Malaria Control Series 21

The United Republic of Tanzania

Ministry of Health and Social Welfare

National Malaria Control Program Monitoring and Evaluation Plan 2008-2013

June 2010

National Malaria Control Program (NMCP)

FOREWORD

Malaria is a major public health problem in Tanzania. It is a leading cause of morbidity and mortality, especially in children under five years of age and pregnant women.

The government of Tanzania through the Ministry of Health and Social Welfare, and its implementing partners are committed to controlling malaria in the country.
The Monitoring and Evaluation (M & E) Plan has been developed to monitor and evaluate all of the National Malaria Control Strategies Implemented in Tanzania under the National Malaria Control Programme (NMCP).

This Monitoring and Evaluation Plan have been developed in line with the National Malaria Medium Term Strategic Plan (NMMTSP) 2008 – 2013, the Health Sector Reform Strategy III 2008 – 2015, the National Growth and the Reduction of the Income Poverty vision of 2025, Millennium Development Goals, as well as Roll Back Malaria Monitoring and Evaluation Reference Group (RBM – MERG) recommendations for malaria Control. Therefore the plan will draw out a robust picture that indicates how malaria morbidity and mortality within the respective transmission domains have changed during the national scale-up within the context of external, and potentially confounding factors.

The plan will focus on providing a roadmap for monitoring the implementation of routine malaria control activities and evaluating the effect of such activities on population-level outcome coverage indicators and impact endpoints of malaria morbidity and child mortality due both to malaria and other causes. Also the plan will help ensure resources are being used in the most cost-effective manner.

In order to maximize the potential of getting data that is as representative as possible given the divers epidemiological pattern of malaria in the country and the challenges in the health management information system the M & E plan design will rely on the use of multiple data points collected through routine surveillance and population-based surveys.

I would like to thank all our partners in the fight against malaria who made the M & E plan a possibility. May I urge all stakeholders to use it in the spirit of alignment and harmonization towards a common goal, such that malaria trends in the country can be tracked systematically.

Blandina S. J. Nyoni
Permanent Secretary
Ministry of Health and Social Welfare

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The Ministry would also like to extend appreciations, to officials from the Ministry of Health and Social Welfare sections and programmes, including NMCP. Officials from WHO, UNICEF, USAID, CDC - PMI, MEDA, NIMR, CEEMI, World Vision, IHI, JSI – Deliver, JHU/CCP, JHPIEGO, PSI, CSSC, T-MARC, CEDHA, PHC – Iringa, The Clinton Foundation, TANAM, RTI, MUHAS, ZMCP staff, DMO's - Kyela, Makete, Liwale, Monduli, Mbulu, Mpanda, Kisarawe, and Lushoto also RMOs from – Dar es Salaam, Pwani, Mwanza, Dodoma, Iringa, and Ruvuma.for their participation in the whole process of finalizing this plan. Their valuable contribution has played a fundamental role, in making this document a success.

Since it is not easy to mention everyone involved in this long process, the Ministry acknowledges the work of every partner, who in one way or another, contributed in the development and finalization of this Malaria M&E Plan.

Lastly but not the least, the ministry extends appreciations to CDC – PMI for supporting printing this document

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Acronyms

ACT	Artemisinin-based Combination Therapy
AFENET	African Field Epidemiology Network
CDC	Centers for Disease Control and Prevention
CHW	Community Health Workers
CHMT	Council Health Management Teams
DHS	Demographic Health Survey
DSS	Demographic Sentinel Surveillance
ELISA	Enzyme Linked Immunosorbant Assays
EPI	Expanded Program on Immunization
FELTP	Field Epidemiology and Laboratory Training Program
GFATM	Global Fund to Fight AIDS, Tuberculosis and Malaria
HH	Household
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
HMIS	Health Information Management System
HSA	Health Statistics Abstract
HSSP	Health Sector Strategic Plan
IDSR	Integrated Disease Surveillance and Response
IEC/BCC	Information, Education, Communication / Behavioral Change Communication
IHI	Ifakara Health Institute
ILS	Integrated Logistics System
IPTp	Intermittent Presumptive Treatment for pregnant women
IRS	Indoor Residual Spray
ITN	Insecticide Treated Net
LLIN	Long Lasting Insecticidal Net
M&E	Monitoring and Evaluation
MACEPA	Malaria Control and Evaluation Partnership in Africa
MEEDS	Malaria Early Epidemic Detection System
MDG	Millennium Development Goals
MERG	Monitoring and Evaluation Reference Group
MIS	Malaria Indicator Survey
MMTSP	Malaria Medium-term Strategic Plan
MOHSW	Ministry of Health and Social Welfare
NATNETS	National Insecticide Treated Net Strategy
NHS	National Health System
NIMR	National Institute of Medical Research
NMAC	National Malaria Advisory Committee
NMCP	National Malaria Control Program
NGO	Non Governmental Organization
NSGRP	National Growth and Reduction of Poverty
OPD	Outpatient Department
OR	Operational Research
PHSDP	Primary Health Service Development Program
PMI	President's Malaria Initiative
PSI	Population Services International
RCH	Reproductive and Child Health
RBM	Roll Back Malaria
RDT	Rapid Diagnostic Test

RTI	Research Triangle Institute
SP	Sulphadoxine-Pyrimethamine
TNVS	Tanzania National Voucher Scheme
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WHO	World Health Organization

Executive summary

The Tanzanian National Malaria Control Program (NMCP) has funding for malaria control activities totaling approximately US$ 402 million dollars for 2008 – 2013 from a number of sources, including the Global Fund to Fight AIDS Tuberculosis and Malaria, the President's Malaria Initiative, the World Bank, UNICEF, Malaria No More, Swiss Cooperation and the Government of Tanzania . The scale up of the national program will be geared towards contributing to the achievement of the Millennium Development Goals (MDGs) and Abuja targets of reducing the burden of malaria and to eventually halt transmission of the disease. The main strategic areas that have been identified for the scaling-up of malaria prevention and control activities include case management, prevention and control of malaria among pregnant women, epidemic preparedness and response, and selective vector control with special emphasis on increasing coverage and use of long lasting insecticidal nets (LLIN) by the population as a whole and targeted application of indoor residual spraying.

It will be essential to monitor and evaluate all of the national malaria control strategies implemented in Tanzania under NMCP to assess progress towards national and international targets and to ensure resources are being used in the most cost-effective manner. The focus of this Monitoring and Evaluation (M & E) plan is to provide a roadmap for monitoring implementation of routine malaria control activities and evaluating the effect of such activities on population-level outcome coverage indicators and impact endpoints of malaria morbidity and child mortality due both to malaria and other causes. The specific objectives of the M & E plan are: 1) measure the degree to which the national plan has been successfully implemented and scaled-up, as measured against targets for population coverage to be achieved between 2008 – 2013; 2) assess changes in malaria-related morbidity and child mortality due to malaria and all causes before and after the scale-up of the NMCP strategic plan (2008 – 2013); 3) measure the degree to which specific intervention delivery systems are effective for increasing intervention uptake; and 4) assess the changes in malaria-related morbidity and child mortality which can be plausibly attributed to the impact of the national program, including both NMCP and partners' activities, between 2008 – 2013.

To meet the M & E objectives, given the existing context of malaria epidemiology and system constraints in Tanzania, the M & E plan design will rely on the use of multiple data points collected through routine surveillance and population-based surveys. It should be noted that this M & E approach is largely consistent with Roll Back Malaria (RBM) Monitoring and Evaluation Reference Group (MERG) recommendations. In this way, it is hoped a robust picture will emerge that indicates how malaria morbidity and mortality within the respective transmission domains have changed during the national scale-up within the context of external, and potentially confounding, factors. The use of multiple data points will also strengthen the plausibility that any resultant changes in malaria morbidity and mortality are attributable to NMCP and partner activities.

The M & E plan includes a description of current malaria control activities, goals and targets for malaria control for the period 2008-2013, data sources and systems for the collection of data, operational indicators, implementation and analysis plans, a detailed action plan, and limitations and system strengthening opportunities.

Chapter 1: Country Profile, Malaria Burden and Control Strategies

1.1 Country Profile

The United Republic of Tanzania is located between longitudes 28°E and 40°E; latitudes 1°S and 12°S, and has a total area of 947,480 km^2, of which 883,349 km^2 constitute land and the remainder is water bodies. Administratively, the country includes Tanzania mainland and the island of Zanzibar. Tanzania's mainland has 21 regions (Fig. 1) and 132 councils. Each council is divided into 4-5 districts, which in turn are composed of 3-4 wards. Approximately 5-7 villages form a ward. There are a total of about 10,045 villages.

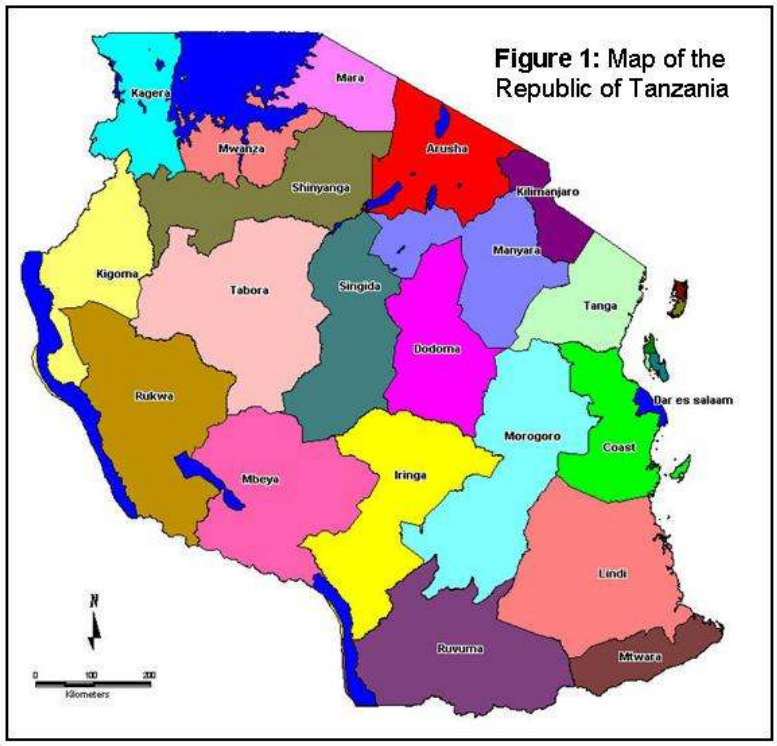


Figure 1: Map of the Republic of Tanzania

Tanzania has largely savannah climatic pattern, with two rainy seasons. The short rains occur in November/December and the long rains from March to May, although extreme variation in precipitation intensity exists among geographic areas. There are four distinct topographical zones. The Coastal Lowlands extending from the seashore for about 150 km inland to an altitude of about 300m. This zone is humid and has temperature variations from 20° C to 30° C. The Central Plateau has more marked diurnal temperature variations, being warm to hot during the day, and cool at night. The Basins around Lakes Victoria and Tanganyika have relatively high temperatures and humidity, and heavier rainfall. The highland areas surrounding Mountain Kilimanjaro and the Southern Highlands have cooler temperatures and medium to heavy rainfalls.

The country has an estimated population of 38,710,723 million (2002 census with projection for 2007), with an annual growth rate of 2.8%. Seventy-six percent of the people live in rural communities. Twenty percent of the population is children under five years of age, 27% are 5 to 15 years olds, and 20% are women of reproductive age (between 15 to 49 years).

The National Health System (NHS) is based on a central-district government structure. The central Ministry of Health and Social Welfare (MOHSW) is responsible for policy formulation and the development of guidelines to facilitate policy implementation. The Regional Health management Team (RHMT) oversees implementation of health services in the districts. The Council Health Management Teams (CHMT) are responsible for district council health services including dispensaries, health centers and hospitals in a given district. A dispensary serves a population of 6 - 10 thousand people, a health centre, 50 - 80 thousand and a district hospital

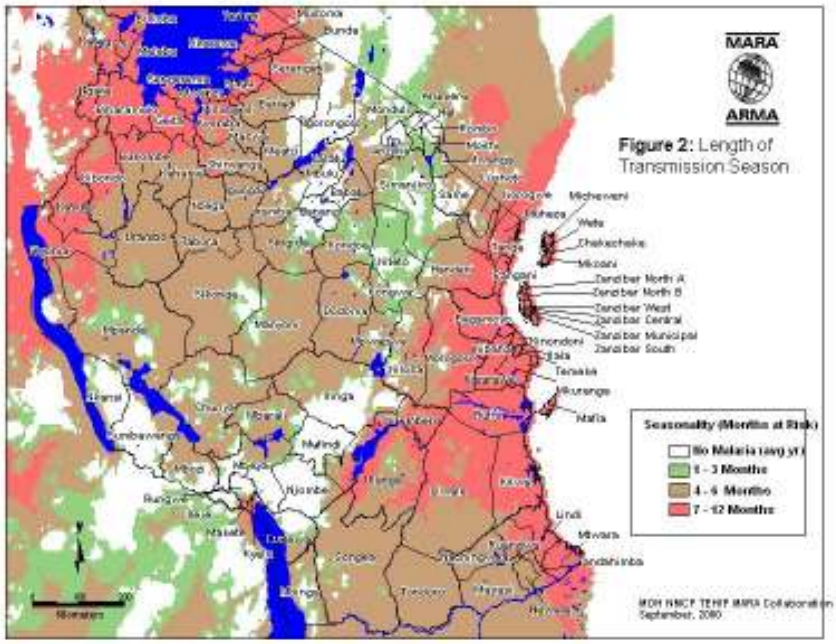
250 thousand. The regional hospital serves as a referral centre for 4 - 8 district hospitals and the four consultant hospitals serve several regional hospitals.

Table 1: Health facilities in Tanzania Mainland according to ownership

Facility type	Type of ownership				
	Government	**Voluntary**	**Parastatal**	**Private**	**Total**
Consultancy/Specialized Hospitals	6	2	0	0	8
Regional Hospitals	17	0	0	0	18
District Hospitals	61	14	1	0	85
Other Hospitals	0	74	8	34	108
Health Centers	300	82	5	47	481
Dispensaries	2,788	613	164	843	4,679
Total	3,172	785	181	924	5,379

Source: National Bureau of Statistic and Macro International Inc., 2007. *Tanzania Service Provision Assessment Survey, 2006*

1.2 Malaria Situation



Malaria is the leading cause of morbidity and mortality in Tanzania, affecting the health and welfare of its 38,710,723 million inhabitants (2002 census with projection for 2007). The climatic conditions are favorable for transmission throughout almost the entire country; *Anopheles gambiae* s.l. mosquitoes form the main vectorial system. With close to 90% of Tanzanians at risk, Tanzania has the third largest population at risk from of stable malaria in Africa, after Nigeria and Democratic Republic of Congo. Close to 90% of Tanzanians are at risk of malaria infection. Malaria transmission is stable perennial to stable seasonal in over 80% of the country; about 20% of the population lives in unstable malaria transmission areas prone to malaria epidemics. Above and below are maps illustrating the length of malaria transmission seasons (Fig 2), the percentage of malaria Outpatient Department (OPD) cases (Fig 3) and the prevalence of malaria among children 6-59 months old during 2007-2008 (Fig 4)

1.3 Malaria Prevention and Control Strategies: The 2008-13 NMMTSP

In 2002 the first National Mainland Malaria Strategic Plan (NMMTSP) was developed with the objective of reducing malaria mortality and morbidity in all 21 regions by 25% by 2007 and by 50% by 2010. The second 2008-2013 NMMTSP builds on the major achievements, challenges, and lesson learned during the implementation of the 2002-07 Plan. The Goal of the 2008 - 13 MMTSP is to reduce the prevalence of malaria by 50% by the end of 2013 from current levels (as determined by indicator values at point of last measurement). Figures 3 and 4 illustrate current levels of malaria, as reported by the NMCP. The MMTSP coverage targets by 2013 are:

- 80% of malaria patients are diagnosed and treated with effective antimalarial medicines, artemisinin-based combination therapy (ACT), within 24 hours of the onset of fever;
- 80% of all pregnant women receive 2 or more doses of intermittent preventive treatment (IPTp)
- 80% of people in malarious areas are protected through the use of insecticide-treated nets (ITNs);
- 80% of people in target areas are protected through the indoor residual spraying (IRS);
- Early detection and containment of 80% of malaria epidemics within two weeks from onset ;

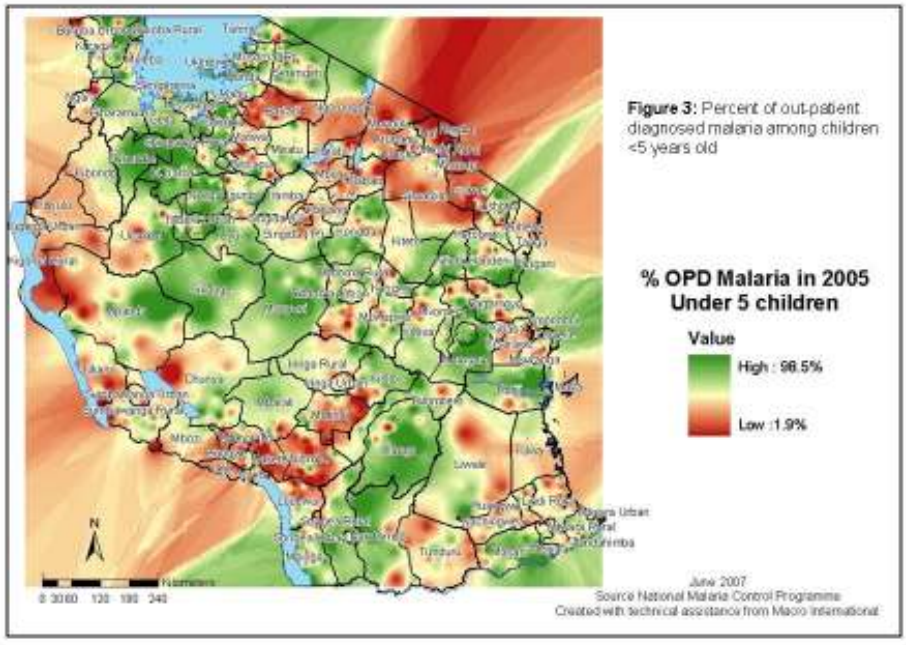
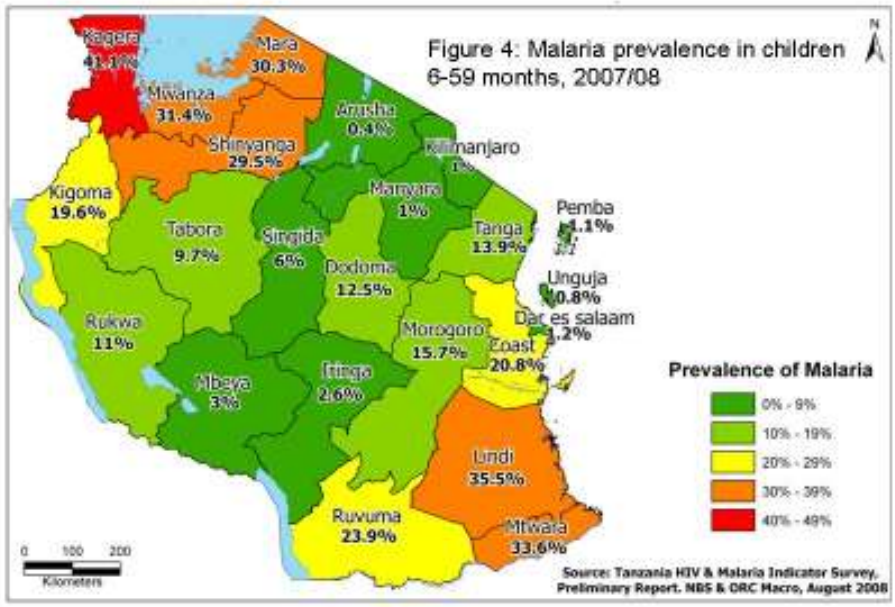


Figure 3: Percent of out-patient diagnosed malaria among children <5 years old

The current plan aims to rapidly scale-up the levels of coverage for the main interventions and includes a comprehensive array of activities. The plan also includes measures for strengthening malaria surveillance systems so as to inform decision makers and institute timely preventive measures. The plan is aligned with the key Strategic Government Policies: National Strategy for Growth and Reduction of Poverty (NSGRP), the Health Sector Strategic Plan-III (HSSP-III) and the Primary Health Service Development Program (PHSDP). The strategy is also consistent with key global strategies for the prevention and control of malaria: Roll Back Malaria Strategic Plan 2008 – 2015, Millennium Development Goals, the Abuja Targets, and major donors including the Global Fund for AIDS, Tuberculosis, and Malaria and the President's Malaria Initiative. The National NMCP strategy consists of five (5) strategies: two (2) are the main/core strategies and other three (3) are supportive strategies.

1.3.1 Main Malaria Prevention and Control Strategies

1.3.1.1 Malaria diagnosis and treatment



Early diagnosis and effective treatment, including intermittent preventative therapy to pregnant women (IPTp) remains the most important intervention in terms of its contribution in preventing mortality and reduction of the incidence of severe illness. Tanzania introduced the use of Artemisinin-based combination therapy (ACT) as first line treatment for *P. falciparum* malaria in 2004 and full implementation was started in early 2007 (NMCP Strategic Plan 2008-2013). Currently, implementation of the new policy is at the health facility level and has reached nationwide coverage in public facilities. Malaria treatment is available in the public health facilities and faith based organizations at no cost for children under the age 5 and pregnant women, and at a minimal cost for adults through cost sharing. The major challenge in the provision of early diagnosis and treatment services is the low access to basic health service and utilization. The accelerated expansion of health services and the accreditation of private health facilities will provide the opportunity to expand malaria early diagnosis and treatment services, including IPTp, to wider areas. In addition, it is expected the support from the GFATM and other RBM partners and donors will facilitate the accelerated expansion of such services.

In early 2009, 83% of health facilities in Tanzania have no laboratory diagnostic capacity for malaria. This means most of the 12 million reported malaria cases are clinical diagnoses. Through support from GFATM, the NMCP will begin to scale-up the use of rapid diagnostic tests (RDTs) at health facilities throughout Tanzania. The implementation of this activity will occur in five phases over 5 years. The initial scale-up will occur in 2009 in three regions (Dar es Salaam, Kagera, and Iringa).

1.3.1.2 Integrated Malaria Vector Control

The two most important vector control activities implemented in the country include ITNs and IRS (NMCP Strategic Plan 2008-2013). ITNs are the primary intervention implemented to prevent malaria infection and secondary intervention activities include ITN hang-up campaigns. Distribution of ITNs is done using a voucher system targeted to pregnant women and infants; In 2009 NMCP will initiate a campaign to distribute free LLINs to all children under 5. A campaign to distribute free LLINs to all remaining sleeping spaces in Tanzania will be underway in 2009-10 via “catch-up” distribution campaigns. As of 2008-09, IRS has been implemented in target

areas prone to epidemics, but future applications will include districts with intense, perennial transmission. The application of IRS is free of charge in all targeted community villages.

Lack of effective utilization of vector control tools at the individual and community level is a serious problem that require regular follow-up. Therefore, community education and awareness creation on regular use of ITNs, mending damaged ITNs, hanging-up ITNs and preventing re-plastering of insecticide sprayed surfaces are incorporated into NMCP activities. The ITNs coverage to date is estimated to have reached 38% of households with at least one ITN, and 25% and 26% of children under 5 and pregnant women, respectively, report sleeping under an ITN (2007-08, THMIS). However, in light of universal coverage targets set globally and in Tanzania, the estimated average family size in Tanzania, and the need to ensure adequate protection, the target for ITN coverage in the next five years (2008 – 2013) is to achieve distribution of 1 ITN per sleeping space within households. Given that funding will soon be in place to achieve universal coverage, the primary target and indicator of success will be 80% use of ITNs among all age groups. Furthermore the NMCP will carry out universal coverage of all sleeping spaces with at least 2 LLINs in 2009/2010. The application of IRS is carried out at no cost to the end user in all targeted community villages.

Larval habitat management activities are rolled-out in Dar-es-Salaam through the Urban Malaria Control Program. This is a collaborative effort between the City Medical Office of Health and the Ifakara Health Institute (IHI) for delivering larviciding services to a large population in urban Dar es Salaam. Field teams map mosquito breeding habitats, conduct regular inspections, and treat active breeding sites in these wards with a biological larvicide, *Bacillus thuringiensis var israelensis.* In mid-2009, the larviciding intervention will scale-up from 15 to 52 wards in Dar es Salaam region.

1.3.2 Supportive Malaria Prevention and Control Strategies

1.3.2.1 Routine Reporting Systems

Two primary *routine* reporting systems exist for malaria surveillance; the national Health Management Information System (HMIS) and Integrated Disease Surveillance and Response (IDSR) strategy. HMIS is the system used in the health sector to collect routine data from all health facilities. Malaria information collected as part of HMIS includes: numbers of malaria and anemia cases, provision of IPTp, bednet vouchers and iron/folate to ANC clients, and deaths related to malaria. For those HMIS indicators related to malaria diagnosis, most malaria cases represent clinical diagnoses, which are usually non-specific fever cases. Laboratory confirmation of clinical diagnosis is conducted in all hospitals and few health centers. This information is reported annually through CHMTs and/or Health Statistics Abstract (HSA).

IDSR is a strategy that assists health workers to detect and respond to diseases of epidemic potential, public health importance, and those targeted for eradication and elimination. Information from this strategy is intended to enable health teams to respond quickly to outbreaks, set priorities, plan interventions, mobilize and allocate resources. In addition to the health facility and district based monitoring of malaria for timely action, health facility-based data collection and reporting through the IDSR system is also currently implemented. However, the IDSR system, which captures data from health centers and hospitals, is usually aggregated and lacks the essential breakdown by area, which is important for targeting areas at higher risk. IDSR currently reports no malaria data to the NMCP. The issue of gathering and reporting surveillance data through the IDSR system in such a way that it captures timely data from most peripheral health facilities including community based approaches needs to be strengthened.

1.3.2.2 Behavior Change and Communication (BCC)

BCC activities focus on improving household behaviors related to sleeping under an ITN every night, seeking early treatment for fevers, and attending clinics early for antenatal care (including IPTp). Targeted districts have been selected based on 1) the prevalence of malaria, 2) ITN voucher utilization rate – with a focus on districts with a low utilization rate and 3) proportion of the population that is disadvantaged in terms of socio-economic status, geography and/or educational levels. Specific activities focus on training rural engagement team leaders, engaging with districts, subcontracting local organizations, and selecting community-change agents. Intensive, community focused activities are supplemented by External Rural Engagement activities. These include rural road shows using mobile video units and local theatre groups, school campaigns, sports events, and other cultural events promoting key malaria prevention and treatment behaviors. A national mass media campaign using radio and print material will also reinforce the Rural Communications Initiative. In addition, BCC activities are rolled out at the health facility level to improve the interpersonal skills of health providers in malaria prevention and control, including provision of job aids to counsel providers and clients on IPTp provision, ITN use, and correct treatment of malaria using ACTs. It is anticipated that BCC activities will be expanded to include an additional 40 districts by 2009.

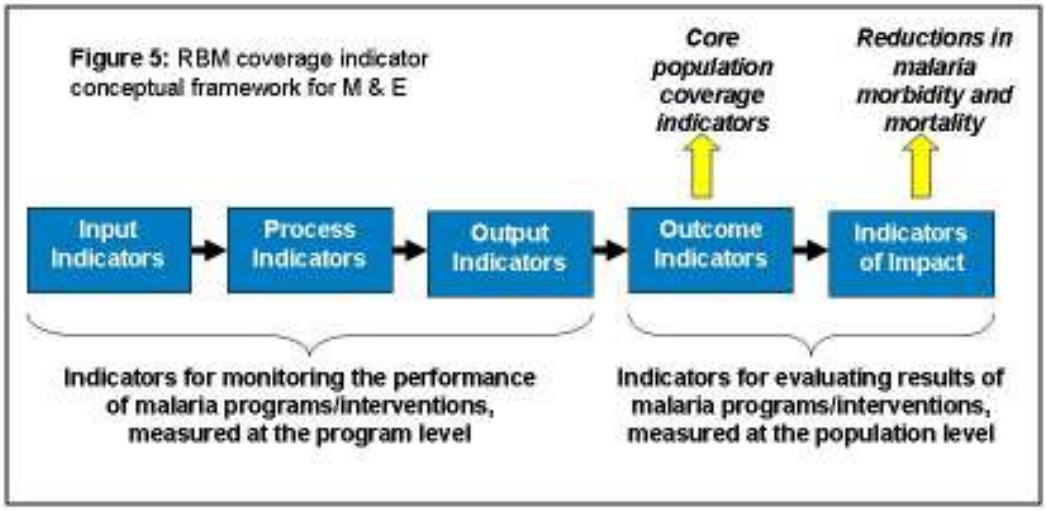
1.3.2.3 Regional / District support and capacity building

Two PMI resident technical advisors each spend approximately 50% of their time at the offices of the NMCP and make frequent visits to the Zanzibar Malaria Control Program. PMI resident advisors are a short-term strategy to provide increased technical capacity within NMCP and ZMCP. Longer-term, more comprehensive training of human resources is a key area where partners can help assure sustainability of malaria control programs. In FY2008, PMI began to support a two-year training program known as the Field Epidemiology and Laboratory Training Program (FELTP). FELTP is a public health training program to enhance competencies in applied epidemiology, implementation and evaluation of disease interventions, monitoring and evaluation, surveillance strengthening, epidemic preparedness, and public health decision making and leadership skills. Ministry of Health and Social Work (MOHSW) staff trained in these competencies will be critical to maintaining the progress achieved by partners.

During the two-year program, FELTP trainees are embedded within the MOHSW where they work daily with the staff of specific disease control programs (in this case, NMCP and ZMCP). FELTP trainees work with NMCP to review surveillance systems, collect data, and plan evaluations of interventions. CDC-Atlanta, CDC-Tanzania, USAID-Global Health Bureau, and the African Field Epidemiology Network (AFENET) have worked with Tanzanian colleagues since February 2007 to develop a plan for a Tanzania FELTP. Implementation of the program in Tanzania began in early 2008 and the first 12 trainees were enrolled in August 2008. The FELTP office is located in the National Institute of Medical Research (NIMR) building within the NIMR/CDC/WHO/NMCP compound.

Chapter 2: Overview of Malaria Monitoring and Evaluation Framework

It will be essential to monitor and evaluate all of the national malaria control strategies implemented in Tanzania to assess progress towards international and national targets, and to ensure resources are being used in the most cost-effective manner. The following M&E model by RBM illustrates the general M&E components that need to be addressed by any national malaria control program (Fig. 5). Figure 6 illustrates the components of a basic M & E framework, in the context of increasing intervention coverage and achieving high impact (e.g. reductions in morbidity and mortality).



Monitoring is the routine tracking of the key elements of program performance through record keeping, regular reporting, surveillance systems and periodic surveys. Monitoring assists program managers to determine which areas require greater effort and may pinpoint areas that might contribute to an improved response. Monitoring is also necessary to inform any evaluation of programs conducted, as monitoring provides contextual information to assist with interpretation. Indicators selected for monitoring will be different depending on the reporting level within the health system and the epidemiological situation of the country. At the global level, the main focus of the monitoring process is outcome indicators to monitor trends in coverage of recommended interventions, as elaborated above. At the national and sub-national levels, the emphasis will be on utilizing programmatic records, health system data, and sentinel site data to monitor inputs, processes, and outputs. A list of key output and process indicators are included in Appendix A.

Formal impact evaluation is required to determine and document the extent to which any expectant population-level results are attributable to a particular intervention or set of interventions, as measured through outcome and impact indicators. A more pragmatic definition of impact for the purposes of this plan is defined as the estimation of overall program impact on malaria morbidity and mortality brought about by all control initiatives and programs combined, irrespective of their financing source(s). The focus of this plan is therefore to provide a roadmap for evaluating the effect of the scale-up of the Tanzania NMCP on population-level outcome coverage indicators and impact endpoints of malaria morbidity and child mortality due to malaria

and all-causes. A secondary objective is to evaluate the incremental effect of the delivery systems used to distribute ITNs and behavior change communication messages.

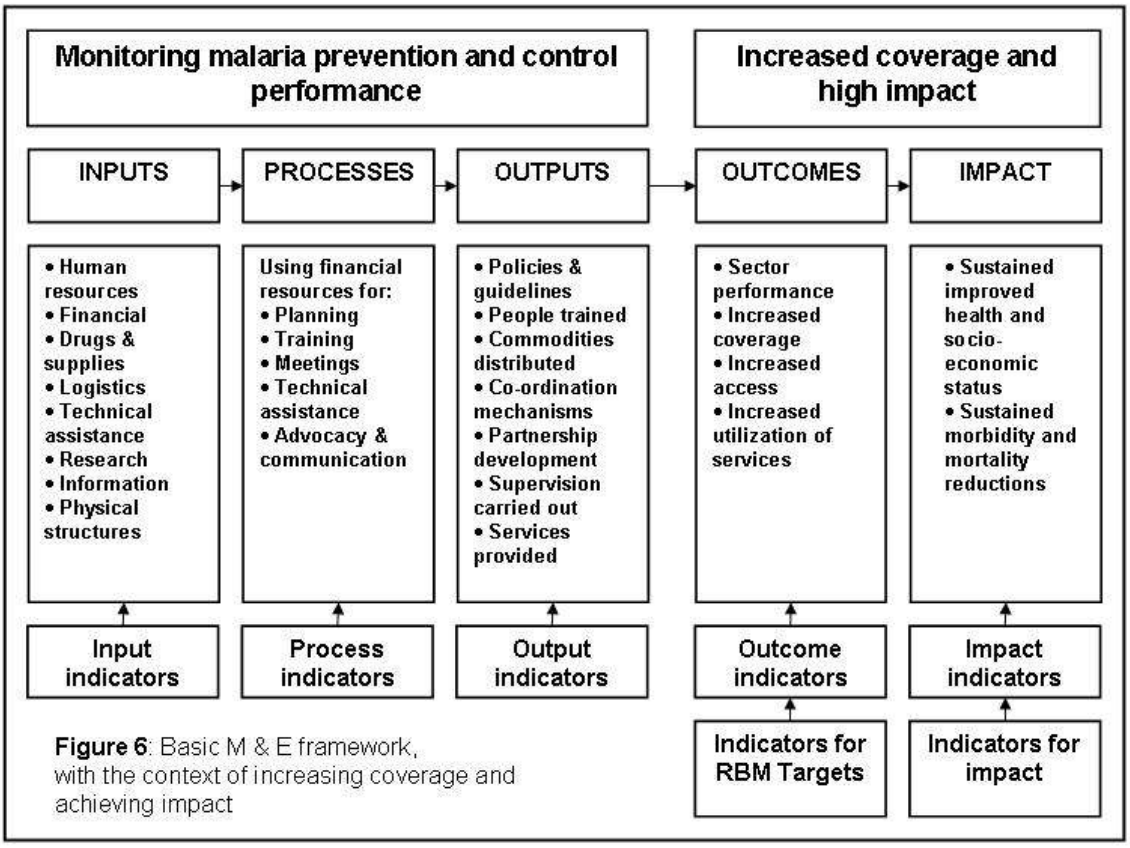


Figure 6: Basic M & E framework, with the context of increasing coverage and achieving impact

2.1 Goal and objectives of the national malaria M&E Plan

The goal of the national monitoring and evaluation Plan for malaria control in Tanzania is to provide reliable information on progress in controlling malaria. The objectives of a national monitoring and evaluation plan for malaria control in Tanzania can be summarized as follows:

Monitoring

- To coordinate collection, processing, analysis and management of malaria data
- To verify whether activities have been implemented as planned, to ensure accountability and address problems that have emerged in a timely manner
- To provide feedback to data providers and relevant authorities to improve future planning

Evaluation

- Measure the degree to which malaria prevention and control interventions have been successfully implemented and scaled-up, as measured against targets for population coverage to be achieved between 2008 – 2013
- Assess changes in malaria-related morbidity and child mortality due to malaria and all causes before and after the scale-up of malaria prevention and control interventions (2008 – 2013)

- Assess the plausible attribution of the malaria prevention and control interventions to any observed decreases in malaria-related morbidity and child mortality due to malaria between 2008 – 2013
- Measure the effectiveness of ITN delivery systems for increasing ITN coverage and use
- Measure the effectiveness of subsidized ACTs in both public and private sectors and RDT use in health facilities for improving coverage of ACT
- Provide guidance for routine monitoring, such as therapeutic efficacy, insecticide resistance, and residual efficacy studies, as well as provide guidance on key operations research studies necessary to inform programmatic decisions.

2.2 Main tasks and activities of the malaria M&E plan

- Work with partners to harmonize indicators, malaria prevention and control strategies, data collection strategies, analyses and reports
- Advocate for evidence-based planning at all levels of the health system
- Review public health goals as well as malaria control plans at all levels of the health system to determine the monitoring and evaluation needs.
- Coordination of monitoring and evaluation processes in country including relevance of data collected
- Identify possible sources of data for selected indicators.
- Assess data quality in terms of collection, reproducibility, and quantitative and qualitative data collection techniques.
- Collect, process, and analyze data, and interpret and report.
- Disseminate progress reports on a regular basis.
- Establish a secure, well managed centralized electronic database to which data can be submitted and recovered remotely through mobile phone and internet communication networks.

The target audience for this M & E plan include the following: MOHSW senior leadership, NMCP, HMIS and IDSR units, WHO/UNICEF, Regional and District health officials, Tanzanian biomedical research/public health institutions (NIMR, IHI, MUHAS, etc), Overseas academic institutions that conduct work in Tanzania, Donors, and other partner organizations implementing malaria prevention and control activities..

2.3 Indicators

Table 2 lists the primary NMCP coverage and impact indicators to be collected as part of the strategic plan, by data source(s) and target populations. These indicators correspond to the overall objectives detailed above and will be needed both to monitor scale-up activities and evaluate effectiveness. Process and output indicators provide measures to assess whether adequate delivery systems exist. These indicators will be collected as part of routine monitoring reports submitted to NMCP by participating partners. NMCP partner organizations currently use data reporting systems that are not standardized across partners, although some indicator data is forwarded on to NMCP on a quarterly, semi-annual, or annual basis. For example, PMI partner organizations use the following system for reporting indicators: partner organizations submit quarterly report to PMI cognizant technical officer (CTO); the CTO will review the data/report and either accepts it or sends it back to partner for clarifications/edits; the final report approved by CTO will be forwarded to the quarterly report repository system; and PMI staff forward to the NMCP filing system. Appendix A lists key process and output indicators. Coverage indicators provide measures to verify if NMCP and partner activities were scaled-up and implemented successfully. Impact indicators provide measures of change in malaria-related morbidity and mortality due to malaria and all causes. As part of the overall impact

evaluation analysis plan coverage, impact and confounding-factor indicators (table 3) will be assessed together.

The indicators listed as part of this plan correspond to the national five-year strategic plan 2008-2013 and the GFATM monitoring and evaluation toolkit. The Roll Back Malaria partnership has defined five core population level outcome indicators to be used for measuring coverage of ITN ownership, use of ITNs by pregnant women and children under 5, access to prompt antimalarial treatment among children under age five with fever, and use of IPT among pregnant women. The MMTSP has adapted these indicators and added other indicators for measuring IRS coverage. Details of select coverage and impact indicators, including interpretation and data sources, are presented in Appendix B. Specific details of data collection methods, including timelines, are described in the implementation plan section.

The details of coverage indicators for non-malaria programs (potential confounders for impact analyses) are presented in Table 3 and Appendix B. They are intended to serve as measures of intervention coverage of key programs that could affect child survival, and thus could influence results of impact analyses. Accounting for extraneous factor is intended to help with interpretation of any changes in malaria-related impact indicators in the context of the scaled up coverage of other interventions. They are not discussed in detail in this plan as they are well-established and are routinely measured and reported by the DHS. It will be necessary to negotiate with implementing institutions for their inclusion in the MIS and sub-national surveys.

Table 2: *Illustrative coverage and impact indicators for assessing malaria prevention and control activities in Tanzania (Note: see Appendix A and Appendix B for a full list of indicators and the operational definitions used in Tanzania)*

	Indicator	Data source(s)	Target population
Coverage Indicators			
1	Proportion of households with at least one ITN	DHS / MIS / NATNETS*	Population at risk for malaria (high and low transmission areas)
2	Proportion of children under 5 years old who slept under an ITN the previous night	DHS / MIS / NATNETS	Children at risk for malaria
3	Proportion of households with at least 1 ITN and/or sprayed in the last 12 months	DHS / MIS / NATNETS	Population at risk for malaria (high and low transmission areas)
4	Proportion of children under 5 years old who received ACT within 24 hours from onset of fever	DHS/MIS/IMPACT2	Children at risk for malaria
5	Proportion of children under 5 years old with fever in last 2 weeks who received any antimalarial treatment within 24 hours from onset of fever	DHS / MIS/IMPACT2	Population at risk for malaria (high and low transmission areas)
6	Proportion of pregnant women who slept under an ITN the previous night	DHS / MIS/ NATNETS	Population at risk for malaria (high and low transmission areas)
7	Proportion of population who slept under an ITN the previous night	DHS / MIS / NATNETS	All age categories (0-4 years, 5-15 years and 16 years or greater) and also pregnant women in populations at risk for malaria (high and low transmission areas)

8	Proportion of women who received two doses of IPT during last pregnancy	DHS / MIS / NATNETS	Women who have been pregnant in the last 24 months at risk for malaria (high and low transmission areas)
9	Proportion of households sprayed in the last 12 months	DHS / MIS/	Households within low transmission areas (program areas defined by NMCP)
10	Entomologic inoculation rate (EIR) - periodic	Sentinel mosquito collection sites	Proxy measure for transmission intensity
Impact indicators			
11	Prevalence of parasitemia in children under 5 years old	MIS / DHS	Population at risk for malaria (high and low transmission areas)
12	All-cause mortality in children under 5 years old	DHS, DSS	Population at risk for malaria (high and low transmission areas)
13	Prevalence of anemia in children 6-59 months	MIS, DHS	Population in high / stable transmission areas only
14	Standardized laboratory-confirmed malaria cumulative incidence per year (among children <5 and +5, and among pregnant women)	HMIS and national census population projection estimates (MYP), adjusted for access/utilization	Population at risk for malaria (high and low transmission areas)

* Note: NATNETS and IMPACT 2 surveys provide sub-national estimates only

Table 3: Key indicators of potentially confounding factors needed for interpreting changes in all-cause child mortality

	Indicator	Primary data source	Description
15	Rainfall and temperature	Tanzanian Meteorological Authority	Proxy indicator for ecological conditions that influence transmission, and therefore yearly variations in malaria epidemics
16	Proportion of children under 5 years old with diarrhea given any ORT	DHS	Proxy measure for changes in coverage of diarrheal disease interventions
17	Proportion of children with ARI symptoms from health-care provider	DHS	Proxy measure for changes in coverage of pneumonia interventions
18	Proportion children fully Immunized	DHS	Measures changes in EPI coverage
19	Proportion of children under 5 classified as malnourished (3 primary anthropometric indices)	DHS	Measures changes in nutritional status
20	Proportion children with fever, diarrhea or ARI symptoms taken to a public health-care provider	DHS	Proxy measure for access and utilization of health care

21	HIV prevalence among children under 5 and women of reproductive age	DHS	Proxy measure for vertical transmission rate

Data from multiple sources will be used to provide strategic information for malaria monitoring and evaluation. Data sources include standard monthly reports from the NMCP implementing partners and other government line ministries; routine reporting from national surveillance systems (HMIS/IDSR/ Health Facility-based Sentinel Surveillance); periodic household surveys (population based: national and sub-national); sentinel site surveillance of mosquitoes; and facility surveys (e.g. Service Provision Assessments and health facility and drug shop surveys as part of IMPACT 2). As capacity already exists for the collection of most data, details on the operational protocols are not provided as part of the national M & E plan. A description of data sources needed and the resulting information flows are presented below; for mosquito collections, suggestions on sample size, collection methods, and frequency are provided.

2.4 Data Sources

2.4.1 Health Facility-Based Data

2.4.1.1 Health Management Information System (HMIS)

HMIS is the system used in the health sector to collect routine data from all health facilities. The objectives of the HMIS are to provide data for measuring/monitoring the following key impact indicators over time: 1) Standardized laboratory-confirmed malaria cumulative incidence per year, among children under 5 years old, everyone older, and pregnant women; 2) Intermittent preventative therapy uptake among pregnant women; and 3) Standardized crude laboratory-confirmed malaria death rate among children under 5 years old, everyone older, and pregnant women.

At present, much of the malaria cases represent clinical diagnosis, which is usually non-specific fever cases, although malaria laboratory confirmation of clinical diagnosis is conducted in all hospitals and a few health centers. This information is reported annually through Council Health Management Teams (CHMTs) and the Health Statistics Abstract. Data flows from the health facility level up to the central level, where it is compiled, analyzed, and reported. The NMCP is currently working with selected sentinel health facilities to improve and standardize diagnostic procedures through capacity building exercises focusing on use of laboratory diagnostic procedures, data recording, and data reporting. To this end, trends in malaria incidence, IPTp and malaria related deaths for impact evaluation purposes will come from the health facility surveillance system (see 2.4.1.3 below).

Current HMIS strengthening should focus on improving human resource capacity, timely reporting so as to accommodate data demand for specific programs, and improving the quality of data recording and reporting. Specific recommendations for strengthening coordination of programs and improving the quality of data include: hiring and/or training focal people at the health facility and district level to ensure complete / accurate reporting, and Improvements to existing data collection tools as needed to ensure accurate and standardized reporting of data for ascertaining data for impact indicators. Further review of the system is currently underway, with the goal of finding ways to respond to the data demands of specific programs in a timely fashion. As well, implementation of a revised Reproductive and Child Health information system is currently underway.

2.4.1.2 Integrated Disease Surveillance and Response Strategy (IDSR)

IDSR is a strategy that assists health workers and the NMCP to detect and respond to diseases of epidemic potential, public health importance, and those targeted for eradication and elimination. Information from this strategy is intended to enable health teams to respond quickly to outbreaks, set priorities, plan interventions, mobilize and allocate resources. Malaria cases are reported on monthly bases. For the NMCP, the purpose of the IDSR is to provide denominator data for measuring the proportion of malaria epidemics detected and appropriately responded to within 2 weeks of onset at the national level. The system could also report on output indicators related to numbers of malaria cases seen, broken out by children under 5, pregnant women, and everyone else, per unit time. Although this system too is functional, further strengthening is needed to increase the timeliness of reporting and the standardization of malaria case diagnostics.

2.4.1.3 Health Facility Surveillance at Sentinel Sites

The NMCP is currently establishing a network of health facilities to be used for tracking trends in malaria related morbidity and mortality. This type of surveillance system relies on regular health facility reports of malaria morbidity and mortality from selected facilities within malaria endemic zones. Data collected from this system will be used to corroborate trends identified using point estimates generated from population-based surveys, annual HMIS trends, antimalarial drug efficacy assessments, and entomologic surveillance. The sentinel sites were selected in order to get more frequent, more in-depth and higher quality indicators than what is available through annual, aggregated HMIS reports.

The selected health facilities will report monthly indicators for inpatient and outpatient malaria cases. These data, collected at a small set of health facilities, will be used to demonstrate trends in malaria morbidity and mortality with the following supportive objectives: 1) Inform programmatic decision-making, 2) Predict demand for services and service provision needs, 3) Advocate for malaria control resources, 4) Describe broad trends across selected facilities, 5) Provide detailed information on malaria morbidity and mortality with supplementary data from specific evaluations, and 6) Contribute to the development a standard set of indicators for malaria surveillance. At present, 4 sites have been established; an additional 17 sites are planned.

2.4.1.4 Passive case detection and mapping at health facilities

By 2011 all public health facilities will be diagnosing malaria through the use of RDT. The introduction of standard malaria diagnosis procedures is expected to improve febrile illness case management. Regular RDT reporting and subsequent mapping provides a basis for continuous monthly passive surveillance. Reporting malaria test positivity rates within all 4,000 health facilities will contribute to the mapping of malaria transmission levels. As part of

2.4.1.5 Service Provision Assessments (SPA)

SPA surveys will be conducted within health facilities every other year. Four instruments are typically used to collect health facility data: 1) *Facility Audit Questionnaires* collect information on the facility infrastructure, equipment, drugs, pharmacy and laboratory services, record-keeping, management, and counseling; 2) *Observation Protocols* are completed for sick child, antenatal care, family planning, and STI consultations. Interviewers observe these client-provider interactions to assess how well service providers adhere to national and international standards of care; 3) *Exit Interview Questionnaires* are administered to clients observed with providers and cover client's understanding and recall of provider instructions and other information, and the client's perception of the service delivery environment; and 4) *The Health*

Worker/Provider Interview collects information from providers on pre-service and in-service training, supervision, and attitudes about their work environment.

2.4.1.6 Malaria epidemic early detection system (MEEDS) in selected sentinel facilities

About 7% of Tanzania population lives in areas with no or very low malaria transmission and a further 13% of population lives in areas with unstable highly seasonal malaria transmission. The ongoing scale up of malaria prevention and control interventions has the potential to create areas of unstable transmission. In the contest of the malaria epidemiological transition, the threat of occurrence of malaria outbreaks is increasing. A weekly febrile illness reporting system was introduced in 2001-2002 at selected facilities in 19 epidemic prone districts. Lack of supervision and delayed reporting hindered the systems functionality. Strengthening of the weekly reporting of confirmed (instead of presumptive) malaria cases is recommended. The MEEDS will be established in selected facilities in the epidemic prone areas and in areas where intensive malaria control initiatives are undergoing (IRS). In conjunction with IDSR, the MEEDS will provide denominator data for measuring the proportion of malaria epidemics detected and appropriately responded to within 2 weeks of onset.

2.4.1.7 Under-five active case detection at RHC clinics

Pregnant woman and children under 5 years of age attending RCH clinics will be considered a sentinel population for monitoring longitudinal malaria morbidity trends. Although data collected through this system in not representative of malaria trends in the community, it is a useful source of data to monitor for the following reasons: 1) there is high coverage in antenatal attendances and measles vaccination (over 90%); 2) this population represents a homogeneous group than can be followed up longitudinally; 3) this population is easily reachable; 4) these data can provide prospective/longitudinal indications of malaria trends; 5) this system does not require extensive financial resources and is easily implementable under existing routine health care delivery systems; 6) low-levels of training are required; 7) data are easily recorded and reported using a modified information system; 9) there is the potential to add Hemoglobin testing in the same facilities to monitor anemia prevalence; and 10) this data collection system will provide a service to the target population as all positive cases will be treated immediately.

2.4.1.8 Monitoring malaria medicines and diagnostic products

Routine information on the management of malaria medicines and diagnostics in public health facilities is currently collected within the Integrated Logistic System (ILS). ILS information system tracks product quantification, requisition, distribution, and consumption data. The ILS provides valuable data on: 1) consumption of antimalarials, 2) test rates for RDT; 3) quantification of medicine or diagnostic supply needs, and 4) products stock levels. The Medical Store Department (MSD) and Pharmaceutical Service Unit (PSU) are currently scaling up the ILS countrywide to reach complete national coverage by the end of 2009. NMCP will collaborate with the above institutions to monitor the use of malaria therapeutic and diagnostic products. The Ministry of Health, through the Affordable Medicines Facility for Malaria initiative, will provide subsidized ACTs to private health facilities. This is expected to reduce the current price of ACT and increase access to treatment for all groups. A system of track ACT management in all private health facilities will be developed and managed by a contractor. This system will monitor and track the process of procurement, distribution and volume of ACTs sales in the private health facilities. In conjunction with population-based surveys described below and RDT/ACT monitoring activities described above, two additional health facility/drug-shop surveys will be conducted (November 2009 – November 2010) to specifically collect data on ACT and RDT coverage and use as part of IMPACT 2 activities.

From 2005, the proportion of malaria cases treated with ACTs rose by 54%, triggered by the introduction of Artemether-Lumefantrine (ALu) as the official first-line treatment in 2006. Today, it is estimated that 57% of all malaria cases in the country are treated using ACTs [NMCP's community-based biennial survey, 2008]. However, this increased ACT uptake has only taken place in the public sector, where ACTs have been highly subsidized or free to patients through regular procurements supported by the Global Fund and U.S. President's Malaria Initiative (PMI). A baseline survey performed in three rural districts indicates that only 1% of patients buying anti-malarials at drug shops obtained ACTs, with the majority receiving Sulfadoxine-Pyrimethamine (SP) and Amodiaquine. The high price of ACTs has been identified as the main bottleneck that hinder access to ACTs in the private sector in Tanzania

It is aimed to increase access to and use of appropriate and affordable artemisinin-based combination therapies (ACTs) such that by 2012, 80% of the population diagnosed with malaria receive effective anti-malaria treatment and displace the cheap but ineffective anti-malarial drugs- SP and Amodiaquine brands.

The monitoring system will be in place to monitor performance in private sector if the intended aims are met, and if not appropriate intervention to be deployed to rectify the situation on time. The monitoring system for private sector will monitor availability of ACT to all levels (Importation, distribution up to retailers) volume of sales, retail prices, and public awareness of subsidized ACTs, willingness and ability of clients to buy subsidized ACTs.

2.4.2 Population-Based Data

2.4.2.1 Demographic and Health Surveys (DHS)

The DHS collects information on fertility levels and preferences, marriage, sexual activity, awareness and use of family planning methods, maternal and child health, breastfeeding practices, nutritional and anemia status of women and young children, childhood mortality, use of insecticide-treated-nets (ITNs) and antimalarials, early treatment seeking behavior for malaria, fever awareness and behavior regarding HIV/AIDS and other sexually transmitted infections, female genital mutilation, and adult and maternal mortality. The survey includes all women, and a sub-sample of men, aged 15-49 years old in the selected households. The sample is usually designed to produce separate estimates on key indicators at the national level for urban and rural areas. It is conducted by National Bureau of Statistics (NBS) after every 4- 5 years. For purposes of the NMCP national M & E plan, the objectives of the DHS are to provide data for measuring the following key intervention coverage and impact indicators over time: 1) Proportion of households with at least one ITN, 2) Proportion of children under 5 years old who slept under an ITN the previous night, 3) Proportion of children under 5 years old with fever in last 2 weeks who received approved antimalarial treatment within 24 hours from onset, 4) Proportion of pregnant women who slept under an ITN the previous night, 5) All-cause mortality in children under 5 years old, and 6) Prevalence of anemia in children 6-59 months. The last DHS was conducted during October 2004 – February 2005. The next DHS is planned for 2009/2010 and 2014/2015.

2.4.2.2 Malaria Indicator Survey (MIS)

In addition to the DHS, a standard MIS survey package for assessing the key household coverage indicators and morbidity indicators will be used in Tanzania. The survey package includes a core questionnaire and data tabulation plan, as well as related materials for organizing and conducting fieldwork. This stand-alone survey is designed to be implemented in a similar manner to the DHS surveys, producing nationally representative, population-based data from which the core RBM indicators can be constructed. The MIS survey will also produce a wide range of data for in-depth assessment of the malaria situation within countries. The MIS survey questionnaire and other related materials can be found online at http://www.rbm.who.int/merg.html.

Future MIS will include supplemental questions related to the Tanzania Voucher System, BCC activities, and IPTp activities specific to Tanzania. An MIS is planned for 2011 and 2013 as a key data collection source for this impact evaluation. In 2011, for the second time, the MIS may be modified to include HIV (becoming the Tanzania HIV/AIDS and Malaria Indicator Survey) to capture information specific to Tanzania NMCP interventions and delivery systems. A two-stage cluster sampling method probability proportional to size method, similar to the DHS, is usually used to obtain national-level population-based estimates for ITN use and parasite prevalence among those at risk for malaria. The Tanzania MIS will be performed during the peak transmission to provide unbiased estimates during periods of high malaria transmission.

2.4.2.3 National Insecticide Treated Net Strategy (NATNETS) Survey

The Tanzania National Voucher Scheme started in November October 2004 with support from the GFATM to provide ITN vouchers to pregnant women. PMI supported the expansion of the voucher scheme to infants, beginning in October 2006. As of July 2008, over 3.6 million vouchers have been redeemed for ITNs. The TNVS has been carefully monitored through annual nationwide surveys (2005 thru 2008) that have measured net coverage (ownership and use), voucher coverage, equity, average top up payments, and redemption rates. This household survey is linked to a health facility survey. The survey design was based on the principles of the previous TNVS national surveys. In 2008, A random two-stage cluster probability sample of 24 districts (21 districts in 2005, 2006, 2007) across mainland Tanzania was drawn, stratified by Zone to ensure an even distribution of districts throughout the country. In the analysis, the data are weighted by population size of districts to provide national estimates. The survey addressed indicators falling into four main domains: (1) net coverage and insecticide treatment indicators; (2) RCH processes; (3) voucher processes; (4) malaria and anemia prevalence. Future NATNETS surveys are planned in 2009 and 2010, although these surveys will be sub-national in nature and will focus on assessing the effectiveness of different ITN delivery systems for increasing ITN use (see section 3.1 & 3.2).

2.4.2.4 IMPACT 2 Surveys

The IMPACT 2 project is concerned with monitoring interventions to improve ACT access and targeting through the use of RDT in health facilities. This project is focused on making ACTs more accessible and targeting ACTs more appropriately. To address these goals, the NMCP plans to improve access through private sector distribution of subsidized ACT (sACT) and improve targeting of ACT through the use of RDTs in health facilities (see 2.4.1.8 above). The data collected via sub-national IMPACT 2 surveys will be used to assess the effectiveness of sACT and RDT use for improving coverage, in terms of coverage, equity, quality, adherence, and public health impact. Secondary objectives of these surveys are to collect data to assess cost-effectiveness and socio-cultural factors influencing outcomes. The main indicators to be collected include: proportion of children under 5 years old who received ACT within 24 hours from onset of fever and proportion of children under 5 years old with fever in last 2 weeks who

received any antimalarial treatment within 24 hours from onset of fever. Data for the collection of secondary indicators and confounding factors will also be collected. Two surveys are planned: November 2009 and November 2010. All effort should be made to use the standardized indicators listed in this plan, as well as coordinate with other partners conducting data collection exercises in the region, so as to avoid duplicative efforts.

2.4.3 Other Data

2.4.3.1 Entomologic Surveillance

Adult mosquitoes will be collected continuously at sampling clusters with CDC Light trap and/or Ifakara Tent Traps and submitted weekly to reporting stations in selected districts at randomly selected houses. Locations of adult sampling sites will be selected in clusters of 20 which are close enough to each other to be readily accessed by bicycle but far enough apart to provide a representative sample of that location that is robust to changes in settlement patterns or other land use changes. The position of each site will be fixed using an immobile marker and its position recorded by GPS. Each month, each site will be sampled once over one night for host-seeking mosquitoes in a pre-specified sequence that begins at one side of the cluster and moves systematically through it to minimize travel burden. One catcher assigned to each sampling cluster (one per sentinel district) will place each night's catch into a separate vial containing desiccated silica covered with cotton wool and will personally submit all 20 samples collected each month to a central collection point in the district, from where they will be forwarded to a national laboratory for determination of taxonomic composition, specifically recording the density, sporozoite infection status and species identity of all *Anopheles*. The sampling and reporting of each of the community-based collectors at each of the 15-25 sampling sites set up nationwide will be quality controlled by a national inspector who will make an unannounced supervision and training visit to four randomly chosen sampling clusters each month. Biting rates will be calculated from the numbers of host-seeking female mosquitoes caught in the traps. While the CDC-Light trap placed beside occupied bed nets is a standard, widely accepted method for assessing host contact in research studies (Note: it has never been applied successfully in a programmatic context, does not catch exophagic mosquitoes, and evaluations by comparison with human landing catches in a number of locations across Tanzania and elsewhere in Africa have yielded inconsistent results). Laboratory processing will involve Enzyme Linked Immunosorbant Assays (ELISA) techniques to identify *P. falciparum* circumsporozoite protein in mosquitoes to determine sporozoite prevalence and a subsample of 500 *An. gambiae sensu lato* from each site will be tested by PCR to determine sibling species identity. These activities will serve multiple purposes: 1) data collected will serve as control variables for impact evaluation analyses, 2) sub-studies at selected sites will be done to monitor insecticide, 3) in combination with district level estimates of morbidity and mortality obtained from HMIS and population-based surveys, mapping of transmission intensity will inform NMCP as to where and when variations in transmission intensity are occurring, and 4) an understanding of the distribution and abundance of vectors to analyze trends in not only EIR (and it's composite measures of mosquito density and sporozoite prevalence) and insecticide resistance, but also vector sibling species composition which is known to change in response to increasing coverage with IRS and ITNs. This work will be supported by NIMRI and the Ifakara Health Institute. EIR will be calculated on a periodic basis for purposes of this M & E plan, while insecticide resistance monitoring will be done on a routine basis.

2.4.3.2 Activity and Supervision Reports

Program level activity reports with data will be obtained from all partners conducting malaria prevention and control activities on a monthly basis. These data will form the basis for tracking commodities, procurement, and implementation of ITNs, IRS, antimalarials, and BCC activities. Monitoring inputs, processes and outputs is important for tracking program performance to ensure that financial, human and other resources are available in a timely manner. Monitoring outputs is especially critical for assessing the level of service delivery achieved during implementation efforts. These data will be used at the analysis phase to assist with the interpretation of impact evaluation results.

2.4.3.3 Routine Monitoring Data Sources & Special Studies

- *Meteorological data* – Rainfall and temperature data collected from the Tanzania Meteorological Agency will be used to ascertain the propensity of study areas to harbor mosquito populations, thus allowing for our analyses to control for periods of unusual dryness or wetness.

- *Census data* – Data collected from the National Bureau of Statistics will be used in support of M & E activities to calculate population projections to be used as denominator data for select indicators.

- *Drug efficacy studies* - To ensure continued effective case management, resistance to currently ACTs needs to be monitored regularly. A drug efficacy study will be carried out by NIMRI at sentinel sites every two years based on standard WHO protocols in collaboration with in-country partners.

- *Demographic Sentinel Surveillance (DSS)* – Although currently not included as a main data source for the 2008-2013 M & E plan, these data will be used to calculate mortality rates and establish denominators for key indicators within the catchment area. Further integration with NMCP and partner data collection activities and strengthening is expected.

- *IRS program data* - Effectiveness of IRS depends on the continued susceptibility of *Anopheles* mosquitoes to DDT. Continued Insecticide efficacy studies will be done in collaboration with NIMRI and IHI at selected sentinel sites once every two years according to standard WHO protocols. As well, the numbers of houses sprayed, quantity of insecticide procured and sprayed, and the location of activities will be used to support reporting of output indicators.

- *ITN program data* – Data on the number of nets distributed, location and timing of net distribution, and re-treatment activities will be collected from participating partners.

- *Larval habitat management program data* – The location, timing, and type of larval habitat management activities are needed to understand the context in which malaria transmission is occurring in urban areas. Key data include the amount of BTI used, the number of habitats managed, and the level of permanence of each habitat managed.

- *Voucher Tracking Studies* - The voucher tracking studies will estimate the extent to which the vouchers reach the target groups, identify mechanisms for misuse, and suggest measures to reduce misuse. This special study will follow pregnant women and infant vouchers once during year 1 and year 2.

- *Retail Audit Tracking Studies* – The retail auditing studies will track changes in the retail market for ITN products. Specifically, these studies will provide data on the characteristics of the shop; whether or not they stocked ITN products; (e.g. nets and insecticide); the prices of the ITN products; whether or not they were stocked. This special study will collect data using a sample of shop keepers once during year 2 and year 4.

- *Qualitative Studies* - Qualitative studies will address the process issues related to the operation of the voucher system and the use of sACT, including: perceptions, understanding and use of the pregnant woman and infant voucher system among community members; the functioning of the system at community level; perceived barriers to access; the use of nets and/or sACT; the effects of the voucher program on the use of ANC and measles vaccine services; access to health facilities; illness narratives. This information is useful to provide the context within which systems (e.g. voucher scheme system, sACT and RDT strategy) are operating in order to assist in interpreting the results obtained from the quantitative data collection methods. These special studies will use focus group interviews with community members during year 1 and year 2 for assessing the voucher scheme; and, focus groups, illness narrative interviews, key informant interviews and structured observations during year 1 and 2 for assessing contextual factors related to the use of sACT and RDT for improving coverage of ACT.

2.5 Data Flow

Several levels of data are collected: household, community, health facility, and special studies. Data collected through health facility surveillance, including the HMIS, are reported quarterly and complied annually for production of an abstract. IDSR data is reported monthly, complied monthly, and reports sent to WHO and districts. Health facility data are stored in a database at the Epidemiology unit of the MOHSW. Informally, the NMCP receives reports from the districts directly, with results compiled annually for presentation at the annual malaria conference. Data collected from sub-contractors are not received by the NMCP on a regular basis. This is a key area that should be addressed through the development of a central database for the storage of all program and population-level data collected. The M & E technical working group will work towards the harmonization of data flow. Figure 7 illustrates the flow of data from the household/individual to NMCP and partners.

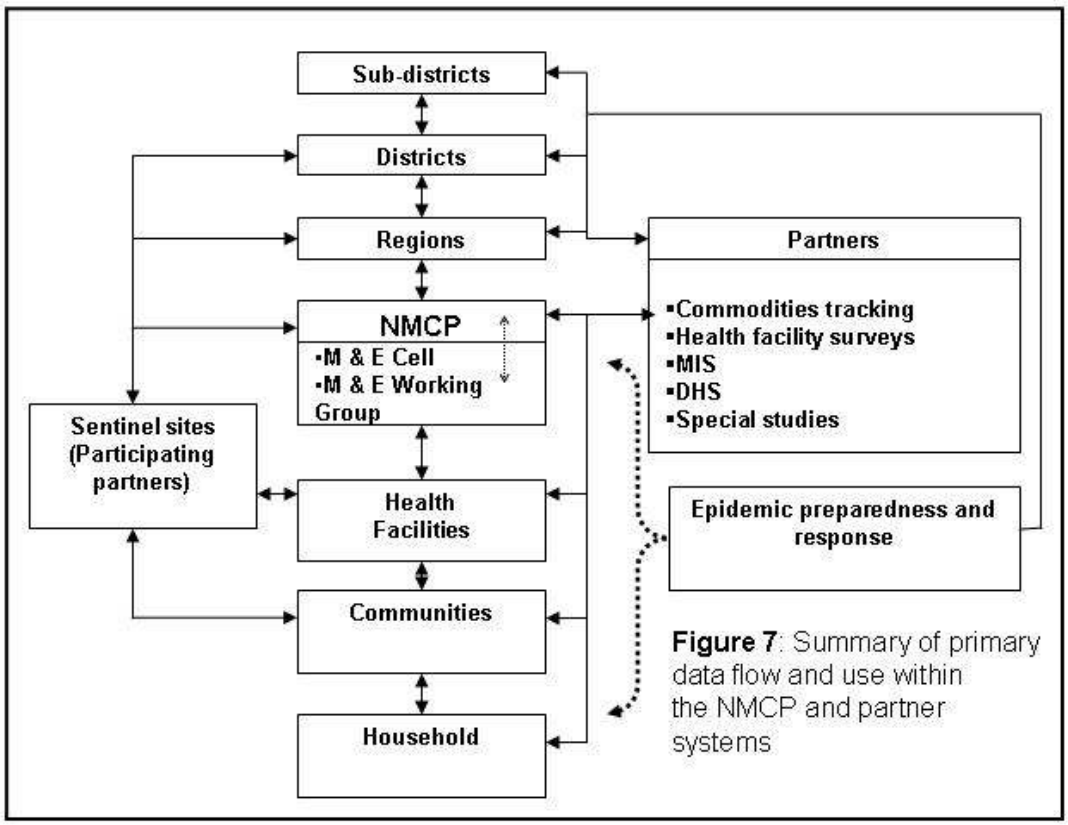


Figure 7: Summary of primary data flow and use within the NMCP and partner systems

2.6 Data Quality Assurance

Data quality assurance will be done by the NMCP and will involve characterizing the operational definitions for the Health facility surveillance sentinel sites and HMIS indicators, documenting how these definitions may change as the needs of the health facility surveillance sentinel sites and HMIS change over time, and assessing the quality of data generated within health facilities. Activities to be performed on a quarterly basis include assessments of the accuracy, completeness and timeliness of data recording and results reporting, the identification of obstacles at each tier of the health facility reporting system, cross-checking diagnosed cases, and an assessment of the current utilization strategies at each tier of the health system in Tanzania. Important outcomes include recommendations on how data quality can be improved, as well as recommendations on how to maximize the use of health facility data to guide malaria programming. We do not anticipate a need for comprehensive data quality assessments for population-based surveys, as individual protocols already exist for collecting and entering data; protocols for the DHS, MIS, and sub-national surveys will be accessed by implementing partners.

Data quality assessments will be performed at selected health facilities quarterly (i.e. all health facilities and not just health facilities selected as sentinel sites). As well, operations research related to drug resistance and insecticide resistance will be performed in support of data quality assessments. To support NMCP and partners to manage results and produce credible reports through improved data quality, it is important to discuss the scope of the data quality assessments needed; these consultations will ensure that we are working towards the same goals with respect to the scale-up of malaria control and prevention interventions. Data verification will be performed to compare the reported numbers from the health facilities or

sentinel sites to the number re-aggregated from the source documents like ITN register, patient records, and monthly reports. A second strategy involves conducting random spot-checks among households and health facilities to ascertain whether or not the data recorded matches whether they have actually received specific malaria control and prevention intervention services like IRS, and among health facilities to verify the presence of ACTs and other anti-malarial drugs against the data reported. As a result of these expanded data quality assurance activities, the M & E unit will be strengthened, thus increasing capacity to conduct M & E, and data management quality will be increased. Quarterly assessments and supervision visits will also provide a platform for supporting health workers at regional/district level on improving data collection procedures.

Chapter 3: Implementation Strategy

3.1 Overall Timeline of Data Collection Activities

Figures 8 and 9 presents the overall timeline for all required data collection systems required to obtain all indicators listed in Tables 2 and 3 and Appendix A. The timeline, and evaluation design, assumes that the majority of the scale-up from minimal coverage of key interventions will occur during 2009-2010, after which scale-up will continue and coverage will be maintained through 2013. Baseline data for impact indicators listed in Appendix A will be collected by these systems as indicated below in 2005 and 2008; surveys implemented after 2008 and before 2013 will serve as mid-point sources of data.

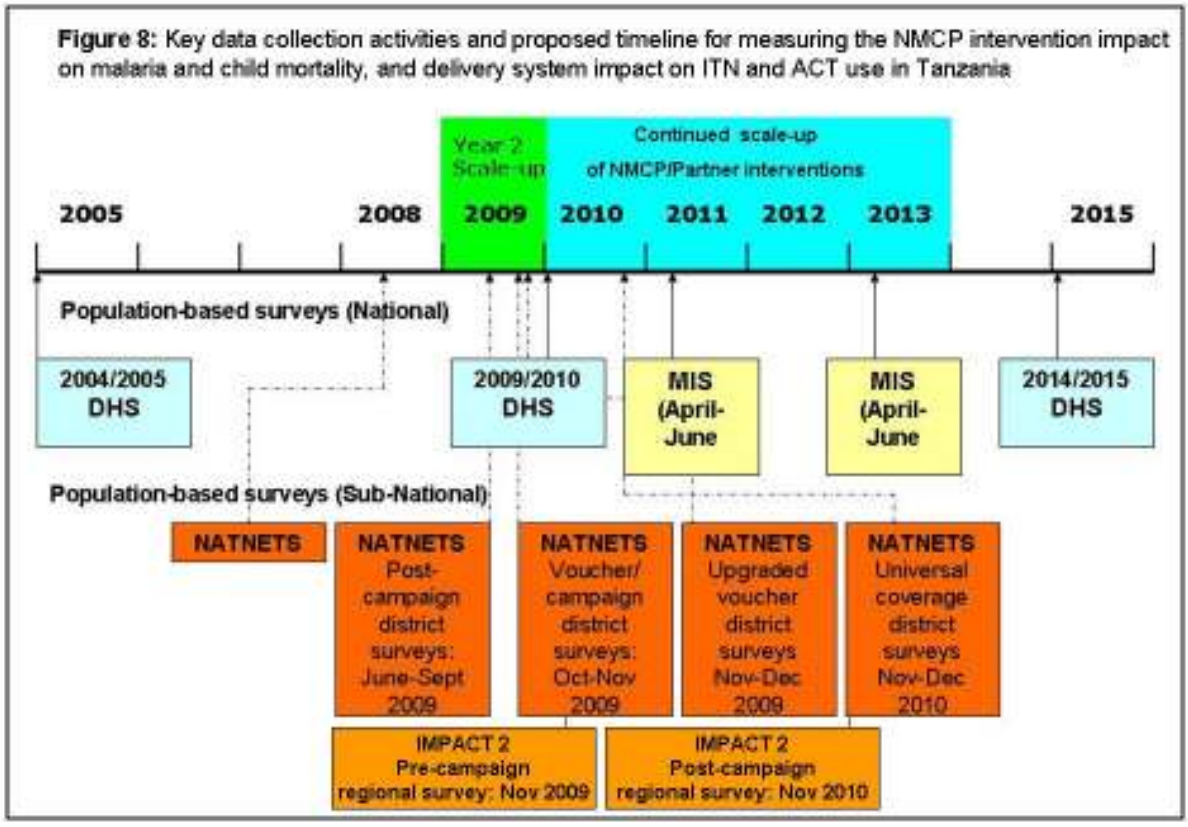
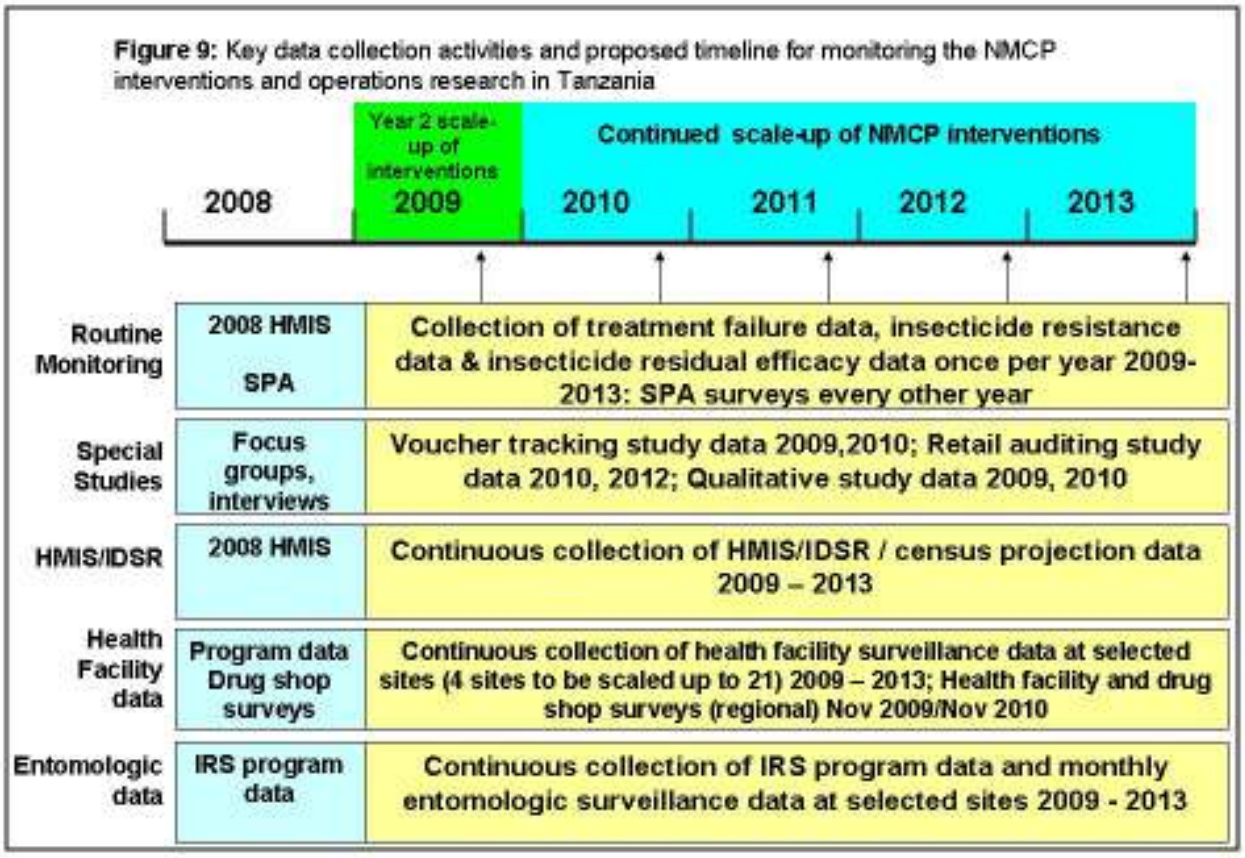


Figure 8: Key data collection activities and proposed timeline for measuring the NMCP intervention impact on malaria and child mortality, and delivery system impact on ITN and ACT use in Tanzania



3.2 Data Analysis Strategy

3.2.1 Monitoring Plan

The primary focus of the monitoring plan is on tracking commodities, assessing coverage of key malaria prevention services and control activities, and monitoring of diagnosis and treatment practices. Specifically, the NMCP monitoring plan focuses on assessing the coverage of selected malaria-related services and diagnostic capacity at health facilities and within communities, as well as entomologic surveillance at selected sites. The output indicators to be monitored are shown in Appendix A.

Districts, communities, households and health facilities are all part of the operational context for implementing malaria prevention and control interventions. For monitoring of community-based programs, Program records from partners (e.g. ITN vouchers distributed, number of houses reached with IRS) will form the main source of data. Entomologic surveillance data will be used to monitor trends in transmission intensity. Special studies will be conducted generate contextual information related to the program. To track trends in voucher redemption, use and misuse (voucher Tracking Study during years 1 and 2); pregnant women and infant vouchers will be followed up. To track changes in market conditions that influence ITN and insecticide stock and sale (Retail Auditing Study during years 2 and 4), a sample of shop keepers will be interviewed. To assess community perceptions, understanding and use of the voucher system (Qualitative study during years 1 and 2), focus groups will be conducted among urban and rural residents. Service provision assessments (SPA surveys) at health facilities will be used to

assess diagnostic and treatment services, drug stock-outs, infrastructure, and quality of services (among other indicators).

District and Regional level reports from malaria focal persons will be received and processed by the M & E team within the NMCP. The NMCP will be responsible for tracking on a monthly, quarterly and annual basis. Reports will be shared with implementing partners on a quarterly basis to assess where additional resources are needed. NMCP will serve as the coordinating body which brings together information from other partners implementing malaria prevention and control activities. Supplemental data collection using small-scale M&E systems developed by partners will be used to share information on outputs with NMCP leadership.

3.2.2 Evaluation Plan

To meet the evaluation objectives in Tanzania in terms of malaria epidemiology and system constraints, the impact evaluation design will rely on the use of multiple data points in time and type to determine impact. Two evaluation study designs are proposed: 1) a pre-post only design, stratified by hypodendemic, holoendemic, and super-holoendemic to capture the effect of intervention coverage on malaria related morbidity and mortality from 2008 to 2013 at the national level; and 2) a quasi-experimental design at the sub-national level to assess the effectiveness of different ITN delivery systems (i.e. Tanzania voucher systems and campaigns) on ITN use during 2009 and 2010. It should be noted that this evaluation approach was developed in the context of existing and planned data collection strategies, and the phased implementation plan for ITN roll-out. In this way, it is hoped a robust picture will emerge that indicates how malaria morbidity and mortality within each transmission domain have changed during the intervention scale-up period, within the context of external confounding factors. Unless otherwise noted, all analyses will be conducted at the household or health facility level.

3.2.2.1 National Level Evaluation

The national level pre-post evaluation will use multiple data points to strengthen the plausibility that any resultant changes in malaria morbidity and motility are attributable to the scale-up of malaria prevention and control interventions, and not the result of extraneous factors confounding results. The following primary data points will be measured over time and used in the pre-post design:

1. Trends in key coverage indicators for both malaria interventions and other interventions intended to impact child survival (population-based household surveys before, during and at the conclusion of the intervention scale-up).

2. Trends in malaria morbidity (parasite prevalence measured with population-based surveys and case incidence with the HMIS before, during and at the conclusion of the intervention scale-up).

3. Trends in all-cause child mortality will be measured pre, mid, and post intervention scale-up from the 2005, 2010, and 2015 DHS; trends in all cause mortality will also be measured using a DSS.

4. Rainfall and temperature will be continually monitored before during and after intervention scale-up by the Tanzania Meteorological Agency.

Although numerous methods can be employed to assess impact, the following text describes basic analyses that could be performed. Descriptive statistics should be used to summarize evaluation outcomes and impact by year, survey round, region, and demographic characteristics of individuals and households. Chi-square and logistic regressions could be used to assess the differences between dichotomous impact and coverage indicators at baseline and the follow-up survey rounds. The following potential confounders should be controlled for in the regression models: rainfall, age, sex, fever, index of relative household wealth, and village. Huber-White-Sandwich estimator of variance should be used to obtain empirically estimated standard errors to account for household and village level clustering. Unadjusted rate ratios and adjusted incidence rate ratios could be compared over time using Poisson regression models to compare changes in malaria incidence over time. The following potential confounders should be controlled for in the Poisson regression models: rainfall, age, sex, distance to health center, concurrent diagnoses, and location of residence. Response rates and measures of data completeness (data quality) could be compared between surveys using chi-square and logistic regression.

Secondarily, chi-square and logistic regression could be used to assess the magnitude and direction of potential risk factors of parasite infection, mortality and anemia, as measured from the cross-sectional surveys, at the community, household and individual level, while controlling for potential confounding factors such as transmission season and year.

3.2.2.2 Sub-national Level Evaluations

3.2.2.2.1 Evaluation of ITN delivery system

In 2009-10, the sub-national NATNETS evaluation will use a combination of before and after surveys under the framework of a quasi-experimental design to capture the impact of ITN delivery systems in Tanzania. Specifically, this evaluation intends to measure the extent to which the upgraded voucher system increases ITN use among children under 5 years old and pregnant women, as well as the incremental effect of additional distribution campaigns over and above the upgraded voucher system. This evaluation exercise will take place within some, but not all, of the in 24 M&E districts that were included in the 2008 NATNETS Household Survey. The NATNETS survey methods will be the primary source of data collection. To measure the effect of the upgraded voucher for increasing ITN use, a simple pre-post design will be used, whereby data collected in 2008 will be used as baseline and data collected in 2009 and 2010 will be used as follow-up. Three separate assessments will be made: 1) five districts (2 in South Zone during June 2009 & 3 in Lake Zone during August 2009) will be surveyed to assess the effectiveness of the targeted campaign 2) the same five districts will be surveyed approximately 3-4 months later (November- December 2009) to measure the incremental effect of adding the upgraded voucher scheme to that of the under five campaigns and 3) a further 3 districts will be sampled in Coast Zone during November-December 2009 prior to the under-5 campaign where only the upgraded voucher has been rolled out to measure the effectiveness of the reduced top-up amount in achieving equity. Following the universal coverage campaigns to be conducted in 2010, seven further post-campaign district-level surveys will be conducted to measure coverage within target groups.

As noted in the preceding section, the following text describes basic analyses that could be performed to assess impact, although we recognize that other methods may also be appropriate. Bivariate associations/differences between the primary outcomes and exposure variables should first be ascertained to guide statistical analyses and subsequent model building. The effectiveness of the intervention could be analyzed in terms of individual net-use

(i.e. the proportion of children under 5, within households owning at least one ITN, reporting to have slept under an ITN the night before the survey, as well as the proportion of pregnant women, within households owning at least one ITN, reporting to have slept under an ITN the night before the survey) and household level net-use (i.e. proportion of households owning at least one ITN with all children under 5 and/or pregnant women reporting to have slept under an ITN the night before the survey). The probability of committing a type-1 error should be set at 5% in hypothesized directions.

Differences in the primary outcome between intervention and control participants could be compared using chi-square statistics and logistic regression Logistic regression could be used to estimate the effect of the intervention on the outcome of under five/pregnant women net use between intervention and control groups at each data collection point, as well as between baseline data collection and follow-up data collection, while controlling for the following potential confounders: socioeconomic status, religion, occupation, health status, distance to health facility, urban/rural residence, mass-media exposure, group strata and subject. The overall significance and effect of the intervention between baseline and follow-up could be assessed with the interaction term for study time points (baseline and follow-up year) times intervention group within a logistic regression model while adjusting for the potential confounders outlined above. Huber-White-Sandwich estimator of variance should be used to obtain empirically estimated standard errors to account for interclass correlations within districts as a result of the group randomization. It is recognized empirically estimated standard errors and tests for significance can slightly inflate the type-1error rate when fewer than 40 clusters are used in a group randomized controlled trial; given the practical considerations of the program roll-out, this design is the best for assessing effect of different delivery systems.

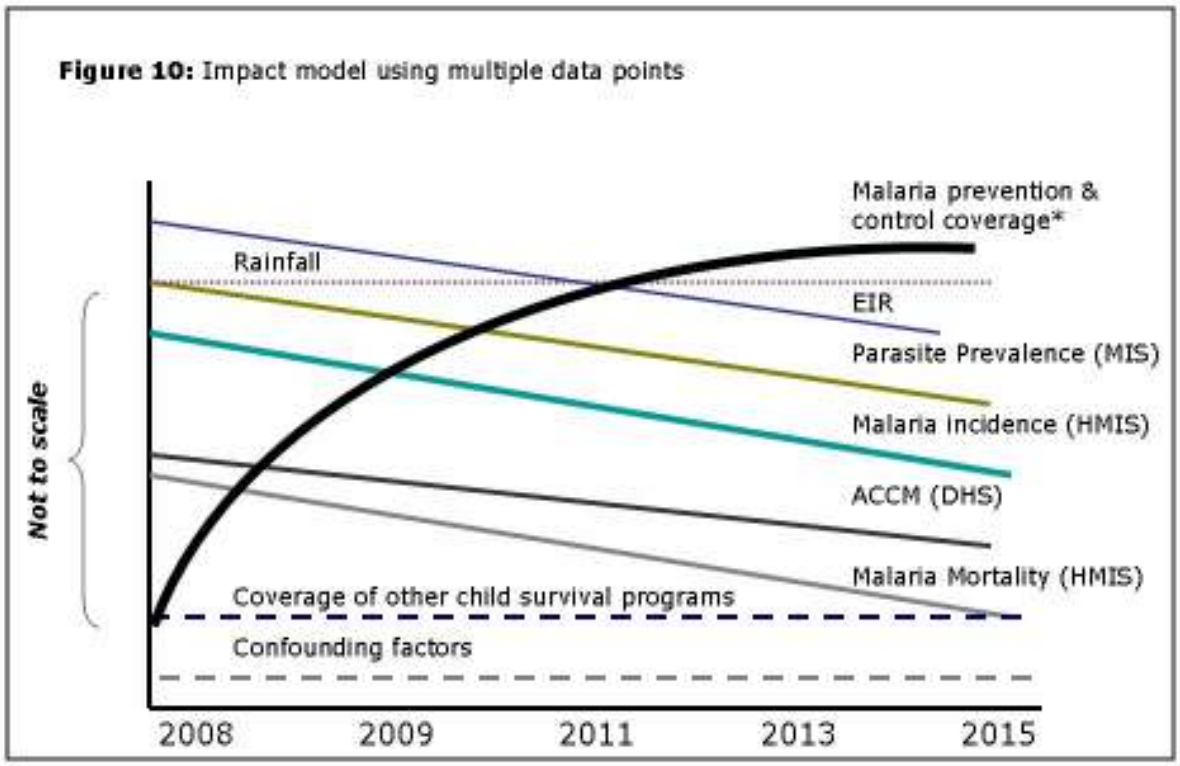
Given that the Tanzania voucher system and catch-up campaigns will result in a full-coverage intervention with BCC activities concurrently rolling out as part of existing malaria control programs, and exposure to BCC may be predicted by explanatory variables of interest in this study, the Durbin–Wu–Hausman test (augmented regression test) could be performed at the onset to test for endogeneity between BCC activities and the respective outcomes, and between BCC and explanatory variables in the respective models. If the results show evidence of endogeneity (i.e. value of one independent variable is dependent on the value of other independent variables), then a two-stage logistic regression is appropriate to measure the impact of the intervention, using instrumental variables of BCC exposure. At the first stage, Poisson regression could be used to estimate the total number of malaria control program BCC exposures using a set of exogenous variables. Wald statistics and log-likelihood ratios will then be used to identify variable significance and model fit, with alpha set at 0.05. To control for the effect of clustering within communities, the Huber-White-Sandwich estimator of variance should be used to obtain empirically estimated standard errors, with the community within the district defined as the *cluster.* Standardized district-level probability weights, based on the relative population size of the study areas should be applied to all regressions.

3.2.2.2.2 Evaluation of ACT access and targeting

In 2009-10, the sub-national IMPACT 2 evaluation will use a pre-post design to capture the impact of subsidized ACT and targeting with RDT on improved access to ACT in health facilities. Specifically, this evaluation intends to measure the extent to the distribution of subsidized ACT and the use of RDT in health facilities improves access, coverage, equity, quality, and adherence to ACT, as well as the cost-effectiveness and cultural factors influencing the strategy. This evaluation exercise will take place within 3 regions in Tanzania. The IMPACT 2 surveys and qualitative assessments will be the primary source of data collection. To measure

the effect of sACT and targeting for increasing ACT coverage, a simple pre-post design will be used, whereby data collected in November 2009 will be used as baseline and data collected in November 2010 will be used as follow-up. Four data collection methods will be used: 1) household surveys, 2) health facility and drug-shop surveys, 3) adherence studies in health facilities, and 4) RDT and ACT quality assurance assessments. As well, a qualitative component will be used to provide data and information related to contextual and possible confounding factors. Focus group discussions will be used to explore perceptions related to malaria and treatment; Illness narrative interviews will be used to identify individuals with a recent malaria episode; Key informant interviews will be conducted with CHMT and ACT providers; Structured observations will be conducted within communities and health facilities; and community calendars will be created to understand drug supply systems, patterns of malaria episodes, agricultural activities, and access to cash and health facilities.

Figure 10 illustrates a hypothetical framework for what impact might look like using the multiple data point approach. This figure is not to scale and should serve as a conceptual model for how the data should be combined to establish plausible attribution of impact. Dotted lines indicate that measures are constant over time, although cyclical variations may occur.



3.3 Data Management

Because of the multiple data point approach to assessing the impact of malaria prevention and control interventions, and the various existing and new data collection methods that will be used, it will be essential that data for all coverage and impact indicators be compiled and stored on a monthly basis for continuous trend data and immediately following survey work for population-based data. Existing data management systems at the NMCP in Tanzania will be expanded to include the additional indicators outlined in this plan. As well, the NMCP will explore the creation of a community-level of registry for tracking all malaria prevention and control activities. Data generated through this registry will be used to update the ITN data base

and also monitor other malaria interventions taking place within the communities. This system will be developed and piloted in districts where IRS is being implemented and LLIN universal coverage campaign is planned. A focal person responsible for all data management should be identified by the impact evaluation working group to coordinate all data management issues, including the development of standard operating procedures for storing, cleaning and accessing data files. Once the data for the primary indicators have been abstracted and entered into the system, the raw data files for individual data collection activities will be safeguarded in a secure location for secondary analysis as needed by the impact evaluation reference group (e.g. operations research). Access to impact evaluation data should be accessible to all impact evaluation reference group members and partners. Regardless of where the data management system is located, significant investment must be made to ensure data are secure, yet accessible and shared with partners. This should include the following: main data storage computer, preferably with at least 100 GB of hard memory; up-to-date antivirus software; and a backup system to ensure all data are routinely backed up to another secure location.

3.4 Capacity Building Plan

Areas in need of strengthening include data recording and reporting, M & E operations, and case diagnostics. Specifically, a lack of a written plan for data entry or data processing, systematic feedback to sub-reporting entities concerning data quality, written policy concerning late or incomplete reporting of data by sub-reporting entities, training requirements specified for staff, mechanism to verify number of staff trained or quality of the training are areas in need of strengthening. Likewise, HMIS personnel at the district level are not all trained in malaria M&E and supervisory visits do not occur at regular intervals.

To address these issues, two PMI resident technical advisors each spend approximately 50% of their time at the offices of the NMCP. PMI resident advisors are a short-term strategy to provide increased technical capacity within NMCP. Longer-term, more comprehensive training of human resources is a key area in need of strengthening. In FY2008, PMI began to support a two-year training program known as the Field Epidemiology and Laboratory Training Program (FELTP). FELTP is a public health training program to enhance competencies in applied epidemiology, implementation and evaluation of disease interventions, monitoring and evaluation, surveillance strengthening, epidemic preparedness, and public health decision making and leadership skills. MOHSW staff trained in these competencies will be critical to maintaining the progress achieved partners. The FELTP office is now located in the National Institute of Medical Research (NIMR) building within the NIMR/CDC/WHO/NMCP compound. The first 10 residents of the Tanzania FELTP finished their introductory training in early November 2008. The residents were dispatched to field assignments, including specific assignments working with district and regional malaria control and program evaluation efforts. Residents will be assigned to a mentor in Dar es Salaam while pursuing their field activities and a regional supervisor will help monitor their day-to-day activities. The M & E technical working group will also serve to bolster capacity in specific areas through technical assistance. Malaria diagnostic capacity building using microscopy is also planned for 2009.

3.5 Operations Research Plan

Operations research is essential for monitoring program progress, establishing which malaria prevention and control programs are effective, and for providing contextual information regarding the success or failure of malaria prevention and control interventions in specific areas, or among sub-groups within the population. The NMCP will work directly with the M & E working group (comprised of a small set of scientists and program personnel from across partners) and all relevant partners to develop a national malaria control operations research framework based on the needs of malaria control and prevention programs operating within Tanzania. A working

draft of the operations research framework will be developed by the end of 2009. The M & E Working group will lead the drafting of the framework in conjunction with the NMCP, with technical assistance from external sources as needed. The national malaria control operations research framework will build on existing frameworks in other sub-Saharan Africa countries where possible, although recognizing that malaria transmission dynamics and extraneous factors are often unique across countries. It is envisioned that the national malaria operations research framework will provide a strategic plan for developing research questions relevant for monitoring programs; the results of which will assist with the identification of factors that influence the successful implementation of malaria control programs. An essential step in developing the national operations research framework will be the development of a core set of agreed-upon priorities, both present and future. The working group will be used as a forum for garnering consensus to arrive a core group of meaningful and focused priorities, including how best to modify future M & E plans in the context of transitioning from control to elimination. Although a host of diverse operations research questions, many of which are part of routine monitoring activities, will be developed and analyzed by the M & E technical working group, below are a few examples of target areas that may prove useful for strengthening malaria prevention and control programs in Tanzania:

- Insecticide resistance studies
- Residual efficacy studies for assessing longevity of ITN/IRS effectiveness
- Drug resistance and therapeutic response studies
- Factors associated with ITN use in the context of a full coverage delivery system with BCC activities
- Factors associated with transmission intensity
- Distribution and composition of mosquito vectors
- Cultural barrier to malaria prevention and control intervention uptake
- Feasibility and effectiveness of novel mosquito collection tools
- Development of novel methods for assessing data quality
- IPTp versus active case management for malaria in pregnancy in areas of low transmission

3.6 Coordination of Malaria and M & E Activities

The NMCP, under the leadership of a Program Manager, is organized into five cells (organizational units) including case management, vector control, ITN, information and education, and monitoring and evaluation (including operations research) under the leadership of a program manager. Each cell includes a Team Leader and from two to four staff members, plus several support staff serving all cells. A separate M & E technical working group will be formed to provide technical assistance for study design development, protocol development and modification for operations research, sample size calculations, and other activities associated with the details of M & E (see section 3.6.1). This technical working group will consist of 4-5 members with expertise in epidemiology, biostatistics, entomology, and/or evaluation research. This technical group will coordinate with the NMCP M & E Cell and partners as needed to harmonize strategies and develop technical protocols for the implementation of studies and data collection. This group is a sub-unit of the M & E network (see section 3.6.1), which consists of members from key stakeholders.

To coordinate and direct actions, the NMCP have established various committees and task forces. The National Malaria Advisory Committee (NMAC) meets twice a year. Its purpose is to offer to the NMCP state-of-the-art technical advice on malaria control. There are four sub-committees of National Malaria Control that address various aspects of the program, namely: case management, vector control, monitoring and evaluation, and information, education and communication (IEC). Malaria prevention and control activities are currently coordinated by stakeholder organizations, in consultation with the NMCP. These include:

- The National ITN strategy is called "NATNETS" and is coordinated by the ITN cell, with support from Swiss Agency for Development and Cooperation (SDC) and is implemented by the Swiss Tropical Institute (STI). NATNETS is the principal mechanism for coordinating and managing all ITN related activities
- The NATNETS program is implemented by separate contractors responsible for logistics, training and BCC respectively, with IHI/London School of Hygiene and Tropical Medicine conducting the implementation of the NATNETS Surveys.
- IRS implementation and monitoring is conducted by RTI.
- Entomologic surveillance, including distribution and abundance studies, susceptibility studies, and vector behavior studies is coordinated by NIMR.
- Health facility sentinel surveillance is conducted by RTI, with support from NMCP and funding through PMI.
- IPTp activities, including a sentinel site approach to data collection which provides quarterly data on IPT from over 30 health facilities, are coordinated and monitored by Jhpiego/ACCESS.
- The malaria database is run by RTI.
- BCC activities for malaria are implemented by PSI and COMMIT, with other partners participating in the development and roll-out of information, education, and communication campaigns.
- ACT and RDT activities are implemented by Ifakara Health Institute, London School of Hygiene and Tropical Medicine, the CDC, the STI, and the ACT Consortium, with other partners participating in the roll-out of interventions and communication campaigns.

Overall supervision of partner activities is performed by the NMCP 3 times per year, with support from RHMT. Monthly meetings of partners are held to give updates and share information. Appendix C provides information on the strategic Action plan for M & E in Tanzania. Specifically, Appendix C provides details on who is doing which malaria prevention and control activities, the timing of data collection and activities, and where activities are taking place.

3.6.1 M & E Coordination

Three groups will be used to coordinate M & E activities specifically. The M & E Network, which is a broad umbrella group comprised of representative from all partners, the M & E Cell within the NMCP, which is responsible for daily operations associated with M & E within the program, and the M & E technical working group, which is small group (4-5 individuals) with expertise in epidemiology, biostatistics, information systems, BCC, health information systems, and/or entomology.

Activities under the M & E Network include:

- This group will be comprised of representatives from all partners; this group will meet twice per year to discuss M & E activities, discuss updates to the M & E plan, and coordinate revisions as needed. Specific activities are as follows:
- To discuss and agree on the minimum set of indicators that are required to be collected in order to monitor M & E progress
- Advise the NMCP on establishment of sentinel districts/sites to collect data on malaria control
- Producing biannual bulletin on M & E for RBM and share with partners at country level
- Supporting NMCP to use M & E information for evidence based planning and promoting advocacy for resource mobilization for RBM
- To review existing systems that are generating information to strengthen the network and also to avoid duplication of activities and conflicts

Activities under the M & E Cell within the NMCP include:

- This group is comprised of malaria program personnel and experts from within the NMCP; the group should meet as needed to discuss operational and logistical issues for conducting M & E activities and coordinate the collation and flow of data and reports. Specific activities are as follows:
- Coordinate and manage funds for the collection of data
- Oversee the management of the national level malaria database
- Monitor the implementation of planned malaria prevention and control activities
- Organize M & E meetings on a quarterly basis
- Provide guidance to district on M & E
- Provide technical assistance to districts on the malaria component on a comprehensive district data base
- Compile monthly reports on malaria morbidity and mortality data
- Compiling annual reports to share with on stakeholders at the district, country and international levels
- Advice decision makers on how to use data and information generated through M & E activities

Activities under the M & E Technical Working Group include:

- This group should be comprised of 4-5 individuals with relevant technical skills from partner organizations; this group will meet every other month to provide technical support for M & E activities. Specific activities are as follows:
- Finalizing and overseeing the implementation of the impact evaluation plans, including overseeing the development/modification of implementation protocols
- Calculating indicator point estimates and trends as needed
- Generating operations research questions and study design protocols
- Comprehensive analysis of all data points (indicators) each year to assess trends in: Malaria intervention coverage, Malaria mortality and morbidity (impacts) , and Coverage of other child survival programs
- Dissemination of results quarterly/annually

3.7 M & E Review Process, Dissemination of Results and Expected Products

Throughout the NMCP strategic framework timeline, continual evaluation of the M & E plan and progress to date will be conducted. The M & E cell within the NMCP and the M & E technical working group will coordinate the process, although all stakeholders will be expected to be involved. Annual reviews will take place to ensure key activities are rolling out as planned. Programmatic reviews will take place as part of this process. The purpose of the review process is to inform the development of the next strategic framework planned for 2014-2019. At the conclusion of each annual review the evaluation team (e.g. representatives of stakeholders present for the annual review plus the M & E cell within the NMCP) will compile a draft report of the current status of the program, areas that need further investment and strengthening, the status of M & E activities, and recommendations for plan or program modification. This report will be presented to the NMCP and Ministry of Health and Social Welfare for action. Malaria program information and the current status of the plan will be disseminated through media briefs (as needed), quarterly reports (electronic and print) to stakeholders, presentations and workshops, annual malaria review meetings, publications, web sites and other documentation. Importantly, regional/provincial review meetings will be held annually; these meetings create an opportunity for engaging partners who normally don't report about their activities and also promote evidence-based practices as this is one of the objectives of the M&E framework/strategy.

3.8 Opportunities and Challenges for Malaria M & E

The National Malaria Control program has clear goals and objectives, and well-established indicators for measuring program performance and impact. As such, there exists synergistic opportunities for capacity building and system strengthening in M & E across partners. The following is a list of key strengths that should be used as a platform for further M & E strengthening.

- There is adequate experience in collecting and managing data at the national and sub- national level
- M&E leader exists within NMCP
- M&E Cell links with other reporting systems
- Data inconsistencies are recognized and can be addressed
- Good oversight of annual sub-reporting activities

- Robust and reliable reporting process for the redeemed voucher
- TNVS logistics contractor has built an M&E unit and strengthened its M&E capacities.
- Malaria Prevention during pregnancy is integral part of the Reproductive and Child Health delivery system, which has a wide network of service provision points
- Standard operating procedures available for laboratory activities
- District Malaria focal persons training completed for 130 districts
- Operation Research priorities identified during stakeholder meeting in March 2009
- Well-established and internationally recognized entomological capacity exists within Tanzania
- Numerous data collection exercises are planned; these activities could be harmonized to increase efficiency, cut costs, and ensure standardized approaches are used to produce point estimates.

The following is a list of priority areas in need of strengthening:

- A small percentage of the malaria budget is allocated to M&E activities
- Dissemination plans should be developed further
- Use of partner strengths and existing internal systems to collect and report data for M&E purposes should be incorporated into strategic action plans
- Data quality assessment training and supervision should be expanded
- Update and standardize guidelines and policies for data entry and processing
- Increase data management staffing
- Increase data management staffing within NMCP
- Increase use of the private sector for malaria prevention during pregnancy activities and reporting; this includes assuring that the private sector adheres to national home based malaria management policy
- Expand linkages with HMIS
- Expand laboratory data quality assurances and laboratory availability
- Establish system for providing periodic M & E training and continual resources for in-country health staff to access
- Improve coordination of partners for the collection of monitoring and evaluation data.

3.9 M & E Budget Summary

The total resources anticipated for the period 2008-2013 is $15,695,901 (Table 4 & Appendix C). Due to the difference in planning and disbursement cycles of some partners, it is difficult to identify and allocate the commitments for the entire 5 year period. As such, some figures have been estimated assuming continuous support over the time. Specific annual budgets will be developed at annual intervals, per NMCP protocol. Table below summarizes the anticipated budget per year.

Table 4: Summary budget by year	
Y1	$5,247,635
Y2	$3,480,221
Y3	$2,593,151
Y4	$1,105,433
Y5	$3,269,461
Total	$15,695,901

About 60% of the 5 years planned activities are funded with actual or anticipated commitments from different sources (9.46 M USD). Two main initiatives will contribute to the implementation plan: PMI (35%) and GF RCC (42%). The government of Tanzania, through the Medium Term Expenditure Framework (MTEF), will contribute 2% of the total anticipated resources. The anticipated gap (i.e. the difference between what is currently available and what is still needed) has been included into the submitted GF Rd IX proposal. The actual and anticipated sources of funding for the 5 years are presented in table 5 below. Additional information is provided in Appendix C.

Table 5: Summary budget by funding source		
MTEF	220,000	2%
Others (WHO/BMGF)	1,958,760	21%
GFATM RCC/Rd 7, Rd 8	3,961,326	42%
PMI	3,325,000	35%
Available/Anticipated	9,465,086	60%
Gap	6,230,815	40%
Total	15,695,901	100%

APPENDICES

Appendix A: Key Process and Output Indicators for Monitoring Malaria Control and Prevention Activities

Information Education and Communication (IES) & Behavior Change Communication (BCC)		**Data source**
PROCESS	1. Number of IEC/BCC materials produced	Monthly monitoring report/participating partners
	2. Number of people trained in IEC/BCC	Monthly monitoring report/participating partners
OUTPUT	3. Number of districts receiving IEC/BCC materials	Commodities Tracking
Diagnosis and case management		
PROCESS	4. Number of health facilities that reported no RDT stock-out for more than one week	Health Facility Survey/ Sentinel Surveillance/IMPACT 2
	5. Number of health facilities that reported no ACT stock-out for more than one week	Health Facility Survey/ Sentinel Surveillance/IMPACT 2
OUTPUT	6. Number RDTs distributed to health facility	Commodities Tracking/IMPACT 2
	7. Number of malaria cases treated	Health Facility Sentinel Surveillance/HMIS/IMPACT 2
	8. Number of pregnant women who received their second dose of IPTp	Health Facility Sentinel Surveillance/HMIS
	9. Number of health facilities equipped with diagnostic facilities	Health Facility Sentinel Surveillance/HMIS
	10. Number of children with fever	Health Facility Sentinel Surveillance/HMIS
	11. Number of malaria microscopy slides taken	Health Facility Sentinel Surveillance/HMIS
	12. Number of malaria RDTs taken	Health Facility Sentinel Surveillance/HMIS/IMPACT 2
	13. Number of anti-malarial drugs distributed in health facilities for malaria treatment	Commodities Tracking/IMPACT 2
Vector control (ITN/LLIN)		
PROCESS	14. Number of LLINs procured	Commodities Tracking
	15. Number of ITN re-treatment trainings	Monthly monitoring report/participating partners
OUTPUT	16. Number of ITNs sold or distributed	Monthly monitoring report/participating partners
	17. Number of LLINs distributed to children ages 1-4	Monthly monitoring report/ participating partners
	18. Number of PW vouchers redeemed	Monthly monitoring report/ participating partners
	19. Number of nets re-treated	Monthly monitoring report/ participating partners
	Number of people trained in net retreatment	Monthly monitoring report/ participating partners
Vector control (IRS)		

PROCESS	20. Kilos of insecticide procured	Commodities Tracking
	21. Number of people trained in IRS	Monthly monitoring report/participating partners
	22. Number IRS trainings conducted per district	Monthly monitoring report/participating partners
	23. Number of environmental management trainings per district	Monthly monitoring report/participating partners
OUTPUT	24. Number of structures sprayed during IRS activities	Monthly monitoring report/ participating partners
	25. Volume of insecticide used for malaria prevention (according to WHO protocol)	Monthly monitoring report/ participating partners
	26. Number of districts implementing IRS and/or malaria environmental management	Monthly monitoring report/ participating partners
Voucher System		
OUTPUT	27. Number HEW and health centre staff training in the National Guidelines and protocols for the malaria epidemic preparedness system	Health Facility Sentinel Surveillance/HMIS
	28. Number of RCH staff trained in voucher distribution and BCC	Monthly monitoring report/ participating partners
	29. Mean gestation at first ANC attendance	Health Facility Sentinel Surveillance/HMIS
	30. Proportion of pregnant women receiving a voucher at first ANC visit	Monthly monitoring report/ participating partners
	31. Proportion of villages having at least one retail outlet for accepting TNVS vouchers	Monthly monitoring report/ participating partners
	32. Number of sentinel sites established for monitoring insecticide resistance	Monthly monitoring report/ participating partners
	33. Number of Ward Executive Officers trained in management of net distribution and training of village staff.	Monthly monitoring report/ participating partners
Sentinel Surveillance at Health Facilities/HMIS		
OUTPUT	34. Number of sentinel sites established for monitoring insecticide resistance	Health Facility Sentinel Surveillance/HMIS
	35. Total number of pregnant women (denominator for IPTp indicators)	Health Facility Sentinel Surveillance/HMIS
	36. Number of inpatient slide confirmed malaria deaths <5, 5+	Health Facility Sentinel Surveillance/HMIS

	37. Number of inpatient RDT confirmed malaria deaths <5, 5+	Health Facility Sentinel Surveillance/HMIS
	38. Number of days out of stock in the last month for each anti-malarial	Health Facility Sentinel Surveillance/HMIS
	39. Number of children <5 receiving a blood transfusion	Health Facility Sentinel Surveillance/HMIS
	40. Number of pregnant women who received IPTp-1	Health Facility Sentinel Surveillance/HMIS
	41. Number of pregnant women who received IPTp-2	Health Facility Sentinel Surveillance/HMIS
	42. Total number of pregnant women who attended first ANC visit	Health Facility Sentinel Surveillance/HMIS
	43. Number of sentinel sites established for monitoring anti-malarial drug resistance	Health Facility Sentinel Surveillance/HMIS
	44. Number of total outpatients <5, 5+	Health Facility Sentinel Surveillance/HMIS
	45. Number of clinical outpatient cases of malaria <5, 5+	Health Facility Sentinel Surveillance/HMIS
	46. Total number of RDTs examined for malaria from outpatients <5, 5+	Health Facility Sentinel Surveillance/HMIS/IMPACT 2
	47. Number of RDT confirmed outpatient cases of malaria < 5, 5+, & pregnant women	Health Facility Sentinel Surveillance/HMIS
	48. Number of total inpatients <5, 5+	Health Facility Sentinel Surveillance/HMIS
	49. Number of clinical inpatient cases of malaria <5, 5+, & pregnant women	Health Facility Sentinel Surveillance/HMIS
	50. Total number of blood slides examined for malaria from inpatients <5, 5+,	Health Facility Sentinel Surveillance/HMIS
	51. Number of slide confirmed inpatient cases of malaria <5, 5+	Health Facility Sentinel Surveillance/HMIS

	52. Total number of RDTs examined for malaria from inpatients <5, 5+	Health Facility Sentinel Surveillance/HMIS
	53. Number of RDT confirmed inpatient cases of malaria < 5, 5+	Health Facility Sentinel Surveillance/HMIS
	54. Number of anemia cases < 5	Health Facility Sentinel Surveillance/HMIS
	55. Number of inpatient deaths <5, 5+	Health Facility Sentinel Surveillance/HMIS
Supervision		
OUTPUT	56. Number of Regional Malaria Focal Persons trained in the supervision, monitoring and evaluation of the malaria program	Monthly monitoring report/participating partners

Appendix B: Key Impact, Outcome, and Confounding Indicators for Monitoring & Evaluating Malaria Control and Prevention Activities in Tanzania (Note: TBD = baseline values and targets to be set at next data collection point)

Definition	Numerator	Denominator	Data Source	Target
Impact Indicators				
1. All cause under-five child mortality	Number of < 5 years old deaths	Per 1,000 live births	DHS, DSS	65/1000
2. Standardized laboratory-confirmed malaria cumulative incidence per year (among children <5 and +5, and among pregnant women)	Number of microscopy or RDT-confirmed malaria cases	Total number of < 5, > 5, or pregnant women seen at health facility	Health Facility Sentinel Surveillance/HMIS	325/1000
5. Anemia in children under five years of age	Number of children under five years of age with severe anemia (Hb <8g/dL)	Total number of children < 5 surveyed	DHS/MIS/IMPACT 2	5%
6. Malaria parasite prevalence in children under five years of age	Total number of children < 5 years old with RDT or microscopy confirmed parasites in blood	Total number of children < 5 years old surveyed	DHS/MIS/IMPACT 2	1%
7. Proportion of live births weighing less than 2,500g	Number of live births weighing less than 2,500g	Total number of live births	Health Facility Sentinel Surveillance/HMIS	<15%
Outcome Indicators (Coverage)				
Vector Control (ITN)				

8. Proportion of households with at least one ITN	Number of surveyed households owning at least one ITN	Total number of households surveyed	DHS/MIS/NATNETS	90%
9. Proportion of households with at least two ITNs	Number of surveyed households owning at least two ITNs	Total number of households surveyed	DHS/MIS/NATNETS	80%
10. % of all household members who slept under an ITN the night preceding the survey	Number of household members that slept under an ITN the night preceding the survey	Total number of household members who spent the previous night in surveyed households	DHS/MIS/NATNETS	80%
11. % of all household members sleeping under an ITN in HH with at least one ITN	Number of household members that slept under an ITN the night preceding the survey	Total number of household members who spent the previous night in surveyed households owning at least one ITN	DHS/MIS/NATNETS	80%
12. Proportion of children under five years of age who slept under an ITN the night preceding the survey	Number of children under five years of age who slept under an ITN the night preceding the survey	Total number of children under five years of age who spent the previous night in a surveyed household	DHS/MIS/NATNETS	80%

13. Proportion of children under five years of age who slept under an ITN the night preceding the survey in HH with at least one ITN	Number of children under five years of age who slept under an ITN the night preceding the survey	Total number of children under five years of age who spent the previous night in surveyed households owning at least one ITN	DHS/MIS/NATNETS	80%
14. Proportion of women aged 15-49 years who slept under an ITN the night preceding the survey	Number of women aged 15-49 years who slept under an ITN the night preceding the survey	Total number of women aged 15-49 years who spent the previous night in a surveyed household	DHS/MIS/NATNETS	80%
15. Proportion of women aged 15-49 years who slept under an ITN the night preceding the survey in HH with at least one ITN	Number of women aged 15-49 years who slept under an ITN the night preceding the survey	Total number of women aged 15-49 years who spent the previous night in surveyed households owning at least one ITN	DHS/MIS/NATNETS	80%
16. Proportion of pregnant women who slept under an ITN the night preceding the survey	Number of pregnant women who slept under an ITN the night preceding the survey	Total number of pregnant women who spent the previous night in surveyed households	DHS/MIS/NATNETS	80%
17. Proportion of pregnant women who slept under an ITN the night preceding the survey in HH with at least one ITN	Number of pregnant women who slept under an ITN the night preceding the survey	Total number of pregnant women surveyed in households owning at least one ITN	DHS/MIS/NATNETS	80%
Vector Control (IRS)				
18. Proportion of houses protected by IRS in target areas in the past 12 months	Number of houses in IRS target areas sprayed with insecticide in the past 12	Total number of houses in IRS target areas	DHS/MIS	85%

	months			
19. Proportion of population protected by IRS in target areas in the past 12 months	Number of people living in houses sprayed with insecticide in the past 12 months in IRS target areas	Total number of people living in IRS target areas	DHS/MIS	85%
20. Proportion of women aged 15-49 years who reported ITNs and/or IRS as a malaria prevention method	Number of women aged 15-49 years who reported ITNs and/or IRS as a malaria prevention method	Total number of women aged 15-49 years surveyed	DHS/MIS	90%
21. Proportion of households with at least one ITN and/or sprayed by IRS in the last 12 months	Number of households that have at least one ITN and/or have been sprayed by IRS in the last 12 months	Total number of households surveyed	DHS/MIS	90%
Case Management				
22. Proportion of children under five years of age with fever in the past two weeks, that received ACTs according to national treatment policy within 24hrs of fever onset	Number of children under 5 years of age who had a fever in the past 2 weeks who received ACTs according to national treatment policy within 24 hours of fever onset	Total number of children under five years of age who had a fever in the past two weeks	DHS/MIS/IMPACT 2	80%
23. Proportion of children under five years of age with uncomplicated malaria correctly treated according to national treatment policy	Number of children under five years of age with uncomplicated malaria correctly treated according to national treatment policy	Number of children under five years of age with uncomplicated malaria	DHS/MIS/IMPACT 2	80%
24. Proportion of children under five years of age with complicated malaria correctly treated according to national treatment policy	Number of children under five years of age with complicated malaria correctly treated according to national treatment policy	Number of children under five years of age with complicated malaria	DHS/MIS/IMPACT 2	80%

25. Proportion of women who received at least two doses of IPTp during their last pregnancy that led to a live birth within the last 2 years	Number of women aged 15-49 years who received at least two doses of IPTp during their last pregnancy that led to a live birth within the last 2 years	Total number of surveyed women aged 15-49 years who delivered a live baby within the last 2 years	DHS/MIS	80%
BCC and Voucher System Indicators				
26. Proportion of women aged 15-49 years who reported fever as a symptom of malaria	Number of women aged 15-49 years who reported fever as a symptom of malaria	Total number of women aged 15-49 years surveyed	DHS/MIS/NATNETS	90%
27. Proportion of pregnant women who received a voucher at first ANC visit	Number of pregnant women receiving a voucher at first visit	Total number of pregnant women	DHS/MIS/NATNETS	90%
28. Proportion of women of child bearing age aware of importance of early attendance at ANC	Number of women 15-49 who are aware of the importance of ANC	Total number of women of child bearing age surveyed	DHS/MIS/NATNETS	80%
29. Proportion of household heads aware of importance of early attendance at ANC	Number of household heads aware of importance of early ANC	Total number of household heads surveyed	DHS/MIS/NATNETS	80%
30. Proportion of women of child bearing age aware of TNVS	Number of women 15-49 aware of TNVS	Total number of women 15-49 surveyed	DHS/MIS/NATNETS	80%

31. Proportion of household heads aware of TNVS	Number of household heads aware of TNVS	Total number of household heads surveyed	DHS/MIS/NATNETS	80%
32. Proportion of respondents who ranked malaria as the most serious health problem in their community	Number of respondents who rank malaria as the most serious health problem	Total number of respondents	DHS/MIS/NATNETS	80%
33. Proportion of respondents who have heard the phrase “Malaria Haikubaliki” (Malaria is unacceptable)	Number of respondents who have heard the phrase “Malaria Haikubaliki”	Total number or respondents	DHS/MIS/NATNETS	60%
34. Proportion of respondents who know that malaria becomes more dangerous after a woman becomes pregnant	Number of respondents who know that malaria is more dangerous when pregnant	Total number of respondents	MIS/NATNETS	60%
35. Proportion of respondents who believe they can protect themselves and their children from getting malaria.	Number of respondents who believe they can protect themselves and their children from getting malaria	Total number of respondents	MIS/NATNETS	80%
36. Proportion of caregivers who believe they can correctly hang a bed net above their children’s sleeping spaces	Number of caregivers who believe they can correctly hand a bed net over their children’s sleeping spaces	Total number of caregivers	MIS/NATNETS	95%

37. Proportion of respondents who to intend to sleep under a bed net every night of the year	Number of respondents who intend to sleep under a bed net every night of the year	Total number of respondents	MIS/NATNETS	80%
38. Proportion of caregivers who believe they could get all of their children under 5 years old to sleep under a bed net every night of the year	Number of caregivers who believe they can get their children to sleep under a bed net every night of the year	Total number of caregivers	MIS/NATNETS	80%
39. Proportion of women pregnant in the previous 24 months intending to visit ANC services before 16 weeks during their next pregnancy	Number of pregnant women in the previous 24 months who intend to visit ANC before 16 weeks of the next pregnancy	Total number of pregnant women in the previous 24 months	MIS/NATNETS	80%
Potential Confounding Indicators				
40. Rainfall and temperature	Expressed as ml and degrees centigrade weekly		Tanzania Meteorological Authority	N/A
41. Proportion of children under 5 years old with diarrhea given any ORT	Number of children < 5 with diarrhea given ORT	Total number of children with diarrhea	DHS	N/A
42. Proportion of children with ARI symptoms given treatment from health-care provider	Number of children < 5 with ARI symptoms given treatment from health care provider	Total number of children with ARI symptoms	DHS	N/A

43. Proportion children fully Immunized	Number of children <5 fully immunized	Total number of children < 5 years old	DHS	N/A
44. Proportion of children under 5 classified as malnourished (using 3 primary anthropometric indices)	Number of children < 5 classified as malnourished according to indices	Total number of children < 5	DHS	N/A
45. Proportion children with fever, diarrhea or ARI symptoms taken to a public health-care provider	Number of children < 5 with fever, ARI, or diarrhea symptoms taken to health provider	Total number of children < 5 with ARI, fever, or diarrhea symptoms	DHS	N/A
46. HIV prevalence among children under 5 and women of reproductive age	Number of children < 5(pregnant women) testing HIV positive	Total number of children < 5 (pregnant women)	DHS	N/A
47. Entomologic inoculation rate (EIR)	Sporozoite rate X human biting rate = EIR		Sentinel mosquito collection sites within Districts (periodic)	< 1/year

Appendix C: Action Plan

Strategic Measure	Activity	Responsibility	Timeline	Budget (In US$)	Main Source of funding	Funding Gap/Remarks
Malaria M&E plan operational						
	Draft and finalize consolidated, comprehensive M&E plan; ensuring ownership/buy-in partners	Joe Keating/ MACEPA	06/09	$614,100	MTEF/ MACEPA	$594,100
	Develop district malaria M&E guidelines	NMCP	2009			
	Dissemination of M&E plan and district guidelines	NMCP and Partners	2009			
	NMCP annual review and report	NMCP	2009			
	Printing and dissemination of the report	NMCP	2009			
NMCP M&E Unit strengthening						
	Strengthening Data Management Cell	NMCP and partners	2009-10	$508,915	MTEF/GFR7/ PMI	$280,915
	Improve data quality		2009-10			
	Strengthen the M&E unit		2009-10			
	Provide regular feedback to sub-reporting entities and stakeholders		2009-13			
	Supervision strengthening		2009-13			
Malaria M&E network revitalized						
	Facilitation of the Malaria M&E network coordination activities (M and E working team, M and E technical working group, All partners implementing partners)	NMCP and partners	2009-13	$100,000	MTEF	$80,000
District M&E strengthening						
	Ensure completion of malaria M&E training for all HMIS staff at district level	NMCP/HMIS and partners	2009-11	$352,800		$352,800
Improve data reporting system						
	Include MIP prevention indicators as part of RCH information system in HMIS	NMCP/RCH/ HMIS	2009	$1,458,000	PMI	$1,253,000
	Include Malaria laboratory diagnosis (definitive diagnosis) into HMIS registers and reports	NMCP/ HMIS	2009			
	Establish Laboratory quality control					
		NMCP/Diagnost	2009-10			

	reporting system	ic Unit MoHSW				
	Strengthen HMIS and support supervision	HMIS and Partners	2009-13			
	Antimalarial management reporting	NMCP/PSU/ MSD	2009-13			
	Establish a system for monitoring IRS activity	NMCP/PMI	2009			
	Establish a system for monitoring ITN distribution at community level	NMCP	2009-10			
	Establish system for updating malaria interventions at community level	NMCP	2009-10			
	Develop malaria management reporting at community level	NMCP and partners	2009-10			
Establish health facility based malaria surveillance						
	Improve malaria data collection, quality and reporting through national sentinel health facilities	NMCP/PMI	2009-10	$2,780,000	PMI	$2,070,000 (submitted to GF R9)
	Establish new national sentinel surveillance sites	NMCP/PMI	2010-11			
	Strengthen malaria surveillance at district level	NMCP/HMIS/IDSR	2010-11			
	Establishment of weekly malaria epidemic early detection system	NMCP/PMI/ IDSR	2009-11			
Ensure regular M&E of the NMMTSP						
	Ensure availability of malaria indicators from population based surveys - DHS, etc (every after 4-5 yrs)	NMCP		$9,882,086	PMI/GFRCC/ WHO/MTEF	$1,590,000
	Malaria Indicator Survey	NMCP/NBS/PMI	2011 and 2013			
	Demographic Health Survey	NMCP/NBS/PMI	2009 and 2015			
	Ensure availability of malaria indicators through DSS	NMCP/PMI/IHI	2009-13			
	NATNETS zonal / district based surveys - sub national surveys	NMCP/IHI	2009-10			
	Monitoring RDT and ACT implementation	IHI	2009-11			

	(IMPACT2)					
	Malaria vector mapping (every after 4-5 yrs)	NMCP/PMI	2011			
	Entomological monitoring	NMCP/PMI	2009-13			
	MEEDS Evaluation/Validation	NMCP/PMI	2010			
	Monitor therapeutic efficacy of antimalarial drugs (every after 2 yrs)	NMCP/PMI	2009-13			
	Monitor susceptibility of mosquitoes to insecticides (every after 2 yrs)	NMCP/WHO/NIMR/PMI	2009-13			
Monitor human resource capacity						
	Monitor training activities	NMCP and Partners	2009-11			
Strengthen monitoring and evaluation of community BCC activities						
	Review monitoring and evaluation tools to include indicators for BCC activities	NMCP and Partners	2009			
Total				**$15,695,901**		**$6,230,815**

Appendix D: Multi-year Targets for Key Impact and Outcome Indicators for Monitoring & Evaluating Malaria Control and Prevention Activities in Tanzania

Definition	Numerator	Denominator	Data Source	2009 Target	2011 Target	2013 Target
Impact Indicators						
1. All cause under-five child mortality	Number of < 5 years old deaths	Per 1,000 live births	DHS, DSS	95/1000	85/1000	65/1000
2. Malaria-attributed deaths in sentinel demographic surveillance sites	Number of deaths due to malaria	Number of deaths due to all causes	DSS	12%	8%	6%
3. Anemia in children under five years of age	Number of children under five years of age with severe anemia (Hb <8g/dL)	Total number of children < 5 surveyed	DHS/MIS/IMPACT 2	7%	5%	5%
4. Malaria parasite prevalence in children under five years of age	Total number of children < 5 years old with RDT or microscopy confirmed parasites in blood	Total number of children < 5 years old surveyed	DHS/MIS/IMPACT 2	-	7%	1%
Outcome Indicators						
1. Proportion of households with at least one ITN	Number of surveyed households owning at least one ITN	Total number of households surveyed	DHS/MIS/NATNETS	70%	90%	90%

2. Proportion of all household members who slept under an ITN the night preceding the survey	Number of household members that slept under an ITN the night preceding the survey	Total number of household members who spent the previous night in surveyed households	DHS/MIS/NAT NETS	50%	80%	80%
3. Proportion of children under five years of age who slept under an ITN the night preceding the survey	Number of children under five years of age who slept under an ITN the night preceding the survey	Total number of children under five years of age who spent the previous night in a surveyed household	DHS/MIS/NAT NETS	85%	85%	85%
4. Proportion of pregnant women who slept under an ITN the night preceding the survey	Number of pregnant women who slept under an ITN the night preceding the survey	Total number of pregnant women who spent the previous night in surveyed households	DHS/MIS/NAT NETS	35%	85%	85%
5. Proportion of children under five years of age with fever in the past two weeks, that received ACTs according to national treatment policy within 24hrs of fever onset	Number of children under 5 years of age who had a fever in the past 2 weeks who received ACTs according to national treatment policy within 24 hours of fever onset	Total number of children under five years of age who had a fever in the past two weeks	DHS/MIS/IMP ACT 2	30%	50%	80%
6. Proportion of malaria cases out of suspected fever cases that are laboratory confirmed at public health facilities	Number of children under 5 years of age with fever who were tested for malaria by either RDT or microscopy	Total number of children under 5 years of age with fever	HMIS	35%	50%	80%