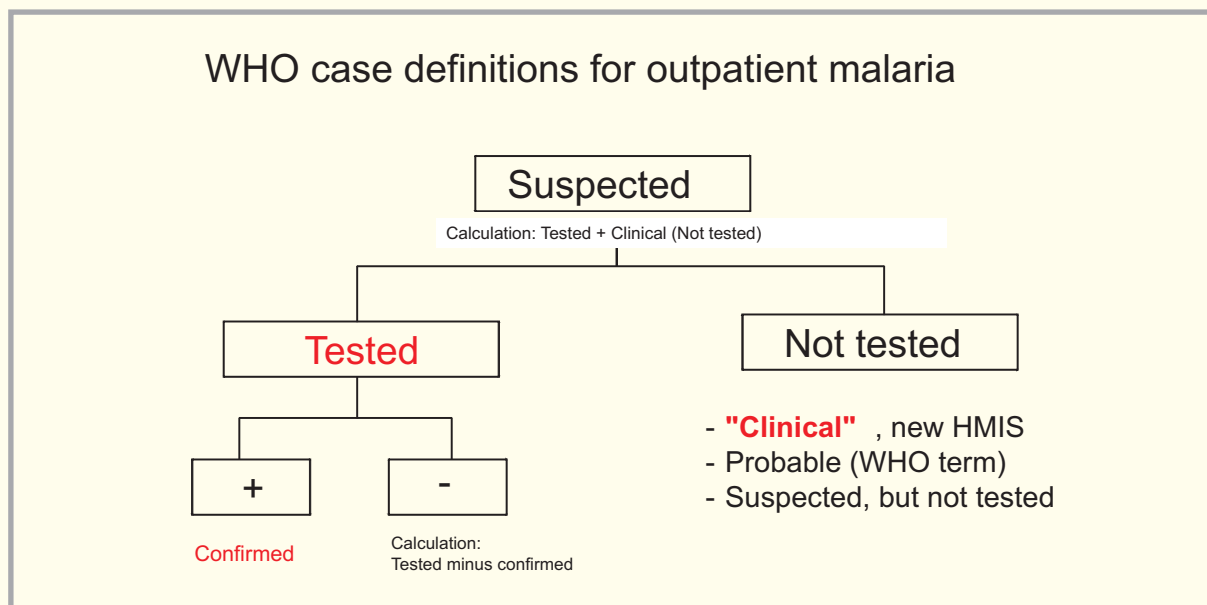
#### 4.5.7 Malaria Treatment

**Treatment of malaria in non-pregnant persons:** AL was adopted in 2003 as the first line antimalarial after SP was found to have failed with the PCR-corrected ACPR for SP was found to be 77% and very low in parasite, gametocyte, and fever clearance (MOH/NMCC 2006 drug efficacy report). AL is used as first line antimalarial in children above 5kg body weight or less than two months of age and any adult presenting with uncomplicated malaria. Quinine is used in the first trimester of pregnancy treatment of uncomplicated malaria while AL is used in the second and third trimesters of pregnancy. SP is still being used for children less than 5kg in body weight with uncomplicated malaria. Oral or parenteral Quinine is used as a second line antimalarial in children, adults, and also in pregnancy when first line treatment fails.

Quinine through the parenteral route is the drug of choice for treatment of severe malaria in both children and adults and pregnant women. For pre-referral treatment a statum dose of quinine at 10mg/kg body weight through the intramuscular route is advised. It has been noted that currently parenteral Artesunate are not recommended for use as pre-referral treatment in the national treatment guidelines. The national malaria treatment guidelines highlight considerations for supportive therapy based on the clinical picture as assessed by the health worker.



Figure 30: WHO Case Definitions for Outpatient Malaria



#### Treatment of malaria during pregnancy:

Uncomplicated malaria in pregnancy is treated with Quinine in the first trimester, while AL is recommended in the second and third trimesters of pregnancy. Quinine is the recommended drug for management of complicated or severe malaria in pregnancy. Severe malaria in pregnancy is a medical emergency, therefore aggressive management is imperative. Parasitological evaluation is necessary for these patients. However, presumptive treatment should be started immediately while awaiting the results. Other similar presenting and common conditions like eclampsia and diabetes mellitus among others should be ruled out in all pregnant patients with severe malaria. IPTp in all pregnant women is recommended after 16 weeks (after quickening). The guidelines recommend three doses at four-week intervals (one month) with three tablets of sulfadoxine 500mg/pyrimethamine 25mg (SP).

The current malaria treatment guidelines recommended three doses of IPTp from the second trimester for HIV-positive pregnant women. The most current national prevention of mother-to-child transmission guidelines

similarly recommend the same (Integrated Prevention of MTCT, 2010).

**Community case management:** The NMSP recognizes HMM as a strategy to increase access to prompt and effective diagnosis and treatment of malaria. At present, ACTs are registered as prescription-only drugs by the Pharmaceutical Regulatory Authority. However, under the home management of malaria programme, ACTs are dispensed by CHWs according to the MOH policy after training and with close supervision by trained health workers.

#### 4.5.8 Malaria Prophylaxis

According to the national treatment guideline, several options are recommended, these include: mefloquine, doxycyclin, and atovaquone-proguanil. Doses should be taken one-to-two weeks prior to arrival in Zambia and should be continued during the stay in Zambia and one-to-four weeks following departure from Zambia. In spite of this, if the patient develops fever, a full dose of an appropriate antimalarial should be taken by the patient, and the patient should go to the nearest hospital. Non-immunes who have

commenced mefloquine from their home countries should continue taking it while in Zambia.

#### 4.5.9 Performance Indicators and Targets

National malaria targets were defined by the NMSP 2006/2010. Table 14 presents the progress towards the attainment of the case management targets and the remaining gaps.

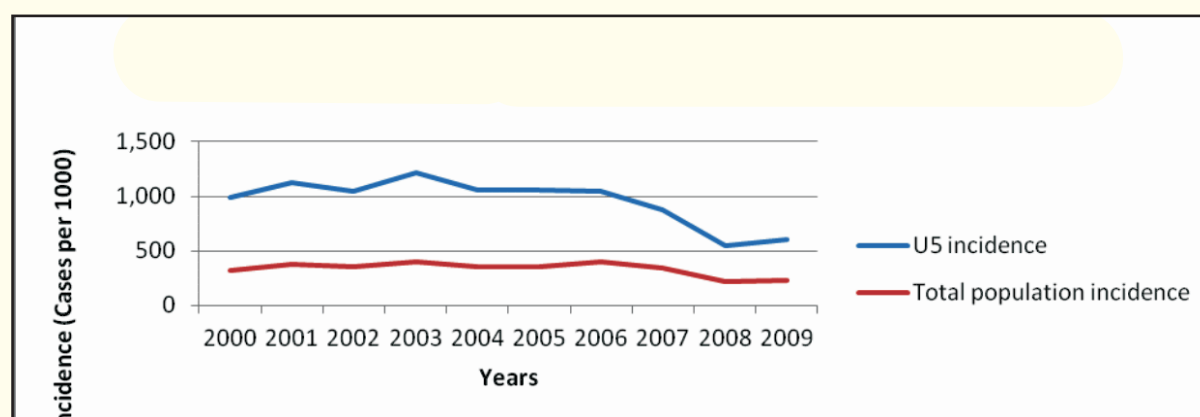
**Table 14: Progress Towards the Case Management Targets**

Target	Current coverage (2010)	Gap remaining
At least 80% of women have access to the package of interventions to reduce the burden of malaria in pregnancy by 2008.	<ul style="list-style-type: none"> <li>64% of households have at least 1 ITN</li> <li>46% of pregnant women slept under an ITN the previous night</li> <li>86% of pregnant women took some IPTp</li> <li>69% of pregnant women received 2+ doses of IPTp</li> </ul>	<ul style="list-style-type: none"> <li>No gap in access; slight gap in receipt or use.</li> </ul>
At least 80% of suspected malaria patients are correctly diagnosed by December 2008.	<ul style="list-style-type: none"> <li>17% of febrile children had diagnosis applied</li> </ul>	<ul style="list-style-type: none"> <li>Substantial gap</li> </ul>

Source: National Malaria Control Centre (NMCC), Zambia

The incidence of malaria in Zambia is declining. The trends of malaria incidence over the years are shown in Figures 31 below.

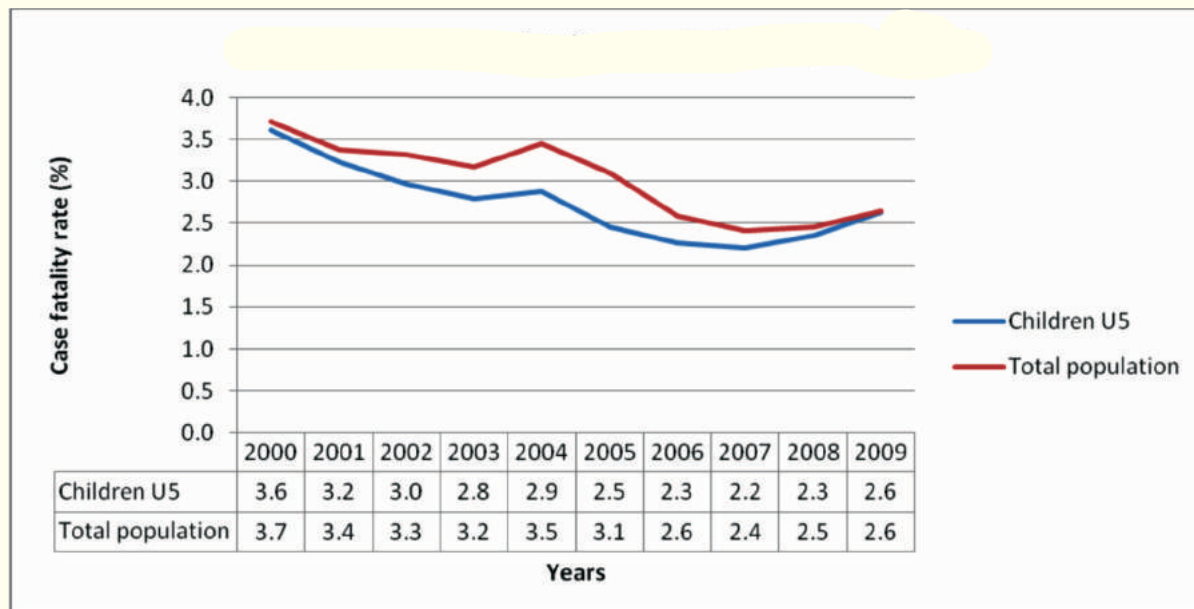
**Figure 31: trend of the incidence of suspected malaria cases (outpatient) in Zambia 2000-2009**



Source: HMIS and National Malaria Control Centre (NMCC), Zambia

In the same vein, malaria case fatality rate is declining. See Figure 32.

#### Trend of malaria case fatality rates in Zambia, 2000 - 2009



Source: National Malaria Control Centre (NMCC), Zambia

#### 4.5.10 Service Delivery Outputs and Outcomes

On the other hand, only a portion of febrile children are reported to have seen a health worker with their illness. This information is further detailed in the Monitoring and Evaluation Thematic Report, but to summarize from the most recent national survey (MIS 2010): 34% of children were reported to have had a fever in the previous two weeks; 17% were reported to have had a finger or heel stick for a diagnosis (up from 11% in the MIS 2008); 34% received an antimalarial drug and 19% received the antimalarial the same or next day from the onset of fever and 31% sought treatment from

a health provider that same or next day. Among children with fever, 26% received Coartem<sup>®</sup> (up from 13% in MIS 2008) and 3% received SP (down from 21% in MIS 2008).

Coartem<sup>®</sup> use rates have doubled in the past two years and SP, quinine, and other antimalarial use is nearly negligible at this time. Zambia has turned the corner on the introduction of ACTs as a first line therapy such that in 2008 an estimated 30% of febrile children receiving an antimalarial got Coartem<sup>®</sup> and by 2010, 75% of febrile children who received an antimalarial got Coartem<sup>®</sup>. Table 15 presents the provincial distribution.



**Table 15: Access to Antimalarials in Zambia**

Province	% of children with fever in last two weeks				
	2001–02	2006	2007	2008	2010
Central	45.1		26	26.8	32.6
Copperbelt	36.6		21.3	26.1	30
Eastern	43.9	26.1	14.4	29	37
Luapula	57	45.1	9.9	40.5	52.3
Lusaka	35		13	16.3	17.5
Northern	46.5	50.5	24.5	28.2	32.2
Northern					
North-Western	38.7		15	16.2	19.9
Southern	41.2	22.2	15	28.8	40.7
Western	50.6	32.8	16.8	36.6	42.5
Zambia	43.3	29.2	17.8	26.7	34.1
Province	% of children with fever who reported a finger or heel stick				
	2001–02	2006	2007	2008	2010
Central				3.4	11.2
Copperbelt				10.4	28.2
Eastern				6.9	19.9
Luapula				15.2	15.1
Lusaka				20.8	15.2
Northern				5.1	7.6
Northern					
North-Western				29.4	27.8
Southern				17.9	15.1
Western				0	19.3
Zambia				10.9	16.7

Province	% of children with fever who reported taking antimalarial drugs				
	2001-02	2006	2007	2008	2010
Central				26.5	14.6
Copperbelt				49.6	40.9
Eastern		84.9		43.9	58.3
Luapula		34.1		39	28.4
Lusaka				47.9	36.2
Northern		51.1		43.5	32.9
Northern					
North-Western				60.5	68.5
Southern		63.6		41.2	21.8
Western		37.5		48.1	18.3
<b>Zambia</b>		<b>57.9</b>	<b>38.4</b>	<b>43.3</b>	<b>34</b>

Province	% of children with fever who reported taking antimalarial drugs same or next day				
	2001-02	2006	2007	2008	2010
Central				19	5.4
Copperbelt				25.8	16.9
Eastern		73.3		31.9	48.9
Luapula		24.2		28.1	7.6
Lusaka				41	26
Northern		27.2		17.7	12.8
Northern					
North-Western				23.2	14
Southern		13.6		39.1	18.4
Western		21.4		34.9	6.5
<b>Zambia</b>		<b>37</b>	<b>20.5</b>	<b>28.9</b>	<b>18.7</b>

Source: National Malaria Control Centre (NMCC):  
ZDHS 2001-02, and 2007; and MIS 2006, 2008, Zambia

#### 4.5.11 SWOT Analysis

##### Strengths:

- Long term plans to sustain the gains have, so far, been achieved.
- Functional partnerships with both local and international institutions.
- The infrastructure for malaria control

exists at all levels, this includes guidelines, equipment, and space.

- The availability of national and provincial trainers in Community Case Malariaccm, BCC, IVM, RDT use, malaria microscopy, and onsite training and support supervision. Lecturers from our major training institutions that train health workers are part of the CM-TWGs and National trainers.

**Weaknesses:**

- Low HRH capacity, especially for laboratory staff where the microscopists and certificate trainings have been phased out. Also the MOH restructuring has grossly underestimated the number of health workers needed in health facilities.
- Poor procurement, supply, and logistics, especially for RDTs and other diagnostics like microscopy slides.
- Inadequate resources for scaling up most of the strategies, like Community Case Management, community sensitization, training, and re-training of health workers in malaria case management, especially those from the hospitals where there are a large number of health workers.
- High staff turnover in the hospitals and health centers, which necessitates continued in-service training.
- Poor health seeking behavior and poor health worker compliance to guidelines.
- HRH crisis.

**Opportunities:**

- Prioritisation of malaria in the NDP, NHSP, and NMSP 2011-2015, currently being developed.
- Availability of financial support from partners, particularly the World Bank, PMI, GFATM, and MACEPA.
- Infrastructure improvements, including the installation of PCRs.

**Threats:**

- The corporate governance challenges being faced by MOH, following the allegations of financial mismanagement last year, which has adversely affected donor confidence and support to the health sector.
- Aid predictability challenges.
- Climate change, e.g., too much rains and favourable weather for mosquitoes breeding.

**4.5.12 Successes, best practices, and facilitating factors**

**Enhanced access to case management services:** Access to case management services is being enhanced through the phased implementation of community case management rolled out to 26 districts. Also there has been improved availability of the first-line anti-malarial drug LAL at facilities, whereby in the last two years no major stock-out has been reported (PMI and JSI Quarterly reports). Between 2008 and 2010, the percentage of children under five years of age with fever accessing anti-malarial drugs from Government health facility or Government Health Worker has increased from 70% to 81%, respectively (MIS 2008; MIS 2010). On the other hand, during the same period, there was only a slight increase in the percentage of children under five years of age with fever accessing ACT, an increase from 13% in 2008 to 26% in 2010 (MIS 2008; MIS 2010).

**Improved access to diagnosed services:** All public facilities in the country are able to confirm malaria diagnosis through either microscopy or RDTs. Between 2008 and 2010, the percentage of children under five years of age with fever who had a finger prick increased from 10% in 2008 to 17% in 2010 (MIS, 2008 & 2010).

**Increased access to IPTp services:** IPTp II has increased from 62% in 2006 to 70 % in 2010 (MIS, 2006, 2010), exceeding the Abuja target on IPTp.

**4.5.13 Issues and challenges**

The greatest challenge to malaria case management in Zambia is the human resource crisis. This is compounded by the non-gazetting of microscopists. Another challenge is poor health seeking behavior leading to late presentation and poor compliance with treatment. Absence of rectal Artesunates for pre-referral treatments is an



added constraint. There is a scarcity of timely information on diagnosis and treatment making programme decision-making difficult. The programme is currently unable to report malaria diagnosis and treatment undertaken by the CHW separate from the health facility data. This is a serious gap that needs to be covered urgently in order to demonstrate the effectiveness of community case management of malaria in the country.

Also the proportion of confirmed malaria cases is too low, estimated at only 13%. There is a gap in the knowledge levels and availability of malaria guidelines between the referral/district hospitals and the health centres this has resulted in poor adherence to accurate and prompt diagnosis and treatment of malaria cases.

#### 4.5.14 Conclusion and Recommendations

##### 4.5.14.1 Conclusion

**Malaria diagnosis:** In the emerging context of better and better malaria control, universal coverage of malaria diagnostics and quality assurance of this work becomes paramount. This is both for the purpose of directing identification of illness that is or is not due to malaria so that it can be treated properly (care & treatment), and identification of infection so that surveillance and response can accurately track transmission, contain it, and chart progress (surveillance and transmission containment). While diagnosis and treatment are typically linked in the language of malaria control, diagnostics are being emphasized as Zambia is now in a position where universal diagnosis is both possible and sorely needed in order to progress in the next steps of malaria control.

**Malaria treatment:** In 2003, Zambia changed its first line treatment for uncomplicated malaria from chloroquine to an ACT (AL or Coartem®) due to drug resistance. Since then, guidelines on case

management have been developed and most of health workers have been trained. However, both the access and coverage to diagnostics for management of malaria is still low in the country. In 2009 to 2010 transmission season, Zambia turned the corner such that the majority of children treated with an antimalarial drug receive AL. However, the lack of universal diagnosis and stockouts in ACTs and RDTs lead to confusion about full progress toward achieving targets in proper and prompt management of malaria.

**Prevention of malaria in pregnancy:** The malaria control programme has well-defined malaria in pregnancy policy including: the provision of free IPTp with at least 2two doses of SP during pregnancy, free ITN(s), and prompt diagnosis and free treatment of clinical disease. This malaria control package is implemented as part of routine ANC.

The current high ANC attendance in the country and a long-standing consistent policy has resulted in quite high uptake of IPTp which currently stands at 86% for IPTp and 70% for IPTp II. Use of ITNs among pregnant women currently stands at 46%. While this progress should be celebrated, further discussions with the reproductive health community are warranted to identify the factors that can fill the remaining gap to exceed targets for full IPTp coverage and ITN use.

##### 4.5.14.2 Recommendations

#### 1. Strengthen diagnosis.

There is a need to strengthen the malaria diagnosis system so that more than 90% of suspected malaria cases are tested for malaria parasite. The following actions are required:

- Implement the policy of testing every case of fever to confirm malaria at all levels of health care; examining and then strengthening the overall system of

malaria laboratory diagnosis. This includes quality control and reference lab capacity, staffing and training, supervision and skill maintenance, the role of microscopy, rapid diagnostics, and new and emerging lab technologies (e.g., non-instrumented nucleic acid detection, serology assays), and management systems (at facilities and in the community) that can achieve universal diagnosis for suspected malaria.

- Revise needs assessment and gap analysis to address universal coverage with diagnostics for malaria.
- Address the bottlenecks associated with the procurement and distribution of diagnostics.
- Provide or enable free diagnosis of malaria using RDTs and microscopy at all levels of the health care system, including the local health facilities and CHWs.
- Scale up training of health workers including CHWs and health workers in the private sector on diagnosis.
- Progression in the DHIS from routine reporting to consistent reporting on laboratory-confirmed malaria.

## **2. Strengthen malaria treatment.**

This should be addressed through the following:

- Address the bottlenecks associated with the procurement and distribution of malaria medicines.
- Implement the policy of testing every case of fever to confirm malaria at all levels of health care.
- Scale up training of health workers in the private sector on diagnosis and case management with ACT.
- Implement management of malaria in health facilities and communities (where appropriate) using ACT to increase access to prompt malaria treatment. This will be enhanced by providing malaria guidelines

to the referral/district hospitals as they are provided to the health centres.

## **3. Strengthen prevention of malaria in pregnancy:**

Scale up MIP activities based on the following epidemiological zones:

- Low to nil transmission zone, where there is no IPTp and no ITNs for pregnant women.
- Low stable transmission zone, where there is no IPTp and no ITNs for pregnant women.
- High persistent transmission zone, where there is scale up of IPTp and ITN for pregnant women.

Further, it is recommended that meetings convene between NMCC, reproductive health, and relevant partners to examine remaining gaps and seek solutions to filling these gaps in IPTp II (or further dose) coverage, ITN use, and prompt recognition and treatment of any malaria cases in pregnant women.

## **4. Community case management of malaria**

The name of this strategy; Home Management of Malaria should be changed to community case management (CCM). The strategy should include diagnosis and treatment of malaria with ACTs, diagnosis, and treatment of pneumonia with an antibiotic and the treatment of diarrhoea. The community CCM strategy to increase access to diagnostics and effective treatment at the community level should be rolled out to the remaining districts to cover the whole country and expanded to cover more CHWs within the already participating districts.

## 4.6 Advocacy, BCC, IEC, and Social Mobilization

### 4.6.1 Introduction

IEC, advocacy, and community mobilization are important strategies in malaria prevention and control because they contribute to the reduction of the burden of malaria morbidity and mortality through behaviour change. These strategies are critical for building support for the malaria programme, increasing the acceptance of key interventions by communities and enhancing skills required for malaria management and prevention at individual, household, and community levels.

The goal of the NMCP is to reduce the incidence of malaria and deaths by 75% by the end of 2011. In this regard, the goal of advocacy, IEC, and community mobilization is to contribute to this goal by increasing awareness, knowledge, and skills on malaria prevention and control, increasing the uptake of interventions and promoting appropriate care-seeking behaviour. Zambia's principal IEC/advocacy strategies are: advocacy for the malaria programme including the orientation of traditional, religious, and civic leaders; development of health learning and communication materials; building capacities for district health officers and CHWs to conduct health promotion and to deliver interventions at the community level; and to build capacity and engage media personnel to disseminate malaria information more effectively.

### 4.6.2 Policy and Guidance

In 2006, the NMCP developed a communication strategy to guide districts in the implementation of IEC/BCC and advocacy interventions. This document provides policy direction and guides

implementation of IEC/BCC and advocacy activities at all levels through the community level.

Specific objectives of the communication strategy are to promote the use or uptake and acceptance of principal malaria prevention and control interventions such as ITNs, IRS, IPTp, and effective case management.

### 4.6.3 Organization

At NMCC level, there is dedicated Principal IEC officer for malaria. This position falls under the health promotion unit at the MOH headquarters and is tasked with carrying out IEC/BCC advocacy and community mobilization functions.

A TWG, representing a range of partners, supports the planning, coordination, and implementation of IEC/BCC activities. Under the MOH structure, all provincial medical offices now have a senior health education officer whose main responsibility is to undertake IEC/BCC including those on malaria activities. At the district level, IEC/BCC activities are planned and undertaken by malaria focal point persons. However, the position of district health education officer is not yet institutionalized in the MOH structure.

### 4.6.4 Human Resources, Training, and Capacity Development

In terms of training, NMCP IEC staff has conducted capacity building activities in collaboration with various organizations such as the Anglican Council, Malaria Consortium, MACEPA, Society for Family Health, and World Vision. This training includes media personnel meant to equip them with the skills to better report on malaria prevention and control. District-level trainings were held targeting health workers

<sup>32</sup> Ministry of Health (2006) Malaria Communication Strategy



on BCC. Similarly, NMCP supported by partners such as faith-based organizations (CHAZ, for example) conduct annual orientations and sensitizations of community leaders on effective malaria prevention and control in their communities. Faith-based organizations conduct training for CHWs and volunteers to carry out malaria control interventions.

#### **4.6.5 Annual Planning**

The principal IEC officer provides technical inputs during national annual provincial/district planning meetings to which provincial and district personnel attend together with MOH partners. The National Malaria Advocacy, IEC, and community mobilization TWG (chaired by an officer from a partner organization and the NMCC serving as secretariat) meets quarterly to plan, monitor, and evaluate IEC/advocacy action plans and guide the IEC research agenda.

#### **4.4.6 Performance Indicators and Targets**

Progress on performance has been noted for IEC/BCC. The following are the examples for both knowledge and behaviour:

##### **Knowledge:**

- The percentage of women aged 15 to 49 who report mosquito bites as cause of malaria has remained high since 2006 (80.4% in 2006 vs 84.7% in 2010). This finding was true both in rural areas and urban areas (80.8 % in rural areas vs 90.2% in urban area). More women aged 15 to 49 reported mosquito nets as a prevention method in the past five years (77.7% in 2006 vs 84.7% in 2010).
- In terms of recognizing fever as a symptom of malaria, more women aged 15 to 49 years recognize fever as a symptom of malaria (64% in 2006 vs 75.3% in 2010).

##### **Behaviour:**

- The national target is that 80% of all people will sleep under an ITN by December 2010. Since 2002 the proportion of children under age five who slept under an ITN has increased significantly (from 7% in 2001 to 50% in 2010) and this increase has been noted both in rural and urban areas (52.5% in rural areas and 44.3% in urban areas). The percentage of pregnant women who slept under an ITN has also increased (7.8% in 2002 to 45.9% in 2010).
- In terms of malaria in pregnancy, the target is at least 80% of pregnant women accessing the package of interventions to reduce the burden of malaria in pregnancy. Progress has been made in the attainment of this target. The proportion of women who received two or more doses of IPTp for malaria during their last pregnancy has also increased (from 61.9% in 2006 to 70.2% in 2010). The increase is true for both rural (65.7%) and urban areas (78.7%).

#### **4.6.7 Service Delivery Outputs and Outcomes**

Notable positive IEC/advocacy outcomes include: significant ITN use as reported by the nationwide malaria surveys (2006, 2008, 2010) among population residing in rural and urban areas. For example, the proportion for children aged five and below has increased from 7% in 2001 to 50% in 2010. The uptake of IPTp at 70% in 2010 is an increase from 61.9 % in 2006, a figure which is higher than the 60% Abuja target. Several different IEC service delivery areas have contributed to the realization of critical outcomes. These include the following:

- A malaria communication strategy was developed in 2006. A specific IRS communication strategy was also developed and is being used by health workers. IRS is now in 54 of Zambia's 73 districts.

- IEC materials have been produced (e.g., advocacy kits, posters, brochures, video dramas, television programmes and advertisements, billboards, radio programmes, television documentaries, and newspaper articles and supplements). Articles on malaria regularly appear in newspapers. National, community, commercial media institutions disseminate malaria-related messages to communities while a malaria-specific programme series is aired on national radio.
- A distribution mechanism for IEC materials is in place which ensures that communities have access to the materials at all levels. The most commonly-used mode of distribution is through the provincial and district offices, which in turn ensure that materials are passed on to the health centres and community levels. Since 2002, the IEC coverage and access has improved countrywide due to partners who contributed technical assistance and funds to the development of IEC materials. CHWs have also expanded the delivery points for key IEC messages.
- A KAP study was conducted in 2008 to guide the development of effective messages. Results show high knowledge levels (more than 80%); 75.3% in 2010 women aged 15 to 49 years recognize fever as a symptom of malaria of malaria. Similarly, a high percentage of women aged 15 to 49 (84.7% in 2010) report mosquito bites as cause of malaria, a figure which has remained high since 2006 (80.4%).
- Key messages have been developed for all the malaria interventions including; IRS, ITN, case management, environmental management, and IPTp. Several IEC materials have been developed to carry messages on all the interventions. Key

messages are outlined in the strategy documents: malaria communication strategy and IRS communication strategy.

- The national programme has conducted orientation and training of key civil leaders since 2009 to engage ward counsellors, and community-level elected officials, on malaria prevention and control issues.
- At least 60 religious leaders per province have been trained in malaria control; the 27 chiefs in the House of Chiefs were similarly oriented and there is a plan to train the new 27 member House of Chiefs in 2010. At least 100 civic leaders (ward counsellors) have been trained in two provinces, North-Western and Western provinces.

#### 4.6.8 SWOT Analysis

Strengths, weaknesses, opportunities, threats in IEC/BCC are indicated below.

##### **Strengths:**

- High government commitment to malaria programme.
- National IEC TWG meets quarterly.
- IEC/BCC focal point person at the national level, and senior health education officers at the provincial level to coordinate IEC activities.
- Partnership/collaboration with religious, traditional, civic and business leaders.
- Partnership with government media institutions (ZANIS, ZNBC), commercials, community radio stations.
- Availability of malaria communication Strategy in 73 districts; communities are increasingly demanding for malaria interventions.
- Dedicated partner's funding to IEC/BCC activities (MACEPA, PMI, SFH).
- Surveys, including 2008 KAP Study to guide messages and interventions.

**Weaknesses:**

- Limited communication facilities at district level, e.g., mobile video units, cell phones, etc.
- Inadequate funds allocated for IEC at all levels.
- Limited IEC materials in local languages for videos and mobile video shows in rural communities.
- Limited documentation of IEC activities.
- Lack of health education officers at the district level.
- IEC focal point offices for IEC have other responsibilities and high turnover.
- Limited evidence to demonstrate impact and prioritize IEC/BCC activities.
- Significant gap remains between knowledge and recommended practice, e.g., ITN use.

**Opportunities:**

- CHWs could strengthen intervention promotion at the household level, e.g., introduction of home management of malaria.
- Tap operations research unit to help research and evaluate IEC/BCC activities.
- Engage school health programme.
- Increase use of community health, local, religious, and traditional leaders.
- Strengthen malaria district task forces with IEC/BCC expertise.
- Expanding network of community radios.
- Existing partnership with local government and private sector on environmental management.
- Engage business on corporate social responsibility in malaria prevention and control and support to community interventions.

**Threats:**

- Private clinics not following case management guidelines.
- Delayed disbursement of funds from partners.
- Negative community practices, such as misuse of ITNs.

- Inadequate media coverage and quality controls.
- High production costs for print and audio visual materials (airing radio and TV programmes).
- Omission of IEC budget component in MOH budget and incorporation into health promotion component.
- Very low literacy levels in some parts of the country.

**4.6.9 Successes, Best Practices, and Facilitating Factors****4.6.9.1 Successes**

The NMCP has developed a communication strategy, and has been distributed to all the 72 districts and has been used to guide districts, who in turn have developed district IEC action plans. Effective use of Zambia's communication strategy has contributed to the development of IEC, advocacy and community mobilization in Zambia. The NMCP has an IEC subcommittee which provides an opportunity for joint planning and the sharing of information and reports. The NMCP's IEC unit produces quarterly and annual reports on IEC activities. Since 2002, the IEC coverage and access has improved countrywide due to partners, e.g., bi- and multilateral agencies such as WHO, World Bank, UNICEF, US Government-supported agencies (USAID, PMI), NGOs (MACEPA, Society for Family Health), who contributed to development of materials. CHWs have also expanded the delivery points for key messages and IEC.

**4.6.9.2 Best practices**

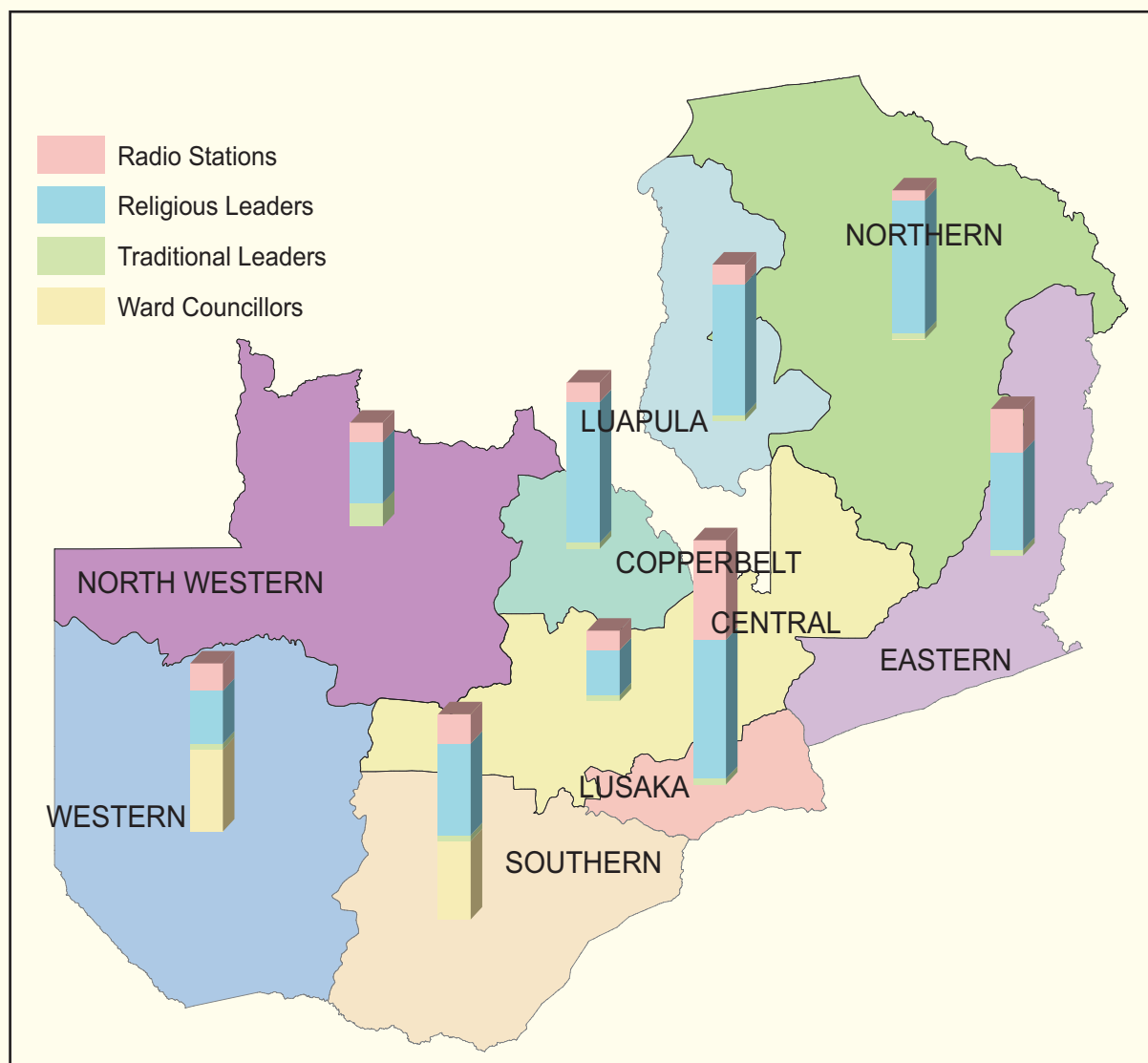
The use of an advocacy information kit to effectively mobilize traditional, civic, and religious leaders is considered a best practice in the NMCP. Increased advocacy and community mobilization through this kit, for example, to the House of Chiefs has strengthened interest and capacities in the



promotion of preventive and curative malaria services in their communities among some traditional leaders, resulting in some of the chiefs having taken up the role of malaria champions or role models among their peers. Examples include Chief Mumena of the Kaonde people in Solwezi district and Chief Ntambu of the Lunda people in Mwinilunga district.

There is broad involvement and partnering regardless of political affiliation. In 2010, the national programme began to engage and orient Ward Councillors, community-level elected officials on malaria prevention and control issues. The map below shows the scope of these trainings to date.

**Figure 33: Numbers of trained participants among Traditional, Community and Religious Leaders in Malaria**



Source: National Malaria Control Centre (NMCC), Zambia

### 4.6.9.3 Facilitating factors

Important facilitating factors to IEC/BCC, advocacy and community mobilisation include political support; malaria is high on the political agenda and enjoys the commitment of politicians at the highest levels due to sustained advocacy activities. The existence of a national communication strategy and IRS strategy are enabling factors to the implementation of IEC and advocacy activities.

### 4.6.10 Issues and Challenges

Issues and challenges on IEC/BCC include the following:

- Negative community practices such as misuse of ITNs and poor health seeking behaviour.
- Non-existence of health promotion officers at district level, prompting the IEC programme and malaria focal point persons currently at district level to have other additional responsibilities of health promotion.
- Limited funding to undertake continuous IEC/BCC activities in a sustainable manner by MOH.
- High production cost for IEC materials (including translation into local languages), pre-testing and airtime for radio/television programmes /advertisements.
- Very low literacy levels in some parts of the country.
- Limited research on IEC issues on factors that hinder use of ITNs and care-seeking behaviours. The questions in the MIS have limitations to guide effective national development of messages. Inadequate community-level IEC/BCC, advocacy, and community mobilisation activities.
- Insufficient IEC training programmes in the country at short term, medium and long-term basis.

### 4.6.11 Conclusion and Recommendations

#### 4.6.11.1 Conclusion

Malaria is high on the political agenda in Zambia. Orientations now include civic leadersbuilding on trainings for religious and traditional leadersand such advocacy and communication has created a demand for malaria control interventions at the household level. However, there remains a significant gap between knowledge levels and practice of recommended behaviours. For example, ITN usage, acceptance of IRS and IPTp, as well as early care-seeking behaviours such as prompt testing and treatment can be improved. Advocacy and communication activities for behaviour change need to be intensified and localized, taking into consideration an area's malaria and literacy levels. (The launch and roll out of the home management of malaria strategy represents an opportunity to implement community-based advocacy and communication for behavior change.)

In addition, research is needed to build an evidence base to inform the design and delivery of appropriate malaria messages and prioritize those IEC/BCC activities with the most impact. This requires building in monitoring and evaluation into activity design, based on agreed-upon indicators, into IEC/BCC efforts. In order for the IEC/BCC programme to sufficiently support the national programme, there is a need to boost community involvement, recruit/support the district health education officers, and increase the overall resources for IEC/BCC activities, both financial and material.

Advocacy and communication cut across all thematic areas and must reflect that different areas of Zambia may require different messages and messengers, whether looking

to increase ITN use in Nchelenge or pursuing the parasite in Kazungula. As the face of malaria is changing in Zambia increasingly localized the advocacy and communication around the disease and the interventions increasingly delivered directly to households must keep pace.

#### 4.6.11.2 Recommendations

Recommendations on IEC/BCC include:

1. **Resource Allocation and Mobilisation:** Resource allocations at the central level for IEC/BCC action plans need to be increased if tangible scale-up results are to be achieved. The IEC/BCC component in the district action plans require increased support in form of technical, material, and financial resources.
2. **Human Resources:** There is need to increase staffing levels and capacity of health workers in support of IEC activities at all levels, particularly the district and community levels.
3. **Focus on the community level:** As malaria is increasingly localized the corresponding advocacy and communication must keep pace. For example, supporting CHWs with the appropriate messages and materials as they test and treat for malaria and other illnesses; and ongoing engagement of media, especially community radio, to reach the rural areas.
4. **Partnership strengthening and collaboration:** The national level IEC TWG must expand its partnership with NGOs; other line ministries, e.g., the Ministry of Education for malaria prevention curriculum in schools; cooperating partners; more private sector engaging through social corporate responsibility.

5. **Involvement of leaders:** Strengthen linkages with national programme and community, religious, and traditional leaders and provincial level trainings while new methods and incentives for their engagement are explored.

6. **Research:** In collaboration with the operations research unit, research should focus on evaluating the impact and cost-effectiveness of IEC interventions. There is a need to standardize the IEC/BCC indicators in the Zambia DHS, MIS, and KAP surveys.

## 4.7 Surveillance, Monitoring, and Evaluation

### 4.7.1 Introduction

The NMCP together with partners has developed a comprehensive surveillance and evaluation plan that is in line with the NMSP 2006-10. The integration of malaria indicators into population-based national surveys and the HMIS has allowed for tracking of disease control progress over the last decade. A needed update for the HMIS was instituted in 2009 as the DHIS and has strengthened routine data collection, use, and dissemination. Zambia has substantial data on programme progress and the current epidemiological situation and publishes an informative quarterly M&E newsletter. Information weaknesses persist at district and community levels.

### 4.7.2 Policy, Guidance, Coordination

Zambia has the IDSR technical guidelines and the malaria epidemic preparedness, prevention and control guidelines that guide malaria surveillance. Similarly, M&E makes use of the M&E systems including the HMIS (now called DHIS) that capture malaria



performance indicators from the health facility level in the districts through to provinces and aggregated at the national level. The indicators are outlined in the performance monitoring/M&E plan for the NMSP.

Surveillance and M&E functions are coordinated by technical surveillance and M&E staff at the NMCC representing the national level. However, at provincial and district levels these are coordinated by the malaria focal persons that are tasked with other public health responsibilities.

In view of the observed changing malaria epidemiology patterns in Zambia during the period under review, there is need for strengthened collaboration among the surveillance, M&E, and operations research units to harmoniously design, capture, and analyze relevant data and indicators to inform policy decision-making and strategic malaria programming.

#### **4.7.3 Malaria country profile, risk mapping and stratification**

National population-based estimates of parasite prevalence in children under five

years of age are available in the 2006, 2008, and 2010 MISs. In 2006 (at a time when limited efforts were underway in malaria prevention), parasite prevalence in under-five-year-olds was 22%. The modeled national parasite prevalence distribution for this age group at this time is shown in Figure 14.

With malaria control scale up progressing nationally from 2006 through 2010, parasite prevalence decreased substantially to approximately 10.2% in 2008. By 2010, parasite prevalence remained low in most provinces, but an increase was seen in two provinces (Luapula and Northern)<sup>34</sup>, and a reversion to previous rates in one province (Eastern); the other five provinces had low parasite prevalence in children under 5 years old (Lusaka=0.4%, Southern=5.7%, Western = 5.8%, Northwestern = 7.8%, Central = 11.2% and Copperbelt = 13.1%). The changes are shown in Table 16 and shown geographically by province in Figure 10 for each of 2006, 2008, and 2010. These changes over time have led to the current situation where malaria parasite prevalence varies substantially across the country with higher rates in the three provinces in the northeast and east part of the country, and low and stable rates elsewhere.

<sup>33</sup> The map is based on a Bayesian logistic regression model with linear terms for day LST, night LST, NDVI and rainfall. The estimates correspond to the median of the posterior predictive distributions computed over 100,000 pixels. Source: Riedel *et al. Malaria Journal* 2010 **9**:37 doi: 10.1186/1475-2875-9-37.

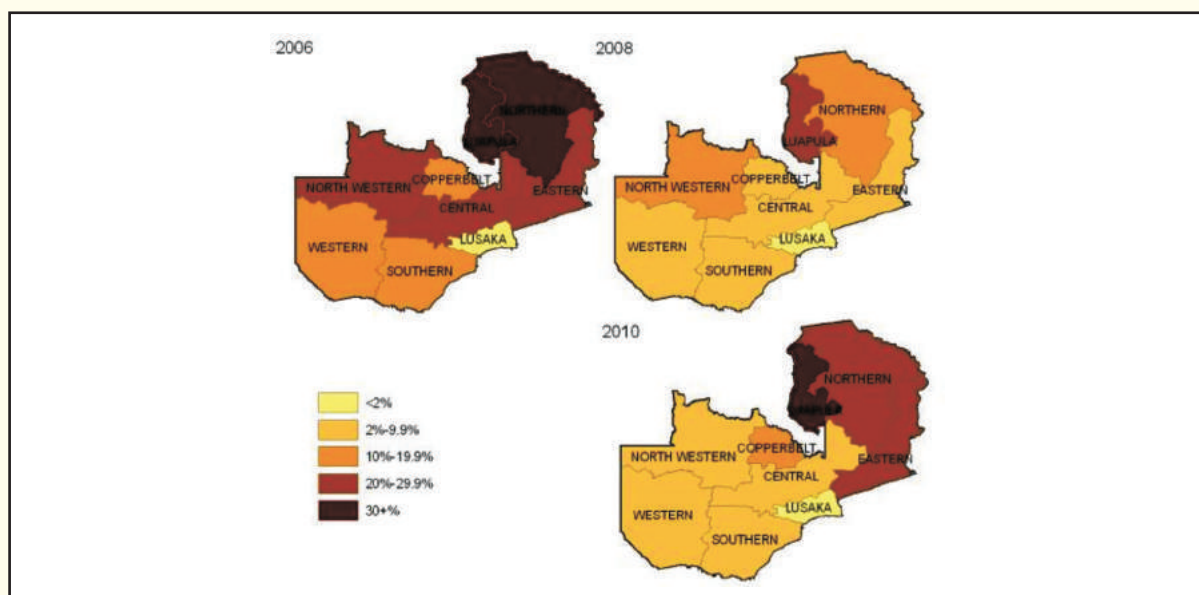
<sup>34</sup> Of note, ITN ownership and use had fallen in Luapula and Northern provinces between 2008 and 2010; ITN coverage and use remained high and stable in the other provinces.

**Table 16: Parasitemia and Anaemia (Hb<8gm/dl) Prevalence in Children under the Age of 5 Years in Nation-wide Surveys at the end of Malaria Transmission Season in 2006, 2008, and 2010, Zambia**

Province	Parasite prevalence in children <5 years of age				Anaemia (Hb<8gm/dl) prevalence in children <5 years of age		
	2006	2008	2010		2006	2008	2010
Central	23.5	7.9	11.2		12.8	3.2	4.1
Copperbelt	11.4	9.9	13.1		11.8	4.2	9.6
Eastern	22.8	9.3	22.6		13.8	6.2	9.9
Luapula	37.5	21.8	53.5		20.3	6.9	20.8
Lusaka	0.7	1.7	0.4		9.2	4.2	4.2
Northern	35.6	12.0	24.3		14.3	3.4	11.0
North-western	20.4	15.2	7.8		19.9	5.0	2.9
Southern	8.6	7.9	5.7		7.8	3.5	8.0
Western	19.1	2.6	5.8		7.4	1.2	7.6
<b>Total</b>	<b>22.3</b>	<b>10.2</b>	<b>16.9</b>		<b>15.8</b>	<b>4.3</b>	<b>9.2</b>

Source: National Malaria Control Centre

**Figure 10. Parasitemia rates by Province by MIS in 2006, 2008, and 2010**



Source: Malaria Indicator Survey (MIS) 2006, 2008, and 2010

#### 4.7.4 Human resources, Training and Capacity Development

Like other thematic areas, the surveillance and M&E also faces the challenge of inadequate number of skilled staff especially at the district and community level.

#### 4.7.5 Routine Information Systems

**Malaria routine information system:** routine sources of information on malaria and malaria control include:

- Routine outpatient reporting that comes from HMIS, now DHIS.
- Routine inpatient cases/admission and deaths reporting that comes from HMIS, now DHIS.
- Routine LLIN delivery reporting from the NMCC ITN database.
- Routine IRS delivery reporting from annual IRS reports.
- Commodities stock control reporting from MSL.
- Lab reporting of malaria slides and RDTs processed and confirmed from DHIS.

The national reporting system is the HMIS, which captures health facility data. All health facilities in the country report in this system. Districts aggregate the data and report to the central level. The programme is currently unable to report malaria diagnosis and treatment undertaken by the CHWs separate from the health facility data. This is a serious gap that needs to be covered urgently in order to demonstrate the effectiveness of community case management of malaria in the country.

Until 2008, the HMIS could only report an aggregated number of clinically diagnosed and confirmed malaria cases seen in health facilities throughout the country. From 2009, the system was updated to report disaggregated data of confirmed and clinically diagnosed malaria cases from

across all facilities in the country. The NMCC has conducted special studies in some selected districts that have shown a clear linkage between availability and appropriate use of diagnostics, disease burden, and ACT consumption. An example of this is illustrated in Kazungula District where the district experienced a dramatic reduction in reported malaria cases per 1000 population and by 2008 and 2009, these were very low at roughly 20 cases per 1000 population. While this reduction in reported cases benefitted from the prevention scale up, the changing malaria case definition due to the change to reporting only lab-confirmed malaria cases (by RDT or microscopic positivity) accounted for much of the decline and now shows the true and very low malaria rate in this district.

#### 4.7.6 Sentinel Surveillance Systems

The purpose of malaria sentinel sites is to collect additional indicators on malaria and to strengthen facility-based malaria surveillance. There are 10 sentinel districts. The selection of the sentinel sites occurred during the development of the 2001-2005 NMSP. The choice included representativeness of all malaria epidemiology, presence/absence of partners, and rural and urban settings.

**Malaria sentinel sites for reporting treatment failure:** All district hospitals in Zambia report any suspected treatment failure, however, special focus for treatment failure monitoring is implemented in 10 sentinel sites. These sites were selected based on their geographical and epidemiological profiles. The sites are Chongwe, Isoka, Sesheke, Choma, Chibombo, Mpongwe, Mansa, Katete, and Chipata. In the past five years, six of these sites have actively participated in efficacy studies while new ones have been included (Kapiri, Mposhi) because some of the older sites recorded low parasitaemia rates (Choma, Sesheke,



Chibombo) that it became difficult to recruit the required sample size from these sites.

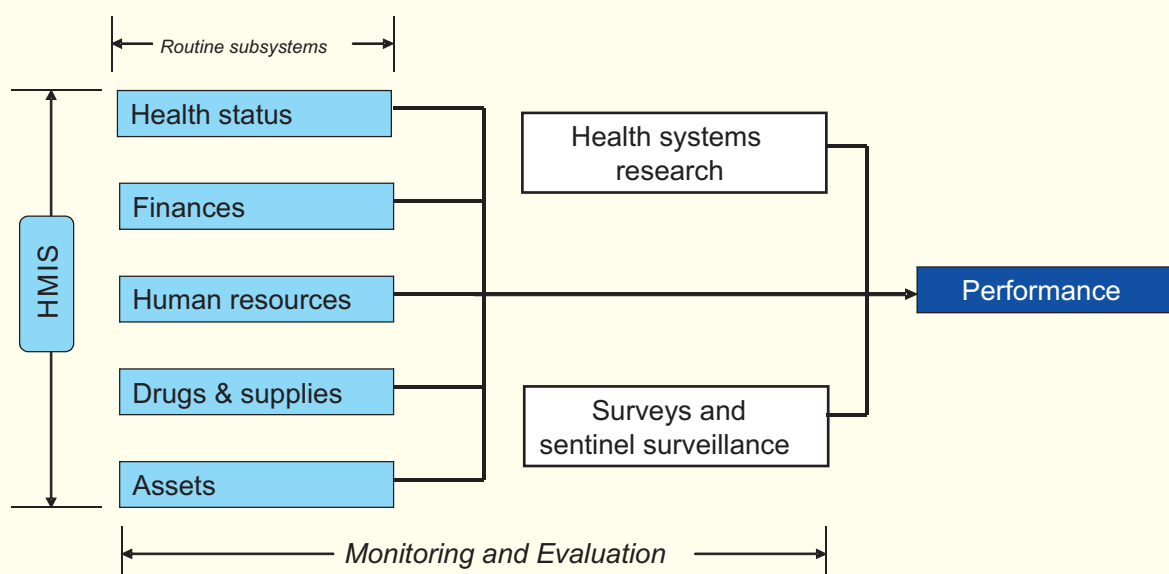
#### 4.7.7 Monitoring and Evaluation Plan

Relevant information for M&E progress in national malaria control comes from many sources and stakeholders encompassing governmental, non-governmental, private, and international agencies. Collecting, analyzing, interpreting, and reporting on the strategic information from stakeholders forms a crucial part of national M&E activities. Strategic information is guided by available standards and norms for defining key malaria M&E indicators for measuring

progress and programme performance, as well as overall national or programme goals and objectives. Several efforts to define and standardize relevant indicators exist.

Understanding the role of stakeholder agencies in defining, collecting, disseminating, and reporting strategic information is important for coordinating national malaria M&E needs. This sections reviews available sources of malaria M&E information and outlines key indicators for measuring progress in disease burden impact, coverage of malaria interventions, and programme performance in implementing malaria control. Figure 11 presents the health systems monitoring and evaluation framework

Figure 11. Health systems monitoring and evaluation: a generic framework



#### 4.7.8 Malaria Surveys

Malaria surveys have been done by the MOH and a number of partners over the years. Table 17 presents the summaries of these surveys.

**Table 17: Malaria surveys (household and health facility) their source of the funding, partners involved in supporting them and, dates of their conduct**

Type	Source	Scale	Details	Coverage issues included
Household	Malaria Indicator Survey 2010	national	~4,500 households, nationally representative	Mosquito net/ITN possession and usage, U5 fever treatment with antimalarials, IPT, IRS
	Malaria Indicator Survey 2008	National	~4,525 households, nationally representative	Mosquito net/ITN possession and usage, U5 fever treatment with antimalarials, IPT, IRS
	Malaria Indicator Survey 2006		~ 3,000 households, nationally representative	Mosquito net/ITN possession and usage, U5 fever treatment with antimalarials, IPT, IRS
	DHS 2007 (CSO, MOH)	national	~7,000 households, nationally representative	Mosquito net/ITN possession and usage, U5 fever treatment with antimalarials, IPT, all-cause U5 mortality
	DHS 2001-02(CSO, MOH)	national	7,100 households, nationally representative	Mosquito net/ITN possession and usage, U5 fever treatment with antimalarials, IPT, all-cause U5 mortality
Household	NetMark 2004 (NetMark 2001)	5 project areas	~2,500 households, urban/rural sampling	Mosquito net/ITN possession and usage
	Sexual Behavior Survey 2004 (CSO)	national		HIV/AIDS, STI behaviors
	LCMS 2002-2003* (Central Statistical Office. and Zambia. Ministry of Health. 2004)	national	~10,000 households, nationally representative	Household income and expenditure, assets, basic health issues (fever prevalence, child immunization and nutrition)
	World Health Survey 2001	national		
	SFH 2001(Kusanthan 2001)	7 districts	4,200 households, representative, three-stage stratified cluster sampling	Mosquito net/ITN possession and usage
	NetMark 2000(NetMark 2001)	5 project areas	1,000 households, urban/rural sampling	Mosquito net/ITN possession and usage
	MICS 1999(UNICEF 2000)	national	7,300 households, nationally representative	Mosquito net/ITN possession and usage, U5 fever treatment with antimalarials, all-cause U5 mortality
	SFH, ACTwatch Outlet Surveys 2008 & 2009	National	Nationally representative sample	Levels and trends in the availability, price, volume, retailer perceptions, and knowledge of antimalarial drugs at different service delivery points. Available at <a href="http://www.ACTwatch.info">www.ACTwatch.info</a> .
	SFH, ACTwatch Household Survey, 2009	National	2,244 households, nationally representative	Treatment seeking behaviour and volumes of specific antimalarial drugs consumed. Available at <a href="http://www.ACTwatch.info">www.ACTwatch.info</a> .

Household + facility	RBM follow up 2004 (report not yet available)	10 districts	Non-representative, ~4,000 households, ~65 facilities	Facility records, OPD, parasite prevalence, ITN coverage, U5 fever treatment with antimalarials
	RBM baseline 2001 (Roll Back Malaria Zambia 2001)	10 districts	Non-representative, 4,031 households, 65 facilities	Facility records, OPD, parasite prevalence, ITN coverage, U5 fever treatment with antimalarials
Facility	Global Fund 5 Year Impact Evaluation Study	9 districts		
	CBoH 2005 (laboratory services))	1 district	Health facility and laboratory inventory	Availability of health personnel and equipment
	JICA 2004	national	~1,400 facilities	Availability of health personnel and equipment
	SAM 2004 (Ministry of Health Zambia 2005)	national	District level	Availability of guidelines, health personnel and equipment
	CBoH 2002 (Central Bureau of Health 2002)	national	~1,300 facilities	Availability of health personnel and equipment

\*LCMS=Living Conditions and Monitoring Survey  
Source: National Malaria Control Centre (NMCC)

**Pharmaco-vigilance system:** The national diagnosis and treatment guidelines also include guidance on identifying and reporting adverse events related to anti-malarial medicines use. In all the health facilities and at the district level there are functional pharmacovigilance committees and a reporting mechanism is in place through the district, PHOs and then to PRA.

#### 4.7.9 Malaria Reporting

The information available to describe the malaria epidemiology in Zambia comes from three main sources:

- Routine HMISs which, as of 2009, has been revised, upgraded, and replaced by the DHIS.

- National population surveys principally from DHS and MISs but also from MICS, RBM surveys, and other surveys.
- Operations research and special studies some of which have been published in the scientific literature and some which remain as reports to the MOH or partners.

#### 4.7.10 Malaria Database and Informatics System

The Zambia malaria database was updated as part of the MPR phase 2 activities.

#### 4.7.11 Progress Towards Achievement of Targets

The summary of progress towards achievement of malaria targets is presented in Table 18 below.



**Table 18: Summary of Progress Against National Malaria Targets**

Indicator	ZDHS 2001/ 02	MIS 2006	MIS 2008	MIS 2010*
Percentage of households with at least one insecticide-treated net (ITN)	13.6	37.8	62.3	64.3
Percentage of households receiving indoor residual spraying (IRS) in the previous 12 months among all households in Zambia	N/A	9.5	14.9	23.1
Percentage of households covered by at least one ITN or recent IRS	N/A	43.2	68.3	72.9
Percentage of children ages 0–59 months who slept under an ITN the previous night	6.5	24.3	41.1	49.9
Percentage of pregnant women (PW) who slept under an ITN the previous night	7.9	24.5	43.2	45.9
Percentage of PW who took any preventive antimalarial drug during pregnancy	35.8	85.3	88.1	89.0
Percentage of PW who received 2 doses of intermittent preventive treatment during pregnancy	N/A	58.9	66.1	70.2
Percentage of children ages 0–59 months with severe anemia (Hb<8 g/dl)	N/A	13.8	4.3	9.2
Percentage of children ages 0–59 months with malaria parasitemia	N/A	22.2	10.2	16.9
Percentage of women ages 15–49 years who recognize fever as a symptom of malaria	N/A	65.2	71.1	75.3
Percentage of women ages 15–49 years who reported mosquito bites as a cause of malaria	N/A	80.4	85.2	84.7
Percentage of women ages 15–49 years who reported mosquito nets as a prevention method	N/A	77.7	81.3	81.7

Sources: ZDHS 2001/02, and MIS 2006, 2008, and 2010

National malaria targets were however defined by the last National Malaria Strategic Plan 2006-2010. These are listed in Table 19 and progress toward achieving the targets are shown; and the remaining gaps are noted and comments are provided.

**Table 19: Zambia Malaria Control Targets, 2010 Coverage Rates and Remaining Gaps**

Target	Current coverage (2010)	Gap remaining
At least 80% of people sleep under Insecticide Treated Nets in eligible ITN areas of every district by 2008	50% of children <5. 47% of women of reproductive age. 64% of households own an ITN and among households that own ? 1 ITN, 68% of children slept under a ITN the night before.	Moderate gap remains.
At least 85% of people sleep in sprayed structures in eligible areas of the 15 selected districts by December 2008 and to be maintained to 2011.	85-90% coverage of targeted households	No gap for targeted areas; programme has expanded the number of districts from 15 to 36
At least 80% of women have access to the package of interventions to reduce the burden of malaria in pregnancy by 2008.	64% of households have at least 1 ITN. 46% of pregnant women slept under an ITN the previous night 86% of pregnant women took some IPTp. 69% of pregnant women received 2+ doses of IPTp.	No gap in access; slight gap in receipt or use.

At least 80% of suspected malaria patients are correctly diagnosed by December 2008.	17% of febrile children had diagnosis applied	Substantial gap
At least 80% of community members will indicate that they have the knowledge, attitudes, and skills to effectively prevent malaria in their communities and in their homes, and to appropriately seek care during suspected malaria illness by December 2008	69% of women age 15-49 have heard a malaria message this year. 99% have heard of malaria. 75% recognize fever as a malaria symptom. 85% report mosquito bites as a cause of malaria. 82% report mosquito nets as a malaria prevention method. 31% of children with fever sought treatment the same or next day.	No or minimal gap in hearing messages and knowing about malaria.  Gap in action for prompt treatment seeking for children with fever.
80% of districts and sentinel sites will collect, process, analyse and manage malaria data by 2007, and 100% by 2008	83% of districts reported monthly within 5 weeks for DHIS in 2009	Minimal gap in reporting timeliness. Analysis of data may need attention

Source: National Malaria Control Centre (NMCC)

Universal coverage of malaria interventions is now being promoted by the Program NMCP

(MOH, National Malaria M&E 2006 - 2010. Lusaka. Available at [http://www.nmcc.org.zm/malaria\\_information\\_system.htm](http://www.nmcc.org.zm/malaria_information_system.htm)) Additional indicators for full coverage for ITN coverage and use have been added. These are based on household survey measurements and include the percentage of households with all sleeping spaces with an ITN, defined as the percentage of households with an ITN to sleeping space ratio greater than or equal to one, as well as a full coverage indicator for use of ITNs among all household members. This indicator is defined as the percentage of all age populations sleeping under an ITN the night before the survey.

Malaria strategic and annual targets have been set and annual progress reviews are in place. National malaria prevention and control targets in place as defined in the NMSP 2006/2010 and further elaborated in the annual action plans (MOH, NMSP, 2006 to 2010. Available at <http://www.nmcc.org.zm/publications.htm>).

#### 4.7.12 Issues and Challenges

Remarkable progress has been made towards set targets but challenges still remain in the areas of data quality and completeness, timeliness of reporting, personnel and rigorous monitoring of activities. A feedback monthly reporting including monthly logistics is under way.

#### 4.7.13 Conclusion and Recommendations

Malaria surveillance, M&E systems exist in Zambia through the development and implementation of the M&E plan, 2006 - 2010. There is, however, room for improvement. The following are the recommendations in this area:

##### 1. Update the malaria surveillance plan:

A strategic, technical framework for malaria surveillance that addresses the need for harmonized and coordinated efforts between the entomologists, epidemiologists, and intervention-monitoring branches, and the additional need to coordinate these data with intervention planning and

implementation parties. Several areas in Zambia are entering pre-elimination stages where high-coverage of IRS, for example, may not be the most cost-effective solution to limit incidence. A pilot project will begin in Lusaka District (2010) and Kazungula District (2011) to test the combination of passive and active detection of cases in an urban environment.

Currently, limited resources exist to guide countries into pre-elimination stages of malaria control. It would be beneficial for many countries as they enter the pre-elimination stage to have access to technical resources, working groups, and guides in order to make informed and strategic programme decisions.

## 2. Enhance the quality and timeliness of data for planning and decision-making:

The speed of data transfer from the health facility to district level, and onward to provincial and central levels is often limited. In some districts, weekly case report forms are completed and sent to the districts for review. Use of SMS to transfer malaria surveillance data from health facility to higher levels will be developed and piloted in 2010 with the intention to scale-up this simple technology to additional districts as resources allow. This system has the potential to greatly increase the speed of malaria case surveillance data transfer, thus providing national, provincial, and district-level decision-makers with timely information to make quality decisions (e.g., where to target IRS resources).

## 3. Conduct malaria surveillance by epidemiological zone:

Based on the three epidemiologic settings (see Epidemiology section above), initial district-wide efforts should be undertaken to try and test systems of improved surveillance and response

based at facilities or in communities and including determination of foci of transmission, population testing, and treatment to reduce the parasite pool in people, active case detection, and other strategies including mapping and containing transmission. In addition, there should be wide dissemination of regular quarterly and annual malaria reports including districts and communities. The focus on surveillance in each zone is as follows:

- i. Low to nil transmission zone:
  - Health-facility-based active surveillance follow up of index cases identified at health facilities.
- ii. Low stable transmission zone active surveillance:
  - Mass testing and treating of parasite positive cases in dry season for two consecutive years.
  - Subsequent health facility-based active surveillance.
  - Surveillance-based response with focalized ITN distribution or focalized IRS.
- iii. High persistent transmission Zone:
  - Routine surveillance and response until SPR is less than 5% or parasite prevalence is less than 5% or incidence is down to 5 to 10 per 1000 population at risk.
  - Subsequent health-facility-based active surveillance.

## 4. Strengthen evidence for policy/strategy:

- i. Evidence generation actions
  - Strengthen entomological monitoring systems in insecticide resistance monitoring, vector susceptibility monitoring, vector mapping, and bionomics.



- Develop quality of care monitoring system.
- Strengthen diagnostics quality assurance and quality control system.
- Support appropriate parasite prevalence surveys (MIS, etc.).
- Continue malaria impact reviews.
- Undertake school-based malaria parasite prevalence surveys malariometric studies.
- Undertake other relevant malaria operation research.

- ii. Conduct annual malaria research policy translation meetings with the participation of researchers, policy makers, development, and implementing partners.

## 4.8 Operational Research

### 4.8.1 Introduction

In order to support the ongoing scale-up of its activities, the NMCP conducts operational research that is timely and relevant to national objectives in order to guide policy decision-making. This research assesses not only the efficacy of specific interventions, but also includes economic, social, cultural, and behavioral factors. The research activities are coordinated by a well-established operational research TWG based on the priority areas identified. This information generated is shared with all stakeholders, such as implementers, policy makers, funding agencies, and academic institutions.

### 4.8.2 Policy and Guidelines

Zambia has a policy on health research which aims to provide well-coordinated health research that will provide evidence based interventions to ensure quality health service delivery as close to the family as possible. The policy articulates all aspects of ethical

considerations, priority settings to suit the local epidemiological context, coordination, financing, regulation, and research and development.

The national malaria research guidelines were developed in 2009 and are aimed to increase capacity to conduct malaria research at all levels.

### 4.8.3 National Basic and Operational Research Priorities

The key strategies according to the NMSP 2006/2010 to develop and strengthen national capacity for developing evidence base for programming are:

- Develop a malaria-specific research agenda.
- Develop a funding stream and contracting mechanism for programme responsive research.
- Timely dissemination of research findings to stakeholders and integration of information in programming.

Additionally, on an annual basis the programme develops an annual plan of action which incorporates the country research priorities by programme area through a consultative process.

### 4.8.4 National Malaria Research Projects and Programmes

There are various research activities that are currently being conducted by the NMCC and in collaboration with other research partners. These include:

- Therapeutic efficacy studies.
- Adherence studies to case management protocols.
- Studies for increasing access to interventions. Studies on impact of interventions.

- Trials on innovative confirmatory diagnostic tools.
- Economic studies on cost effectiveness of interventions.

The research activities are designed to cater for all programme areas, i.e., case management, vector control (ITNs and IRS), IEC, and programme management. Further, research results are widely disseminated locally and internationally (see Annex 3 for a list of references for research publications).

A national research institute with a malaria research section, field malaria sites, and malaria research programmes are in place (the NMCC was initially established as a research institute for malaria). Over time it has evolved into a malaria control programme with an established research unit which coordinates all national malaria-related research activities. Through the operations research unit various research activities as identified by the operational research TWG and the various intervention programmes are implemented.

The various research activities are implemented in all the 72 districts with a special focus on 10 sentinel sites. These sites were selected based on their geographical locations and epidemiological profiles. These sites included Chongwe, Isoka, Kalomo, Chibombo, Chingola, Senanga, Chipata, Mwiinilunga, Samfya, and Kaputa. Further, these research programmes are implemented through strong collaborations with various research institutions in the country. These include the TDRC, UNZA, and the Malaria Institute at Macha. These institutions have conducted and continue to conduct various research agendas in their respective field sites. Below are some highlights of some of the malaria-related research being conducted by the above mentioned research institutions:

#### 1. **Malaria Institute at Macha**

- Entomology
- Epidemiology and GIS

- SMS reporting system
- Molecular biology
- Malaria diagnosis using saliva
- Malaria Active case detection

#### 2. **TDRC**

- Clinical trials
- Entomology
- Molecular biology
- Parasitology
- Epidemiological studies

#### 3. **University of Zambia (UNZA)**

The University of Zambia is principally a training institution and has been conducting capacity-building in malaria research. The main programmes in support of malaria research include:

- Academic programmes in public health, parasitology, and epidemiology.
- Fellowships/in service training activities at the School of Medicine.
- The School of Medicine and the University Teaching Hospital Malaria Research Unit and the Malaria Training and Research Capacity Building in Southern Africa Programme offers capacity-building opportunities for researchers and students: short fellowships, partial research scholarships, international workshops, and scientific meetings.

#### 4.8.5 **Regional and International Collaboration in Malaria Research**

Apart from the local collaborators listed above, the NMCC has collaborations with various other regional and international organizations, universities, and agencies. These include:

<ul style="list-style-type: none"> <li>• WHO</li> <li>• WHO-TDR</li> <li>• Global Malaria Programme</li> <li>• UNICEF</li> <li>• The World Bank</li> <li>• PMI</li> <li>• Malaria Control and Evaluation Partnership in Africa (MACEPA)</li> <li>• PATH</li> <li>• Kenya Medical Research Institute</li> <li>• Integrated Vector Control Consortium</li> <li>• Southern African Malaria Elimination Group</li> <li>• Boston University School of Public Health</li> <li>• London School of Hygiene &amp; Tropical Medicine</li> </ul>	<ul style="list-style-type: none"> <li>• Johns Hopkins University</li> <li>• Harvard University</li> <li>• Institute for Health Matrices and Evaluation</li> <li>• Liverpool University</li> <li>• Ifakara Health Institute</li> <li>• Malaria Transmission Consortium</li> <li>• University of Cape Town</li> <li>• Duke University</li> <li>• Medical Research Council, South Africa</li> <li>• Italian Malaria Network</li> <li>• Population Services International</li> <li>• Norvatis</li> <li>• Dafa Pharma</li> <li>• Pfizer</li> </ul>
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#### 4.8.6 SWOT Analysis

##### Strengths:

- Malaria research institutionalization.
- Research agenda is locally generated to respond to local priorities.
- Partnerships with both local and international research institutions and universities.
- Availability of some funding for operational research activities, e.g., GRZ, WHO, WB, MACEPA, and PMI.
- Use of research findings in guiding policy decision-making.
- Availability of local research expertise, e.g., GRZ, WHO, WB, MACEPA, PMI.
- Use of research findings in guiding policy decision-making.
- Availability of local research expertise, e.g., epidemiologists, health economists, public health experts, parasitologists, biostatisticians, entomologists, biomedical scientists, behavioral scientists.

##### Weaknesses:

- Inadequate funding.
- Lack of regular dissemination of research findings to stakeholders.

- Limited access to published and unpublished malaria research in Zambia.
- Lack of research and development activities especially on drugs and diagnostics.

##### Opportunities:

- Ability to conduct various studies due to availability of local expertise.
- Variable geographical, epidemiological, and programmatic research context.

##### Threats:

- Inadequate internal resources for malaria research.

#### 4.8.7 Summary of progress

Priority research activities have been conducted by the NMCC and in collaboration with various local and international institutions. These include therapeutic efficacy trials, adherence studies, KAP studies, access to health care assessments, trends analysis, evaluation of novel diagnostic tools, capacity building through support of master's level students, and development of malaria research guidelines for districts, among others.



**Table 20: Summary of progress in malaria operations research**

Target	Progress
To provide timely, accurate and relevant evidence to guide implementation of malaria control and inform decision-making.	<ul style="list-style-type: none"> <li>• Implemented priority research.</li> <li>• Conducted routine annual research e.g. therapeutic efficacy studies.</li> <li>• Trained selected districts in malaria research.</li> <li>• Disseminated research findings in local and international fora (journal publications, reports, conference presentations, policy briefs).</li> <li>• Local evidence used for policy change e.g. anti malarial drug policy change, update of ITN guidelines, diagnostic test selection.</li> <li>• Enhanced collaboration with various research partners.</li> <li>• Well established multidisciplinary technical working group.</li> </ul>

Source: National Malaria Control Centre (NMCC)

#### 4.8.8 Key Issues, Challenges, and Problems

The main challenges faced by the OR unit include:

1. Inadequate funds for malaria research activities.
2. Limited access to published and unpublished malaria research in Zambia for all levels.
3. Lack of investment in research and development.

#### 4.8.9 Conclusions and Recommendations

##### 4.8.9.1 Conclusion

The malaria control programme has benefitted greatly from locally-generated evidence to improve policy decision-making and programme implementation. This has been evidenced by the tremendous strides in

reducing the disease burden throughout the country. There is a need to continue to prioritize the operational research agenda through the operational research TWG identification of key gaps and new intervention plans that require further evidence and tracking of intervention effectiveness and efficiency.

##### 4.8.9.2 Recommendations

1. Internal level of funding should increase to 2% of government funding and 5% of donor funding in line with the Bamako Call to Action on Research for Health (Bamako Call to Action, 2008).
2. Establish electronic archive for malaria research findings.
3. Improve capacity in malaria research at lower levels.
4. Invest in research and development programmes.

## 5. CONCLUSIONS

Malaria epidemiology in Zambia is in transition with three clear epidemiological zones: one area (Lusaka city) with a very low transmission level; one area (six central-western-southern provinces) with current low transmission; and one area (three north-eastern and eastern provinces) with current high levels of transmission. In the last five years, malaria control interventions have been scaled up with great impact on malaria burden and transmission patterns. More, however, needs to be done more so with the evidence of decline in ITN coverage and the rise in malaria incidence in some provinces. Much of the malaria morbidity and mortality has been addressed with scale up. In the coming years, the existing morbidity and mortality reductions will need to be maintained, this work needs to be consolidated particularly for the three provinces that are not fully under prevention control. In areas where control has been established and sustained, expanded emphasis on malaria transmission reduction will be required. The following key points summarize the existing epidemiologic situation of malaria in Zambia and provide suggestions for critical next steps both strategic decisions and programme actions.

Zambia's malaria situation is now greatly affected by programme action. Based on historical data, malaria transmission potential exists nation-wide and climatic, geographic, and social features allowed for moderate-to-high levels of transmission. In the past decade, this has been altered dramatically by the package of malaria interventions which currently reach much of the population. Six of the nine provinces now have parasite prevalence rates that are generally below 10% for children under five years of age (in contrast to rates that exceeded 20% and often exceeded 30% in the past). Three provinces (Luapula, Northern, and Eastern) have shown the ability to drop parasite prevalence rates

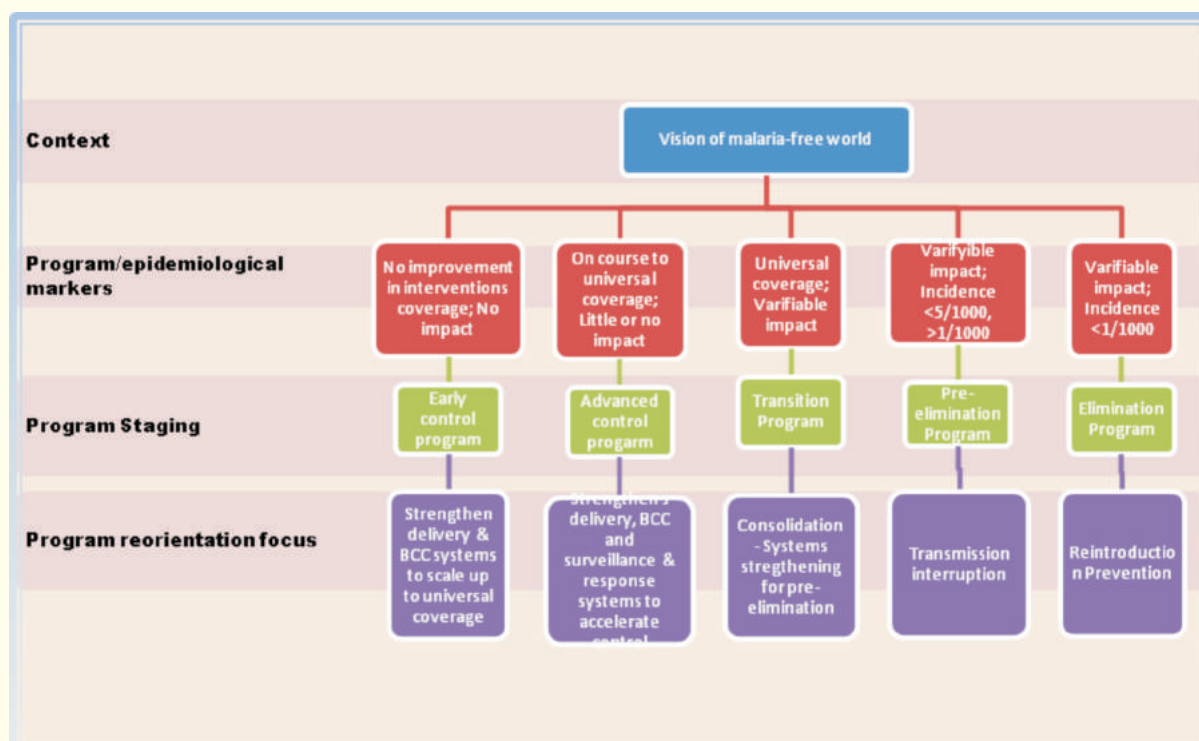
substantially, but recent decreases in ITN ownership and consequently ITN use have apparently led to a return to higher levels of transmission. This suggests that good intervention coverage works and that failure to achieve this or lapses that allow a return to lower coverage rates will be followed by malaria transmission resurgence. Thus, a first priority is to maintain and build on current relatively high malaria intervention coverage rates where they exist and to regain high coverage in areas where this has fallen.

There is a need to take steps to strengthen district and community action against malaria to address the different epidemiologic settings. While assuring sustained prevention control, action should be taken in the Lusaka area to strengthen surveillance, identification of cases, and transmission reduction around cases and action should be taken in areas with substantial existing control in place to further reduce malaria transmission. In the six provinces with evidence of reduced transmission, it is necessary to institute a next set of steps to further reduce this transmission. Because limited experience exists in the choice and sequencing of actions, Zambia and its malaria partners should embark on trying a set of approaches in a few districts that likely include: a) establishing and maintaining very high prevention coverage with ITNs and/or IRS; b) a move to universal coverage with diagnostics for assessing fever and suspected malaria; c) improvement or strengthening of the surveillance system to be able to identify and contain infections both symptomatic and possibly asymptomatic in an effort to reduce the pool of malaria parasites in humans and reduce their transmission on to mosquitoes. Prompt and correct diagnosis of malaria is crucial for accurate epidemiological assessment and better case management.

## 6. KEY RECOMMENDATIONS

### 6.1 Overview

Malaria control in Zambia is a transition programme (see figure below). The programme reorientation focus is therefore a consolidation of control.



### 6.2 Recommended Strategic directions

The following strategic directions are recommended for the Zambia malaria control programme in the next five years:

- Develop, update, and assemble relevant strategic documents.
- Scale up and direct interventions based on epidemiological evidence currently with three different malaria transmission zones in the country.
- Strengthen malaria surveillance and response addressing the epidemiological differences across the country and utilizing the evidence for ongoing refinement of policy and strategy.

- Build and extend malaria control operational strengths at provincial, district, and community levels in line with national policies on decentralized programme action.
- Strengthen partnership and performance management to address human and financial resource needs, commodity requirements, and programme action.

### 6.3 Recommended Strategic Actions

Specific needs to be taken in the following areas:



**1. Develop, update, and assemble relevant strategic documents.**

For the national malaria policies and guidance, there is a need to have a single document or combined set of documents that contain all the malaria control policies currently scattered in several intervention-specific guidelines.

**2. Scaling up and directing interventions based on epidemiological evidence.**

The current gains in Zambia's malaria control efforts have been hard fought and must be maintained. While malaria is still considered endemic throughout the country, Zambia can now be considered as having three different epidemiologic zones:

- **Zone 1:** very low malaria transmission, parasite prevalence in young children at the end of the rainy season (1%); very few cases in health

facilities and essentially no malaria mortality; Lusaka city and environs; possibly parts of Southern Province.

- **Zone 2:** low malaria transmission, parasite prevalence in young children at the end of the rainy season (214%); still a moderate number of cases in health facilities and some malaria mortality; most parts of Central, Copperbelt, North-Western, Southern, and Western provinces.
- **Zone 3:** moderate-to-high transmission, parasite prevalence in young children at the end of the rainy season (over 15%); many cases in health facilities and continued malaria mortality; most parts of Eastern, Luapula, and Northern provinces. Possible variations in malaria control programming are summarized in Table 21.

Table 21: Variations in malaria control priorities in different transmission zones in Zambia

Zone by Province	Epidemiology	LLIN	IRS	IPtP	Dx	Rx	IEC/BCC	Surveillance
<b>Zone 1</b>	Very low level of transmission; parasite prevalence $\leq 1\%$ in young children at end of transmission season Lusaka city	Targeted; used for response to focal case containment	Targeted; used for response to focal case containment	No; Rely on case identification, diagnosis, and treatment	Universal diagnosis for suspected malaria	Prompt Rx with 1 <sup>st</sup> line ACT; assure every case resolves	Sensitize community to reduced malaria, case finding, their local responsibility for action	Critical intervention; passive detection from facilities; mapping and follow up and ACD in house and neighbourhood to contain transmission
<b>Zone 2</b>	Low level of transmission; parasite prevalence 2-14% in young children at end of transmission season Central, Copperbelt, North-Western, Western, and Southern	Achieve and sustain universal coverage of sleeping spaces or ~3 ITNs per HH on average	Achieve and sustain high coverage of IRS targeted areas	Yes Strengthen diagnosis and case management for fever during pregnancy	Universal diagnosis for suspected malaria	Prompt Rx with 1 <sup>st</sup> line ACT;	Assure high ITN use and acceptance of IRS; begin to sensitize community to reduced malaria, case finding, their local responsibility for action	Critical intervention; District level active screen and treat infections in entire populations village-by-village; initiate before transmission season & repeat 1+ times to assess focal transmission and measure incidence; strengthen facility case recording and possible home/neighbourhood mapping, follow up to contain transmission
<b>Zone 3</b>	Moderate/high transmission; parasite prevalence $> 15\%$ in young children at end of transmission season Eastern, Luapula, Northern	Achieve and sustain universal coverage of sleeping spaces or ~3 ITNs per HH on average	Achieve and sustain high coverage of IRS targeted areas	Yes	Universal diagnosis for suspected malaria	Prompt Rx with 1 <sup>st</sup> line ACT;	Assure high ITN use and acceptance of IRS; increase prompt presentation for fever illness; sensitize for diagnosis	Strengthen surveillance capability and reporting procedures at facilities; track intervention coverage and parasite and anemia prevalence

Efforts must assure 1) high coverage and use of appropriate interventions (per table above); 2) fully resourced and functional procurement systems and supply systems to districts to achieve the coverage; 3) appropriate numbers and skills for the people managing and delivering the services; 4) collection of quality information that continues to track progress and inform programmes.

**1. Strengthening malaria surveillance and response addressing the epidemiological evidence.**

*Enhance the quality and timeliness of data for planning and decision-making:* The speed of data transfer from health facility to district to provincial and to central level is often limited. Use of new and evolving technologies to transfer malaria data from health facility to higher levels will be developed and piloted in 2010 with the intention to scale up this simple technology to additional districts as resources allow. This system has the potential to greatly increase the speed of malaria case data transfer, thus providing national, provincial and district-level decision-makers with timely information to take action (e.g., to investigate cases and address focal transmission).

Actions to generate and then respond to evidence might include: a) strengthen entomological monitoring systems insecticide resistance monitoring and mapping; b) developing a quality of care monitoring system; c) strengthening the diagnostics of the quality assurance and quality control system; d) supporting appropriate parasite prevalence surveys; e) continuing malaria impact reviews; f) undertaking other relevant malaria operation research prioritizing the operational research agenda through the OR TWG identification of key gaps and new intervention plans that will require further evidence and tracking of intervention effectiveness and efficiency and

BCC research; and g) conducting annual malaria research to policy translation meetings with the participation of researchers, policy makers, development, and implementing partners.

*Update malaria surveillance plan:* A strategic, technical framework for malaria surveillance should be developed that addresses the need for coordinated efforts between the entomologists, epidemiologists, and intervention implementation units. Several areas in Zambia are entering pre-elimination stages where high-coverage of IRS, for example, may not be the most cost-effective solution to limit incidence. A pilot project will begin in Lusaka District (2010) and Kazungula District (2011) to test the combination of passive and active detection of cases and infections in an urban and peri-urban environment. Currently, limited resources exist to guide countries into pre-elimination stages of malaria control. It will be beneficial for Zambia to try, test, and document their actions as they enter the pre-elimination stage and to then share and learn from other countries to make informed and strategic programme decisions.

**2. Build and extend malaria control operational strengths at provincial, district and community levels in line with national policies on decentralized programme action.**

The programme support strengths at the national level must continue to provide key services including overall programme strategy, guidance, management, and technical support for commodity supplies and skills building.

However, extending operational strengths to provinces, districts, and communities is now a critical priority for malaria control in Zambia. These national strengths should include: appointment, capacity building, and operational support for provincial and district



malaria focal persons; capacity building for IRS and routine ITN distribution to fill all gaps; capacity building for surveillance and programme monitoring and evaluation including skill building for data collection, decision-making and response including GPS mapping, data analysis, and interpretation for action

Expanding access to malaria control interventions especially in the high transmission zone is critical. Community structures and organizations already working in this area should be explored to expand access. There is need for increased funding for the coordination and implementation of activities for advocacy and behavior change communication; there is also a need to strengthen the capacity of provincial administration to undertake community-based malaria BCC activities.

Similarly, strengthening local structures and capacity to address new approaches in low and very-low transmission zones will be critical to success in the effort to ultimately seek a malaria-free Zambia.

### **3. Strengthen partnership and performance management to address human and financial resource needs, commodity requirements, and programme action.**

In an effort to build on existing partnership performance, the NMCC should convene regular malaria stakeholder coordination meetings and continue to strengthen the actions of TWGs. The NMCC should conduct semiannual review and planning meetings at national and provincial levels.

Within this context, the partners should systematically examine and address the human resource capacity within NMCC and NMCP, at province, district, and community levels. This should include addressing

recruitment and designation of additional staff in malaria control. For example, malaria control focal persons at provincial and district levels are needed to coordinate implementation activities. At national or provincial levels, programme planning officers, training officers, commodities logistician(s) and resource mobilization and partnerships coordinator(s) are needed for a full and functioning national programme.

Malaria surveillance is a key component needing continual enhancement within Zambia. At the clinic level, continued training in the use of appropriate case definitions (e.g., confirmed malaria versus clinical cases) is necessary, especially considering that staff turnover is often frequent.

With the proposed expansion of diagnostics use, training on use of RDTs and microscopy remains a critical need in Zambia. Utilization of RDTs for diagnosis is a good step, especially in more rural areas. However, stock-outs are common and reduce the quality of malaria diagnostic data. Much effort has been focused on quality control of microscopy diagnoses with continual support necessary to ensure that all microscopists, including new recruits, are well trained and provide quality laboratory results. Training on the importance of quality malaria case data and how it affects the allocation of resources (treatments, RDTs, LLINs) and other interventions is lacking, but would be a beneficial addition to health facility staff training. In addition, most current facility training programmes are funded. An increased focus on building capacity at the provincial and district levels to assume responsibility for facility training would benefit diagnostic improvements and, in general, data cleanliness.

Other key opportunities for consideration in skill building should include: a) malaria management skill building and course work; b) pre-service malaria control training in

training institution curricula; c) internships for MPH students at UNZA's Department of Community Medicine; and d) procurement and supply management training.

Finally, good budgeting to assess the costs and priorities for these recommendations will be critical to then inform discussion among

Zambia's malaria control partnership to inform resource mobilization and a stable system of financing malaria control progress in the coming years. This should be addressed as an in-country partnership with a medium and long-term perspective at the same time that it addresses acute life-saving actions in the near term.

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## 7. ANNEXES

MINISTRY OF HEALTH, ZAMBIA  
NATIONAL MALARIA CONTROL CENTRE PROGRAMME  
ZAMBIA MALARIA PROGRAMME REVIEW 2010

### LIST OF REVIEWERS

#### Annex 1: List of MPR Reviewers

No.	NAME	ORGANISATION	POSITION	TEL. NO.	MOBILE	FAX	E-MAIL
A)	LOCAL REVIEWERS						
1.	Alex Nondo Chikwese	Consultant	MPR Coordinator		0977-773443		<a href="mailto:alexchikwese@yahoo.co.uk">alexchikwese@yahoo.co.uk</a>
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3.	Dr. Mulakwa Kamuliwo	MOH/NMCC	Ag Deputy Director – PH&R (NMCC)	282482	0977-133433	282427	<a href="mailto:mkamuliwo@yahoo.co.uk">mkamuliwo@yahoo.co.uk</a>
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## Annex 2: Selected Peer Publications from Zambia Malaria Control Partners

1. Chalwe V, Van geertruyden JP, Mukwamataba D, Menten J, Kamalamba J, Mulenga M, D'Alessandro U, 2009. Increased risk for severe malaria in HIV-1-infected adults, Zambia. *Emerg Infect Dis* 15: 749; quiz 858.
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17. Zurovac D, Ndhlovu M, Sipilanyambe N, Chanda P, Hamer DH, Simon JL, Snow RW, 2007. Paediatric malaria case-management with artemether-lumefantrine in Zambia: a repeat cross-sectional study. *Malar J* 6: 31.

### Annex 3: Other Relevant Literature

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