REPUBLIC OF ZAMBIA

MINISTRY OF HEALTH

NATIONAL MALARIA PREVENTION AND CONTROL SURVEILLANCE, MONITORING AND EVALUATION PLAN

2011 - 2015

NATIONAL MALARIA CONTROL CENTRE

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ACRONYMS

ACT	Artemisinin-based Combination Therapy
ANC	Antenatal care
AQ	Amodiaquine
AIDS	Acquired Immuno Deficiency Syndrome
CFR	Case fatality rate
CSO	Central Statistical Office
DDT	dichloro-diphenyl-trichloroethane
DfID	United Kingdom Department for International Development
DHS	Demographic and Health Survey
DSS	demographic surveillance system
EANMAT	East African Network for Monitoring Antimalarial Therapy
EARN	East African Regional Network
EDP	Essential Drugs Programme
EPI	Expanded Programme on Immunization
GFATM	Global Fund to Fight AIDS, TB and Malaria
GIS	Geographic Information System
HMIS	Health management Information System
HIV	Human Immunodeficiency Virus
IDSR	Integrated Disease Surveillance and Response
IMCI	Integrated Management of Childhood Illness
IPTpi	Intermittent Preventive Treatment in Infants
IPTp	Pntermittent Preventive Treatment in Pregnancy
IRS	Indoor Residual Spraying
ITNs	Insecticide-Treated Mosquito Net
JICA	Japanese International Cooperation Agency
LLIN	Long-lasting Insecticide Treated Net
MDGs	Millennium Development Goals
MARA	Mapping Malaria Risk in Africa
MERG	Monitoring and Evaluation Reference Group
MICS	Multiple-indicator cluster survey
MIS	Malaria Indicator Survey
MoH	Ministry of Health
NGO	Non-Governmental Organization
NMCC	National Malaria Control Centre
NMCP	National Malaria Control Programme
PMTCT	Prevention of mother to child transmission
PRSP	Poverty Reduction Strategy Paper
PSI	Population Services International
RBM	Roll Back Malaria
SFH	Society for Family Health/PSI
SM&E	Surveillance, monitoring and evaluation
SP	Sulfadoxine-Pyrimethamine
SWAp	Sector-wide Approach
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WHO	World Health Organization
WHOPES	WHO Pesticide Evaluation Scheme

1.0 INTRODUCTION

Zambia's 2011-2015 Surveillance, Monitoring and Evaluation Plan, which is part of the National Malaria Strategic Plan (NMSP), was developed to track progress in the implementation of the National Malaria Prevention and Control Programme (NMCP). The vision, mission and goals of the NMSP 2011-2015 are described as follows:

Vision: Zambia's malaria prevention and control programme vision is to progress towards a "*malaria free Zambia"*

Mission: "To facilitate equity of access to quality assured, cost effective malaria prevention and control interventions close to the household".

Goals: By 2015, to 1) reduce malaria incidence by 75% of the 2010 baseline; 2) reduce malaria deaths to near zero and reduce all-cause child mortality by 20%; and 3) establish and maintain 5 "malaria-free districts" in Zambia

This Surveillance, Monitoring and Evaluation Plan outlines a framework for the surveillance, monitoring and evaluation of the NMCP. It addresses the following key areas:

- Indicator selection
- Requisite data and data sources
- Description of information flows and reporting frameworks
- Data analysis and feedback
- Integration of data with decision-making processes

By developing this plan, and implementing its objectives, the NMCP will strengthen malaria surveillance, monitoring and evaluation (SME) and operational research across all programme areas. A primary concern in this pursuit will be to mobilize resources for increased investment in technical and human resource capacity development for SME at all levels of the health system.

A detailed cost analysis is included.

1.1 GENERAL APPROACH

A technically sound malaria monitoring and evaluation (M&E) plan is fundamental to the effective tracking of the progress of the implementation of malaria prevention and control activities. This plan will build on the National Malaria Control Monitoring and Evaluation Plan for 2006-2010 anchored on the principles of three-ones; i.e., one strategy, one monitoring & evaluation framework and one coordinating body.

At national and sub-national levels the target will be to:

- Develop, update and assemble relevant M&E strategic training documents (tools, job-aids, and allied training materials)

- Strengthen the national malaria surveillance system through regular (monthly/quarterly) tracking of malaria cases, logistics-commodity monitoring and feedback to sub-national levels.

- Monitor in-puts (human resources, financing, supplies), processes (procurements and training), outputs (services delivered), outcomes (bed net ownership & use, IRS coverage) and programme impact (changes in malaria incidence, prevalence, and mortality rates).

- Strengthen linkages at national, regional and global levels, including with Roll Back Malaria's Monitoring and Evaluation Reference Group (M&E-MERG) and other global links to standardize Indicators.

1.2 EPIDEMIOLOGY OF MALARIA IN ZAMBIA

The epidemiology of malaria in Zambia is the result of two major forces: (1) the geographic, climatic, and social features of the country that establish factors conducive or restrictive to malaria in Zambia, and (2) the introduction and scaling up of malaria control interventions across the country, which alter malaria transmission and the consequent infection, morbidity, and mortality.

National population-based estimates of parasite prevalence in children under five years of age are available from the Malaria Indicator Survey (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 1.

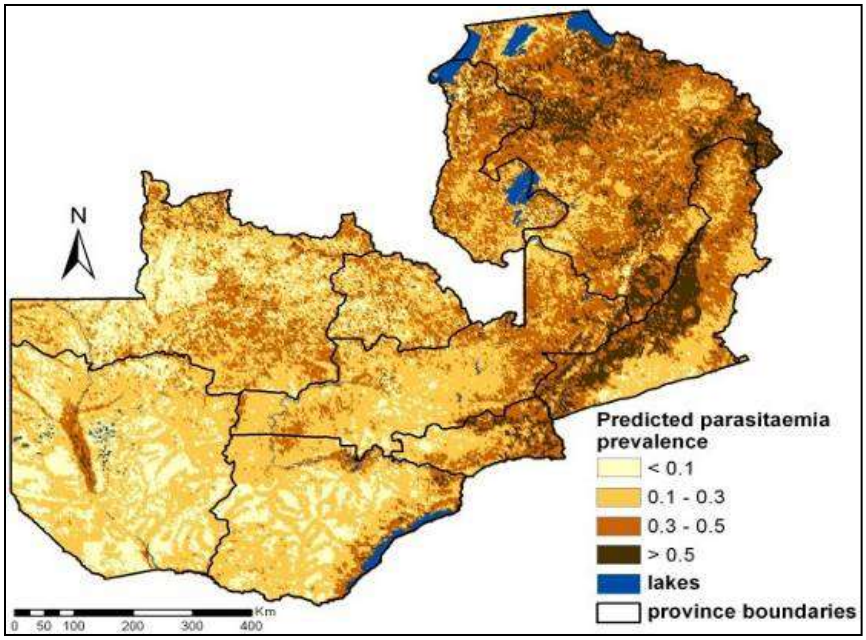

Figure 1 Predicted parasitaemia risk map for children under 5 years of age in Zambia in 2006[1]. 0.1 = 10%; Source: Malaria Indicator Survey 2006, Zambia.

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 Eastern province. Changes over time in parasite prevalence by province for 2006, 2008, and 2010 are shown in Table 1. These changes 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.

[1]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.

Table 1. 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. Source: Malaria Indicator Survey 2006, 2008 and 2010.

	Parasite prevalence in children <5 years of age				Anaemia (Hb <8gm/dl) prevalence in children <5 years of age		
Province	**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
Total	**22.3**	**10.2**	**16.0**		**15.8**	**4.3**	**9.2**

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 rates compared to children in urban areas (MIS, 2010). In young children, especially those under five years of age and even more so in children between 6 and 36 months of age, anaemia is strongly associated with malaria infection.

1.2.1 STRATIFICATION AND RISK MAP

The current malaria stratification map is based on the 2010 MIS (Figure 2). 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. Figure 2 displays MIS parasitemia prevalence data for 2006, 2008 and 2010.

Category 1: areas where malaria control has markedly reduced transmission and parasite prevalence is <1% (Lusaka city and environs).

Category 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).

Category 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).

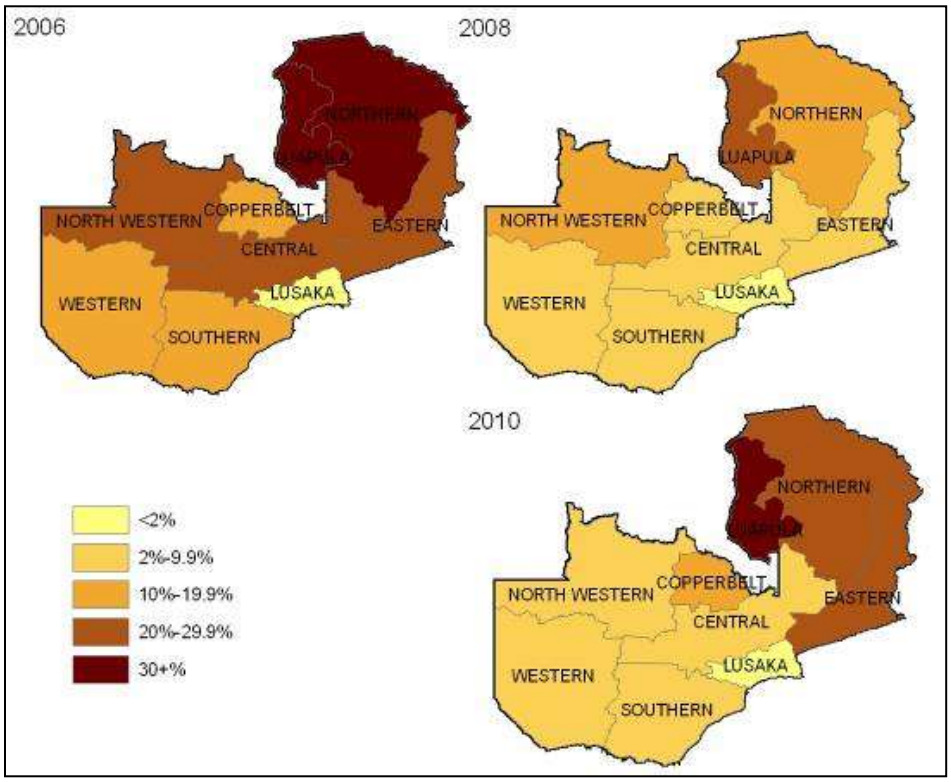

Figure 2: Parasitemia rates by Province, MIS in 2006, 2008 and 2010

1.2.2 MALARIA PARASITES AND VECTORS

In Zambia, *Plasmodium falciparum* accounts for more than 98% of all malaria cases in Zambia with *Plasmodium malariae* (1%) and *Plasmodium ovale* (0.1%)[2].The main malaria vectors in Zambia are the *Anophelene gambiae s.l.* and *Anophelenes funestus* complexes. Other *Anophelene* mosquitoes present in the country are *Anophelene pretoriensis, Anophelene rufipes, Anophelene squamosis,* and *Anophelene coustani.* 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

[2]Moonga. H, 2008-Unpublished; MoH Drug Efficacy Report, 2006

the case during the wet season. However, other places with 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.

1.2.3 DISEASE TRENDS

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, 252 in 2008, and 246 in 2009 and 330 in 2010. 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).The 2010 MIS also showed an improvement in malaria parasitemia compared to the 2006 MIS in children under five—17% versus 22%—and severe anemia—9% versus 13%.

HMIS outpatient data has 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 and to 246 in 2009. 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 increased coverage of malaria interventions has 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).

Special populations. 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 (

Table 2).

Table 2 Changes in child mortality rates 2001/02 and 2007, Zambia. 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.

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%

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., In many settings, including Zambia, 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, 85% of women received at least one dose of IPTp and 69% received at least two doses of IPTp through antenatal care (ANC).

1.3 SUMMARY OF THE NMCP STRATEGIC PLAN

The National Malaria Control Strategic Plan presents a Vision, Mission, and Goals (see introduction) and a set of objectives and targets (see below). These objectives and targets represent agreed upon measures developed during a highly consultative process with stakeholders. A comprehensive national Malaria Programme Review conducted in 2010 informed development of the strategic direction and objectives of this plan. The strategic plan builds on lessons learned during the 2006-2010 Strategic Plan at different levels of care and seeks to consolidate these gains to ensure future program impact.

Overall programme objectives and summary targets and milestones are described here:

Objective 1. Have reduced malaria cases from 2010 levels by 75% in 2015.

Target 1.1 Achieve universal coverage and utilization of prevention measures[3].

By 2012, in provinces and districts where universal coverage and utilization have not yet been achieved, achieve 100% coverage and 80% utilization for all populations at risk with locally appropriate interventions. Milestone: none, as the target is set for 2012.

Target 1.2 Sustain universal coverage and utilization of prevention measures.

By 2015 and beyond, in provinces and districts where universal coverage and utilization have been achieved, sustain this achievement through an appropriate package of supportive interventions. Milestone 1: Between 2012 and 2015, maintain 100% LLIN ownership, at least 80% LLIN use; Milestone 2: Between 2012 and 2015, maintain 100% IPTp coverage among pregnant women at risk of malaria and attending antenatal care; Milestone 3: Between 2012 and 2015, maintain 85% IRS coverage in IRS-targeted areas.

Target 1.3 Accelerate development of surveillance systems

By 2015, all districts are capable of reporting monthly numbers of suspected malaria cases, number of cases receiving a diagnostic test and number of confirmed malaria cases from all public health facilities. Milestone: By 2013, 50% of districts have met the 2015 target; districts not meeting full surveillance reporting are able to consistently report from select health facility sites.

Objective 2. Have reduced malaria deaths to near zero by 2015.

Target 2.1 Achieve universal access to case management in the public and private sector.

By 2012, 100% of suspected cases receive a malaria diagnostic test and 100% of confirmed cases receive treatment with appropriate and effective antimalarial drugs. Milestone: none, as the target is set for 2012.

Target 2.2 Achieve universal access to community management of malaria.

By 2015, 100% of fever (suspected) cases receive a malaria diagnostic test and 100% of confirmed cases receive treatment with appropriate and effective antimalarial drugs. Milestone 1: By 2012, community systems (neighborhood health committees [NHC] and community health workers [CHWs] have training and sufficient supplies and equipment to perform diagnostic testing and dispense effective treatment. Milestone 2: By 2013, 80% of fever cases receive a malaria diagnostic test and 80% of confirmed cases receive treatment with effective anti-malarial drugs.

Objective 3 Have established malaria free zones by 2015 in 5 districts.

Target 3.1: By 2015, have supported and documented 5 Zambia malaria free zones/districts. Milestone: By 2013, malaria has been eliminated in 2 districts in Zambia

STRATEGIC PRIORITIES

[3] Universal coverage and utilization is defined as every person at risk sleeping under a quality ITN or in a space protected by IRS and every pregnant woman at risk receiving at least one dose of IPTp during each of the second and third trimesters.

Priority 1 By 2015, strengthen programme management capacities to achieve programme goals at all levels.

Priority 2 By 2015 achieve universal coverage with effective interventions:

– 80% of people at risk of malaria are using locally-appropriate vector control methods such as long-lasting insecticidal nets (LLINs) and indoor residual spraying (IRS)

– 100% of malaria patients are diagnosed and treated promptly with effective anti-malarial treatments according to national laboratory and case management guidelines;

– 100% of pregnant women receive at least two doses of appropriate anti-malarial drugs for intermittent preventive treatment (IPTp)

Priority 3 By 2015, strengthen integration of malaria control services with other health sectors (e.g., Maternal and Child Health and others), and with non-health sectors (e.g., Education, Agriculture, Environment, Local Authorities, and Civil Society).

Priority 4 By 2015, reduce malaria transmission to zero within five districts in Zambia, thereby leading the country towards malaria elimination.

Priority 5 By 2015, ensure that all malaria epidemic-prone districts have the capacity and preparedness to respond to malaria epidemics.

Priority 6 By 2015, strengthen operational research to generate evidence and translate it into effective action at all levels of health care.

Priority 7 By 2015, strengthen surveillance, monitoring and evaluation systems so that key indicators are routinely monitored.

Priority 8 Adhere to Zambia health values as noted below:

VALUES	
Access	Accountability
Decentralization	Excellence
Quality assurance	Empowerment
Equity	Efficiency

2 THE NATIONAL MALARIA SURVEILLANCE, MONITORING AND EVALUATION PLAN

The National Malaria Control Programme together with partners has developed a comprehensive surveillance, monitoring and evaluation plan that is in line with the national malaria goals and targets. 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. An update of the HMIS [the District Health Information System (DHIS)] was instituted in 2009 and has strengthened routine data collection, use and dissemination. Zambia has substantial data on program progress and the current epidemiological situation and publishes an informative quarterly M&E newsletter. Though remarkable progress has been made towards set targets, challenges still remain in the areas of data quality and completeness, timeliness of reporting, personnel and rigorous monitoring of activities.

2.0 OBJECTIVE

To continue to strengthen surveillance, monitoring and evaluation systems so that key indicators are tracked and the data is used to strategically inform malaria programming at the national, provincial and district levels.

2.1 STRATEGIES

- Strengthen capacities at district, provincial and national level for malaria surveillance and monitoring to provide feedback to NMCP, RBM partners, and other relevant authorities in order to improve programme planning, management, and accountability.
- Strengthen malaria data management systems at district, provincial and national levels and their ability to collect, process, analyse, manage and use malaria transmission and disease data for programming.
- Strengthen coordination in surveillance, monitoring and evaluation across the NMCP by working with each programme area to enhance their capacity to manage and use data for programming.

2.2 MEASURING PERFORMANCE

The Surveillance, Monitoring and Evaluation (SME) system for the strategic plan will use routine data as the main source of malaria data through the Ministry of Health's Health Management Information System (HMIS), the principal health care monitoring system for collecting routine information that includes malaria indicators. The HMIS is based on the District Health Information System (DHIS) 1.4 platform. DHIS ideally seeks to provide monthly reporting from health facilities

to district and province where it is consolidated and transmitted electronically to the national level. The DHIS system collects and reports malaria information on a monthly basis but data are often not received by districts or provinces in a timely manner or they are incomplete. Furthermore, the NMCC experiences difficulty accessing the routine HMIS malaria data on a consistent basis and in a standardized format ready for analysis and decision making. The NMSP 2011-2015 plans to address these setbacks by strengthening capacities at district levels. Furthermore, the NMCC will begin to use a standardized malaria profile (developed based upon WHO recommendations) which provides useful summaries at national and district level to quickly identify performance and progress in malaria trends and commodities.

The routine data collection system will be complemented by household population based surveys – Zambia Demographic and Health Surveys (ZDHS) and the Malaria Indicator Surveys (MIS). These provide primary information on all-cause under-five mortality rates, fever treatment among children under-five with anti-malaria drugs, possession and use of ITNs, and other malaria interventions. The ZDHS is conducted every five years. The next survey is planned for 2012. The MIS surveys will be done every 2 years with the next survey also planned for 2012.

These data will be compared against the indicator targets listed by each sector during periodic data reviews. If the data show targets or objectives are not being attained, the respective programme manager and technical working group chairperson will be alerted. In addition, the surveillance, monitoring and evaluation technical working group will assist NMCP sectors in tailoring intervention or operational strategies to best address these gaps or shortfalls.

2.3 DATA COLLECTION SYSTEMS

To provide a comprehensive account of strategic information for malaria surveillance, monitoring and evaluation, several sources of data and information are used. These sources include standard reports from the National Malaria Control Centre and other government line ministries, routine reporting from national surveillance systems, and periodic household and facility surveys. An overview of these sources and the resulting information flows are presented below.

The primary routine reporting system for malaria monitoring is the national Health Management Information System (HMIS). Other routine reporting systems exist within government line ministries and non-governmental agencies targeting disease- or issue-specific reporting. Substantial efforts have been made from 2008 to 2010 to introduce the new HMIS system and to strengthen routine malaria reporting.

2.3.1 HEALTH MANAGEMENT INFORMATION SYSTEM.

The primary clinical services monitoring system for the Ministry of Health in Zambia is the Health Management Information System (HMIS). The Zambia HMIS is part of the monitoring and evaluation framework for the public health sector. The HMIS was completed, updated and

redeployed in 2008/9. The role of HMIS fits within the larger context of health sector monitoring and evaluation efforts and in Zambia and consists of five parts: health status reporting, finance, human resources, drugs and supplies, and assets (Figure 3).

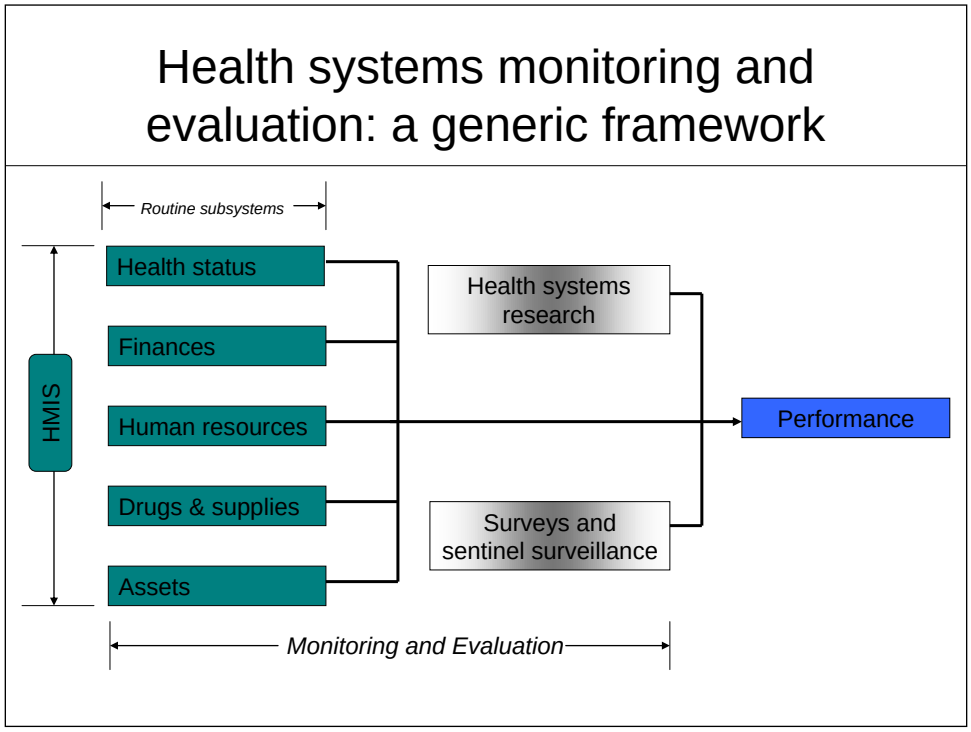

Figure 3: The role of HMIS in health sector monitoring and evaluation. Adopted from Chishimba 2003.

Malaria information collected as part of the HMIS includes malaria cases and deaths for children less than five years of age and above. This information is reported quarterly through DHMTs and provincial medical offices. Malaria cases include both laboratory-confirmed cases and those that are clinically diagnosed cases based on the reported presence of fever with no other obvious cause. RDTs and/or microscopy are now widely available in both rural and urban areas of Zambia.

Many recognized problems exist with the current Zambia HMIS stemming from changes to the human resource capacity and data demand for specific programs. However, improvements in quality and completeness of data have resulted from the sustained effort to strengthen the HMIS. From 2008 to 2009, all nine provinces have had their District Health Information Officers trained in the use of HMIS with emphasis on data completeness and methods of displaying data. The extent to which reporting completeness and data quality are reflected in routine reporting remain problematic in the ability for the end user to understand from the malaria information generated through HMIS. Further strengthening of capacity within health facilities and the DHMTs, the focal point for ensuring timely and complete information is reported at the local level, is needed. The

NMSP 2011-2015 plans to strengthen capacities at district levels. Furthermore, the NMCC will begin to use a standardized malaria profile (developed based upon WHO recommendations) which provides useful summaries at national and district level to quickly identify performance and progress in malaria trends and commodities. A partner organization is planning another series of trainings for DHIOs in 2011-2012. In the near future, the HMIS system will be used to populate a WHO dashboard to report on key indicators on a monthly basis.

2.3.2 RAPID REPORTING SYSTEM FOR LOW BURDEN AREAS

In 2010 and 2011, NMCC developed a rapid reporting system using the latest version of the District Health Information System 2 (DHIS2). This system was designed to enable faster access to critical information on malaria burden and important testing and treatment commodities. This system was initiated in response to decreasing levels of malaria in various provinces and districts in Zambia and therefore the need to understand continued progress in reducing malaria burden in ever-more focalized malaria transmission patterns. The Malaria Rapid Reporting System also takes advantage of the latest trends in mobile reporting technology for faster reporting of information relevant for the Zambian context with continued deployment of data-enabled mobile phone networks throughout the country.

The primary objective of this system is to support facilities, District Health Office, Provincial Health Offices, and central level, including the NMCC, with faster information flows and improved decision-making abilities, specifically for understanding local levels of malaria burden and efficient targeting of malaria interventions and commodities.

This system offers weekly reporting of simplified malaria information sent by mobile telephones enabled with a JAVA-based data entry forms through data-enabled mobile telephone networks to a centralized data server with pre-programmed data quality and analysis functionality delivering critical information and reports back to data consumers in real-time to district and central levels.

Prioritized malaria information has been adopted from existing facility forms used for routine reporting of the HMIS forms to minimize training and reporting frustrations and to facilitate improved compliance with monthly HMIS reporting requirements.

2.3.3 ACTIVE SURVEILLANCE WITH ACTIVE INFECTION DETECTION

In 2011, Lusaka District began a program to identify and follow up all laboratory confirmed cases of malaria. This program involved ongoing training of laboratory staff in proper techniques as well as an emphasis on complete, weekly reporting of all confirmed cases via HMIS. After confirmed cases are identified, the patient's home is visited, and household members are offered RDT testing as well

as nearby neighbors (Figure 4). It is hoped that this system will provide a prototype for surveillance in low prevalence districts as malaria rates continue to decrease. Throughout this program, data is collected at the clinic level for each confirmed malaria case (index case) followed by household data collected during household follow up visits. This information will initially be collected in paper-based form, but will be migrated into the DHIS platform. As the project progresses, it is hoped that these data may be captured and transmitted electronically either by PDA or mobile phone.

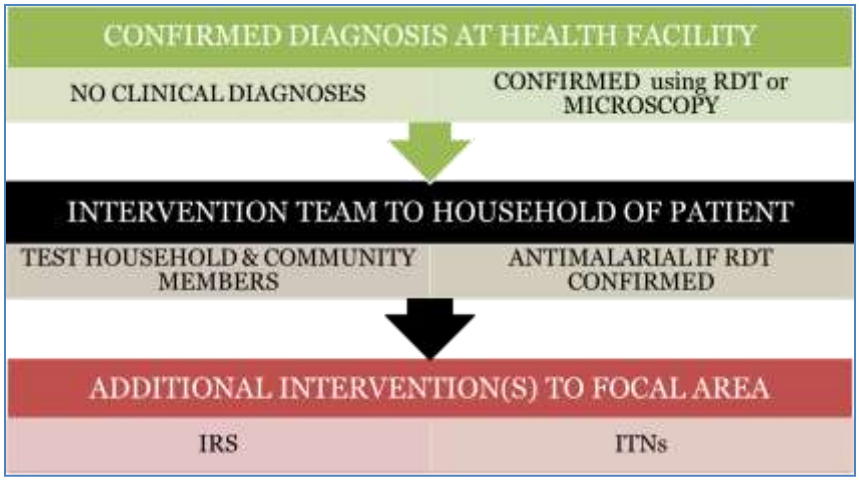

Figure 4 A plan for malaria active infection detection (AID) in Lusaka District, Zambia.

2.3.4 INTERVAL SURVEYS

Many surveys relevant for malaria monitoring and evaluation have been conducted in Zambia (

Table 3). Surveys provide useful measures of population and facility-based coverage indicators for gauging progress in scale up efforts on a national, provincial or district level. Methods for conducting surveys vary greatly, but rigorous sampling methods and household surveys based on representative samples of the Zambian population or facility surveys based on the most recent national facility inventory are desirable. These provide greater reliability and comparability with other survey efforts and allow for monitoring trends over time.

At the household level, Roll Back Malaria has developed a standardized Malaria Indicator Survey package and guidelines for assessing core global malaria coverage indicators at the household level[4]. The survey package contains standard methods and questions for measuring household level possession and usage of insecticide-treated mosquito nets, treatment of febrile children with

[4] The RBM Malaria Indicator Survey Package is available from RBM Monitoring and Evaluation Reference Group (MERG) website http://rbm.who.int/merg.

antimalarial medicines, and use of intermittent preventive treatment for the prevention of malaria during pregnancy. Household surveys also provide a reliable method for understanding trends in all-cause child mortality. These indicators and methods are incorporated in large-scale survey mechanisms such as the Demographic and Health Surveys (DHS)[5] and the Multiple Indicator Cluster Surveys (MICS)[6] for standardized cross country comparability and global monitoring efforts.

Table 3 Surveys planned or conducted in Zambia relevant for malaria M&E.

Type	Source	Scale	Details	Coverage issues included
Planned				
Household	MIS 2012	National	TBD	ITNs, IRS, case management, IPTp, IEC/BCC
Household	ZDHS 2012	National	TBD	ITNs, IRS, case management, IPTp, IEC/BCC
Facility	Health Facility 2013	National	TBD	Quality of malaria care against malaria treatment guidelines
Completed				
Household	MIS 2010	National	~4300 households, nationally representative	ITNs, IRS, case management, IPTp, IEC/BCC
	MIS 2008	National	~4400 households, nationally representative	ITNs, IRS, case management, IPTp, IEC/BCC
	ZDHS 2007 (Central Statistical Office, Zambia Ministry of Health et al. 2008)	National	7164 households, nationally representative	Mosquito net/ITN possession and usage, U5 fever treatment with antimalarials, IPT, all-cause U5 mortality
	MIS 2006	National	~3000 households, nationally representative	ITNs, IRS, case management, IPTp, IEC/BCC
	SFH/PSI 2005 (October)	National	~2500 households, nationally representative	Mosquito net/ITN possession and usage
Facility	National Malaria Facility Survey 2011	National	170 facilities (stratified by level of facility) 2500 patients	Quality of malaria care against malaria treatment guidelines

[5] http://www.measuredhs.com
[6] http://www.childinfo.org

	CSO 2005	Based on discussions with CSO (June 2005)		Availability of health personnel and equipment
Household	NetMark 2004 (NetMark 2001)	5 project areas	~2500 households, urban/rural sampling	Mosquito net/ITN possession and usage
	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)
	ZDHS 2001-02(Central Statistical Office, Zambia Ministry of Health et al. 2002)	National	7100 households, nationally representative	Mosquito net/ITN possession and usage, U5 fever treatment with antimalarials, IPT, all-cause U5 mortality
	World Health Survey 2001	National		
	SFH 2001(Kusanthan 2001)	7 districts	4200 households, representative, three-stage stratified cluster sampling	Mosquito net/ITN possession and usage
	NetMark 2000(NetMark 2001)	5 project areas	1000 households, urban/rural sampling	Mosquito net/ITN possession and usage
	MICS 1999(UNICEF 2000)	National	7300 households, nationally representative	Mosquito net/ITN possession and usage, U5 fever treatment with antimalarials, all-cause U5 mortality
Household + facility	RBM follow up 2004	10 districts	Non-representative, ~4000 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, 4031 households, 65 facilities	Facility records, OPD, parasite prevalence, ITN coverage, U5 fever treatment with antimalarials
Facility	CBoH 2005 (laboratory services) *(report not received)*	1 district	Health facility and laboratory inventory	Availability of health personnel and equipment
	JICA 2004 (report not available)	National	~1400 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	~1300 facilities	Availability of health personnel and equipment

2.3.5 LARGE-SCALE, NATIONALLY-REPRESENTATIVE HOUSEHOLD SURVEYS

Several large-scale, nationally representative household surveys have been conducted in Zambia that are useful for malaria monitoring and evaluation. The majority of these are carried out with the assistance of the Central Statistical Office (CSO) for design of representative samples based on the most recent census information. Demographic and Health Surveys (DHS) are nationally representative household surveys that focus on reproductive and child health issues. Typically, DHS consist of interviews with between 4000 and 12000 women aged 15-49 years living in households that are sampled in a multiple-stage cluster design. Because the questionnaires are standardized and structured and change little between surveys, DHS results are comparable between countries and over time. Since 1998 specific questions on malaria prevention and treatment have been included in DHS, where relevant. In 2007 these questions were grouped into a standard malaria module which is to be added to DHS conducted in malarious countries. In addition to providing information on the major outcome indicators, the DHS are a primary source of information on all-cause under-5 mortality rates, obtained by the direct estimation technique , e.g., from birth histories. Recent DHS also measure the prevalence of anaemia by haemoglobin measurement in children under 5 years of age. DHS are organized by ORC MACRO, Calverton, MD, USA and are funded by the United States Agency for International Development (USAID) and other partners. Questionnaires and survey results are usually publicly available on the internet approximately one year after completion of field work.

In Zambia, Demographic and Health Surveys were conducted in 1992, 1996, 2001-02, and most recently in 2007 (Central Statistical Office, Zambia Ministry of Health et al. 2002), (Central Statistical Office, Zambia Ministry of Health et al. 1997). These are facilitated through the Central Statistical Office, with additional financial support from the Ministry of Health. The most recent DHS in 2007, included standardized questions on coverage of key interventions including fever treatment among children under five with antimalarial drugs and possession and use of insecticide-treated nets, as well as all-cause child mortality. The next DHS is planned for 2012 and will include similar coverage measures based on RBM recommendations.

2.3.6 INTERVAL EVALUATION SURVEYS OF "SCALE-UP FOR IMPACT"

Zambia conducted four national Malaria Indicator Surveys in 2006, 2008, 2010 and 2012. This is more than any other African country. The results have provided critical data for decision making. The longitudinal data have been particularly useful as Zambia monitors the progress of it scaling up of interventions.

The MIS is a nationally-representative household survey which includes the core RBM coverage indicators for ITN possession and use. IPT among pregnant women also includes assessments of anemia among target children and parasite prevalence. The Zambia surveys have also included questions on IRS coverage and IEC/BCC. The Zambia MISs have been conducted in April-May of each year just at the end of the rainy season and a time considered to have high malaria transmission

2.3.7 HEALTH FACILITY SURVEYS

Health facility surveys are useful for determining quality of care delivered by health professionals for outpatient and inpatient or severe case management; stock outs and levels of malaria-related drugs; commodities and laboratory equipment; as well as capacity at health facilities for delivering adequate care and diagnosis. In 2011, NMCC fielded a national malaria health facility survey to establish baseline levels of the quality of malaria care afforded in facilities across Zambia. This survey included 170 facilities from all 9 provinces. The results of the survey will be available in 3rd quarter 2012. Other previous facility surveys exist and provide additional evidence as the level and quality of care for malaria patients in Zambia. In 2006, the USAID-supported "Health Services and Systems Project" (HSSP), in conjunction with Boston University, conducted a health facility survey in 4 districts looking at care of paediatric patients.

2.3.8 INTERVENTION EFFICACY SURVEYS/STUDIES

Antimalarial Drug Efficacy and Effectiveness: Over the past decade, studies have been conducted to assess the efficacy of various antimalarial drugs in specific populations, particularly among young children. The results from these studies have been used to assess existing and changing policies for antimalarial drug use across the nation, including the recent changes to adopt artemisinin-based combination therapy for acute malaria illness. A summary of the studies is provided in Table 4. Of the 50 recent studies available, studies conducted in 2003 examined the clinical efficacy of the current national antimalarial drug for treatment of uncomplicated malaria, ATM-LUM.

Table 4 Studies conducted to assess the efficacy of various antimalarial drugs.

Drug	Number of available studies	Study years
Artemether-lumefantrine (ATM-LUM)	4	2003, 2004, 2005, 2009, 2011 (ongoing)
Sulfadoxine-pyrimethamine	4	2003, 2004, 2005, 2010

2.3.9 **Insecticide efficacy against Anophelene mosquito populations**: A study to evaluate the possible emergence of insecticide resistance in malaria vectors *An. gambiae* s.s. to two classes of insecticides, dichloro-diphenyl-trichloroethane (DDT) and pyrethroids, was conducted in May 2010. Additional insecticide resistance monitoring is planned that will include speciation of *Anopheline* vectors in intervention areas, establishing vector distribution, seasonality, and feeding behaviors, and insecticide susceptibility and mechanisms of resistance.

2.3.10 Specialized malaria research centres and ongoing operational research

The key operational research strategies of the NMCC have been to develop and strengthen national capacity for developing a strong evidence base through:

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

Within Zambia, the capacity to conduct high quality malaria research to backstop malaria monitoring and evaluation efforts exists at many levels. 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.

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 malaria research institute and over time it has evolved into a malaria control programme with an established research unit which coordinates all national malaria-related implementation and 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, in part, implemented through strong collaborations with various research institutions in the country. These include the Tropical Disease Research Centre (TDRC), the University of Zambia (UNZA), and the Malaria Institute at Macha (MIAM). These institutions have conducted and continue to conduct various research agendas in their respective field sites. Research centers at UNZA (Lusaka), TDRC (Ndola), the Malaria Institute at Macha (Choma), various hospitals and others have expertise in conducting a variety of research that assist monitoring of antimalarial drug efficacy, insecticide resistance and site-specific or evaluative malaria burden impact assessments.

2.3.11 DATA QUALITY ASSURANCE

There are three main systems through which data are assessed for quality and completeness.

- Quarterly Data Audits by Districts – Districts review DHIS data from each facility on a quarterly basis. Individual facilities are then visited to verify these data, and provide feedback as to the quality and completeness of reports.
- Annual Data Review by Districts – Districts review and verify with each facility all available malaria program data, general health data and the DHIS data.

- Grant related Data Quality Audits – They are performed according to requirements of specific donors (Global Fund, PMI, World Bank and others). These typically focus on selected indicators ranging from national to peripheral level.

When problems are indentified with data quality and completeness, corrective measures are assessed and implemented by the District, Provincial and National programme. These measures include local visits, supervision, and additional training to improve the timeliness, completeness, and correctness of the data.

3 Implementation Arrangements

This M&E plan has been compiled in line with the National Malaria Strategic Plan in order to monitor its implementation. The NMCP M&E TWG will play an important coordinating role in monitoring the implementation of the National Malaria Strategic Plan by advising and giving strategic direction for effective monitoring and evaluation of the National Malaria Control Programme (NMCP). The M&E Technical Working Group reports to the Director Public Health and Research and is accountable to the Ministry of Health and NMCP partners. The M&E Technical Working Group will also coordinate the monitoring of the implementation of malaria control programmes. The Technical Working Group is cross cutting to all other technical working groups.

The M&E Technical Working Group responsibilities are to:

- Develop malaria M&E guidelines for use at all levels
- Develop and implement the annual M&E action plans
- Monitor and evaluate the National Malaria Control Programme performance as outlined in the National Malaria Strategic Plan
- Mobilise and coordinate all resources for monitoring and evaluation activities
- Advise/provide input into the Annual Malaria Report, M&E quarterly newsletter
- Facilitate the build-up of robust frameworks for data collection and health information management
- Co-ordinate M&E activities being implemented by the NMCP.

3.0 COORDINATION OF MALARIA SURVEILLANCE, MONITORING AND EVALUATION IN ZAMBIA

Coordination of malaria M&E within Zambia must occur within the MOH and partner agencies. The M&E TWG will play an important role by understanding ministry and partner activities and ensuring integration of data collection systems especially focused on the HMIS. To ensure strong collaboration and integration, the M&E TWG will work closely with the following technical working groups:

- Case Management Technical Working Group
- Insecticide Treated Nets Technical Working Group
- Indoor Residual Spraying Technical Working Group
- Integrated Vector Management Technical Working Group
- Information, Education and Communication Technical Working Group
- Epidemic Preparedness Technical Working Group

3.1 SM&E WITHIN THE NMCP

As parasitemia prevalence continues to decrease in many areas, it becomes even more necessary to have quality surveillance data in order to monitor and evaluate whether prevention and intervention strategies are effective amidst the changing epidemiological situation. The National Malaria Control Program and key partners will continue to work together to support the M&E plan including strengthening HMIS data, improvement of facility-based information and periodic population-based community surveys. Recent improvements in routinely reported malaria indicators through the HMIS have laid the foundation for demonstrating more accurate surveillance data at local levels. Building on those improvements, the M&E TWG have outlined a number of key action-orientated steps towards the continued objective to improve the availability of malaria information for decision making through enhancement of laboratory diagnostics, appropriate use of case definitions, proper data collection and reporting practices and rapid dissemination of malaria data from field to central levels.

3.2 EVALUATION OF THE MALARIA STRATEGIC PLAN

The following will be used to monitor the strategic plan in a joint collaborative approach by the Ministry of Health and Cooperating Partners;

- National Joint Annual Assessments
- Mid-Term Review to be conducted in 2013

  End-term Malaria Programme Review Evaluation of the NMSP in 2015

The malaria strategic plan will be evaluated based on indicators presented in Table 5.

Table 5 Indicators for monitoring the malaria strategic plan, 2011 – 2015.

		Baseline	Targets							
Item	**Indicators**	**Year** ***2010***	**Yr1** ***2011***	**Yr2** ***2012***	**Yr 3** ***2013***	**Yr 4** ***2014***	**Yr5** ***2015***	**Data Source**	**Method**	**Frequency**
Goals	**Impact Indicators**									
To reduce malaria incidence by 75% of the 2010 baseline by 2015. To reduce malaria deaths to near zero of the 2010 baseline by 2015	Malaria incidence (confirmed and unconfirmed) per 1000	330			227		145	Health facility	HMIS	Yearly
	In-patient malaria deaths (all ages) per 1000 persons per year	37			30		15	Health facility	HMIS	Yearly
	% of children ages 0-59 months with malaria parasites	16			-		5	Household	MIS	Every 2 years
.	% of children ages 0-59 months with severe anemia (Hb < 8 g/dl)	9			-		4	Household	MIS	Every 2 years
Objective 1: To achieve universal coverage and utilization of malaria prevention measures by 2015. .	% households (HHs) with at least one ITN (ITN coverage=1 net for 2 people)	64			-		100	Household	MIS	Every two years
	% of HH members who slept under ITN the previous night	42			-		80	Household	MIS	Every two years
	% pregnant women who slept under an ITN previous night	46			-		80	Household	MIS	Every two years

	% of children ages 0-59 months who slept under an ITN previous night	50			-		80	Household	MIS	Every two years
	% of pregnant women who receive two doses of intermittent preventive treatment during pregnancy (IPTp2)	70			-		80	Household	MIS	Every two years
	% HH with at least one ITN or recent IRS	73			-		90	Household	MIS	Every two years
	Proportion of population protected by IRS in target districts				85%		85%	NMCC IRS reports	IRS	Yearly
Objective 2 To achieve universal access to quality malaria case management in the public and private sector.	Proportion of out-patient suspected malaria cases that undergo laboratory diagnosis	40			50		100	Health facility	HMIS	Monthly
Objective 3 **To establish five malaria-free zones by 2015.**	Number of malaria-free zones established by 2015.	0			2		5	Districts	Surveillance	Annually
Objective 4 To build capacity and preparedness to respond to malaria epidemics by 2015.	Proportion of facilities reporting no stock-outs of first line antimalarial medicines within the past three months	80			100		100	Health facility	HMIS	Monthly
Objective 5 To increase public awareness and	Percentage of women ages 15-49 who recognize fever as a	75			-		90	Household	MIS	Every two years

knowledge on malaria prevention and control and to improve uptake and correct use of interventions.	symptom of malaria									
Objective 6: To achieve universal coverage of malaria prevention measures by 2015.	Number of LLINs distributed to beneficiaries to achieve universal coverage	4,415,946			2,787, 500		4,008,776	NMCC ITNs reports	Surveillance	Quarterly
Objective 7: To increase public awareness and knowledge on malaria prevention and control and to improve uptake and correct use of interventions.	% of pregnant women who reported mosquito bites as a cause of malaria	85					90	Household	MIS	Every two years
Objective 8: To build capacity in preparedness to respond to malaria epidemics by 2015.	% target districts with district epidemic preparedness plans.	98			100		100	Districts District		Quarterly
Objective 9: To build capacities in surveillance monitoring and evaluation for timely quality data reporting	Proportion of targeted districts conducting data audits	0			50		80	Districts	Supervisory visits	Monthly
Objective 10 To develop multi sectoral partnerships for effective program coordination, management and monitoring of program activities	Proportion of GOZ budget (USD) allocated to health	10			11		15	GRZ Budget		Annually

4 SURVEILLANCE, MONITORING AND EVALUATION ACTION PLAN

A detailed monitoring and evaluation action plan describing activities that will be implemented during the life cycle of the plan (2011 – 2015) has been developed and is shown as Table 6. The budget associated with the action plan will be referenced in Appendix 1. The plan follows the three primary strategies to fulfill the NMCP SM&E objectives. These strategies include:

- Strengthen capacities at district, provincial and national level for malaria surveillance and monitoring to provide feedback to NMCP, RBM partners, and other relevant authorities in order to improve programme planning, management, and accountability.

- Strengthen malaria data management systems at district, provincial and national levels in their ability to collect, process, analyse, and manage malaria transmission and disease data.

- Strengthen coordination in surveillance, monitoring and evaluation across the NMCP by working with each programme area to enhance their periodic monitoring and evaluation systems and to aid in the use of data to inform programme directions.

Table 6 Monitoring and Evaluation Action Plan Activities from 2011 – 2015.

Objectives	Strategies	Activities	Timeline (FY Jan – Dec)				
			2011	2012	2013	2014	2015
Continue to strengthen surveillance, monitoring and evaluation systems so that key indicators are routinely monitored and used to strategically direct malaria programming at the national, provincial and district level	Strengthen capacities at district, provincial and national level for malaria surveillance and monitoring to provide feedback to NMCP, RBM partners, and other relevant authorities in order to improve programme planning, management, and accountability.	1. Develop and disseminate Surveillance, M&E Strategic Plan 2011-2015	X				
		2. Conduct district malaria surveillance monitoring	X	X	X	X	X
		3. Train district/provincial staff in surveillance, M&E (HMIS procedures, malaria data use and integration workshops)	X	X	X	X	X
		4. Develop and disseminate monthly and quarterly disease trend and commodity tracking bulletin	X	X	X	X	X
		5. Conduct provincial/district data audits (10 provinces per year)	X	X	X	X	X
	Strengthen malaria data management systems to collect, process, analyse, and manage malaria transmission and disease data	1. Conduct community population-based malaria surveys		X		X	
		2. Conduct health facility surveys	X		X		
		3. Update and review malaria databases (NMCC malaria databases; programmatic monitoring datasets including ITN distributions, IRS spraying and facility reporting)	X	X	X	X	X

		4. Document and provide feedback of SME findings to district/provincial/national through bulletins, reports, website and other methods.	X	X	X	X	X
	Strengthen coordination in surveillance, monitoring and evaluation	1. Support annual and midterm review for NMSP and Annual Action plans	X	X	X	X	X
		2. Support quarterly Technical Working Group meetings on SM&E among Zambia SM&E stakeholders	X	X	X	X	X
		3. Support ad hoc SM&E TWGs for thematic areas including TWGs focused on ITNs, IRS, case management, program management.	X	X	X	X	X
		4. Support regional and global linkages in surveillance, monitoring and evaluation such as Southern Africa Regional Annual Planning and Review Meetings and participation at the RBM Monitoring and Evaluation Reference Group (MERG).	X	X	X	X	X
		5. Supportive supervision at provincial, district and community levels.	X	X	X	X	X

5 APPENDICES

5.0 APPENDIX 1: BUDGET

Surveillance, Monitoring and Evaluation (SM&E) **Objectives:** By 2015 to strengthen surveillance, monitoring and evaluation system so that key indicators are routinely monitored.				
Strategies	**Activities**	**Timeline (FY Jan – Dec)** **$**		
		2011	**2012**	**2013**
1. Strengthen capacities for malaria surveillance, monitoring and evaluation (SME)	Develop and disseminate surveillance, M&E Strategic Plan 2011-2015	5,000	-	-
	Conduct district malaria surveillance monitoring	230,000	250,000	250,000
	Train district/provincial staff in surveillance, M&E (HMIS procedures, malaria data use and integration workshops)	50,000		50,000
	Develop and disseminate monthly and quarterly disease trend and commodity tracking bulletin	5,000	5,000	5,000
	Conduct provincial/district data audits (10 provinces per year)	80,000	80,000	85,000
2. Strengthen malaria data management systems	Conduct community population-based malaria surveys		800,000	
	Conduct health facility surveys	227,800		230,000

	Update and review malaria databases (NMCC malaria databases; programmatic monitoring datasets including for ITN distributions, IRS spraying and facility reporting)	-	-	-
	Document and feedback SME findings to district/provincial/national through bulletins, reports, and website etc.	5,000	5,000	5,000
3. Strengthen Coordination in Surveillance, monitoring and evaluation	Support annual and midterm review for NMSP and Annual Action plans	-	-	-
	Support quarterly TWGs meetings on SM&E at national and district among M&E stakeholders	5,000	5,000	5,000
	Support ad hoc technical working groups for thematic areas, including SM&E for other TWGs (ITNs, IRS, case management, insecticide resistance program management) for SM&E responsibilities.	-	-	-
	Support regional and global linkages in surveillance, monitoring and evaluation such as Regional Annual Planning and Review Meetings etc	8,000	10,000	10,000
	Supportive supervision and monitoring of all interventions	350,000	350,000	350,000
4. Strengthen malaria surveillance towards pre-elimination phase principles in 5 Districts	Conduct case based malaria epidemiological investigations	50,000	50,000	50,000
	Conduct foci investigations surveys, mapping and classification	100,000	100,000	150,000
	Conduct parasite surveys in malaria foci	100,000	100,000	100,000
	Training of surveillance teams & DRRTs in response mechanisms & in malaria elimination	50,000	50,000	
Subtotal		**1,265,800**	**1,805,000**	**1,290,000**

5.1 APPENDIX 2: NATIONAL DASHBOARD AND CORE INDICATOR DEFINITIONS

National dashboard of malaria performance monitoring indicators

Indicator	Definition	Source	Frequency	Level of measurement
Impact				
Under five, all-cause child mortality	The probability of dying before the 5th birthday, expressed per 1000 live births	Representative, household surveys with sufficient sample size (DHS)	Every ~5 years	National
Malaria incidence rate	*Current definition:* Numerator: reported cases of malaria (<5 years, ≥5 years) Denominator: population, expressed per 1000	Routinely reported through HMIS and rapid reporting system	Monthly, weekly	National, provincial, district, facility
	Desired definition: Numerator: reported cases of malaria (<5 years, ≥5 years) with a parasitological confirmed diagnosis using either microscopy or RDTs Denominator: population, expressed per 1000	Routinely reported through HMIS and rapid reporting system	Monthly, weekly	National, provincial, district, facility
Malaria positivity rate	*Desired definition:* Numerator: Reported cases of malaria (<5 years, ≥5 years) with a positive parasitological confirmed diagnosis using either microscopy or RDTs	Routinely reported through HMIS and rapid reporting system	Monthly, weekly	National, provincial, district, facility

		Denominator: Number of suspected malaria cases tested using either microscopy or RDTs (by age group, especially U5s) Expressed as a percentage			
	Malaria parasite prevalence	Numerator: Number of children under five years with malaria parasites, tested either through microscopy or RDTs Denominator: Total number of children under five years tested within malaria-endemic areas	Representative, household surveys (DHS, Malaria Indicator Survey)	Biennial	National, provincial
	Severe anemia prevalence among children	Numerator: Number of children aged 6-30 months with severe anemia (hemoglobin <8) Denominator: Total number of children under five years tested within malaria-endemic areas	Representative, household surveys (DHS, Malaria Indicator Survey)	Biennial	National, provincial
Outcomes					
Case management	Malaria case fatality rate	*Current definition:* Numerator: deaths attributed to malaria from a clinical malaria diagnosis Denominator: inpatient malaria cases with clinical diagnosis Rate expressed per 1,000 district population	Routinely reported through HMIS	Monthly	National, provincial, district, facility
		Desired definition: Numerator: Deaths attributed to inpatient malaria cases with a confirmed diagnosis using either microscopy or RDTs (by age group, especially U5s)	Routinely reported through HMIS	Monthly	National, provincial, district, facility

		Denominator: inpatient malaria cases with a confirmed diagnosis using either microscopy or RDTs (by age group, especially U5s) Rate expressed per 1,000 district population			
	Malaria cases with confirmed diagnosis (%)	Numerator: number of clinical malaria cases with a positive confirmed diagnosis using either microscopy or RDTs Denominator: Total number of suspected malaria cases	Routinely reported through HMIS, rapid reporting system	Monthly, weekly	National, provincial, district, facility
	Malaria testing rate (%)	Numerator: number of suspected malaria cases tested for malaria Denominator: number of suspected malaria cases	Routinely reported through HMIS, rapid reporting system	Monthly, weekly	
	Health care providers correctly diagnosing and treating malaria (%)	Numerator: Number of health care providers correctly diagnosis and treating malaria according to national policy. Denominator: Total number of health care providers surveyed	Representative facility surveys	Biennial	National, provincial
	Health facilities with no stock outs of Coartem for more than a week (%)	Numerator: Number of health facilities with no stock outs of Coartem for more than one week in a month Denominator: Total number of health facilities	Routinely reported through HMIS, rapid reporting system, performance assessment	Monthly, weekly	National, provincial, district, facility
	Febrile children who received antimalarial treatment according to national policy within 24 hours (%)	Numerator: Number of children under 5 years old with reported fever in the previous 2 weeks who received antimalarial treatment according to national policy within 24 hours of onset of the fever Denominator: Total number of children under five years	Representative, household surveys (DHS, Malaria Indicator Survey)	Biennial	National, provincial

		with fever in the past 2 weeks within malaria-endemic areas			
	Intermittent preventive treatment (IPT) for pregnant women through ANC visits (%)	*Routinely reported through facilities:* Numerator: number of antenatal clinic attendances given 1st, 2nd, and 3rd dose SP Denominator: total number of first antenatal clinic attendances Expressed as percentage for each 1st, 2nd, and 3rd dose IPT received separately	Routinely reported through HMIS	Monthly	National, provincial, district, facility
		Household survey sample: Numerator: Number of women at risk for malaria who took an antimalarial drug to prevent malaria during their last pregnancy that led to a live birth within the last 5 years. Denominator: Total number of women surveyed at risk for malaria who delivered a live baby within the last 5 years	Representative, household surveys (DHS, Malaria Indicator Survey)	Biennial	National, provincial
ITNs	Households with at least one insecticide-treated mosquito net (%)	Numerator: Number of households surveyed within malaria-endemic areas with at least one insecticide treated mosquito net (now all distributed ITNs are Long-lasting Insecticidal Nets [LLIN]) Denominator: Total number of households surveyed within malaria-endemic areas	Representative, household surveys (DHS, Malaria Indicator Survey)	Biennial	National, provincial
	Households with ITN to sleeping space ratio ≥ 1(%)	Numerator: Number of households with the number of reported ITNs greater than or equal to the number of reported household sleeping spaces	Representative. household surveys (DHS, Malaria	Biennial	National, provincial

		Denominator: Total number of households surveyed within malaria-endemic areas	Indicator Surveys)		
	Use of ITN among children under five the previous night (%)	Numerator: Number of children under 5 years old who slept under an ITN the previous night Denominator: Total number of children under five years surveyed within malaria-endemic areas	Representative, household surveys (DHS, Malaria Indicator Survey)	Biennial	National, provincial
	Use of ITN among pregnant women the previous night (%)	Numerator: Number of pregnant women who slept under an ITN the previous night Denominator: Total number of pregnant women surveyed within malaria-endemic areas	Representative, household surveys (DHS, Malaria Indicator Survey)	Biennial	National, provincial
	Use of ITN among household members the previous night (%)	Numerator: Number of household members who slept under an ITN the previous night Denominator: Total number of household members surveyed within malaria-endemic areas	Representative, household surveys (DHS, Malaria Indicator Survey)	Biennial	National, provincial
IRS	Targeted structures sprayed for Indoor Residual Spraying (IRS) (%)	Numerator: Number of eligible structures sprayed Denominator: Number of eligible structures targeted for IRS This indicator represents operational coverage for IRS efforts at districts and national level.	NMCC reports	Annual	National, IRS districts
Outputs					
IVM	Number of breeding sites identified, treated, eliminated	Includes both IVM activities undertaken by various partners consolidated by NMCC	NMCC program reporting	Monthly	National, provincial, district level

ITNs	Number of insecticide-treated nets (ITNs) sold or distributed	Includes both ITNs sold through subsidized net programmes in antenatal clinics and nets distributed free of charge to target populations through facility and community efforts; listed separately for PW through ANC	NMCC program reporting	Monthly	National, provincial, district level
IRS	Volumes of insecticide used for vector control	Total volume of insecticides used for vector control, including indoor residual spraying, and other Integrated Vector Management activities. (see WHO standard definition)	NMCC program reporting	Annual	National
	Number of eligible structures sprayed	Total number of eligible structures sprayed with indoor residual spraying (IRS)	NMCC program reporting	Annual	National, IRS districts
Case Management	Number of pregnant women receiving IPT (1,2 or 3)	Total number of pregnant women receiving IPT1, IPT2 and IPT3 through antenatal clinic visits, listed separately for IPT1, IPT2, IPT3	Routinely reported through HMIS	Monthly	national, provincial, district, facility
	Number of malaria cases treated	Total number of treatments dispensed for treatment of malaria diagnosis.	Routinely reported through HMIS	Monthly	National, provincial, district, facility
	Number of malaria microscopy slides taken	Total number of slides taken for confirmation of clinical diagnosis of malaria	Routinely reported through HMIS	Monthly	National, provincial, district, facility
	Number of malaria Rapid Diagnostic Tests (RDTs) taken	Total number of RDTs taken for confirmation of clinical diagnosis of malaria	Routinely reported through HMIS	Monthly	National, provincial, district, facility
IEC.BCC	Number of BCC materials produced	Total number of IEC materials, including print, media, skits, dramas for malaria IEC/BCC activities	NMCC	Monthly	National