

This Malaria Operational Plan has been approved by the U.S. Global Malaria Coordinator and reflects collaborative discussions with the national malaria control programs and partners in country. The final funding available to support the plan outlined here is pending final FY 2015 appropriation. If any further changes are made to this plan it will be reflected in a revised posting.



## PRESIDENT'S MALARIA INITIATIVE



**PRESIDENT'S MALARIA INITIATIVE**

**Tanzania**

**Malaria Operational Plan FY 2015**

## Table of Contents

<b>ACRONYMS AND ABBREVIATIONS.....</b>	<b>3</b>
<b>EXECUTIVE SUMMARY .....</b>	<b>5</b>
<b>STRATEGY.....</b>	<b>13</b>
INTRODUCTION .....	13
MALARIA SITUATION IN TANZANIA.....	14
HEALTH SYSTEM DELIVERY STRUCTURE AND MOH ORGANIZATION .....	15
STRATEGY UPDATES.....	16
TANZANIA’S MALARIA CONTROL STRATEGY.....	16
INTEGRATION, COLLABORATION, AND COORDINATION .....	18
PMI GOALS, TARGETS, AND INDICATORS .....	21
PROGRESS ON COVERAGE AND IMPACT INDICATORS.....	22
CHALLENGES, OPPORTUNITIES, AND THREATS.....	23
PMI SUPPORT STRATEGY .....	27
<b>OPERATIONAL PLAN.....</b>	<b>29</b>
INSECTICIDE-TREATED NETS (ITNs) .....	29
INDOOR RESIDUAL SPRAYING (IRS) .....	377
MALARIA IN PREGNANCY .....	422
CASE MANAGEMENT .....	477
MONITORING AND EVALUATION .....	577
OPERATIONAL RESEARCH.....	699
BEHAVIOR CHANGE COMMUNICATION .....	72
HEALTH SYSTEM STRENGTHENING/CAPACITY BUILDING .....	766
STAFFING AND ADMINISTRATION .....	822
TABLE 1.....	84
TABLE 2.....	87

## ACRONYMS AND ABBREVIATIONS

ACT	Artemisinin-based combination therapy
ADDO	Accredited drug dispensing outlet
AL	Artemether-lumefantrine
ANC	Antenatal care
ASAQ	Artesunate-amodiaquine
BCC	Behavior change communication
CDC	U.S. Centers for Disease Control & Prevention
CHAI	Clinton Health Access Initiative
CHW	Community health workers
CMS	Central medical store (locally called Medical Stores Department)
DFID	Department For International Development (U.K.)
DHIS2	District Health Information System
DHS	Demographic & health survey
DMSO	District medical surveillance officer
eIDSR	Electronic integrated disease surveillance and response
EPI	Expanded program on immunization
FANC	Focused antenatal care
FBO	Faith-based organization
FELTP	Field epidemiology and laboratory training program
FSN	Foreign service national
FY	Fiscal year
GHI	Global Health Initiative
Global Fund	Global Fund to Fight AIDS, Tuberculosis & Malaria
GoT	Government of Tanzania
HIV	Human immunodeficiency virus
HMIS	Health management information system
iCCM	Integrated community case management
IMCI	Integrated management of childhood illness
IPTp	Intermittent preventive treatment in pregnancy
IRS	Indoor residual spraying
ITN	Insecticide-treated mosquito net
JSI	John Snow, Inc.
LGA	Local government authority
MAISHA	Mothers and infants safe, healthy, alive
M&E	Monitoring and evaluation
MCN	Malaria Case Notification
MEEDS	Malaria early epidemic detection system
MIP	Malaria in pregnancy
MIS	Malaria indicator survey
MOHSW	Ministry of Health & Social Welfare
MOP	Malaria operational plan
NATNETS	National insecticide-treated nets program
NBS	National Bureau of Statistics
NGO	Non-governmental organization

NHLQATC	National Health Laboratory and Quality Assurance Training Center
NIMR	National Institute for Medical Research
NMCP	National Malaria Control Program
PEPFAR	President's Emergency Plan for AIDS Relief
RBM	Roll Back Malaria
RDT	Rapid diagnostic test
RTI	Research Triangle Institute
SME	Surveillance, Monitoring, and Evaluation
SNP	School net program
SP	Sulfadoxine-pyrimethamine
SPA	Service provision assessment
THMIS	Tanzania HIV & malaria indicator survey
TNVS	Tanzania National Voucher Scheme
UCC	Universal coverage campaign
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USG	United States Government
WHO	World Health Organization
WHOPES	World Health Organization pesticide evaluation scheme
WRAIR	Walter Reed Army Institute of Research
ZAMEP	Zanzibar Malaria Elimination Program

## EXECUTIVE SUMMARY

Malaria prevention and control are major foreign assistance objectives of the U.S. Government (USG). In May 2009, President Barack Obama announced the Global Health Initiative (GHI), a comprehensive effort to reduce the burden of disease and promote healthy communities and families around the world. Through the GHI, the United States will help partner countries improve health outcomes, with a particular focus on improving the health of women, newborns, and children.

The President's Malaria Initiative (PMI) is a core component of the Global Health Initiative (GHI), along with HIV/AIDS, and tuberculosis. PMI was launched in June 2005 as a 5-year, \$1.2 billion initiative to rapidly scale up malaria prevention and treatment interventions and reduce malaria-related mortality by 50% in 15 high-burden countries in sub-Saharan Africa. With passage of the 2008 Lantos-Hyde Act, funding for PMI has now been extended and, as part of the GHI, the goal of PMI has been adjusted to reduce malaria-related mortality by 70% in the original 15 countries by the end of 2015. This will be achieved by continuing to scale up coverage of the most vulnerable groups — children under five years of age and pregnant women — with proven preventive and therapeutic interventions, including artemisinin-based combination therapies (ACTs), insecticide-treated nets (ITNs), intermittent preventive treatment of pregnant women (IPTp), and indoor residual spraying (IRS).

In June 2005, the United States Government (USG) selected the United Republic of Tanzania (including the Mainland and Zanzibar) as one of the first of three countries to be included in PMI. Malaria is a major public health problem in Tanzania. Although dramatic progress in malaria control has been made in recent years with support from PMI and other partners with the scale-up of malaria prevention and treatment interventions, nearly all 42 million residents on the Mainland and all 1.3 million persons in Zanzibar are still at risk of infection.

This FY 2015 Malaria Operational Plan presents a detailed implementation plan for Tanzania, based on the USG malaria strategy and the National Malaria Control Program's (NMCP's) and the Zanzibar Malaria Elimination Program's (ZAMEP) strategy. It was developed in consultation with the NMCP and the ZAMEP and with the participation of national and international partners involved in malaria prevention and control in the country. The activities that PMI is proposing to support fit in well with the National Malaria Control Strategy and Plan and build on investments made by PMI and other partners to improve and expand malaria-related services, including the Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund) malaria grants. This document briefly reviews the current status of malaria control policies and interventions in Tanzania, describes progress to date, identifies challenges and unmet needs to achieving the targets of the NMCP and PMI, and provides a description of planned FY 2015 activities.

The most recent national-level data for malaria interventions in Tanzania comes from the 2011-12 Tanzania HIV/AIDS-Malaria Indicator Survey (THMIS) and shows further impressive improvements in nearly all malaria indicators when compared with 2005 and 2010 figures. Ninety-one percent of Mainland households owned at least one insecticide-treated mosquito net (ITN), with 72% of children under five years of age and 75% of pregnant women sleeping under an ITN. This compares with just 63% ownership and 64% and 57% usage in the

2010 Demographic and health survey (DHS). In Zanzibar, ITN ownership and usage fell somewhat when compared with the 2010 DHS; 74% of households now own at least one ITN and estimates of use among children under five years of age and pregnant women are 51% and 36%, respectively. Malaria prevalence in Zanzibar remained extremely low at less than 1% in the 2011-12 THMIS.

Within the United Republic of Tanzania, the NMCP and the ZAMEP have independent malaria control programs. Under the Global Fund New Funding Model, the proposed malaria funding level for Tanzania Mainland is \$185 million for the 2014-2016 allocation period. This includes funds previously approved for an ITN universal coverage campaign, the scaling up of prompt, effective treatment of malaria and detection and containment of malaria epidemics. The proposed envelope for Zanzibar is \$5 million. The Mainland and Zanzibar will submit their respective concept notes in October 2014. The British Department for International Development (DFID) is also providing \$36 million in malaria funding from 2014-2016.

This PMI FY 2015 Malaria Operational Plan was developed with the NMCP and the ZAMEP and in collaboration with other malaria control partners. The proposed activities have been reviewed and approved by both malaria control programs. The proposed FY 2015 budget for the country is \$45 million. The major activities to be supported by PMI include the following:

**Insecticide-treated Nets (ITNs):**

The last universal coverage campaign on the Mainland in 2010-2011 distributed 17.6 million ITNs. A second universal coverage campaign will take place in mid-2015, targeting 22 of the 25 regions on the Mainland with the goal of delivering over 22 million ITNs to achieve the goal of 1 ITN for every 2 persons. Most of the ITNs were procured by Global Fund; PMI support will include logistics management and training of the community volunteers who distribute the ITNs within their villages and will carry out follow-up visits to ensure that the nets are appropriately hung and used.

Zanzibar implemented its first universal coverage campaign (UCC) in March of 2012 and distributed 660,000 ITNs, after which they adopted a continuous distribution strategy to maintain high coverage. Some of the ZAMEP's activities and achievements in 2013 included: procurement of a two-year supply of ITNs for continuous distribution with Global Fund support; production and adoption of an operational manual and training guide; finalization of forms and documents for the community-based delivery; completion of a training of trainers; a KAP study to inform messaging; preparation of behavior change communication (BCC) materials; training of 700 *shehia* (village) leaders and their assistants; and training of 335 health workers in antenatal care (ANC) clinics.

As a means of sustaining universal coverage on the Mainland, PMI has supported a recent school-based net distribution program in the Southern Zone as well as the Tanzania National Voucher Scheme (TNVS) in collaboration with other donors. The school-based net program distributes free nets to school children in first, third, fifth, seventh, ninth, and eleventh grades. A total of 19 districts in three regions in the south of the country (Ruvuma, Lindi and Mtwara) were selected and the first net distribution of 510,000 nets was completed in July 2013, a second is planned for mid-2014 (500,000 nets) and a third in 2015. The TNVS allows pregnant women and

caregivers of infants to obtain highly subsidized ITNs through local retail stores. A 2011 evaluation of the TNVS showed that this channel reached about 55% of pregnant women and 40% of infants under one year of age on an annual basis. The TNVS reached a new distribution high mark, achieving the delivery of over 2 million ITNs in 2013 (approximately 30% of the annual need delivered through continuous distribution), up from 1.5 million in 2012.

With FY 2015 funding, PMI will procure 2.1 million ITNs for the UCC to be rolled out in mid-2015 in 22 of 25 regions on the Mainland. These ITNs compliment the 19.9 million that will be procured by the GF for a total of 22 million ITNs. PMI will continue to support continuous distribution by supporting about 1.2 million subsidized ITNs for pregnant women and infants and about 800,000 ITNs for the third round of the school net program. In Zanzibar, PMI will procure about 240,000 ITNs and provide support for delivery through ANC and expanded program on extended program on immunization (EPI) clinics and through community-based delivery.

### **Indoor Residual Spraying (IRS):**

The Mainland reduced the targeted area for IRS from 659,146 structures in 2012/2013 to about 445,000 structures in 2013/2014, protecting over 2 million people (approximately 5% of Mainland's population). One factor in the reduction in the number of structures sprayed is the switch to a more expensive, but longer lasting pirimiphos-methyl CS. The switch is in keeping with the NMCP adoption of World Health Organization (WHO) guidance that calls for insecticide rotation prior to development of resistance.

In April 2014, Zanzibar used focal spraying to cover about 55,000 structures and protect about 265,000 people (approximately 25% of Zanzibar's population). Both pirimiphos-methyl CS and carbamate were used for IRS in the early 2014 spray round.

With FY 2015 funding, PMI will support targeted and focal IRS in the Lake Zone reaching approximately 400,000 structures and protecting about 2 million persons. PMI will support spraying in Geita through a public-private partnership with Geita Gold Mine. PMI will supply the insecticide and Geita Gold Mine will pay the operational costs for spraying. PMI will also support activities for cross border collaboration with Uganda, Kenya, Rwanda, and Burundi. In Zanzibar, PMI will support focal spraying to cover about                    structures and protect 100,000 people.

### **Malaria in Pregnancy (MIP):**

WHO recommends control and prevention of MIP via a three-pronged approach: distribution of ITNs through antenatal care clinics, provision of intermittent preventive treatment of pregnant women with SP (IPTp), and prompt case management of pregnant women with malaria. The Mainland implements all three activities, however, due to low prevalence in Zanzibar, the ZAMEP has revised their policy to discontinue the use of IPTp and is developing a strategy for screening and treatment of pregnant women.

With support from the MIP Task Force, the NMCP updated the IPTp policy (IPTp3+) in all national documents and staff from all public hospitals and health centers were trained on the new guidelines. With PMI support, the Mothers and Infants Safe, Healthy, Alive (MAISHA) program updated pre-service training materials for nurses, midwives, laboratory and health facility staff

and trained 210 Medical Education Instructors on MIP and case management updates. With support from PMI and other USG funds, MAISHA also continued to provide integrated supervision to focused antenatal care (FANC) facilities to improve FANC service provision and institutionalize a facility-based quality improvement approach. To date, this has been rolled out in 250 facilities in 115 districts in more than 16 regions across the country.

With FY 2015 funds, PMI will take advantage of an Accelerated Plan to improve family planning and labor and delivery in the Lake Zone to co-fund training and supervision to ensure proper implementation of IPTp3+ and malaria case management using the recently updated MIP training materials. Similarly, in Lindi and Mtwara, PMI will support an MCH-funded initiative to strengthen ANC services to ensure that training of trainers and supervision includes prevention and case management of malaria in pregnancy. Efforts will continue to ensure that ANC clients are counseled on the importance of IPTp through investments in the Safe Motherhood Campaign and to provide for more consistent supplies of SP for IPTp at ANC clinics. The commodities partner will strengthen national and zonal commodity forecasting and distribution as well as facility-based requisitions and reporting. In Zanzibar, PMI will also provide technical assistance to assess continued relevance and cost-effectiveness of the test and treat strategy.

### **Case Management:**

#### Diagnosis

Both Mainland Tanzania and Zanzibar require that all suspected cases of malaria be confirmed by test (microscopy or malaria rapid diagnostic test, RDT) prior to treatment. With PMI and Global Fund support the NMCP completed implementation of RDT provision to all government health facilities in all districts as of November 2012. During the RDT rollout a total of 9,647 routine RDT testers were trained (two from each health facility) out of a total of 11,765 trained health service providers. Between 14 and 16 million RDT are procured yearly on the Mainland. Through PMI support, the ZAMEP has been able to enhance microscopy at hospitals and larger facilities and to provide RDTs to 156 health facilities including all government and some private.

PMI has supported diagnostic quality assurance/quality control (QA/QC) activities in order to help improve the quality of malaria diagnosis in Tanzania. On the Mainland the program has focused on laboratory QA/QC with a pilot implementation of RDT QA/QC in one region of the Lake Zone (Kagera). In Zanzibar, the focus has been primarily on malaria microscopy QA/QC, but the ZAMEP did support a one-day RDT quality assurance refresher training for 330 health facility personnel in Unguja which represents 93% of the 354 who were targeted. The ZAMEP will complete training of another 246 personnel in Pemba by June 2014.

With FY 2015 funding, PMI plans to procure up to 4 million RDTs for the Mainland to fill the gap left by the Global Fund and 415,000 RDTs for use by public health facilities in Zanzibar. PMI will also support the NMCP's scale-up of RDT use in accredited drug dispensing outlets (ADDOs). This will include coordination with the Pharmacy Council, development of standard operation procedures, capacity building via comprehensive trainings, and on-going supervision. PMI continues to support training in microscopy in Zanzibar and development and implementation of a quality assurance/quality control program for both malaria microscopy and RDTs in Zanzibar and for RDTs on the Mainland.

#### Treatment

ACTs were officially launched in Mainland Tanzania in December 2006. The NMCP adopted artemether-lumefantrine (AL) as the first-line drug and in 2013 the NMCP revised the national treatment guidelines to include injectable artesunate for the treatment of severe malaria. ACTs were deployed for the first time in Zanzibar in 2003 and the current first-line treatment for uncomplicated malaria is artesunate-amodiaquine (ASAQ). The current Zanzibar Malaria Diagnosis & Treatment Guidelines were updated in April 2014 to incorporate various WHO recommendations such as the use of injectable artesunate for treatment of severe malaria, recommended antimalarials for HIV/AIDS patients, and inclusion of the WHO recommendation of the use of single low-dose (0.25 mg base/kg) primaquine for all patients with confirmed uncomplicated *P. falciparum* infection in areas pursuing elimination.

Funding for ACTs in the public sector throughout Tanzania has been supported primarily by Global Fund. Because of Tanzania's successful Global Fund grants, PMI currently provides only gap funding support for malaria commodities. With FY 2013 funding, PMI procured 1.5 million ACT treatments to avoid stockouts in public health facilities on the Mainland; all ACT needs for Zanzibar were met by the Global Fund.

With FY 2015 funding, the Global Fund is expected to procure most ACT needs in country. PMI is planning to supplement this procurement and procure ACTs to ensure no stockouts. PMI will also procure injectable artesunate to fill the gap not covered by the Global Fund. PMI will provide funds to support the strengthening and scale-up of facility-based management of febrile illness beyond the Lake Zone Region and will support the inclusion of a malaria curative package at the CHW level as well as printing and dissemination of guidelines. Support will continue for both the Mainland and Zanzibar in strengthening of quantification for malaria commodities, transportation, storage, inventory management, and end-use verification surveys. In addition, PMI will support technical assistance for the dissemination of the treatment guidelines to private health facilities and lower level dispensaries in Zanzibar and will continue to support routine *in vivo* efficacy monitoring of AL and second-line treatments at four to five sites on the Mainland.

### **Epidemic Surveillance and Response:**

During the past year, PMI continued to support and strengthen the Malaria Early Epidemic Detection System (MEEDS) on Zanzibar to identify and respond to sudden increases in malaria transmission. Health facility-based early epidemic detection sites now exist in 156 sites, consisting of all government health facilities in Zanzibar and some of the larger private facilities. This system has already detected several small outbreaks and investigations were launched. PMI efforts to help the Mainland Ministry of Health establish a similar surveillance network in Lake Zone have proceeded slower than expected due to problems launching the electronic reporting component of the system. However, the Mainland is working towards developing a sustainable, electronic Integrated Disease Surveillance and Response (eIDSR) system that can detect sudden increases in transmission.

With FY 2015 funding, PMI, in collaboration with other donors, will support the rollout of the eIDSR system in 5 regions on the Mainland and will continue to support Zanzibar with the maintenance of MEEDS at all government health facilities and eventual scale-up to 100% of private facilities.

**Monitoring and Evaluation (M&E):**

On the Mainland, the NMCP receives a large amount of data from its own M&E activities and those of multiple national and international malaria partners. The core of the routine malaria surveillance system is the Health management information system/District health information system 2 (HMIS/DHIS2) and the Integrated disease surveillance and response (IDSR). In conjunction with other donors, PMI is supporting the strengthening of these two platforms and the implementation of the electronic reporting system which is expected to substantially reduce the time delays NMCP has experienced in receiving, analyzing, and acting upon the data. In Zanzibar, the MEEDS system serves as both a routine monitoring system as well as a system to detect outbreaks.

As of December 2013, the basic HMIS/DHIS2 system has been successfully rolled out countrywide. A new 'malaria module' within the DHIS2 was a later addition and has now been rolled out in 10 regions. PMI supported the successful pilot of the electronic IDSR (eIDSR) system in 4 regions of Tanzania and supported a one year pilot of sentinel population malaria surveillance among pregnant women and infants in the Lake Zone. The NMCP has also developed a Malaria Epidemiologic Profile which will be used to better focus malaria control efforts. The draft Malaria Surveillance, Monitoring, and Evaluation (SME) Strategic Plan is nearing finalization and should be disseminated by the end of 2014. With PMI support, the NMCP has reconstituted the Surveillance, Monitoring & Evaluation technical working group and held the first meeting of the wider SME network.

PMI also supports three categories of routine entomologic monitoring on the Mainland and Zanzibar:

- 1) Insecticide resistance monitoring of products used for vector control (once per year at 22 sites on the Mainland and a total of 10 sites for Zanzibar)
- 2) Cone bioassay monitoring of residual insecticidal activity on sprayed walls (every 4-9 weeks on the Mainland and monthly at 10 sites in Zanzibar)
- 3) Monitoring of vector species abundance and distribution, feeding/resting behavior, sporozoite rates (seven sites monthly on the Mainland, and in Zanzibar, the monitoring was expanded from twice a month at 7 sites to monthly at 22 sites)

With FY 2015 funding, PMI will continue to support the collection of malaria data on the Mainland with the introduction of surveys of malaria parasitemia prevalence among school children in 10 regions and support for implementation of the 2014-15 DHS, which provides critical outcome and impact data. In Zanzibar, PMI will continue to support the MEEDS program. PMI will continue to support entomological monitoring on both the Mainland and Zanzibar; 11 national sites on the Mainland and 22 sites in Zanzibar. On the Mainland, PMI will also support the malaria program review and the orientation and training of new Malaria Focal Personnel.

**Operational Research:**

While PMI supports operational research to help guide malaria control activities, neither the NMCP nor the ZAMEP have an official operational research (OR) strategy.

The Mainland has engaged in two PMI-supported OR activities in the past few years including the monitoring of parasitemia prevalence among pregnant women and infants. This OR activity was supported with FY 2011 funds and completed in December 2013. The second is a durable wall liner (DWL) study which is a multi-year, three-arm cluster randomized trial that aims to assess the protective efficacy of DWL with a non-pyrethroid insecticide plus ITNs, ITNs plus IRS, and ITNs alone.

Zanzibar conducted a placental parasitemia study among women who had not had IPTp for malaria. The goal of this study was to measure placental parasitemia rates among pregnant women delivering in the selected facilities in Zanzibar who had not received IPTp and to provide cost-benefit analyses to help inform policy decisions on the IPTp program in Zanzibar; the study results were published in 2014<sup>1</sup>.

With FY 2015 funding, one new OR activity is being proposed. On the Mainland, the NMCP proposes to monitor malaria epidemiology in areas with insecticide resistance detected among mosquitoes. For this activity, epidemiological surveillance will be conducted over a three-year period to measure the level of malaria transmission in four sentinel sites where mosquito resistance to insecticides has been detected as well as one site where resistance has not been detected (control). In addition, hospital data will be collected in order to establish the contribution of malaria to the burden of severe disease in the respective districts.

**Behavior Change Communication (BCC):**

PMI has supported BCC efforts on both the Mainland and Zanzibar, disseminating messages related to the Malaria No More campaign and the Safe Motherhood campaign that deliver malaria and other health messages to pregnant women. An evaluation was conducted in November 2013 that showed that 48% of women had exposure to the Safe Motherhood campaign. PMI funds also supported the BCC efforts for the school-based net distribution program in the Southern Zone of Tanzania and a new “Test and Treat” BCC campaign was implemented that focused on getting healthcare workers to test all fevers. This was based on recent findings in the 2011-2012 THMIS, which showed that while malaria has been decreasing, the rate of fever has stayed the same. Thus the campaign slogan, “Not all fevers are malaria, get tested”.

In addition, the Peace Corps continues to support BCC efforts on the Mainland and a new private sector project, called the Malaria Safe Companies Initiative, aims to involve private companies to educate and engage their employees in malaria prevention and control efforts.

With FY 2015 funding, PMI will continue to support implementation of the national strategy plan for BCC including support for the Safe Motherhood campaign and messages focusing on

---

<sup>1</sup> Plotkin M, Said K, Mwinyi M, et al. Placental malaria is rare among Zanzibari pregnant women who did not receive intermittent preventive treatment in pregnancy.

the changing malaria situation in Zanzibar and in certain regions of the Mainland, such as the Lake Zone. Zanzibar BCC messages will focus on messages related to the continued risk of malaria despite reductions in prevalence and the need to be vigilant about malaria prevention and control activities. In the Kagera Region, where IRS is being scaled-down, messages will focus on the rationale and the importance of using other malaria prevention measures, such as ITNs. PMI will also continue to support the Peace Corps Volunteers who assist the NMCP and PMI with BCC interventions.

**Health Systems Strengthening and Integration:**

During the past year, PMI has worked to build capacity in the ministries of health and malaria control programs of the Mainland and Zanzibar to strengthen their capacity for planning, implementing, and managing malaria control activities and to expand PMI's integration with other USG programs. To help deal with the severe shortage of health staff, PMI also contributes to a project to promote recruitment and retention of health workers. PMI contributed to the two-year Tanzanian Field Epidemiology and Laboratory Training Program (FELTP). Trainees from this program have participated in various malaria control activities at the NMCP and the ZAMEP, including malaria surveillance and outbreak investigations and most return to the Ministry of Health on completion of their training. PMI is also working with the U.S. Department of Defense to train and certify laboratory technicians for improved performance of both microscopy and RDTs for malaria diagnosis.

With FY 2015 funding, PMI will help the NMCP and the ZAMEP to provide supportive supervision and improve coordination among malaria partners. PMI will continue to contribute, along with USAID HIV and other health funds, to health systems strengthening activities that include financing governance, results-based financing, and health workforce recruitment and retention. PMI will also continue to co-fund with PEPFAR the training of Tanzanian epidemiologists through the FELTP and will provide funding for capacity building for the NMCP and the ZAMEP.

# STRATEGY

## INTRODUCTION

Malaria prevention and control is a major foreign assistance objective of the U.S. Government (USG). In May 2009, President Barack Obama announced the Global Health Initiative (GHI) to promote healthy communities and families around the world. Through the GHI, the United States will help partner countries improve health outcomes, with a particular focus on improving the health of women, newborns, and children. The GHI is a global commitment to invest in healthy and productive lives, building upon and expanding the USG's successes in addressing specific diseases and issues in a sustainable fashion.

The President's Malaria Initiative (PMI) is a core component of the Global Health Initiative (GHI), along with HIV/AIDS and tuberculosis. PMI was launched in June 2005 as a 5-year, \$1.2 billion initiative to rapidly scale up malaria prevention and treatment interventions and reduce malaria-related mortality by 50% in 15 high-burden countries in sub-Saharan Africa. With passage of the 2008 Lantos-Hyde Act, funding for PMI has now been extended and, as part of the GHI, the goal of PMI has been adjusted to reduce malaria-related mortality by 70% in the original 15 countries by the end of 2015. This will be achieved by continuing to scale up coverage of the most vulnerable groups — children under five years of age and pregnant women — with proven preventive and therapeutic interventions, including artemisinin-based combination therapies (ACTs), insecticide-treated nets (ITNs), intermittent preventive treatment of pregnant women (IPTp), and indoor residual spraying (IRS).

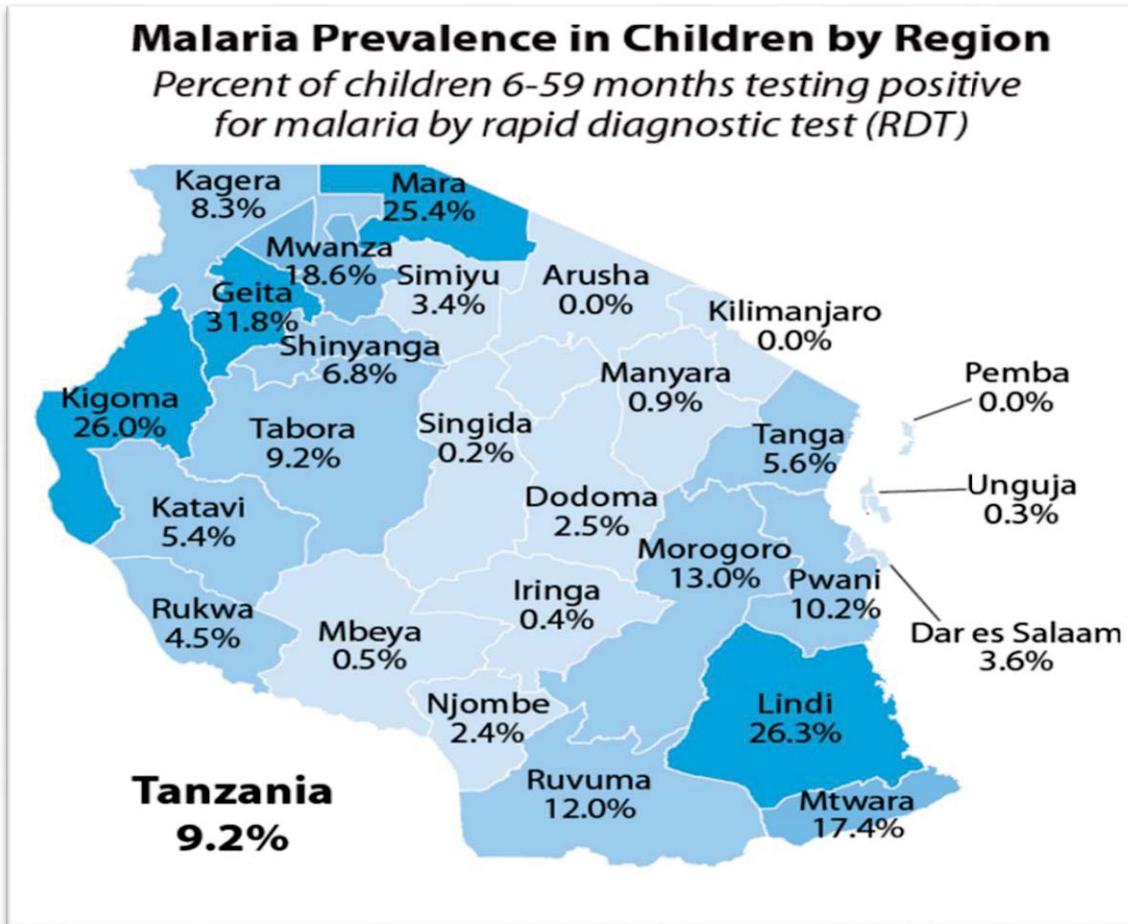
In June 2005, the USG selected the United Republic of Tanzania (including the Mainland and Zanzibar) as one of the first of three countries to be included in PMI. Malaria is a major public health problem in Tanzania. Although dramatic progress in malaria control has been made in recent years with the scale-up of malaria prevention and treatment interventions, nearly all 42 million residents on the Mainland and all 1.3 million persons in Zanzibar are still at risk of infection.

This FY 2015 Malaria Operational Plan presents a detailed implementation plan for Tanzania, based on the USG malaria strategy and the National Malaria Control Program's (NMCP) and the Zanzibar Malaria Elimination Program's (ZAMEP) strategy. It was developed in consultation with the NMCP and ZAMEP and with the participation of national and international partners involved in malaria prevention and control in the country. The activities that PMI is proposing to support fit in well with the National Malaria Control Strategies and Plans and build on investments made by PMI and other partners to improve and expand malaria-related services, including the Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund) malaria grants. This document briefly reviews the current status of malaria control policies and interventions in Tanzania, describes progress to date, identifies challenges and unmet needs to achieving the targets of the NMCP, the ZAMEP, and PMI, and provides a description of planned activities in 2016.

The total amount of PMI funding requested for United Republic of Tanzania in FY 2015 is \$45 million.

## MALARIA SITUATION IN TANZANIA

On the Mainland, 93% of the population lives in areas where malaria is transmitted, while the entire population of Zanzibar is prone to malaria infection. Unstable seasonal malaria transmission occurs in approximately 20% of the country, while stable malaria with seasonal variation occurs in another 20%. The remaining malaria endemic areas in Tanzania (60%) are characterized as stable perennial transmission. *Plasmodium falciparum* accounts for 96% of malaria infection in Tanzania, with the remaining 4% due to *P. malariae* and *P. ovale*.



Source: 2011-2012 THMIS

The principal vectors of malaria in Tanzania are mosquitoes of the *Anopheles gambiae* complex (*An. gambiae* s.s and *An. arabiensis*). However, entomological data collected in 2013 indicate that *An. funestus* is prevalent on the Mainland as well, particularly in the Kagera Region. In Zanzibar, high coverage of ITNs and IRS has resulted in a shift in the malaria vector population from *An. gambiae* to *An. arabiensis*, which now represents 90% of the population in Pemba and 50% of the population in Unguja.

The 2011–2012 Tanzania HIV/AIDS Malaria Indicator Survey (THMIS) showed that 10% of Mainland children under five years of age had tested positive for malaria, down from 18% in the

2007-08 THMIS. Prevalence varied by region variation from <1% in the highlands of Arusha to 26% along the Lake Victoria shores (figure above). The same survey showed a much lower malaria prevalence of 0.2% in Zanzibar. On the Mainland, more than 40% of all outpatient attendances are attributable to malaria, resulting in an estimated 10-12 million clinical malaria cases annually. The NMCP estimates that 60,000-80,000 malaria deaths occur annually in the Mainland among all age groups.

Tanzania registered a 45% reduction in all-cause under-five mortality from 146/1000 live births in 1999 to the current level of 81/1000 live births in 2010.

<b><i>Infant and Under-five Mortality Rates for Five-year Periods Preceding Nationwide Household Surveys, Tanzania</i></b>				
	<b>1999 DHS</b>	<b>2004-05 DHS</b>	<b>2007-08 THMIS</b>	<b>2009-10 DHS</b>
Infant mortality rate (95% C.I.)	99.1 (85-113)	68.0 (61-75)	57.7 (50-65)	51 (44-57)
Under-five mortality rate (95% C.I.)	146.6 (128-165)	112.0 (103-122)	91.4 (83-100)	81 (72-90)

The trend analysis of 1999 -2012 demographic surveys shows that the decline was greater in rural areas compared to urban areas, and more in medium to high malaria risk areas, indicating that interventions are reaching the poor and the more at-risk populations (January 2012 Roll Back Malaria report of *Progress and Impact series: Focus on Mainland Tanzania*; June 2012 *Evaluation of the Impact of Malaria Interventions on Mortality in Children in Mainland Tanzania* available at [http://www.pmi.gov/docs/default-source/default-document-library/tools-curricula/tanzania\\_ie\\_report.pdf](http://www.pmi.gov/docs/default-source/default-document-library/tools-curricula/tanzania_ie_report.pdf)).

## **HEALTH SYSTEM DELIVERY STRUCTURE AND MOH ORGANIZATION**

Tanzania's health system is complex and pluralistic. It is comprised of public, private, and donor stakeholders operating at different levels including national, regional, district, and community levels. Donor dependency for health financing typifies Tanzania's health system with the latest National Health Accounts (2009/10) showing that donors contribute a sizeable 40% of total health expenditures, followed by the private sector (largely household out-of-pocket spending) at 34%, and lastly the government at 26%. Of the total spent on health care, malaria accounts for 19% again largely financed by external funds with public financing for malaria decreasing since 2006 in absolute terms. The path towards universal health coverage is considerable; less than 15% of the population has health insurance coverage. With 1.5 health facilities per 10,000 population, Tanzania's health system has 6,734 facilities, the majority owned by the public sector (86%), 12% by faith-based organizations, and 2% by the for profit sector. While efforts have been made to ensure that there is a health facility in every village, there remains a significant deficit of skilled health staff (48% of positions are vacant) in public and faith-based facilities.

The three main health systems challenges affecting the success of PMI programs revolve around inadequate healthcare worker coverage, insufficient financing, and stockouts of commodities at the point of service delivery. Other systems issues affecting malaria programming include limitations in healthcare infrastructure and the challenges of managing a health system that is in the process of decentralization. The ongoing process of the GoT's 'Decentralization by Devolution' policy adds a layer of complexity that stretches the managerial ability of staff to coordinate across different ministries and fulfill their roles within the Ministry of Health and Social Welfare (MOHSW) and Prime Minister's Office-Regional Administration and Local Government (PMO-RALG) structures. Overall health system implementation is often weak, arising in part from poor communication between the different levels of the system, and a lack of leadership and management skills.

## **STRATEGY UPDATES**

There have been two developments in Tanzania over the past year that should be noted:

- 1) The two malaria control programs (Mainland and Zanzibar) are finalizing new National Malaria Strategic Plans for 2014-2020 and 2013-2018 respectively. Although not yet launched, the documents have been used to guide MOP planning and strategic decisions.
- 2) The Zanzibar malaria program has officially changed its name to the Zanzibar Malaria Elimination Program, abbreviated ZAMEP.

## **TANZANIA'S MALARIA CONTROL STRATEGY**

Two separate Ministries of Health operate in the United Republic of Tanzania, one for the Mainland and one for Zanzibar. Each Ministry has its own malaria control program, with separate leadership/management and malaria strategic plans. The NMCP serves only the Mainland, while the Zanzibar Program serves Zanzibar. In 2014, the Zanzibar Malaria Control Program changed its name to the Zanzibar Malaria Elimination Program (ZAMEP).

### ***Mainland***

Under the leadership of a Program Manager, the NMCP is organized into five cells: case management; vector control; ITNs; information and education; and surveillance, monitoring and evaluation (including operations research). Each cell consists of a Team Leader and two to four staff members. The ZAMEP has similar organizational units and a comparable staff.

The Mainland's NMCP has established several committees to coordinate and direct national malaria control policies and priorities. The Malaria Control Steering Committee is the body that is expected to provide strategic and policy direction for malaria control on the Mainland. It is to be chaired by the Chief Medical Officer and will include representatives from leading stakeholders. The organization of this Steering Committee has been outlined in the new Strategic Plan but has not yet been convened. The ITN strategies and policies are coordinated through the National Insecticide-Treated Nets (NATNETS) Program, which is very active and meets regularly. A diagnostics and case management working group guides NMCP policies/strategies

for strengthening and expanding malaria case management. A surveillance and monitoring and evaluation (SME) technical working group was re-formed in 2014. PMI is represented on each of these working groups.

The mid-term malaria strategic plans of both the NMCP and the ZAMEP ended in 2013 and 2012 respectively and both malaria programs are developing new strategic plans, with input from PMI and other partners, which will cover the time period for the FY 2015 MOP. While essentially complete, the new strategic plans are not expected to be finalized until the third or fourth quarter of 2014.

The NMCP strategic plan for 2014-2020 includes the following goals:

- To reduce malaria morbidity and malaria deaths by 80% from the 2012 levels by 2020.
- To reduce malaria prevalence from 10% in 2012 to 5% in 2016 and to 1% in 2020.
- To increase the proportion of women receiving two or more doses of SP during their pregnancy from 32% in 2012 to 80% by 2016.

To implement the new strategic plan the NMCP will address the thematic areas of 1) malaria case management, 2) integrated malaria vector control, 3) supportive interventions, such as behavior change communication (BCC) and monitoring and evaluation (M&E), and 4) program management. Each thematic area has objectives and strategies that support the overarching program goals.

#### Malaria Case Management

The principal objectives of malaria case management are to minimize severity and complications from malaria infections and thus reduce morbidity/mortality among vulnerable populations and to ensure that all people with malaria have access to appropriate, timely diagnosis and prompt treatment.

#### Integrated Malaria Vector Control

The objectives of integrated vector control are: 1) to achieve and maintain universal access of ITNs in order to have at least 80% appropriate use by 2020, 2) to consolidate the scope of IRS interventions to protect at least 85% of the population living in areas selected using evidence-based criteria, 3) to scale up larviciding interventions by 2020 to selected (urban) areas where breeding sites are few, fixed, and findable, and 4) to promote effective environmental management for malaria control among at least 80% of communities through local government authorities in all districts.

#### Supportive interventions

The main objectives are: 1) improve BCC so that by 2020, 80% of all populations at risk of malaria will be aware of the appropriate use of malaria prevention and treatment interventions, 2) to attain 100% reporting of routine and periodic key malaria indicators from all districts, 3) to strengthen malaria surveillance to detect 100% of malaria epidemics within one week of onset, 4) to effectively manage malaria epidemics within two weeks of detection, and 5) to strengthen monitoring and evaluation of malaria control interventions, activities, policies, and strategies.

## Program Management

The principal objective is to strengthen capacity in program management, resource mobilization, and coordination at all levels.

### ***Zanzibar***

The ZAMEP's 2013-2018 Strategic Plan focuses on pre-elimination and its vision is that by 2018 Zanzibar will have no locally-acquired malaria cases. The ZAMEP expects to achieve this by providing quality, affordable, and cost-effective antimalarial interventions and malaria curative services to all people in Zanzibar and by maintaining and expanding a well-performing epidemic detection and response system. The operational objectives in the ZAMEP Strategic Plan are:

- To test 100% of suspected malaria cases with a parasitologic test by 2015 and to provide effective antimalarial treatment to all confirmed cases.
- To add primaquine to the treatment regimen by 2017 to reduce gametocytemia levels in the population and thereby limit transmission.
- To achieve and maintain 100% coverage with appropriate prevention measures by 2017.
- To expand malaria surveillance, conduct reactive case detection, and investigate 100% of confirmed malaria cases by 2018.
- To establish functional coordination structures for malaria elimination at national, district, and *shehia* (village) levels by 2018.
- To conduct relevant operational research to evaluate and optimize ongoing activities and monitor resistance to antimalarials and insecticides.

## **INTEGRATION, COLLABORATION, AND COORDINATION**

### **Funding and Integration with Key Development Partners**

The Global Fund and PMI provide more than 90% of malaria funding to mainland Tanzania. Ninety-nine percent of the total malaria control budget in Zanzibar comes from external resources<sup>2</sup>, with PMI contributing the largest amount followed by the Global Fund. This does not take into account staff salaries, which are paid by the government. Other donors include WHO, UNICEF, and African Development Bank, JICA, Danida, DFID, and research institutions.

Under the Global Fund New Funding Model, the proposed malaria funding level for Tanzania Mainland is \$202 million for the 2013-2016 allocation period.<sup>3</sup> Of this, \$17 million was earmarked by the Global Fund to be part of pooled funds to support the health system strengthening component of Tanzania's overall grant. Thus, the actual level of funding for malaria is \$185 million. A large proportion of these funds were already approved in earlier grants, which included funds for an ITN universal coverage campaign and for prompt and effective treatment of malaria cases and detection and containment of malaria epidemics. The NMCP will develop and submit a concept note for the use of these funds in October 2014. The

---

<sup>2</sup> Zanzibar Malaria Strategic Plan 11 (2013-2018)

<sup>3</sup> <http://www.theglobalfund.org/en/fundingmodel/allocationprocess/allocations/>

proposed envelope for Zanzibar is \$5 million and represents all new funds. Zanzibar will also submit a concept note in October 2014.

PMI, the Global Fund, the British Department for International Development (DFID), and the Swiss Agency for Development and Cooperation provide funding for the ITN strategy on the Mainland and Zanzibar. The Global Fund and PMI co-funded the 2011-2012 universal coverage campaign on the Mainland that distributed 17.6 million free nets, achieving net coverage of over 91%. In 2015, PMI and the Global Fund will again jointly provide funds to undertake a universal coverage campaign in 22 of the 25 regions in the Tanzania Mainland. In Zanzibar, DFID and the Global Fund procured 660,000 ITNs for the 2012 universal coverage campaign and PMI provided funding for the distribution of nets and a net hang-up campaign to improve net use.

The Global Fund, PMI, and DFID have shared responsibility in funding the Tanzania National Voucher Scheme that offers ITNs to pregnant women and infants at a highly subsidized fee of \$0.34. The Global Fund funded the initiative from 2004-2011, PMI funded the initiative from 2006-2013 and in October 2013 DFID took over the funding of the entire voucher scheme. DFID funding for the TNVS will end in December 2015 and discussions are underway as to who will continue supporting the TNVS in 2016. Currently, the TNVS channel distributes approximately 25-30% of the necessary 7 million ITNs the Mainland needs to distribute each year to maintain universal ITN coverage. The Swiss Agency for Development and Cooperation provides technical assistance to the ITN unit of the NMCP.

For case management, PMI and the Global Fund provide all funding for ACTs and RDTs for the NMCP and the ZAMEP. In 2016, the Global Fund will provide procure most of the ACTs and RDTs needed for Mainland Tanzania. PMI will provide \$1 million for ACTs and \$900,000 for RDTs to help fill the gap and place emergency orders in case of delayed release of funds or late delivery of commodities. PMI will also provide technical assistance for quantification, procurement planning, and monitoring of ACTs and RDTs.

<i>Major non-PMI External Sources of Funding for Malaria Control Mainland, 2008-present</i>			
Source	Amount (millions)	Period Covered	What is covered
Global Fund New Funding Model	\$185	October 2014-December 2016	ITN universal coverage campaign, sustaining universal coverage with continuous distribution channels, improved malaria case management through the use of RDTs and ACTs in the public and private sectors; and improved quality of care in children with severe malaria; Monitoring and evaluation.
DFID	\$36	2014–2016	Funding for the Tanzanian National Voucher scheme until the end of 2015; funding to increase role of commercial sector in 2016
Swiss Agency for Development & Cooperation	\$6	2013 – 2017	ITN cell within NMCP; school-based ITN distribution program in Southern Zone

### **Private Sector**

Through the Global Fund, the Clinton Foundation has provided technical assistance to the NMCP and the ZAMEP to introduce ACT and RDTs, respectively, in the private sector. In 2016, PMI will provide funding for the scale-up of this successful program. In FY 2012, PMI partnered with Geita Gold Mine to spray houses in two districts of Geita Region. Geita Gold Mine is providing funds to the local government for operational costs while PMI is providing the insecticide and technical expertise for microplanning, environmental compliance, data management and reporting, and final disposal of chemical waste. In 2015, the IRS partnership will expand to cover all the five districts in Geita Region.

Malaria Safe is a project that encourages private sector participation in malaria education, prevention, and advocacy. In Tanzania, 22 companies have joined to support activities including sponsorship of the 2014 World Malaria Day and provision of long-lasting ITNs and case management services to employees. PMI plans to support outreach to other companies using the GIZ cost-benefit analysis tool to demonstrate the loss-of-productivity costs associated with malaria and savings associated with malaria prevention.

### **Collaboration with the Global Health Initiative**

PMI functions within the GHI strategy and contributes to strengthening health systems for delivery of GHI programs of maternal, neonatal and child health, and reproductive health. At community level, malaria community-based interventions like net distribution, hang-up campaigns, and house spraying use the community change agents and other health workers that

deliver a package of other GHI initiatives, such as community-based drug distribution for neglected tropical diseases, immunization, and behavior change communication for positive health behaviors.

### **Collaboration with Other USG Programs**

PMI works in collaboration with President's Emergency Plan for AIDS Relief (PEPFAR) on many cross-cutting programmatic issues related to HIV/AIDS and malaria interventions. This has included co-funding two *Tanzania HIV/AIDS and Malaria Indicator Surveys* (THMIS), in 2007 and 2011; co-funding a two-year surveillance officer position in Zanzibar that assisted both the ZAMEP and Zanzibar AIDS Control Program to strengthen surveillance activities and help coordinate disease cluster investigations (FY 2011-2012); and co-funding, since 2007, the Tanzania Field Epidemiology & Laboratory Training Program (FELTP). PMI's support for strengthening malaria diagnostics uses the infrastructure and equipment supplied by PEPFAR. The alignment of PEPFAR and malaria diagnostics activities has avoided duplication of efforts and facilitated the mutual interest in developing and implementing appropriate laboratory quality assurance/quality control (QA/QC) programs.

PMI also partnered with the Department of Defense Walter Reed Army Institute of Research (WRAIR) to strengthen the NMCP and the ZAMEP malaria diagnostics QA/QC system. In addition, PMI supports Peace Corps Volunteers to develop their capacities for malaria control and promote behavior change communication activities aimed at improving use of ITNs and promotion of early health seeking behavior.

### **PMI GOALS, TARGETS, AND INDICATORS**

The goal of PMI is to reduce malaria-associated mortality by 70% compared to pre-Initiative levels in the 15 original PMI countries and to reduce malaria-associated mortality by 50% in new countries added to PMI in FY 2010 and later. By the end of 2015, PMI will assist Tanzania to achieve the following targets in populations at risk for malaria:

- >90% of households with a pregnant woman and/or children under five will own at least one ITN;
- 85% of children under five will have slept under an ITN the previous night;
- 85% of pregnant women will have slept under an ITN the previous night;
- 85% of houses in geographic areas targeted for IRS will have been sprayed;
- 85% of pregnant women and children under five will have slept under an ITN the previous night or in a house that has been protected by IRS;
- 85% of women who have completed a pregnancy in the last two years will have received two or more doses of IPTp during that pregnancy;
- 85% of government health facilities will have ACTs available for treatment of uncomplicated malaria; and
- 85% of children under five with suspected or confirmed malaria will have received treatment with ACTs within 24 hours of onset of their symptoms.

## PROGRESS ON COVERAGE AND IMPACT INDICATORS

Four nationally representative population-based household surveys and other data sources provide intervention coverage estimates for key malaria outcome indicators between 2004 and 2012. The table below describes current estimates of intervention coverage and impact indicators, respectively, for the Mainland and Zanzibar. The 2004-05 Tanzania DHS provides baseline estimates for the main PMI indicators of interest.

The 2011-12 THMIS collected data on knowledge and behavior regarding HIV/AIDS and malaria and measured HIV prevalence among adults aged 15-49 and malaria parasitemia among children aged 6-59 months. It also updated estimates of selected demographic and health indicators covered in previous surveys to more accurately measure trends in malaria infection.

<b>Coverage Indicators</b>								
Coverage Indicator	<i>Mainland</i>				<i>Zanzibar</i>			
	2004-05 DHS (%)	2007-08 MIS (%)	2009-10 DHS (%)	2011-12 MIS (%)	2004-05 DHS (%)	2007-08 MIS (%)	2009-10 DHS (%)	2011-12 MIS (%)
Households with at least one ITN	23	38	63	91	28	72	76	74
Children under five years old who slept under an ITN the previous night	16	25	64	73	22	59	55	51
Pregnant women who slept under an ITN the previous night	15	26	57	76	20	51	50	36
Women who received two or more doses of IPTp at ANC visits during their last pregnancy	22	30	27	33	14	52	47	48
Children under five years old with fever in last two weeks who received any antimalarial treatment	58	57	60	55	61	66	17	1.7
Children under five years old with fever in the last two weeks who received treatment with ACTs within 24 hours of onset fever	-	14	27	21	-	9	4	1
Targeted houses adequately sprayed with a residual insecticide in the last 12 months	-	-	95	-	-	94	96	87

<b><i>Impact Indicators</i></b>								
	<b><i>Mainland</i></b>				<b><i>Zanzibar</i></b>			
Impact Indicator	<b>2004-05 DHS</b>	<b>2007-08 MIS</b>	<b>2000-10 DHS</b>	<b>2011-12 MIS</b>	<b>2004-05 DHS</b>	<b>2007-08 MIS</b>	<b>2009-10 DHS</b>	<b>2011-12 MIS</b>
All-cause under-five mortality rate	112	92	81	-	101	79	73	-
Parasitemia prevalence (6-59 mo. old)	-	18.1%	-	9%	-	0.8%	-	0.2%
Anemia (Hb<8 g/dL) prevalence (6-59 mo. old)	11.1%	7.8%	5.5%	5.6%	6.4%	4.7%	3.8%	4.1%

In 2012, the Roll Back Malaria (RBM) Partnership released the results of an Impact Evaluation for Mainland Tanzania that concluded that the lives of an estimated 63,000 children under five have been saved by malaria control interventions since 1999 (January 2012 Roll Back Malaria report of *Progress and Impact series: Focus on Mainland Tanzania*) Zanzibar is currently conducting an Impact Evaluation which should be available in 2014.

## **CHALLENGES, OPPORTUNITIES, AND THREATS**

One of the major programmatic challenges to malaria prevention and control in Mainland Tanzania is related to human resource constraints, including staff shortages, a lack of adequately trained malaria officers at the regional and district levels, and the very high turnover rate of Ministry of Health staff, particularly in more peripheral settings. In addition, the weak supply chain management system further jeopardizes the ability of the Ministry of Health and the NMCP to deliver malaria prevention and treatment interventions to all health facilities across the Mainland. Finally, weak information systems hamper the ability of the NMCP to monitor malaria control activities and measure progress. PMI is contributing to cross-cutting USAID health systems strengthening (HSS) programs to address some of these problems; however, it is likely to take several years before progress becomes apparent.

In Zanzibar, one of the major programmatic challenges is how to realign activities as the ZAMEP moves towards pre-elimination. Much of the technical information and assistance from the global community focuses on malaria control and prevention and very little is known about how to realign, intensify, or scale-back interventions as regions move toward pre-elimination and elimination. On the other hand, Zanzibar is in the unique position of often being on the cutting edge of activities such as surveillance and case detection. Zanzibar is conducting a number of operational research activities funded by various donors to try and address questions related to pre-elimination.

## **Insecticide-treated nets**

Both Mainland and Zanzibar can be justifiably proud of the very high levels of ITN ownership and usage that were achieved after the 2010-2011 universal coverage campaign on the Mainland and 2012 campaign on Zanzibar. The greatest challenge since then for the NMCP and the ZAMEP has been to sustain those levels of ITN ownership. Rallying support and funding around large-scale campaigns seems to be easier than sustaining that support and funding for a continuous ITN distribution system over several years. However, the NMCP is moving forward with its ‘keep-up strategy’ by planning a second round of the school net distribution program in the Southern Zone and maintaining the Tanzania National Voucher Scheme (currently supported by DFID), which has begun to reach target levels of net distribution. Zanzibar is currently rolling out a continuous distribution program including provision of nets at antenatal care (ANC) and EPI visits and at the community level.

## **IRS**

IRS continues to benefit from strong political support and community acceptance in both the Mainland and Zanzibar in the face of major reductions in the prevalence of malaria on the Mainland and extremely low levels of transmission on Zanzibar. In fact, both the NMCP and the ZAMEP have expressed concerns about scaling down IRS coverage, even with high levels of ITN ownership. A study carried out in Muleba District, Lake Zone was designed to determine the added value of IRS in areas with ITNs. The evaluation found in one of three serial surveys conducted that prevalence in children 6 months to 14 years old was significantly lower among those in households with ITNs+IRS as compared to those in household with only ITNs. An issue with this study was the low ITN ownership and use. Use the previous night ranged from a high of 53% in one arm at the beginning of the study to 36% in both arms in the last survey.<sup>4</sup> The greatest threat to IRS is the intensification and spread of insecticide resistance, which increases costs of spraying due to the need to use more expensive insecticides and the potential need to spray twice a year when using insecticides with short active duration. Public-private partnerships, such as partnering with Geita Gold Mine, provide an opportunity to expand IRS to target the Geita Region. Longitudinal entomological monitoring has shown that the population of endophilic *An. gambiae ss* has declined in Zanzibar and been replaced by the outdoor biting *An. arabiensis*, greatly lowering the efficacy of IRS and ITNs. A resurgence of *An. gambiae ss* in Unguja Island points to the need for continuous entomologic vigilance as vector populations continue to change with the IRS and ITN program.

## **Diagnosis and Treatment**

With the increased Global Fund contributions and continuing PMI support, commodity gaps for RDTs, microscopy supplies, and ACTs are less likely to be a major problem for the next several years. While stockouts of RDTs and other commodities have been reduced over the past few years they still occur and there are still considerable challenges in supply chain management

---

<sup>4</sup> West PA, Protopopoff N, Wright A, et al. Indoor residual spraying in combination with insecticide-treated nets compared to insecticide-treated nets alone for protection against malaria: a cluster randomized trial in Tanzania. 2014. PLOS Medicine, 11, e1001630.

between the Central Medical Stores and the peripheral health facilities. Continuing to scale up laboratory diagnosis of malaria with microscopy and RDTs will be a major challenge on the Mainland with the continuing problems related to supply chain management, the frequent stockouts of RDTs and ACTs at the health facility level, the large geographic area involved, and the large number of health facilities and health workers who need to be trained, re-trained, or visited for supervision. Evaluations have shown that overall malaria diagnostic testing performance is weak at all levels of the health system and that working conditions and RDT storage are generally unsatisfactory. PMI is providing technical and financial support to the NMCP and the ZAMEP's efforts to develop and implement a national approach to ensure high quality RDT results. A quality assurance/quality control (QA/QC) program is in the process of being implemented in the Lake Zone with plans for expansion to the remaining districts in 2015 and subsequent years. Complicating the expansion of this system is the very large number of health facilities in Tanzania (more than 6,000) and the limited supervisory capacity within the district and regional systems.

### **Malaria in Pregnancy**

The primary factors contributing to missed opportunities to ensure that all pregnant women receive three or more doses of sulfadoxine-pyrimethamine (SP) are: a confusing policy related to eligibility for IPTp (by specific weeks); delayed first ANC visits that reduce the opportunity to provide a second dose; a lack of good information in the community regarding efficacy and safety of SP; and repeated stockouts of SP at the ANCs. While health workers' confusion around when to administer SP and pregnant women and their spouses' concerns about the safety of SP during pregnancy cannot be dismissed, shortages of SP are, in fact, a major limiting factor to the scale-up of IPTp. A weak supply chain management system, compounded by inadequate communications between programs and central medical stores (CMS), has led to stockouts of SP at many health facilities. Additionally, reproductive and child health supplies and services are generally less financially attractive at the point of service since they are free and the drugs are dispensed prior to reimbursement from the government, which is often delayed.

The renewed attention to malaria in pregnancy by the NMCP and partners is encouraging and has led to relatively rapid adoption and nationwide rollout of the new WHO IPTp policy. An RCH-led Accelerated Plan to improve ANC visits and family planning outcomes is also underway in the Lake and Western zones, and opportunities to leverage PMTCT activities in ANC may provide a platform for greater reach. In addition, efforts are already being made with PMI support to improve quantification and distribution of SP to health facilities.

### **Monitoring and Evaluation**

The Tanzania impact evaluation highlighted the often poor quality of malaria data collected through HMIS. Reported malaria case numbers are frequently based on clinical case definition (non-laboratory confirmed), summary forms are incomplete and submitted either late or frequently not at all. Anecdotal evidence indicates that the reporting rate from facilities in several regions is less than 50%. In addition, the NMCP seems to have recurrent problems with access and availability of data from established databases, such as the HMIS and IDSR. Full implementation of the electronic DHIS2 and e-IDSR is intended to be a cornerstone of malaria

surveillance and is expected to improve the timeliness of data availability to the NMCP. However, the rollout of the systems is proving to be both expensive and complex. For example, the current e-IDSR system relies on a single mobile network which some health facilities have difficulty accessing. In addition, the NMCP is currently understaffed and lacks capacity to effectively use data.

Plans for a new DHS/MIS household survey are currently underway. However, household surveys tend to miss children who are attending school. As it is important to understand changing malaria prevalence by age the NMCP intends to institute a program of school malaria surveys starting in 2014.

### **Behavior Change Communication**

With the reduction of malaria prevalence as seen in the 2011-2012 THMIS (from 18% in 2008-2009 to 10%), there is concern about discontinued use of nets in low transmission areas and the challenge is how to ensure that people continue to sleep under nets even when they do not experience malaria. This is an area of concern in both the Mainland and especially in Zanzibar where prevalence is under 1%. There have been a number of studies on messaging in low prevalence areas (Zanzibar and Kagera). Results have suggested that general messaging around using nets for a good night's sleep and varying communication strategies in high and low transmission seasons may be useful in maintaining high net usage.

Moving from IPTp2 to IPTp3+ will be an opportunity with its own set of challenges. While IPTp2 rates have remained stagnant for the last decade, moving to IPTp3+ may remove some of the barriers to use such as timing of doses (e.g. no need to figure out if pregnant woman is between 20 and 24 weeks and 28-32 weeks). The new IPTp3+ policy has clarified language for providers including information on when SP can be started and how often doses can be given (see MIP section for more information). There still might be provider bias, and this could increase since there are more doses recommended. In addition, stockouts of SP have been a continued problem so even with new BCC messages, IPTp2 rates may remain stagnant. Therefore, as Tanzania's Mainland moves to IPTp3+, good planning and good provider interpersonal communication is needed. BCC messages will need to be clear and consistent in relation to the new policy to ensure providers are receiving correct and timely information related to the new policy.

A key challenge for BCC is to reach target populations where they live. The rural population is more than double the urban population, however many BCC efforts are not reaching them. While overall exposure and reach of BCC messages are good (60-80%), when looking at audience segmentation, only half of the rural women (and slightly more rural men) are being reached. While that overall number is probably larger due to 70% of the population being rural, there needs to be more efforts to reach them. New channels and approaches need to be used to increase the reach of BCC programs.

### **Health Systems Strengthening**

Despite successes at the district level, challenges in health systems strengthening continue to center on workforce shortages, poor commodity availability at the point of service delivery, and

inadequate financing for health care. With multiple ministries implicated in these issues, additional challenges include weaknesses in communication, coordination, management, and planning across GoT entities and between the various levels in the health care system.

Two major threats need to be noted. The first is a trend of decreasing GoT investment in health care; between FY 2011/12 and FY 2012/13 alone, the GoT decreased its contribution to health (in real terms) by 7%. This suggests declining priority of the health sector relative to those more closely linked to economic growth (such as roads, infrastructure, and agriculture), which consume the majority of the GoT budget. A second related threat to the health sector is its ballooning commodities debt amounting to \$47 million (as of December 2013) by the CMS largely related to its handling of vertical program items (whereby the GoT bears the burden of financing the delivery cost). Payment of this debt by the GoT has not yet occurred; in addition, more budget allocation is needed to match the increasing need for health commodities by a population undergoing a double-disease burden (of both infectious and chronic ailments).

Despite such challenges and threats, there are opportunities to strengthen the health system, including its delivery of malaria results. For example, the GoT has made substantial progress in formalizing a community worker cadre, which will extend the point of malaria service delivery from the facility to the community level. Also, in FY 2014, the GoT will phase-in a national Results-Based Financing Initiative (which will be the largest of its kind in a developing country) to reward facilities and their staff for improvements in poor performing health indicators, including those related to malaria. An opportunity to strengthen domestic financing lies with the health care financing strategy, which is undergoing extensive national consultation and likely to be finalized this coming year. Its main emphasis will be to mobilize greater private sector involvement and scale up health insurance coverage to minimize excessive payments by households at health facilities. A number of other key strategies have the potential for focusing health sector efforts to achieve results—such as the Health Sector Strategic Plan IV, the Pharmaceutical Action Plan, and the Human Resources for Health Strategy. Finally, while not yet confirmed, it is anticipated that the Tanzanian President will soon announce that the health sector, in particular the achievement of MDG 5, will be part his administration’s “Big Results Now” initiative; this initiative holds sectors directly accountable to the President and also influences national budget priorities. Inclusion in “Big Results Now” would prioritize the health sector and direct national attention to needed services to reduce maternal mortality, including those relating to malaria.

## **PMI SUPPORT STRATEGY**

Through GHI and PMI, the USG is committed to working closely with host governments and within existing national malaria control plans. Efforts are coordinated with other national and international partners, including the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund), RBM, the World Bank Malaria Booster Program, and the non-governmental and private sectors, to ensure that investments are complementary and that RBM and Millennium Development Goals are achieved.

PMI collaborates and coordinates with the NMCP, the ZAMEP, and other partners based upon the NMCP's and the ZAMEP's strategic goals and priorities. The level of support for each of the interventions takes into consideration the contributions from other donors such as the Government of Tanzania, the Global Fund, DFID, and other stakeholders to ensure priority interventions are scaled up to fill gaps, avoid duplication, and target interventions to address regional variations in malaria epidemiology and progress to date.

Mainland Tanzania's goal is malaria control and prevention, focusing certain interventions on areas with the highest transmission and others on routine malaria prevention. For instance, IRS is supported in the Lake Zone, the area with the highest transmission, while ITNs are universally distributed throughout the Mainland.

In Zanzibar, decreasing malaria prevalence has prompted the ZAMEP to adopt a new malaria 2013-2018 strategy, which focuses on achieving pre-elimination by 2018. Zanzibar is re-evaluating its interventions to match the current epidemiology and PMI is supporting these changes. For instance, the ZAMEP is scaling down IRS from blanket to focused spraying and conducting reactive case detection as part of its surveillance program. PMI is supporting the ZAMEP to realign its interventions and is working with the program to ensure rational strategies are adopted relating to the changing epidemiology.

## OPERATIONAL PLAN

### INSECTICIDE-TREATED NETS (ITNs)

#### NMCP/ZAMEP/PMI Objectives

##### *Mainland*

The NMCP's strategic objective for Integrated Malaria Vector Control for 2014-2020 is to increase the percentage of the population who slept under a long-lasting ITN last night or in a dwelling sprayed with IRS in the past six months from a baseline of 73% in 2012 to 90% in 2020. The specific objective for nets is to maintain universal access to long-lasting ITNs in all transmission settings and control stages, resulting in an increase of households with at least one long lasting ITN for every two persons from a baseline of 74% in 2012 to 85% in 2020. Targets for net use include increases: 1) among all household residents from 67% in 2012 to 80% in 2020, 2) among children under five years of age from 71% to 85%, and 3) among pregnant women from 73% to 85%.

The Tanzania National Malaria Strategic Plan: 2014-2020 calls for a national universal coverage campaign (UCC) to bring coverage levels to 80% with access to an ITN (as defined as one ITN for every two persons) and "keep-up" (continuous distribution) to maintain high levels after the mass campaign. Continuous distribution channels include the traditional targeted distribution of vouchers to clients at ANC and EPI clinics through the Tanzania National Voucher Scheme (TNVS). In addition, school-based distribution is being tested in three regions in the south of the country and may be scaled up to other regions based on the outcome of that ongoing trial. Modeling the possibilities for achieving and maintaining high coverage showed that the most appropriate approach would be a combination of the TNVS (ANC and EPI delivery) with an annual school-based delivery to alternate grades beginning with first grade through eleventh grade (Standards 1,3,5,7 and Forms 2 and 4). School-based delivery is intended to function as an effective distribution mechanism for getting nets into households with at least one school-age child. This combination would potentially reach just over 70% of Tanzanian households, representing about 85% of the population. This assumes that all pregnant women, infants under one and households with a child in school received an ITN from the program.<sup>5</sup> The NMCP adopted this approach and will look for other possible approaches to reach those missed by this combination of continuous channels.

The modeling exercise also found that to maintain 80% coverage for a ten-year period following a UCC requires an average annual input of 7 million ITNs. The model assumed that ITNs have a three year useful life, i.e. 50% of ITNs are still viable after three years of use in the field. The annual ITN input needed in the first two years following the campaign are 3.5 and 5.1 million respectively, and rise to 8.7 million by the ninth year after the campaign.<sup>5</sup>

Key achievements for the three distribution channels used on the Mainland include:

---

<sup>5</sup> Koenker HM, Yukich JO Mkindi A et al. 2013. Analysing and recommending options for maintaining universal coverage with long-lasting insecticidal nets: the case of Tanzania in 2011. *Malaria Jour*, 12:150

Universal coverage campaign (UCC): The last universal coverage campaign in 2010-2011 distributed 17.6 million ITNs. A second universal coverage campaign will take place in mid-2015, targeting 22 of the 25 regions on the Mainland with the goal of delivering over 22 million ITNs to achieve the goal of one ITN for every two persons.

School-based net distribution program (SNP): The school-based net program distributes free nets to school children in first, third, fifth, seventh, ninth, and eleventh grades. A total of 19 districts in three regions in the south of the country (Ruvuma, Lindi, and Mtwara) were selected and the first net distribution was completed in July 2013, a second is planned for mid-2014 and a third in 2015.

Results of a household survey conducted one month after the first school-based delivery showed that 37% of households sampled qualified for a school-based long-lasting ITN and of those 80% actually received a net.<sup>6</sup> A lower percentage of households met the criteria for inclusion in the program than expected, highlighting the fact that both the average household size and gross school enrollment rate (proportion of school-age children who are enrolled in school) affect the proportion of households eligible for a net through the program. Modeling shows that in Tanzania, a combination of ANC/EPI and school-based delivery has the potential to reach 82% to 95% of households.<sup>7</sup> The lower than anticipated delivery in the first school-based distribution, resulted in a relatively large oversupply of nets. Provisions were made with the district authorities to deliver surplus nets to those children who either missed school on the net delivery day or who were eligible but had not been registered, representing about 15% of the total eligible population. Results from a household survey in intervention and non-intervention areas showed no difference in the percentage of households owning at least one ITN, but there were significant differences between the control and intervention arms for households with enough nets (23% control; 49% SNP) and for the proportion of the population with access to an ITN (54% control; 68% SNP).

Tanzania National Voucher Scheme (TNVS): The TNVS began in November 2004 with support from the Global Fund to improve the availability of ITNs to pregnant women through ANC clinics. In 2006, PMI supported the expansion of the TNVS to infants during vaccination clinics. Under the TNVS, vouchers delivered in antenatal and vaccination clinics can be redeemed for an ITN at a retail shop, along with a top-up fee of 500 Tanzania shillings (~ \$ 0.30).

A September 2011 evaluation of the TNVS<sup>8</sup> found that this channel reached about 55% of pregnant women and 40% of infants under one year on an annual basis. The estimated cost for a net delivered under the voucher scheme varies over time from what was considered a high of almost \$10 per net in 2011 to \$7-\$8 per net delivered in 2010 and projected for 2012. The volume of nets delivered via the TNVS has increased in recent years: 1.2 million nets in 2011,

---

<sup>6</sup> Nathan R, Kalage R & Lutambi A. 2013. Draft Evaluation of school net pilot project in the Southern zone. Ifakara Health Institute.

<sup>7</sup> Albert Kilian, presentation to Tanzania NMCP 15 April 2014.

<sup>8</sup> Donaldson D & Thiede M.. 2011. USAID/Tanzania: National Voucher Scheme Evaluation. [http://www.ghtechproject.com/files/1%20496%20Tanzania%201%2004%2012%20Updated%20Table%204\\_and%20Title\\_Format%20JM\\_new%20508%20\(secured\)%201-17-12.pdf](http://www.ghtechproject.com/files/1%20496%20Tanzania%201%2004%2012%20Updated%20Table%204_and%20Title_Format%20JM_new%20508%20(secured)%201-17-12.pdf)

1.5 million nets in 2012, and 2 million nets in 2013. This trend may contribute to lowering the cost per net over time. The overall recommendation of the evaluation was to continue the TNVS for at least two to three years and expand to include people living with HIV/AIDS<sup>8</sup>. The analysis of keep-up strategies<sup>9</sup> found that the TNVS contribution is vital to maintain high coverage and should be continued until 2021, at which time the NMCP should reassess the need for a focus on high risk groups. The TNVS introduced electronic vouchers at the end of 2011. The e-voucher shortens the time for redemption, reduces operational costs, and it is expected to provide geospatial data on voucher transactions throughout the Mainland. A second net supplier joined the TNVS scheme in 2013 resulting in increased choice and competition, potentially fostering a more sustainable market.

The ITN strategy addresses previously identified gender and equity disparities through the voucher ITN scheme that targets pregnant women and infants, and free mass net distribution campaigns that provide nets to the general population at no cost to the beneficiaries. PMI, with other partners, continues to support BCC interventions for mass campaigns and continuous distribution approaches with the goal of increasing demand and use of ITNs.

### **Zanzibar**

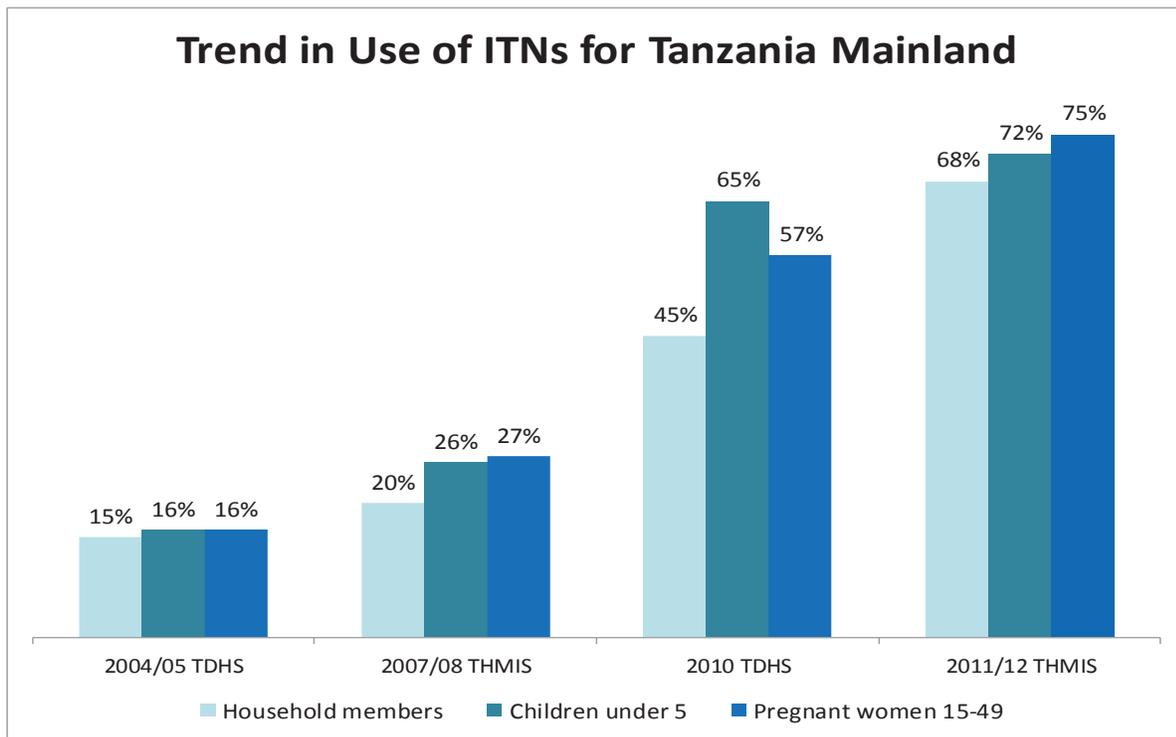
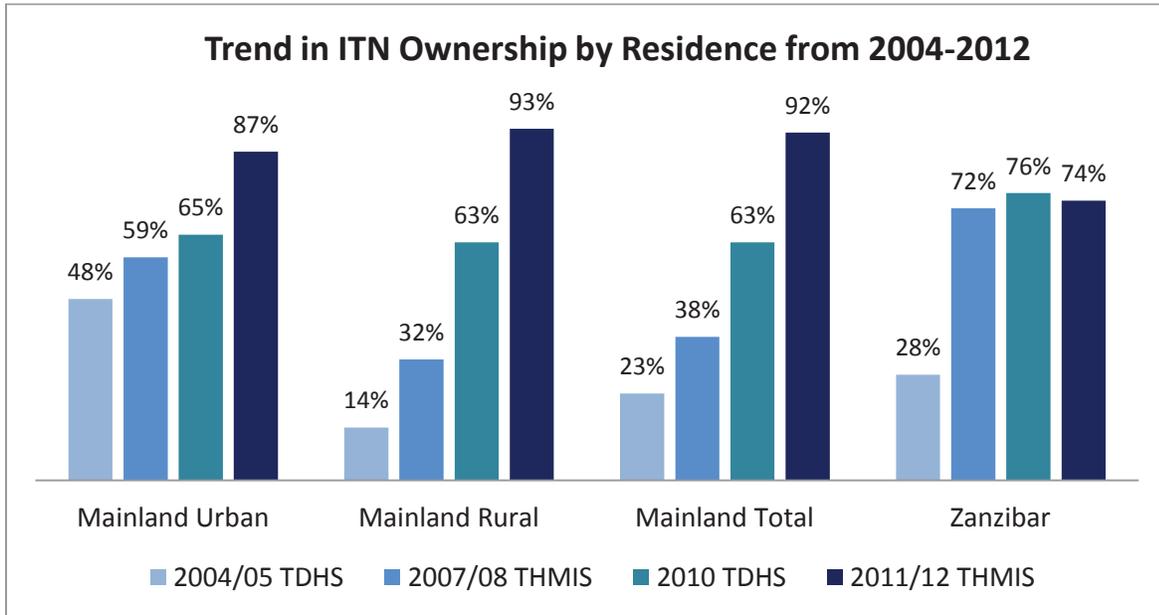
In the Zanzibar Malaria Strategic Plan III 2013 – 2018, the ZAMEP adopted the WHO definition of universal coverage as 1 ITN per 2 persons. ITN targets outlined in the Zanzibar malaria strategic plan include increasing access to long-lasting ITNs (i.e. the proportion of individuals living with a ratio of one ITN for every two persons) from a baseline for 35% in 2012 to 100% in 2014 and beyond; increasing use of long-lasting ITNs among pregnant women from 32% in 2012 to 95% in 2017; and among children under five years of age from 35% in 2012 to 95% in 2016 and beyond. This will be achieved through a combination of UCCs, which are called for every three years, and continuous delivery through facility-based and community-based approaches. At the facility level, free provision of nets to pregnant women at ANC clinic visits was adopted in 2004 and delivery at vaccination clinics was added to the strategy in 2006. These will be fully operationalized in 2014. The second continuous channel delivers ITNs at the community level to those in need, including households with no nets, those with unusable or lost nets, those with an uncovered sleeping space, and others. A village committee, led by the village chief (*sheha*), determines who meets the criteria and issues a coupon that can be redeemed for an ITN at the health facility. This was launched in June 2014. ITNs are also provided on an as-needed basis to households with confirmed cases of malaria.

The ZAMEP implemented its first UCC in March of 2012 and distributed 660,000 ITNs. The distribution of ITNs overlapped with the 2011/2012 THMIS survey in Zanzibar. As a result, only a partial effect of the UCC was captured in the THMIS. This may account for results that showed a slight drop in ownership and use from the 2010 TDHS and the 2011/2012 THMIS: ownership of at least one ITN dropped from 76% to 74%; usage among children fell from 55% to 51% and among pregnant women from 50% to 36%. Low access is probably a contributor to this relatively low use, however, results also indicate that at least in some areas of Zanzibar

---

<sup>9</sup> Koenker HM, Yukich JO Mkindi A et al. 2013. Analysing and recommending options for maintaining universal coverage with long-lasting insecticidal nets: the case of Tanzania in 2011. *Malaria Jour*, 12:150

behavioral issues are a major factor contributing to low use. An example of this is in Kaskazini Pemba District where access (those living in households with a 1 ITN: 2 person ratio) was 72% but use was only 41%. In spite of insufficient ITN coverage and low use in some areas, the overall protection in Zanzibar was found to be 95%, as measured by the percentage who slept the previous night under an ITN or in a dwelling sprayed with IRS in the past 12 months (2011/2012 THMIS).



## **Progress in the Past 12 Months**

### ***Mainland***

In 2013, PMI procured 510,000 ITNs for the school-based net distribution program in Tanzania. From June to July 437,930 nets were delivered in three regions through 2,302 schools.

PMI procured 500,000 ITNs for the second school-based distribution in mid-2014 in the same three regions. PMI will also procure 2.1 million ITNs that will add to the 19.9 million Global Fund ITNs for the UCC to be rolled out in mid-2015. Three regions participating in the school-based continuous distribution program will not be part of the 2015 UCC. An evaluation of the second round of school-based distribution will be completed in late 2014 and will guide program decisions on future school-based distributions.

The TNVS reached a new distribution high mark, achieving the delivery of over 2 million ITNs in 2013, up from 1.5 million in 2012. The e-voucher also made significant gains accounting for 45% of all voucher redemptions in 2013 as compared with 22% one year earlier.

### ***Zanzibar***

The ZAMEP adopted a continuous distribution strategy to maintain high coverage following the 2012 UCC. Some of the ZAMEP's activities and achievements in 2013 included: a two-year supply of ITNs for continuous distribution was procured with Global Fund support; an operational manual and training guide was produced and adopted; forms and documents for the community-based delivery were finalized; a training of trainers was completed; a KAP study to inform messaging was undertaken; BCC materials were prepared and reproduced; 700 *shehas* and their assistants have been trained; and 335 health workers in ANC clinics were trained.

### Tanzania Mainland ITN Gap Analysis

Calendar Year	2014	2015	2016 <sup>1</sup>
Total Targeted Population	46,012,926	47,255,275	48,531,167
<b>Continuous Distribution Needs (number of nets)</b>			
TNVS: ANC to Pregnant women (4.7% of the population x 65% coverage x 85% redeem voucher)	1,194,841	1,227,101	661,300 <sup>2</sup>
TNVS: Infants at vaccination clinics (4.5% of the population x 65% coverage x 85% voucher redemption)	1,143,996	1,174,884	603,000 <sup>2</sup>
School-based distribution at national scale (in 2014 and 2015 this covers only 3 regions)	500,000	500,000	2,233,000 <sup>3</sup>
<i>Estimated Total Need for Continuous</i>	2,838,837	2,901,985	3,497,300
<b>Mass Distribution Needs (number of nets)</b>			
Universal coverage campaign for 22 of 25 regions (3 regions covered by school-based distribution not included in UCC)	0	24,497,490	0
<i>Estimated Total Need for Campaigns</i>	0	24,497,490	0
<b>Total Estimated Need: Routine and Campaign</b>	<b>2,838,837</b>	<b>27,399,475</b>	<b>3,497,300</b>
<b>Partner Contributions (number of nets)</b>			
PMI (UCC)	0	2,100,000	0
PMI (continuous)	541,667	500,000	1,250,000
Global Fund (UCC)	0	19,900,000	0
DFID	2,000,000	1,666,667	0 <sup>4</sup>
<b>Total ITNs available in calendar year</b>	<b>2,541,667</b>	<b>24,166,667</b>	<b>1,250,000</b>
<b>ITN Surplus or Gap (-)</b>	<b>-297,170</b>	<b>-3,232,808</b>	<b>-2,247,300</b>
<ol style="list-style-type: none"> <li>1. Modelling indicates that the total estimated input needed to maintain 80% use among all individuals in Tanzania, an equivalent of 87% access in the population, requires an average input of about 7 million ITNs annually over a nine year period following a UCC. The number of ITNs needed each year ranges from a low of 3.5 million nets in the first year following a UCC to a high of 8.7 million nets in year nine following a UCC.</li> <li>2. Tanzania anticipates a drop off in the redemption rates for the TNVS in 2016 following the 2015 UCC. For the purposes of this exercise we are using an estimated 50% reduction and will adjust as information becomes available.</li> <li>3. The number of ITNs distributed to schools can be adjusted by delivery to few or more classes as needed. The estimated need through schools is determined by the total need minus the quantity delivered through the TNVS system.</li> <li>4. DFID is changing its strategic approach in 2016 and will be working to increase sales through the commercial sector. The increase possible through this new approach in the first year is unknown.</li> </ol>			

## Zanzibar ITN Gap Analysis

Calendar Year	2014	2015	2016
Total Targeted Population	1,377,591	1,416,164	1,455,817
<b>Continuous Distribution Needs (number of nets)</b>			
ANC to Pregnant women (4.5% of the population and 100% attendance)	61,992	63,727	65,512
Infants at vaccination clinics (4.3% of the population and 85% attendance)	50,351	51,761	53,210
Community-based distribution (as-needed basis) <sup>1</sup>	131,243	112,814	124,942
Reactive case detection and follow-up	1,000	1,000	1,000
<i>Estimated Total Need for Continuous</i> <sup>2</sup>	244,586	229,302	244,664
<b>Total Estimated Need</b>	<b>244,586</b>	<b>229,302</b>	<b>244,664</b>
<b>Partner Contributions (number of nets)</b>			
PMI (continuous)	0	0	238,000
Global Fund (continuous)	457,187	0	0
<i>Estimated Total Partner Contributions</i>	457,187	0	238,000
Surplus ITNs from previous year	0	213,601	0
<b>Total ITNs available in calendar year</b>	<b>457,187</b>	<b>213,601</b>	<b>238,000</b>
<b>ITN Surplus or Gap (-)</b>	<b>212,601</b>	<b>-15,701</b>	<b>-6,664</b>
<p>1. Priority groups include: orphans, widows, disabled, and poor; households with no nets; households who lose a net due to disaster; households with a net too damaged to repair; and households with an uncovered sleeping space</p> <p>2. The annual need is taken from modeling using the NetCALC tool and presented in "Zanzibar Draft Continuous Distribution Strategy," Lokko K and Koenker H, JHUCCP NetWorks Project &amp; COMMIT Project, March 2013</p>			

## Plans and Justification

### *Mainland*

Between 2009-2011, approximately 30 million long-lasting ITNs were distributed in Mainland Tanzania: 9 million through a national under-five campaign (2009), 17.6 million through a UCC (2010-2011), and about 3.5 million through the TNVS (2009-2011). By 2015, all of the nets from those campaigns will be at least four years old and the majority will be five or more years old. Very few replacement nets have been distributed since those major campaigns. The combined input for 2012 and 2013 was approximately 4.1 million ITNs, 510,000 through a

school-based distribution in three regions and the remainder through the TNVS. This input is far too low to maintain high ITN coverage at a national level.

Tanzania will undertake a UCC in mid-2015 in order to quickly return to high coverage levels. With FY 2014 funds, PMI will procure 2.1 million nets to cover most of the Kagera and Kigoma Regions. Global Fund will procure 19.9 million ITNs to fill needs for the remaining 21 regions. In 2016, PMI's focus will be entirely on continuous delivery channels. This must include delivery of ITNs to pregnant women and infants in association with ANC and EPI clinic visits. The other leg of the keep-up strategy is the school net program. PMI will expand support for the school net program beyond the current three regions. DFID will end support for the TNVS in December 2015. In 2016, PMI will launch a new mechanism to ensure delivery of ITNs to pregnant women and infants, and delivery through schools.

### ***Zanzibar***

Zanzibar achieved universal ITN coverage in March 2012. The Global Fund has procured 457,187 ITNs required for the continuous net distribution for 2014 and 2015. PMI will support continuous distribution through ANC and community-based distribution in Zanzibar following the exhaustion of the Global Fund's contribution in 2015.

### **Budget and Proposed Activities with FY 2015 Funding (\$16,230,000)**

#### ***Mainland***

*Delivery of ITNs to pregnant women and infants:* PMI will support the delivery of an estimated 1.2 million ITNs to clients of ANC and EPI clinics. (\$10,000,000)

*School net program:* Procure and support distribution of about 1 million ITNs for the school net program. (\$5,000,000)

#### ***Zanzibar***

*Zanzibar continuous distribution:* Procure about 240,000 ITNs and provide support for delivery through ANC and EPI clinics and through community-based approaches. (\$1,130,000)

*Evaluation of continuous distribution approaches:* PMI will support an independent assessment and evaluation of the ITN continuous delivery approaches that will provide information and lessons learned to improve the program. (\$100,000)

## INDOOR RESIDUAL SPRAYING (IRS)

### NMCP/ZAMEP/PMI Objectives

#### *Mainland*

The NMCP Strategic Plan 2014-2020 calls for application of quality IRS in selected areas and maintain coverage at near the current level of 14% in Mainland Tanzania. To maintain optimal protection with ITNs, the NMCP recommends that pyrethroid insecticides not be used for IRS.

Since 2007, the NCMP has focused spraying in 18 districts in Lake Zone. The 2010 DHS shows that the Lake Zone had the highest under-five mortality rate of 109/1,000 live births, above the national average of 81/1,000 live births. Malaria prevalence among children 6-59 months of age in the Lake Zone, at 34%, was also the highest in Tanzania (2007/2008 THMIS).

After several rounds of IRS, and high ITN coverage following mass universal coverage campaigns between 2009-2011, the prevalence in the Lake Zone fell to 14% (2011/2012 THMIS). The region with the greatest reduction in the Lake Zone was Kagera where prevalence fell from 41% (2007/2008 THMIS) to 8% (2011/2012 THMIS). With this and other data indicating success after blanket spraying multiple times, PMI and the NMCP moved from blanket to targeted spraying in the Lake Zone. The decision was also made to end spraying altogether in the Kagera Region beginning in 2014, limiting the targeted IRS to districts in other regions of the Lake Zone with the highest malaria prevalence.

#### *Zanzibar*

The Zanzibar malaria elimination goal is to achieve 100% coverage with IRS or ITNs by 2015 by achieving 95% coverage of IRS in the target areas, and 90% ITN use in non-IRS areas. The ZAMEP strategy follows the PMI adopted approach of moving from blanket spraying, which was done in all ten districts in Zanzibar, to targeted spraying that includes those districts showing high malaria transmission, and then to focal spraying once malaria transmission is highly localized and sound surveillance can identify those hot spots (*shehias* reporting at least 4 or more weekly cases and a 1.5 fold increase in weekly cases compared to the average from previous three weeks). Zanzibar moved from blanket to targeted spraying in 2011, and then to focal spraying in 2013. Zanzibar has also adopted an approach for using focal spraying of hot spots both proactively based on previous evidence of persistent transmission in an area and reactive to outbreaks.

#### IRS Scale-down phases and timing in Zanzibar

Spray phase	2006 - 2007	2007- 2008	2008- 2009	2009- 2010	2010- 2011	2011- 2012	2012- 2013	2013- 2014	2014- 2015
Blanket (Knock-down)									
Targeted (Keep-down)									
Focal (Keep-low)									

- **Blanket** to knock-down transmission (or knock-down further) in entire regions
- **Targeted** to maintain low transmission in particular districts with high/increasing transmission
- **Focal** to address specific “hot spots” where higher transmission persists

IRS activities in the Mainland and Zanzibar ensure protection of the environment and safe disposal of waste in accordance with the approved Pesticide Evaluation Report and Safe Use Action Plans. Environmental inspection visits are conducted regularly to assess compliance with US Government and Tanzanian national environmental standards.

### **Progress in the Past 12 Months**

In late 2011 and early 2012, based on evidence of increasing insecticide resistance, the PMI-supported IRS program switched from pyrethroid to a carbamate insecticide (bendiocarb) for selected areas. A decision to switch to a slow-release pirimiphos-methyl formulation was made in 2013, in close collaboration with the NMCP, the ZAMEP, and key partners. The decision was prompted by a rapid loss of effectiveness of carbamate and strong results from testing of pirimiphos-methyl formulation in Zanzibar. This meets the suggested insecticide resistance mitigation plan and pirimiphos-methyl CS was used for IRS on both the Mainland and Zanzibar in the 2014 spray rounds.

#### ***Mainland***

The Mainland reduced the targeted area in the Lake Zone for IRS from 659,146 structures in 2012/2013 to about 450,000 structures in 2013/2014, protecting just under 2 million people. About three fourth of structures were covered in February/March 2014 using pirimiphos-methyl CS; the other structures were sprayed in late 2013 using carbamates. The high cost of pirimiphos-methyl CS was a factor contributing to the lower number of structures sprayed. PMI continued its contribution to a public-private partnership by supplying insecticide to Geita Gold Mine, which contributed approximately \$200,000 towards the operational costs of the spraying in the area of Geita Town Council.

Results from entomological monitoring, insecticide resistance monitoring and residual insecticidal activity following IRS on the Tanzania Mainland are presented in the Monitoring and Evaluation section.

#### ***Zanzibar***

In 2013, Zanzibar continued the combination of targeted and focal spraying that was implemented in 2012. In February 2013, a round of targeted spraying took place in the villages (*shehias*) that showed malaria incidence of more than 2 cases/1,000 population. Targeted spraying took place in 51,904 structures, protecting 250,505 people. Carbamate was used for IRS in 2013. In April 2014, Zanzibar conducted focal spraying in eight of ten districts reaching about 45,000 structures and protecting almost 270,000 residents. About seventy five percent of structures were sprayed using pirimiphos-methyl CS. The remaining structures were sprayed using carbamate that had not been used in the 2013 spray rounds and which were due to expire in late 2014.

Results from entomological monitoring, insecticide resistance monitoring, and residual insecticidal activity following IRS on Zanzibar are presented in the Monitoring and Evaluation section.

**IRS reporting table – Zanzibar**

<b>Year</b>	<b>Number of Districts Sprayed</b>	<b>Insecticide Used</b>	<b>Number of Structures Sprayed</b>	<b>Coverage Rate</b>	<b>Population Protected</b>
<b>2011</b>	10 (blanket)	Pyrethroid (P)	194,808	95%	1,033,742
<b>2012</b>	9 (targeted)	Carbamate (C)	141,128	95%	815,700
<b>2013</b>	9 (targeted)	Carbamate (C)	51,904	96%	250,505
<b>2014</b>	8 (targeted)	Carbamate (C) Pirimiphos-Methyl CS (OP)	14, 173 (re-spray in select C areas) 40,619 (OP areas)	~ 90%	61,921 (C areas) ~ 203,000 (OP areas)
<b>2015</b>	8 (targeted)	Pirimiphos-Methyl CS (OP)	20,207	~ 90%	~ 101,845

**IRS reporting table - Mainland**

<b>Year</b>	<b>Number of Districts Sprayed</b>	<b>Insecticide Used</b>	<b>Number of Structures Sprayed</b>	<b>Coverage Rate</b>	<b>Population Protected</b>
<b>2010/2011</b>	18	Pyrethroid (P)	1,144,621	94.5%	6,343,091
<b>2011/2012</b>	18	Pyrethroid (P) 16 districts  Carbamate (C) 2 districts	1,224,095	93.2%	6,518,120
<b>2012/2013</b>	18 (targeted)	Pyrethroid (P) 11 districts  Carbamate (C) 18 districts	659,146 (P and C areas)  114,783 (re-spray C areas)	94.6%	3,496,421 (P and C areas)  555,932 (re-spray C areas)
<b>2013/2014</b>	15 (targeted)	Carbamate (C) 9 districts  Pirimiphos-Methyl CS (OP) 6 districts	108,173 (re-spray remaining C areas)  335,000 (OP areas)	~ 90%	555,503 (C areas)  ~ 1,400,000 (OP areas)
<b>2014/2015</b>	16 (targeted)	Pirimiphos-Methyl CS (OP) and/or Etofenprox (P)	~ 400,000	~ 90%	~2,000,000

## **Plans and Justification for FY 2015**

### ***Mainland***

After eight consecutive years, PMI remains the only donor funding IRS in Tanzania. With the achievement of universal coverage with ITNs and the marked reduction of malaria prevalence, PMI and the NMCP stopped IRS in the Kagera Region in 2013 and focused on continued ITN availability and use. However, delays in beginning continuous ITN distribution approaches have resulted in a significant drop in ITN coverage and increases in the number of reported malaria cases in the Kagera Region. The NMCP and PMI have therefore decided that districts in the Kagera Region should be included among those considered for spraying in 2014 and 2015.

The principal criteria used to determine which areas in the Lake Zone to spray include: 1) overall malaria positivity rates and 2) incidence, as determined using health facility reports and recent census data. Operational factors are also considered. While this approach has limitations, including poor quality of data, lack of true representativeness of the population, and using past reporting periods for current decision-making, at present these are the best criteria for selecting the IRS areas. The longer-term vision of IRS in vector control is being debated among the NMCP and partners. The NMCP is committed to achieving and maintaining universal ITN coverage. Limited resources will not support both approaches and thus the role of IRS in Tanzania is evolving from that of a major control intervention to one with more targeted applications.

The IRS budget provides for environmental supplemental assessments and development of pesticide evaluation reports and safe use action plans (PERSUAP) in new areas of IRS expansion; conducting environmental monitoring before, during, and after the spray season; cross-border collaboration; final disposal of medical waste; and capacity building for IRS operations.

Cross-border collaboration with Uganda, Kenya, Rwanda, and Burundi will involve exchange visits, and regional meetings to share information, strategic approaches (where to target IRS, insecticide selection and rotation, etc.), and best practices for malaria control. Areas of collaboration will start around IRS, strategies to maintain ITN coverage, entomological monitoring, insecticide resistance monitoring and mitigation plans, disease surveillance, and exit plans for IRS.

### ***Zanzibar***

In 2012, Zanzibar achieved universal coverage with ITNs and thus began to scale-down IRS. Zanzibar also has a strong entomological and epidemiologic surveillance system that provides real-time data for epidemic detection and response. The ZAMEP proposes to use proactive and reactive spraying of “hot spots”, that is, to spray those known hot spots from the previous year and also spray areas immediately that meet hot spot criteria (*shehias* reporting at least 4 or more weekly cases and a 1.5-fold increase in weekly cases compared to the average from previous three weeks) during the course of the transmission season.

## **Budget and Proposed Activities with FY 2015 Funding (\$12,135,000)**

### ***Mainland***

*Procure insecticide and support spraying in the Lake Zone.* PMI will support targeted IRS in the Lake Zone reaching approximately 400,000 structures and protecting about 2 million persons. PMI will also continue to support the public-private partnership with Geita Gold Mine and also support activities for cross border collaboration with Uganda, Kenya, Rwanda, and Burundi. (\$11,500,000)

### ***Zanzibar***

*Focal spraying.* PMI will support focal spraying in hot spots, covering about structures and protecting 100,000 people. (\$600,000)

### ***Mainland and Zanzibar***

*Environmental monitoring, compliance and assessment.* PMI will support activities for environmental compliance and final disposal of empty insecticide sachets, in accordance with US Government and national environmental regulations and guidelines. (\$35,000).

## **MALARIA IN PREGNANCY**

### **NMCP/ZAMEP/PMI Objectives**

Tanzania implements the three-pronged approach to prevent the adverse effects associated with malaria in pregnancy recommended by the WHO: 1) ITNs through antenatal care clinics, 2) intermittent preventive treatment (IPTp) with sulfadoxine-pyrimethamine (SP), and 3) prompt case management of pregnant women with malaria. The objectives are to achieve 80% coverage of two doses of IPTp, 85% use of ITNs by pregnant women, and 100% prompt case management of malaria infections in pregnancy.

### **ITNs**

On the Mainland, the TNVS provides e-coupons to women at ANC visits which are redeemed at nearby retail locations for 500 Tanzanian shillings (~\$0.30). Zanzibar recently implemented a continuous long-lasting ITN distribution strategy which includes free provision of a net to pregnant women at their first ANC visit.

### **IPTp**

#### ***Mainland***

The MOHSW is finalizing changes to the IPTp policy to reflect updated WHO guidance to move to IPTp3+. The new policy is to give three or more doses of SP as directly observed therapy during ANC visits. The new policy includes clearer language to health care providers on when to start IPTp and specifies that SP doses can be given every month until the day of delivery.

#### ***Zanzibar***

Given the low prevalence of malaria in women at time of delivery (0.8%)<sup>1</sup>, Zanzibar has decided to move away from IPTp and to adopt screening of pregnant women by RDT and treatment only if the test is positive. Details of the approach are still being determined and PMI has provided funds for technical assistance to support its development. Regardless of the approach to screening asymptomatic women, all symptomatic women will be screened.

### **Iron/folate**

A three-year supply of iron/folate (ferrous sulphate 200mg + folic acid 0.25mg) was purchased with USAID and DFID funds for use in 2014-2016. This combination is provided at ANC according to national policy for prevention and treatment of anemia. High-dose folic acid is procured and provided for pediatric indications only and is not provided at ANC.

### **Case management of acute malaria**

Case management of uncomplicated malaria in pregnancy follows WHO recommendations. For severe malaria in the first trimester, parenteral quinine remains the nationally recommended treatment pending further evidence of injectable artesunate safety, while treatment in the second and third trimesters is parenteral artesunate.

### **Progress since PMI started in 2006**

The TNVS, which provides highly subsidized ITNs to pregnant women on the Mainland, was introduced in 2004 as part of a keep-up strategy between universal campaigns. Net use among pregnant women was at 76% on the mainland in 2012 but at only 36% in Zanzibar (THMIS) after universal coverage campaigns in 2011-2012 (see ITN section for further details). Zanzibar recently implemented continuous distribution via ANC (see section below on Progress in the last 12 months).

Since 2006, PMI and maternal health funding has focused on rolling out the national training on Focused Antenatal Care (FANC), a package of antenatal services which includes IPTp. Cumulatively, 7,181 providers from 3,540 facilities have been trained, covering 74% and 100% of FANC facilities on the Mainland and Zanzibar, respectively. PMI has also supported development of a pre-service malaria in pregnancy training curriculum, which has contributed to approximately 1,600 new graduates with FANC skills each year since 2006. Training in antenatal care continues when District Health Management Teams invest their own budgets and use PMI-trained trainers to conduct further training within their district.

ANC attendance is almost universal (94% of pregnant women make at least two visits; 2010 DHS), yet IPTp2 uptake has remained at approximately 30% (see table below). Recent efforts to improve IPTp2 uptake include the push by the Malaria In Pregnancy Task Force, a group composed of members from the NMCP and the Reproductive and Child Health group as well as other relevant stakeholders, for changes to align Tanzania's policy with the revised WHO recommendation and promote three or more doses of IPTp (IPTp3+), and the Ministry-led Safe Motherhood Campaign (*Wazazi Nipendeni*) to spread IPTp messages through a multimedia campaign.

## IPTp uptake in Tanzania

Intervention	2004/05 DHS	2007 THMIS	2009/10 DHS	2012 THMIS
Percentage of women who took at least one dose of SP at ANC during their last pregnancy (IPTp 1)	53%	57%	60%	60%
Percentage of women who took at least two doses of SP at ANC during their last pregnancy (IPTp 2)	22%	30%	26%	33%

### Progress in the Past 12 Months

The TNVS, which includes vouchers for both pregnant women and infants, achieved its goal of distributing 2 million nets in 2013 and, as of early 2014, is performing above the target of 250,000 nets distributed per month. Zanzibar finalized its continuous net distribution strategy, including provision of nets at ANC, EPI visits, reactive case detection visits, and via community distribution. The ZAMEP completed the operation manual, training guide, and forms and held consultative meetings with district officials, health facility staff, and *shehia* leaders. Media promotion and training of 335 ANC health workers began in April 2014, with net distribution scheduled to begin in May.

With support from the MIP Task Force, the NMCP updated the IPTp policy (IPTp3+) in all national documents including FANC guidelines, the National Guidelines for Malaria Diagnosis and Treatment, and the 2014 version of the HMIS Reproductive and Child Health book. Staff from public hospitals and health centers were trained on the new guidelines, which also include updates to case management including management of malaria in pregnancy, between October and December 2013. Staff at all public dispensaries will be trained in Phase II of the rollout scheduled for April - October 2014. The Mothers and Infants Safe, Healthy, Alive (MAISHA) program updated pre-service training materials for nurses, midwives, laboratory and health facility staff and trained 210 Medical Education Instructors on MIP and case management updates. Training of an additional 190 instructors is scheduled to be completed by October 2014 and supportive supervision visits will be conducted at 20 selected health training institutions.

MAISHA, with support from PMI and other USG funds, continued to provide integrated supervision to FANC facilities to improve FANC service provision and institutionalize a facility-based quality improvement approach. To date, this has been rolled out in 250 facilities in 115 districts in more than 16 regions across the country, while at the same time empowering district and regional Reproductive and Child Health Coordinators to undertake supervision using the standardized approach. Facilities which have achieved quality improvement recognition scores will be given a special designation in FANC quality of care this year.

PMI also supported BCC efforts for the Safe Motherhood Campaign which is designed to improve uptake of all ANC services, including IPTp and nets, continued to run a multimedia campaign. Details are in the BCC section.

### Commodity gap analysis

SP is procured by the Tanzanian government; thus, PMI has no plans to procure SP. However, there have been persistent challenges in getting this stock to the peripheral facilities. PMI is working to address this problem to ensure availability at facilities with ANC clinics.

### National stock status of sulfadoxine-pyrimethamine (SP)

The NMCP recently completed quantification and forecasted public sector needs to 2017. The current stock on hand in 2014 is not sufficient to cover the forecasted consumption and to conform to the minimum stock levels mandated at MSD. PMI will reprogram funds to help fill this pipeline. Once the pipeline is filled the forecasted need will fall in subsequent years. The GF commitment beyond July 2015 is not yet known nor to what extent the Government of Tanzania will support SP procurement in coming years. PMI will continue to encourage the Government to purchase SP, monitor the SP gap, and reprogram funds as needed.

<b>SP Gap Analysis for Mainland</b>			
	<b>July 2014-June 2015</b>	<b>July 2015-June 2016</b>	<b>July 2016-June 2017</b>
Total population	46,012,926	47,255,275	48,531,167
Number of pregnant women	1,792,130	1,840,517	1,890,211
Pregnant women attending ANC (98%)	1,756,287	1,803,707	1,852,408
Women receiving IPTp3+ (Target 70%)	1,229,401	1,262,595	1,296,685
<b>Number of SP tablets needed (including backfill of pipeline and buffer stock)</b>	<b>23,715,100</b>	<b>12,642,900</b>	<b>14,486,400</b>
PMI commitment (tablets)	-	-	-
GF commitment (tablets)	6,243,200	-	-
Other sources (GoT, etc.)	-	-	-
<b>Gap (-) (SP tablets)</b>	<b>-17,471,900</b>	<b>-12,642,900</b>	<b>-14,586,400</b>
<b>Costs to cover gap</b>	<b>\$1,149,651</b>	<b>\$832,903</b>	<b>\$959,785</b>

### Plans and Justification

PMI will support provision of subsidized long-lasting ITNs to pregnant women and associated BCC activities to promote net use. Following on the successful rollout of the new IPTp

guidelines in 2014, PMI will support refresher training and supervision for IPTp3+ and case management integrated with family planning, maternal and child health, and HIV programming. BCC to boost ANC attendance and IPTp uptake will continue nationwide with a focus on regions with high malaria prevalence. In Zanzibar, PMI will support technical assistance for the test and treat policy for pregnant women as well as messaging to promote uptake of long-lasting ITNs.

### **Budget and Proposed Activities with FY 2015 Funding (\$285,000)**

PMI's funding for the following activities will contribute to a larger effort funded by other USAID health programs to improve demand for and the quality of antenatal care on the Mainland, including malaria prevention and treatment of acute infections.

#### ***Mainland***

*Refresher trainings and integrated supportive supervision for MIP interventions in Lake Zone and Lindi and Mtwara Regions.* PMI will take advantage of an Accelerated Plan to improve family planning and labor and delivery in the Lake Zone to co-fund training and supervision to ensure proper implementation of IPTp3+ and malaria case management using the recently updated MIP training materials. Similarly, in Lindi and Mtwara, PMI will support an MCH-funded initiative to strengthen ANC services to ensure that training of trainers and supervision includes prevention and case management of malaria in pregnancy. (*\$235,000*)

*BCC activities to promote IPTp3+ and ITNs.* Efforts initiated by the Safe Motherhood campaign will continue through co-investments supported by HIV, family planning, and MCH funds to ensure that ANC clients are counseled on the importance of ANC attendance, IPTp3+, and ITN use. BCC materials will be printed and disseminated systematically, targeting regions where malaria prevalence is high and IPTp uptake is low. This activity includes leaflets and other promotional materials in health facilities as well as media messages in the community. (*Included in BCC budget*)

*Supply chain support.* PMI is working to address the problem of SP stockouts at ANC facilities through a national commodities electronic tracking and requisition system to ensure more consistent supplies of the drug, sulfadoxine-pyrimethamine, for IPTp at ANC clinics. PMI will support strengthening of quantification for malaria commodities, transportation, storage, inventory management, and end-use verification. (*Included in Case Management budget*)

#### ***Zanzibar***

*Technical assistance for test and treat policy.* Technical assistance to assess continued relevance and cost-effectiveness of test and treat strategy. (*\$50,000*)

*Supportive supervision.* Support regular antenatal clinic supervisory visits by ministry staff, including ensuring adherence to the new policy. (*Included in integrated supportive supervision budget*)

*BCC activities to promote ITNs.* Mass media messaging and printed materials will be dispersed to promote early uptake of ITNs at ANC visits. Community mobilization via *shehia* health custodian committees will also be included. (*Included in BCC budget*)

*Procurement of RDTs for use in the ANC.* RDTs will be procured to support the screen and treat policy at ANC. (Included in RDT budget)

## **CASE MANAGEMENT**

## **DIAGNOSTICS**

### **NMCP/ZAMEP/PMI Objectives**

#### ***Mainland***

The goal of the NMCP diagnostic strategy is to achieve universal access to high quality malaria diagnostic testing in both public and private health facilities. The national targets for the 2014-2020 National Malaria Medium-Term Strategic Plan for case management are to increase to 80% the proportion of children under five years of age who: 1) receive appropriate diagnosis and treatment within 24 hours of onset of fever, and 2) receive appropriate management of both uncomplicated and severe malaria according to national treatment guidelines. In addition, the proportion of drug outlets selling quality assured antimalarial drugs according to the national treatment guideline should increase to 80%. The new strategic plan is expected to be finalized in mid-2014.

Since 2006, PMI has supported the procurement and scale-up of RDTs, assisted the MOHSW's Diagnostic Services Section to conduct comprehensive malaria diagnostics training sessions at the National Health Laboratory and Quality Assurance Training Center (NHLQATC), and supported the development of a Malaria Reference Laboratory within the NHLQATC.

NMCP guidelines state that all suspected malaria cases should be confirmed by a recommended malaria test prior to treatment. Microscopic examination of Giemsa-stained blood films remains a cornerstone of malaria diagnosis throughout Tanzania, but is only available at regional and district hospitals and some health centers (about 20% of all health facilities) therefore most health facilities use RDTs to confirm malaria cases. With PMI and Global Fund support the NMCP completed implementation of RDT provision to all government health facilities in all districts as of November 2012. During the RDT rollout a total of 9,647 routine RDT testers were trained (2 from each health facility) out of a total of 11,765 trained health service providers as part of a program of cascade training in health facilities. Between 14 and 16 million RDT are procured yearly. Malaria RDT quantification is based on the assumption that all cases of fever will be tested for malaria parasites: 90% by RDTs and 10% by microscopy. Lot testing of RDT kits is coordinated by the NMCP using a WHO protocol and random samples sent to *Institut Pasteur du Cambodge* in Cambodia. The central medical stores (CMS) sends random samples of RDT kits to Ifakara Health Institute as part of their internal quality checks of stored products before shipment to the CMS zonal stores.

Previous assessments have shown that the quality of both malaria microscopy and RDT testing is very poor at almost all levels of the health system. The NMCP intends to improve the quality of malaria diagnosis by continuing RDT and microscopy training and establishing a functional QA/QC system within the existing healthcare system infrastructure. PMI has extensively

supported the NMCP in this goal. From November 2009 through August 2013, PMI, through partners, supported the NMCP to conduct 10 two-week long training sessions that certified 160 laboratory workers from all regions to be expert malaria microscopists. These personnel serve as resource malaria microscopists at regional and district hospitals and some health centers. This exceeded the target of 1 person certified from each of the 133 districts. In addition, PMI supported the evaluation and quality assurance project conducted in 2012 in 16 hospital laboratories (microscopy) and 48 representative health facilities (RDT) in both the Mainland and Zanzibar. This project was used as the basis for the NMCP's current QA/QC program plans. PMI also allocated money to establish a National Malaria Slide Bank. The protocol for the bank has been submitted and is awaiting ethical approval to begin sample collection. As part of the plan for the slide bank the NMCP has also worked with partners to propose a microscopy QA system that will include monthly blinded cross-checking of blood slides by a District supervisor and periodic external QA via blinded positive and negative samples sent from the slide bank. This proposed system has not yet been fully initiated: a partner has received PMI funding to establish the slide bank and expects that the sample collection will begin in 2014. In 2016 the NMCP intends to use GF support to continue microscopy training and QA/QC implementation and to support the NHLQATC to maintain the National Malaria Slide Bank once it is established.

The NMCP, with technical support from partners, has completed a pilot implementation of RDT QA/QC in one region of the Lake Zone (Kagera). PMI will work with the NMCP to bring that pilot program to scale throughout the rest of the Mainland over the next two years.

The NMCP is working with both the public and private sector to promote universal access to RDTs and ACTs. Current implementation strategies emphasize consolidating universal access to malaria diagnostics in both public and private health facilities, scale-up of diagnostics quality assurance, provision of appropriate management of uncomplicated malaria, and introduction of injectable artesunate for treatment of severe malaria. The NMCP's anticipated implementation strategies include scale-up of RDT provision in Accredited Drug Dispensing Outlets (ADDOs) through price negotiation, training, and the social marketing of RDT in ADDOs, both of which are being piloted with support from CHAI and UNITAID. The NMCP has obligated \$214,558 from the Global Fund through 2015 to scale up RDTs in the private sector through training. The scale-up also includes social marketing of RDTs in private for profit hospital and pharmacies through a UNITAID project in a few selected geographical areas. Since the Global Fund and other partners are supporting the NMCP in the private sector, PMI funds will be primarily focused on the public sector.

### ***Zanzibar***

In 2013, malaria positivity rates in Zanzibar among children under five, patients over five and pregnant women were 0.4%, 1.2%, and 0.3% respectively. As on the Mainland, the Zanzibar malaria strategy calls for parasitological confirmation for all patients with fever. Through PMI support, the ZAMEP has been able to enhance microscopy at hospitals and larger facilities and to provide RDTs to 156 health facilities including all government and some private. This has enabled the program to operate the well-functioning Malaria Early Epidemic Detection System (MEEDS). Malaria microscopy QA/QC was established in 2005 at 23 public health facilities in Zanzibar and as of 2014 had been expanded to 72 (45 public, 10 private, 8 faith-based

organizations, 9 military). While the ZAMEP conducts quarterly supervision visits there is need for a more standardized RDT QA/QC system.

## **Progress in the Past 12 Months**

### ***Mainland***

As noted above, the NMCP and partners recently completed a pilot implementation of RDT QA/QC in Kagera Region. This QA/QC system relies upon trained personnel from regional and council health management teams to conduct supportive supervision at quarterly intervals for health facility personnel who perform RDT testing. With the aid of PMI, the NMCP plans to roll out the model to an additional 5 regions within the Lake Zone beginning in the second quarter of 2014. The model will eventually be implemented in all regions of the Mainland. Malaria Care has conducted a site visit to begin the process of helping the NMCP to develop the workplan for scale-up.

The NMCP participates in the Strengthening Laboratory Management Towards Accreditation (SLMTA) program which consists of baseline and final assessments, supervisory visits, training, and mentorships on laboratory quality management. In 2013 this program accredited 18 hospital laboratories (13 regional, 2 FBOs, 1 private, 1 Special, and 1 Municipal). Another 18 laboratories are targeted to undergo the same process in 2014.

Through its supply logistics contractor, PMI procured 461,200 RDTs for the Mainland in 2013. The partner supported the MOHSW to develop a Logistics Management Unit which will oversee all supply chain activities including malaria commodities. The unit will have focal people at CMS to better coordinate its requisition and supply system to healthcare facilities.

### ***Zanzibar***

To help improve RDT performance, the ZAMEP, in conjunction with a partner, has provided a one-day RDT quality assurance refresher training to 330 health facility personnel in Unguja which represents 93% of the 354 who were targeted. A similar training of an expected 246 participants will take place in Pemba and be completed by June 2014. Sixty laboratory technicians were trained on malaria microscopy and the number of facilities able to competently perform microscopy increased by 40% from 52 to 72. The ZAMEP conducted quarterly supervisory visits to all district hospitals and health centers and held a large stakeholder meeting to provide feedback to the districts about microscopy performance.

PMI supported the procurement of 6,252 RDTs for Zanzibar in 2013.

## **RDT Gap Analysis and Forecasted Needs**

Recent malaria commodities quantification for the public sector takes into account the need for a buffer stock and that the current stock on hand in 2014 is not sufficient to cover the forecasted consumption and to conform to the minimum stock levels mandated at MSD. Reprogrammed funds will be used to help fill this current pipeline with the expectation that forecasted needs will decline in subsequent years once the pipeline is filled. The GF commitment for July 2016-June

2017 is not yet known. PMI will continue to monitor RDT requirements and to reprogram funds as needed.

<b>RDT Gap Analysis for Mainland</b>			
	<b>July 2014-June 2015</b>	<b>July 2015-June 2016</b>	<b>July 2016-June 2017</b>
Number of suspected malaria cases	19,539,731	20,067,303	20,609,121
Diagnostic coverage by microscopy	10%	10%	10%
Diagnostic coverage by RDT	90%	90%	90%
Buffer stock	6%	6%	6%
<b>Number of RDTs needed</b>	<b>18,758,142</b>	<b>19,264,611</b>	<b>19,784,756</b>
PMI commitment (tests)	1,750,000	2,000,000	-
GF commitment (tests)	15,296,683	16,082,799	-
Other sources (GoT, etc)	-	-	-
<b>Gap (-) (tests)</b>	<b>1,711,459</b>	<b>1,181,812</b>	<b>19,784,756</b>
<b>Costs to cover gap</b>	<b>\$872,844</b>	<b>\$602,724</b>	<b>\$10,090,226</b>

## **Plans and Justifications**

### ***Mainland***

PMI funds will continue to be used to support procurement of RDTs and the implementation on the Mainland of a QA/QC system that focuses on RDTs rather than microscopy, as RDTs are the primary means of malaria diagnosis at lower-level health facilities where most patients seek care and the Global Fund is expected to support the microscopy QA/QC system. The RDT QA/QC system has been developed based on the evaluation project done by WRAIR and has been piloted in Kagera Region. Results from the Kagera pilot are being used to develop a scalable package for national implementation. PMI will support the national implementation.

Many persons in Tanzania seek care at private health facilities so to improve overall access to malaria diagnosis NMCP plans to roll out RDT provision to private health facilities. Introduction of RDT services in ADDOs will proceed after analysis of the pilot projects and resolution of some regulatory issues.

### ***Zanzibar***

As Global Fund support for RDTs for FY 2015 has not yet been secured, PMI will plan to support procurement of RDTs for Zanzibar. PMI will continue to support the implementation of a flexible system of external quality assurance to strengthen both RDT and microscopy performance and QA/QC at public facilities in Pemba and Unguja. The ZAMEP intends for this system to include the development of benchmarks, checklists, and standard operating procedures for quarterly QA/QC, supportive supervision of health facility personnel, and strengthening of

the computerized database for monitoring diagnostic performance. This QA/QC support will also be scaled up to private health facilities.

PMI will continue to support the establishment of a PCR laboratory that will be primarily used for entomologic and insecticide resistance monitoring, but which could also perform other molecular studies including parasite resistance markers, assessment of prevalence of asymptomatic infections and gametocytemia.

The ZAMEP plans to use molecular biology techniques for epidemiologic and entomologic testing in Zanzibar. The ZAMEP plans to look at sub-patent infections and is discussing future epidemiologic studies with collaborators (such as the Karolinska Institute) that will involve molecular biology assays. The ZAMEP plans to perform the molecular testing on site once PCR capability is established. Similarly molecular testing for entomologic activities have in the past been outsourced (CDC, Liverpool School, Ifakara Health Institute, etc.). This has resulted in slow turnaround of data needed by the ZAMEP and high costs due to overhead charges by some of the institutes.

The ZAMEP will be able to sustain and maintain a PCR laboratory, since there will be no added personnel salary cost. Most of the cost will be for reagents and laboratory maintenance which the ZAMEP can sustain in their budget and through collaborations. For entomologic activities it is estimated that the yearly running cost (reagents and disposable supplies) for processing entomologic samples, in-house, at the ZAMEP will cost approximately \$2,500 as compared to out-sourcing to Ifakara Health Institute which currently costs about \$4,500 - \$5,000 annually.

### **Budget and Proposed Activities with FY 2015 Funding (\$3,201,000)**

#### ***Mainland***

*RDT procurement.* PMI will continue to support forecasting, quantification, and procurement planning for RDTs. In addition, PMI will procure 2 million RDTs to help to fill the gap between procurement by the Global Fund and actual projected requirement. (\$900,000)

*Supporting use of RDTs in ADDOs.* PMI will support the NMCP's scale-up of RDT use in ADDOs. This will include coordination with the Pharmacy Council, development of standard operating procedures, capacity building via comprehensive trainings, and on-going supervision. (\$500,000)

*RDT Quality Assurance and Quality Control.* Technical and programmatic support will be provided to the NMCP to support the scale-up of a quarterly QA/QC system to five additional regions of the Lake Zone with FY 2014 funds with the aim of extending to an additional 10 regions with FY 2015 funding. This will include support for refresher trainings as well as coordinated quarterly supportive supervision via Council and Regional Health Management Teams. (\$1,250,000)

*Support for NMCP to provide QA/QC supervision.* PMI will provide direct support to the NMCP to allow appropriate supervision of the regional and council health management teams that will be responsible for primary quarterly RDT QA/QC at the health facilities. (\$100,000)

*Integrated supportive supervision.* PMI will support the NMCP's system of supportive supervision which coordinates NMCP supervisory activities both across malaria interventions and with other non-malaria activities. (\$100,000)

### **Zanzibar**

*RDT procurement.* PMI will procure approximately 415,000 RDTs for use in public health facilities. In addition, these supplies may be used for reactive case detection and response in the event of an unusual increase in reported cases identified through the MEEDS. (\$181,000)

*RDT and Microscopy Quality Assurance and Quality Control.* PMI will support the development and implementation of a comprehensive system of quarterly supportive supervision and external proficiency testing. These funds will also cover an annual meeting for feedback to all districts about diagnostic performance. (\$120,000)

*Integrated supportive supervision.* PMI will continue to fund integrated laboratory and surveillance supportive supervision visits on a quarterly basis at all government health facilities throughout Pemba and Unguja as well as scale up to private facilities. This type of integrated visit to the health facilities helps ensure diagnostics and surveillance systems are harmonized. Analysis of the support supervision visits data will be performed on a semi-annual basis and used for further refining and strengthening Zanzibar diagnostics and MEEDS systems. (\$50,000)

## **TREATMENT**

### **NMCP/ZAMEP/PMI Objectives**

#### **Mainland**

ACTs were officially launched in Mainland Tanzania on December 15, 2006. The NMCP adopted artemether-lumefantrine (AL) as the first-line drug and artesunate-amodiaquine (ASAQ) as the second-line drug for the treatment of uncomplicated malaria. In 2013, the NMCP revised the guidelines. Among the updates is the change of regimen for treatment of severe malaria from quinine to injectable artesunate. Parenteral quinine remains as an alternative where parenteral artesunate is not available.

The goal of the NMCP malaria case management policy is to improve access and use of safe, effective, and affordable antimalarial drugs. The NMCP's priorities for 2016 are: to maintain and improve antimalarial drug supplies in the public sector; improve access, quality, and affordable ACTs in the private sector; strengthen the pharmacovigilance system; and strengthen therapeutic drug efficacy monitoring.

PMI has supported several interventions to improve access to ACTs and case management at the health facility level. Through the three Zonal Resource Centers of Arusha, Iringa, and Kigoma, PMI has supported the training of health workers in comprehensive malaria case management, including management of severe malaria and malaria in pregnancy.

#### **Zanzibar**

ACTs were deployed for the first time in Zanzibar in 2003 and the current first-line treatment for uncomplicated malaria is ASAQ. ACTs are widely available in health facilities. The current Zanzibar Malaria Diagnosis & Treatment Guidelines were updated in April 2014 to incorporate various WHO recommendations such as the use of injectable artesunate for treatment of severe malaria, recommended antimalarials for HIV/AIDS patients, and to include the WHO recommendation of the use of single low-dose (0.25 mg base/kg) primaquine for all patients with confirmed uncomplicated *P. falciparum* infection in areas pursuing elimination. The ZAMEP will follow the recommendations of the 2012 WHO Evidence Review Group that state that when G6PD testing is not available, a single dose of 0.25 mg base/kg primaquine in addition to ACT should be given on day zero to all patients with falciparum malaria with the exception of pregnant women and infants less than one year of age. Via its implementing partner, PMI provides support to the ZAMEP in forecasting, quantification, and procurement planning for ACTs and primaquine.

Evidence from a placental parasitemia study conducted in Zanzibar in 2011-2012 showed very low malaria prevalence (0.8%) among pregnant women who were not taking IPTp. The ZAMEP has therefore decided to discontinue IPTp in favor of a strategy of screening and treatment coupled to enhanced malaria prevention methods such as distributing long-lasting ITNs at ANC visits, strengthened capacity for early detection and prompt treatment of malaria in pregnant women, expanded surveillance, and enhanced BCC to encourage women to seek treatment early.

## **Progress in the Past 12 Months**

### ***Mainland***

With PMI and Global Fund resources, NMCP updated the National Diagnostic and Treatment Guidelines and began implementation roll-out. The training objectives were 1) to reinforce appropriate practices for care of malaria patients and management of commodities, 2) to instruct healthcare workers on the use of injectable artesunate for the treatment of severe malaria, and 3) to orient healthcare workers about the increased IPTp dosing schedule. The first phase of this roll-out was to all government hospitals and health centers and took place from October to December 2013. The second phase is for dispensaries; it began in May 2014 and is expected to continue through November 2014.

Analysis of the data from the therapeutic efficacy monitoring conducted at 8 sentinel sites in 2011 and 2012 to assess *in vivo* efficacy of ACT was completed. The monitoring was hampered by enrollment that was both slower and lower than expected and by the fact that many of the cases had an insufficient number of parasites. Nevertheless the results clearly showed that the two ACT combinations studied, AL and ASAQ, still retain very high efficacy.

PMI provided technical assistance for the annual quantification and procurement planning for ACTs and RDTs, including procurement planning for commodities funded by the Global Fund. Bi-annual reviews were done to update stock tables and procurement plans. This exercise has assisted the MOHSW, NMCP, CMS, and the Pharmaceutical Services Section to manage the commodity pipeline for the country. The MOHSW has set minimum and maximum standards for stock availability at six and nine months, respectively.

## **Zanzibar**

The Integrated Management of Childhood Illness (IMCI) guidelines were updated to include the most recent WHO malaria recommendations and a total of 600 copies were printed with support from PMI. Distribution and training on the use of the guidelines is ongoing. To date, they have been distributed to 56 facilities in Pemba and Unguja and 210 of 400 healthcare workers have undergone a three-day training.

PMI has supported the strengthening of the logistics system for ordering essential medicines, which includes ACT and RDTs. Two hundred and thirty-three health workers from 86 health facilities and 43 CMS and districts management team staff have received training on ordering and stock management. The project is also working to improve the distribution system for essential medicines. A team of technical advisors is working to re-define the distribution route using Llamasoft® software. This will improve CMS efficiency in distribution thus reducing operation costs. On an annual basis, with support from partners, the ZAMEP and CMS conduct quantification of malaria commodities and support monitoring the supply plan for the whole country.

### **Commodity Gap Analysis**

Funding for ACTs in the public sector has been supported primarily by Global Fund with PMI providing secondary support. Recent malaria commodities quantification for the public sector takes into account the need for a buffer stock and that the current stock on hand in 2014 is not sufficient to cover the forecasted consumption and to conform to the minimum stock levels mandated at MSD. Reprogrammed funds will be used to help fill this pipeline. The GF commitment for July 2016-June 2017 is not yet known. PMI will continue to monitor the ACT need and to reprogram funds as necessary.

<b>ACT Gap Analysis for Mainland</b>			
	<b>July 2014- June 2015</b>	<b>July 2015- June 2016</b>	<b>July 2016- June 2017</b>
Number of confirmed cases*	4,360,450	4,478,182	4,151,275
Number of clinical cases*	3,278,186	3,366,697	3,120,928
Total cases	7,638,636	7,844,879	7,272,203
<b>Number of treatments needed **</b>	<b>12,911,100</b>	<b>9,709,080</b>	<b>8,050,680</b>
PMI commitment (treatments)	1,500,000	-	
GF commitment (treatments)	9,580,026	9,960,080	-
Other sources (GoT, etc)	-	-	-

<b>Surplus (+) or Gap (-) (treatments)</b>	<b>-1,831,074</b>	<b>+251,000</b>	<b>-8,050,680</b>
<b>Costs to cover gap</b>	<b>\$2,435,328</b>	<b>-</b>	<b>\$10,707,404</b>

\*Based on prevalence estimates/projections

\*\* Projected number of treatments is higher than the projected number of cases because it includes current stock on hand, forecasted consumption, procurement lead time, mandated maximum and minimum stock levels at MSD, and required buffer stock. After filling the pipeline deficit in 2014, the expected need will decrease in subsequent years.

### ***Zanzibar***

The Global Fund is expected to procure all the ACT needs for Zanzibar, thus no PMI funds are being budgeted for medication.

### **Plans and Justifications**

#### ***Mainland***

PMI will support NMCP and the Zonal Resource Centres to train health workers in comprehensive malaria case management at private facilities and at the dispensary level according to the revised NMCP Diagnostic and Treatment Guidelines.

Programmatic decisions regarding changes to malaria treatment policy require continuous data to demonstrate that first and second-line regimens remain effective at treating malaria parasitemia. Until molecular markers of resistance are identified, measurement and reporting of parasite clearance on day three after treatment with ACTs is particularly important, as this is one of the first signals of artemisinin resistance available today. PMI will support drug efficacy monitoring following the standard WHO protocol at four to five sentinel sites on the Mainland.

The MOHSW continues to develop a national integrated community health worker (CHW) program. CHWs in Tanzania do not currently perform RDT testing and are not allowed to dispense ACTs. NMCP has requested PMI funds to help develop a pilot program to introduce the addition of IPTp and a malaria diagnostic and curative package (RDT and ACT) at the CHW level.

To improve the procurement of needed commodities, PMI will support forecasting, quantification, and procurement planning for ACTs and RDTs and will support the CMS and MOHSW Pharmaceutical Supply Unit to institutionalize supply chain management functions. Support for malaria commodity logistics will continue to focus on monitoring the Integrated Logistics System to ensure continued availability of ACTs and other malarial commodities at health facility level. The logistics monitoring capacity of the district malaria/IMCI focal people will be strengthened and additional support provided on inventory control procedures at central, regional, and facility levels.

Pharmaceutical and supply chain strengthening activities will also include: conducting quarterly end-use verification surveys to a sample of health facilities and zonal warehouses to monitor the availability of key antimalarial commodities; visits to health facilities and regional warehouses to detect and respond to critical issues such as ACT (or other drug) stockouts; establishing systems

for monitoring distribution of ACTs and RDTs from the Medical Store departments to health facilities; and repacking of ACTs. PMI support will address medical waste management and final disposal, as per U.S. Government and local environmental laws.

#### Diagnosis and Management of Febrile Illness

For the past five years PMI has supported the integrated service delivery project in the Lake Zone aimed at improving child health through strengthening the capacity of facility-based health workers to provide fundamental diagnostic and treatment services for malaria and other major causes of severe febrile illness and death in children under five years of age. With the project's support, the proportion of children under five years old tested via RDT/microscopy before antimalarial treatment improved, as did the proportion with positive results who received correct antimalarial treatment from a skilled HCW in the first 24 hours after onset of fever.

As part of joint PMI and USAID programming in child health, community-focused efforts with funding from Maternal and Child Health and HIV/AIDS have contributed to reductions in under-five mortality by strengthening the referral to health facilities of sick children identified in the community.

PMI will support the training of health care workers in health care facilities in 6 regions of the Lake Zone in case management, supply chain management and quality improvement. It will also train laboratory workers on RDT and quality malaria microscopy, and develop a system for checking accuracy. The team will continue training the Regional and Council Health Management Teams in supportive supervision and onsite mentoring to facility-based quality improvement teams, and will arrange for monthly visits from coaches. These interventions will upgrade the skills of health workers in quality improvement and case management of febrile illness for children under five years of age. The program will ensure availability of updated guidelines and algorithms for health facilities to aid in differential diagnosis for febrile illnesses. PMI will also facilitate linkages between the primary health facilities and the community health workers.

In order to increase locally-raised resources and sustainability to support case management, the project will facilitate identification of private sector organizations to support child health and management of malaria and febrile illness as part of their corporate social responsibility. The private sector organizations include private corporate companies like the mining companies in the Lake Zone and banking companies. PMI will support Council Health Management Teams to leverage funds from these companies to support the availability of commodities such as RDTs and ACTs in their respective councils. Community networks and leaders will be organized and trained to promote health-seeking behaviors and address obstacles to accessing services. These partnerships and networks will strengthen referral systems and improve access for the most vulnerable children. PMI will also facilitate transitioning of project activities to the respective local government authorities.

#### ***Zanzibar***

PMI supports the dissemination of the ZAMEP treatment guidelines. As these include the addition of primaquine treatment of all confirmed cases to reduce gametocytemia, the ZAMEP

plans to conduct a study on how best to implement this new use in Zanzibar and to ascertain the occurrence of any unexpected problems of hemolysis due to undiagnosed G6PD deficiency.

As the ZAMEP has revised the guidelines to discontinue IPTp, PMI will provide support to develop a replacement system for screening and treatment of pregnant women.

PMI will support the ZAMEP to collect consumption and logistics data needed for annual quantification and procurement planning, implement end-use verification surveys to monitor availability and use of malaria commodities at health facility level, and handle medical waste and final disposal of expired ACTs and RDTs.

### **Budget and Proposed Activities with FY 2015 Funding (\$4,665,000)**

#### ***Mainland***

*ACT procurement to fill needs in the public sector.* The Global Fund is expected to procure most ACT needs on the Mainland. However, there remains a gap; thus, PMI is planning to procure approximately 2 million ACTs to ensure no stockouts. (\$1,000,000)

*Artesunate procurement.* PMI will procure injectable artesunate to fill the gap not covered by the Global Fund. (\$1,315,000)

*Support for IMCI/severe malaria and fever management for children under five.* PMI will provide funds to support the strengthening and scale-up of facility-based management of febrile illness. (\$650,000)

*Strengthen pharmaceutical management and supply chain system.* PMI will support strengthening of quantification for malaria commodities, transportation, storage, inventory management and end-use verification. (\$750,000)

*Routine therapeutic drug efficacy monitoring.* PMI funds will be used to support routine *in vivo* efficacy monitoring of artemether-lumefantrine and second-line treatments at four to five sites. (\$250,000)

*Integrated Community Case Management (iCCM).* PMI funds will be used to support the inclusion of a malaria curative package at the CHW level as well as printing and dissemination of guidelines. (\$500,000)

#### ***Zanzibar***

*Strengthen pharmaceutical management and supply chain system.* PMI will support improved quantification for RDTs and antimalarial drugs, transportation, storage, and record keeping. (\$200,000)

## **MONITORING AND EVALUATION**

### **NMCP/ZAMEP/PMI Objectives**

## **Epidemic Surveillance & Response**

### ***Mainland***

The malaria risk profile is becoming more heterogeneous throughout the Mainland as malaria prevalence has decreased more in some regions than in others. True malaria epidemics are uncommon, but seasonal increases in transmission do occur. Thus, the Mainland is working towards developing a sustainable Malaria Early Epidemic Detection System (MEEDS) that can detect sudden increases in transmission. The NMCP's principal objectives for epidemic surveillance are: 1) to attain 100% reporting of key malaria indicators from all districts, 2) to establish a MEEDS in areas of unstable transmission to detect 100% of malaria epidemics within one week of onset, 3) to effectively respond to malaria epidemics within two weeks of detection, and 4) to strengthen monitoring and evaluation of malaria control interventions, activities, policies, and strategies.

### ***Zanzibar***

PMI continues to focus attention and resources to epidemic surveillance and response activities in Zanzibar which is in the pre-elimination phase. In FY 2008, PMI provided technical and financial support to the ZAMEP to develop and implement a MEEDS. The system includes a strategy to collect daily data for three key indicators (total visits, confirmed malaria-positive cases, confirmed malaria-negative cases) among outpatients visiting peripheral health facilities. Weekly aggregated data, stratified by age, are transmitted from each health facility using a customized cell phone menu. All data are received by a computer server operated by a Tanzanian telecommunications company. The weekly data are processed by the server and packaged into two useful formats: 1) text messages with weekly data summaries sent to cell phones of key ZAMEP staff and district medical officers; and 2) longitudinal weekly data made available for viewing over a secure web site.

Zanzibar instituted a Malaria Case Notification (MCN) system at the end of 2011 with the aim of conducting a household investigation of every confirmed case of malaria infection within 24 hours of notification from the health facility where the case was diagnosed. In this system, the District Malaria Surveillance Officer (DMSO) travels to the case household to interview and test household members and occasionally those of neighboring households when specific hotspots are identified and investigated. While there, the DMSOs provide BCC materials on the need for early testing and adherence to treatment. They ascertain ITN use and provide coupons for a free net as needed. They also identify visible larval sources and provide information on environmental management.

## **Monitoring and Evaluation (M&E)**

### ***Mainland***

The NMCP's objectives for M&E in addition to the above epidemic surveillance objectives are: 1) to attain 100% reporting of routine and periodic key malaria indicators from all districts 2) to strengthen and expand the scope of the M&E malaria indicators collected periodically, including intervention coverage, quality of service provision, parasite prevalence, vector susceptibility and dynamics, therapeutic efficacy of medicines, and availability of quality assured commodities and

3) to develop a comprehensive framework for collecting and storing malaria impact, outcome, and output data from programmatic monitoring and periodic surveys including nationwide household surveys and sentinel surveillance in pregnant women and school-aged children.

### ***Mainland and Zanzibar***

The NMCP receives a large amount of data from its own M&E activities and those of multiple national and international malaria partners. For several years, PMI has been supporting efforts to: 1) strengthen the data management unit within the NMCP to store, analyze, and disseminate information for decision making, 2) hold regular meetings to discuss M&E activities, and 3) make regular M&E supervisory visits to the field. PMI will continue to support these activities.

PMI has worked closely with colleagues from the NMCP, the ZAMEP, Global Fund, WHO, World Bank, Malaria Control and Evaluation Partnership in Africa, other units of the MOHSW (e.g., HMIS, Integrated Disease Surveillance and Response (IDSR), and Health Sector Reform), and other sectors of the Government of Tanzania (National Bureau of Statistics, Ministry of Education) to promote coordinated M&E efforts.

The following data sources and timelines provide the foundation for PMI's and the Government of Tanzania's evaluation of malaria control outcomes and impact.

*Demographic and Health Surveys (DHS)*. Every four to five years, the DHS collects nationally representative, population-based data for a wide variety of demographic and health indicators, including core malaria intervention coverage indicators, anemia, and all-cause under-five child mortality. It is conducted by National Bureau of Statistics with technical assistance from Macro International. The last DHS was conducted in Tanzania during December 2009 – May 2010. The next Tanzania DHS is scheduled for 2014-2015.

*Malaria Indicator Survey (MIS)*. The MIS survey assesses core household coverage and morbidity indicators used in Tanzania. In 2007 and 2011, PMI co-funded the first and second population-based MIS combined with an AIDS Indicator Survey (THMIS). The 2011-12 THMIS survey results were officially released in March 2013 and provided critical data for NMCP/PMI's effort to evaluate the impact of malaria control efforts (see *Progress on Coverage and Impact Indicators section* for results). The main benefit to malaria is that with the larger AIS funding and sample size, regional level data were obtained for parasitemia (as with HIV prevalence) without an added cost. However, as new PEPFAR requirements will now mandate more intensive sampling it is unlikely that the MIS will be combined with the AIS in future years. Instead the MIS will most likely be combined with the DHS.

*Service Provision Assessment (SPA)*. The Service Provision Assessment is an evaluation conducted every four to five years in public and private health facilities and collects actionable information on the availability and quality of facility infrastructure, resources, and management system and on services, including child health, maternal health, and infectious diseases such as malaria, tuberculosis, and HIV. Tanzania carried out a SPA in 2006 that included a malaria case management module that provided baseline information for PMI. A SPA is planned to start in September 2014 with previous years' PMI funding.

Health Management Information System (HMIS/DHIS2). The objectives of the HMIS/DHIS2 are to provide data for monitoring key process, outcome, and impact indicators over time: 1) standardized laboratory-confirmed malaria cumulative incidence per year, among patients under five years old, patients older than five years, and pregnant women; 2) IPTp uptake among pregnant women; and 3) standardized crude laboratory-confirmed malaria death rate among patients under five years of age, patients older than five years, and pregnant women. Historically, the majority of malaria cases reported to this system represented clinical diagnoses, usually non-specific fever. However, this situation is changing as Tanzania continues to scale up the use of RDTs at health facilities of all levels. HMIS information is reported annually through Council Health Management Teams and the Health Statistics Abstract. Data flows from the health facility level up to the central level, where it is compiled, analyzed, and reported. Currently, a major multi-donor initiative (including PEPFAR) is reforming the existing paper-based HMIS platform to the electronic DHIS2. When fully implemented this is expected to reduce duplicate facility level data collection, reporting and entry. PMI staff continues to ensure that malaria is well represented in the ongoing DHIS2 implementation plans.

Integrated Disease Surveillance and Response (IDSR). IDSR captures data on notifiable/epidemic-prone diseases which are reported on a daily, weekly or monthly basis depending on the disease. The new national IDSR guidelines are in place and the new participant manuals and eIDSR reporting booklets have been distributed. Three malaria data variables are captured in the IDSR– total tested (RDT/microscopy), total positive, and total treated clinically. The long term strategy for IDSR is to use mobile phone technology for data submission (eIDSR) and this has been piloted in 4 regions of Tanzania. The eIDSR uses the DHIS2 as the platform for data capture, analysis, and reporting.

Implementing Partner Reporting System (IPRS). Effective performance monitoring is critical to PMI success in achieving results. Since 2010, PMI has relied on the Implementing Partner Reporting System (IPRS) as the USAID/Tanzania Mission’s source of data for PMI Annual Reporting. IPRS is a web-based system where PMI implementing partners enter their performance data on a quarterly basis.

Monitoring and Evaluation Strengthening Initiative (MESI). This is an on-going activity, led by the Government of Tanzania and supported partially by PMI, aimed at strengthening the Health Management Information System (HMIS) to better collect, manage, and report health data.

End-Use Verification Surveys (EUV). This is a public health facility supply chain monitoring activity to assess the performance of the public health supply chain, focused first on malaria commodities. The activity provides key information regarding the availability of these products, as well as visibility into how malaria is being diagnosed and treated at the health facility level. Tanzania was the pilot country for the EUV in Jan 2009, and has continued to implement the activity on a quarterly basis since that time. Supply chain information is captured not only for malaria commodities, but also for other essential medicines and reproductive health commodities.

## Entomologic monitoring

Three categories of routine entomologic monitoring are supported by PMI on the Mainland and Zanzibar:

1. Insecticide resistance monitoring of products used for vector control (once per year at 22 sites on the Mainland and a total of 10 sites for Zanzibar)
2. Cone bioassay monitoring of residual insecticidal activity on sprayed walls (every 4-9 weeks on the mainland and monthly at 10 sites in Zanzibar)
3. Monitoring of vector species abundance and distribution, feeding/resting behavior, sporozoite rates (seven sites monthly on the mainland and in Zanzibar the monitoring was expanded from twice a month at 7 sites to monthly at 22 sites)

### *Mainland*

The national resistance monitoring on the Mainland, supported by PMI through its implementing partner NIMR Amani Research Center, currently consists of 22 sentinel sites from 22 regions in the Mainland. These include the 2013-2014 PMI IRS districts of Mara and Mwanza and a previous IRS district of Kagera. These sites were selected based on areas with high malaria prevalence, history of insecticide use (both for public health and in agriculture) in the area, level of ITN coverage, demography (urban/rural) and site accessibility.

The NIMR-Mwanza entomology facility, serving as a regional entomology center for the Lake Victoria basin, conducts routine entomologic monitoring of PMI-supported IRS activities in the districts. Monthly mosquito collections performed by the Regional/District Health authorities are sent to NIMR-Mwanza for processing and analysis from a total of seven sentinel sites in Kagera, Geita, Mwanza and Mara Regions. In addition, cone wall bioassays are conducted to monitor residual insecticide activity for IRS. In 2010, when IRS was expanded in Mwanza, Geita and Mara Regions, entomologic monitoring was correspondingly expanded and currently there are seven sentinel sites to cover the IRS regions.

### *Zanzibar*

From 2005 – 2012 the ZAMEP conducted longitudinal entomologic monitoring in 4 sentinel sites in Unguja and 3 in Pemba. Analysis of the MEEDS data from 2009-2012 indicated areas of persistent malaria transmission. In November 2013, entomologic monitoring was expanded to 12 sentinel sites in Unguja and 10 in Pemba to evaluate these areas of persistent malaria transmissions. This provides information on vector species and density, human blood feeding index and malaria infection rates in the various vector species. In addition, the ZAMEP also conducted IRS monitoring activities such as residual efficacy testing and insecticide resistance monitoring.

The ZAMEP conducted wall contact bioassays to monitor the efficacy of bendiocarb on sprayed surfaces, using their colony of susceptible *An. gambiae s.s.* As part of the insecticide resistance mitigation plan and in preparation for rotation of bendiocarb (a carbamate) to pirimiphos-methyl CS (an organophosphate) that will be used for the IRS in 2014, the residual efficacy of pirimiphos-methyl CS was evaluated. The ZAMEP continues to conduct yearly insecticide resistance monitoring in both islands at five sites each on Pemba and Unguja.

## Progress in the Past 12 Months

### *Mainland*

The basic HMIS/DHIS2 system has been successfully rolled out countrywide as of December 2013. A new 'malaria module' within the DHIS2 was a later addition and has now been rolled out in 10 regions. PMI supported the successful pilot of the eIDSR system in four regions of Tanzania through its implementing partner and will continue to support the rollout to facilities in the Lake Zone and eventually in other regions. PMI also supported a one-year pilot of sentinel population malaria surveillance among pregnant women and infants in the Lake Zone.

The NMCP, in conjunction with the Wellcome Trust/KEMRI and Ifakara Health Institute, has developed a Malaria Epidemiologic Profile which it will use to better focus malaria control efforts. The draft Malaria SME Strategic Plan is nearing finalization and should be disseminated by the end of 2014. With PMI support, the NMCP has reconstituted the Surveillance, Monitoring & Evaluation technical working group and held the first meeting of the wider SME network.

Along with other USAID health programs PMI is co-funding with FY 2014 funds midterm and end-of-project evaluations of the management of febrile illnesses project (Tibu Homa) in Lake Zone and the Tanzania Capacity and Communication Project Behavior Change communication program. The statements of work for these evaluations have been completed and are in the process of procurement. Findings from these evaluations will inform future programmatic planning.

### *Entomologic Monitoring*

NIMR-Amani has established a total of 22 sentinel sites for insecticide resistance monitoring and pyrethroid resistance has been detected in many of the 22 sites. In 2013, the national insecticide resistance monitoring program carried out insecticide resistance testing in 18 of the 22 sites using the WHO standard assay for permethrin, deltamethrin, bendiocarb, fenitrothion, lambda-cyhalothrin and DDT. The mosquitoes used in these tests were identified to species by molecular assays. In addition the mosquitoes were tested for the *kdr* insecticide resistance mechanism by molecular assays and enzymatic resistance mechanisms were tested using biochemical assays. Permethrin resistance, ranging from 4% to 39.8% was detected in 10 of the 18 sites. Similarly lambda-cyhalothrin resistance (7% - 66%) in 13 of the sites and deltamethrin resistance (11% - 46%) in 6 sentinel sites. Resistance to all three pyrethroids was detected in 6 of the 22 sites. In PMI IRS regions, 22% and 25% resistance was detected at the Mwanza and Mara sentinel site, respectively. 13% resistance was detected for fenitrothion (an organophosphate) only in Mbeya Region at the Kyela site and DDT resistance (2.3% - 16%) was detected in five regions. Bendiocarb resistance was detected in three regions, none of which were in the PMI IRS area.

Monitoring of the residual efficacy of the IRS in the Lake Zone were conducted in one site in each of Geita Region and Mwanza Region, which were areas were sprayed with bendiocarb. In Mara Region, which was sprayed with deltamethrin, residual efficacy monitoring was carried out at one site. The cone bioassays using susceptible *An. gambiae s.s.*, from the NIMR-Mwanza facility were tested on different wall surfaces (mud, cement, painted and wood). Residual efficacy monitoring in the Lake Zone of the 7<sup>th</sup> spray campaign of 2013-2013 indicated that

cement and painted surfaces had longer residual efficacy: three-four months post-spray for deltamethrin and two-three months for bendiocarb. On mud surfaces the residual effect of bendiocarb and deltamethrin declined more rapidly than on the other surfaces.

Currently entomologic monitoring for vector species is being carried out at seven sentinel sites: Muleba and Karagwe in Kagera Region, Chato in Geita Region, Sengerema and Ukerewe in Mwanza Region, and Serengeti and Tarime in Mara Region. In 2013, light traps and clay-pot traps were used for monthly collections. PCR species identification showed that vector species composition varied between regions. Only *An. funestus* s.l. was collected in Karagwe (72.9% of the 177 mosquitoes), Chato (81.3% of 32 mosquitoes) and Muleba (80% of 20 mosquitoes). In In Sengerema a greater proportion of *An. arabiensis* (32.2% of 90 mosquitoes) than *An. gambiae* s.s (10%) was found. In Ukerewe however more *An. gambiae* s.s. (70.5% of 61 mosquitoes) than *An. arabiensis* (29.5%) were collected. In Tarime the predominant species collected was *An. arabiensis* (57.8% of 109 mosquitoes) and in Serengeti, *An. gambiae* s.s (13.3% of 15 mosquitoes), *An. arabiensis* (20%) and *An. funestus* s.l. (33%) were found. Mosquitoes were found to be positive for *P. falciparum* in Karagwe(1.3%), Chato (1.9%), Sengerema (1.7%) and Tarime (0.8%)

## **Zanzibar**

### Epidemic response

As of 2014 the MEEDS system covers a total of 156 reporting sites, consisting of all government health facilities in Zanzibar and some of the larger private facilities. The ZAMEP is planning for eventual expansion to all private health facilities. A data quality assessment showed that the completeness of reporting has reached 100% with >75% reporting within one week. There is >90% agreement between MEEDS and HMIS data. The ZAMEP has increased the number of DMSOs to have two per district.

In 2013 a total of 3,116 cases of malaria were reported in Zanzibar. Of these, 2,603 were detected through passive surveillance at health facilities and the remaining 513 through active surveillance via the MCN system. Of the 2,603 cases identified through passive surveillance, 1,814 (69.7%) were investigated by DMSOs via the MCN. Through this case investigation, a total of 7,615 household members were tested for parasitemia and 513 (6.7%) were treated. Only twenty-nine percent of the cases reported recent travel, indicating that most transmission occurred locally. The overall functioning of the MCN is good. Nevertheless, some impediments to timely and complete follow-up remain and in 2013 only 61% of cases were seen within 24 hours and only a total of 76% of cases were followed-up. The ZAMEP disseminated information about the functioning of the MEEDS and MCN to the districts via quarterly reports. Using data from the MCN, the ZAMEP has initiated village mapping to highlight foci of transmission (hotspots) in relation to implementation of various interventions.

Because of very low rates of asymptomatic parasitemia detected during large-scale reactive case detection conducted in prior years, the ZAMEP has revised their epidemic response guidelines to focus reactive case detection efforts on family/household members.

### Entomologic monitoring

WHO insecticide resistance testing was carried out at five sites each on Pemba and Unguja. In addition to determine whether the pyrethroid resistance was due to an oxidase mechanism, the WHO assay with the synergist piperonyl oxide (PBO) was performed. Mosquitoes tested for resistance were sent to the Liverpool School of Tropical Medicine and the CDC in Atlanta for PCR species identification, since there is currently no PCR capability in Zanzibar. The mosquitoes were also screened for target site mutations of insecticide resistance mechanisms (*kdr*).

In Pemba, resistance was detected for all four sites monitored for lambda-cyhalothrin (18% - 87%), for three sites monitored for permethrin (24% - 37%), for one site for deltamethrin (87%) and the two sites DDT (37% - 63%). No resistance was detected for bendiocarb and pirimiphos-methyl CS. In Unguja, lambda-cyhalothrin resistance (24% - 40%) was detected in four of the five sites tested and permethrin resistance (37%) in one of the two sites tested. There was no insecticide resistance detected for bendiocarb, pirimiphos-methyl CS and DDT. Resistance was not homogeneously expressed across both islands. Dose-response assays indicated that the pyrethroid resistance is 2-4 times stronger in Pemba than Unguja. The widespread pyrethroid resistance in Unguja and Pemba should be monitored closely as this may impact the efficacy of long-lasting ITNs. Synergist assays with PBO restored the susceptibility to pyrethroids indicating that the resistance is in part due to an oxidase enzyme mechanism. For the first time, the *kdr* resistance mutation (target site insensitivity) was detected in Pemba and testing of the mosquitoes continues.

Residual efficacy of bendiocarb was monitored using the WHO cone bioassay on six houses with different wall surfaces (mud, oil painted, water painted, lime washed, un-plastered cement, and un-plastered stone blocks). Two- to five-day old susceptible *An. gambiae* s.s mosquitoes from the insectaries in Pemba and Unguja were used. The baseline was conducted one day post-spray followed by monthly monitoring for four months.

Residual efficacy of bendiocarb testing in Pemba indicated that efficacy decreased rapidly to below 90% after the first month on all surfaces tested. In Unguja, bendiocarb was still effective up to three months post-spray except on mud walls. Similar residual testing for pirimiphos-methyl CS indicated 100% residual efficacy up to six month post-spray. pirimiphos-methyl CS residual efficacy on lime-washed walls decreased to 80% in Pemba and 90% in Unguja on the seventh month. The apparent long-lasting residual efficacy is promising and this evaluation continues.

Routine entomologic monitoring continued at four sentinel sites in Unguja and three in Pemba in 2013. Mosquitoes were initially identified morphologically. The mosquitoes will be sent for PCR species identification. Testing for malaria infection using the ELISA method has been delayed due to the breakdown of the ELISA machine and will resume when the machine is replaced. Vector density distribution in Zanzibar is bi-modal, associated with the two rainy seasons.

There has been a shift in vector species composition and vector dynamics on both islands since 2005. *An. arabiensis* continues to be the predominant vector in Pemba and *An. merus* was found in Pemba. There was an increase in the number of *An. gambiae* s.s collected in Unguja in 2013

compared to the previous years. *An. quadriannulatus* and *An. merus* was also collected in Unguja. Man landing collections at the sentinel sites in Pemba continue to show that transmission is occurring mainly through outdoor biting, a pattern consistent with the predominance of the more exophilic and exophagic *An. arabiensis*. However in Unguja, biting is now occurring both indoors and outdoors and this may reflect the increase in *An. gambiae*.

### *Monitoring and Evaluation*

With FY 2012 funds, PMI contributed \$450,000 to support the second national facility-based survey—the Tanzania Service Provision Assessment (TSPA). The TSPA is currently in the planning stages, will be implemented in May 2014 and will provide information at regional level on the availability, readiness, and quality of malaria and other health and HIV/AIDS services at the regional level. Preliminary stakeholder meetings have been conducted on the Mainland and Zanzibar.

PMI supported the integration of malaria indicators into the electronic IDSR surveillance system and its piloting in four regions of Tanzania. As it is still not fully operational continued reliance on paper-based reporting will continue until the system is fully rolled out. In addition to the new malaria prevalence indicators in the HMIS/DHIS2, NMCP is working with the HMIS unit to add other indicators to better quantify at the health facility level the number of patients with a positive malaria test who are dispensed antimalarial drugs.

PMI has identified Tanzania as a site for the pilot routine information system strengthening activity. This selection was based on the findings from Tanzania malaria control impact evaluation (completed 2012) that noted that the poor quality of malaria data (appropriate case definition, completeness, and timeliness of reports) from the routine system made it difficult to analyze and interpret the data. A PMI technical team has conducted an evaluation site visit and is working with a partner to develop a pilot program to help strengthen the routine surveillance system.

In 2011, the NMCP, in collaboration with partners, undertook a comprehensive review of the progress and performance of the malaria program for the period of 2002 to 2011. The objective of the review was to assess the current policies, strategies, and activities with a view of strengthening the malaria control program and health systems used in delivery of malaria control services. The major MPR finding was a significant increase in resources for malaria that led to the scale-up of malaria control interventions, especially ITNs and ACTs in both the public and private sector. The MPR identified gaps in the management capacity at NMCP, lack of Government of Tanzania capacity to sustain the gains, absence of a robust ITN strategy to sustain net availability, inadequate use of new epidemiological data to target interventions, an outdated insecticide resistance mitigation plan that threatens the IRS and ITN strategy, and lack of innovations to improve antenatal attendance and IPTp coverage. Most of the identified gaps are now being addressed by the NMCP.

## **Plans and Justification**

### *Mainland*

The core of the routine malaria surveillance system is the HMIS/DHIS2 and the IDSR. In conjunction with other donors, PMI is supporting the strengthening of these two platforms and

the implementation of the electronic reporting system which is expected to substantially reduce the time delays NMCP has experienced in receiving, analyzing, and acting upon the data. In addition to data from the routine surveillance system the NMCP receives reports and data from a wide array of their own M&E activities, plus ongoing activities in other parts of the MOHSW, sentinel surveillance sites, and from all PMI-funded partners. Data flow and utilization of these data need to be improved. PMI support will strengthen the data management unit within NMCP to collect, store, analyze, display, and disseminate information for decision making.

PMI will continue to support and evaluate the Mission-wide M&E services contract which covers a broad range of M&E services such as: 1) performance monitoring (via a web-based reporting system), 2) M&E Capacity Building and GIS mapping of USAID/Tanzania activities, and 3) Data Quality Assessment and Evaluation. The web-based performance monitoring system will collect and store data before reporting and includes all required PMI reporting indicators. Implementing partners enter performance data quarterly and upload their narrative reports that serve as data sources.

Several partners have joined forces to undertake a comprehensive study of the durability of ITNs in Tanzania titled *The Useful Life of Bednets for Malaria Control in Tanzania: Attrition, Bioefficacy, Chemistry, Durability and Insecticide Resistance* (ABCDCR study). In light of this, PMI will not support a durability study.

Tanzania has changed its guidance to reflect the WHO recommendation that IPTp-SP should be provided to all pregnant women at each scheduled ANC visit after the completion of the first trimester. However, given the potential risks associated with use of IPTp-SP in areas with highly resistant parasites, monitoring for the development of these resistant parasites is crucial. With FY 2014 funding PMI proposed to monitor the prevalence of resistance markers against SP in parasites recovered from pregnant women attending first ANC visits at the sentinel sites that were part of the OR study to monitor malaria parasitemia among pregnant women and infants. As the local IRB approval for the maintenance of those sentinel sites has expired this activity has been put on hold until the new IRB approval comes which is expected soon.

### ***Zanzibar***

PMI will support maintenance of MEEDS at all government health facilities and eventual scale-up to 100% of private facilities. Refresher training and supportive supervision visits for diagnostics and surveillance will be increased. PMI will continue to support reactive case detection among household and neighborhood contacts of confirmed cases. Epidemic confirmation procedures will be maintained and response systems further strengthened to allow the ZAMEP to deploy a small cadre of trained staff to investigate all suspected epidemics.

## **Budget and Proposed Activities with FY 2015 Funding (\$2,510,000)**

### **Epidemic Surveillance and Response**

#### ***Mainland***

*Support for continuation of eIDSR rollout.* The MOHSW has begun rollout of the eIDSR with plans to cover 5 regions in 2014, an additional 5 to 10 regions in 2015, and the remaining regions (approximately 10) in 2016. (\$700,000)

### ***Zanzibar***

*Maintain MEEDS and outbreak preparedness/response.* Support readiness for malaria epidemic investigation and response (e.g., active or reactive case detection using RDTs, mass treatment of fever cases in the affected community, focal IRS, and supplies for management of severe malaria) will require adequate stocks and periodic rotation of commodities. (\$550,000)

## **Monitoring and Evaluation**

### ***Mainland***

*Malaria Program Review.* PMI in partnership with other partners will contribute towards the next MPR which should take place in 2016 on the Mainland. The MPR will assess the progress made in addressing the gaps identified in the 2011 MPR, and the innovations made to further reduce malaria transmission on the Mainland. (\$50,000)

### ***Mainland and Zanzibar***

*Provide support for Malaria Indicator Survey.* PMI will provide support for early preparations for the 2016-17 MIS, which includes malaria prevalence biomarkers and provides critical outcome and impact data. (\$300,000)

*Technical assistance for M&E.* CDC staff will conduct three TA visits to assist with strengthening of malaria surveillance and other monitoring activities, including technical expertise in malaria program reviews, national and special surveys, and routine health information systems. (\$36,300)

## **Entomological Monitoring**

### ***Mainland***

*Entomologic monitoring.* This includes longitudinal monitoring in the Lake Region, insecticide resistance monitoring at 22 national sentinel sites, and will include in the Lake Victoria Basin area and WHO bioassays to monitor insecticide residual efficacy. 11 sites of the 22 sites will be tested each year, such that each site will be tested once every two years. This will provide a database of insecticide resistance and efficacy for the NMCP and other partners. (\$650,000)

### ***Zanzibar***

*Entomologic monitoring.* PMI will continue support to the ZAMEP in entomologic monitoring. In view emerging of pyrethroid resistance in Zanzibar, focal areas with persistent transmission, changes in insecticide class for IRS activities, shift from blanket spraying to targeted and focal IRS strategies and scale-up to universal ITN coverage, the ZAMEP expanded entomologic monitoring from four to twelve sites in Unguja and from three to ten sites in Pemba. The program will continue to review and re-focus the current entomology surveillance strategies in line with the changes in vector control strategies. PMI will continue to assist the ZAMEP in

developing its molecular laboratory capability for entomological and epidemiological monitoring and surveillance. (\$152,400)

*PCR-based entomologic monitoring.* PMI will support operational costs, maintenance, fuel for generator. To cover PCR for both entomology and diagnostic work. (\$25,000)

***Mainland and Zanzibar***

*Procurement of entomological reagents.* PMI will continue to support procurement of entomology supplies and laboratory reagents for the insectary, testing mosquitoes for malaria parasites, and for insecticide resistance testing. Laboratory testing will include molecular biology, immunological and biochemical methods. (\$10,000)

*Technical assistance for entomological monitoring.* CDC staff will conduct three TA visit to support entomological monitoring for Mainland and Zanzibar. To provide technical assistance to NIMR Mwanza to achieve the necessary routine entomologic monitoring of post spray activities and to monitor the entomology effects of the under five coverage campaign and the UCC in non-IRS area. In Zanzibar CDC will provide technical assistance to increase ELISA capability to include blood meal analysis for vector biting preferences and essays for mosquitoes. (\$36,300)

## M&E Table

Data Source	Survey Activities	Year					
		2011	2012	2013	2014	2015	2016
Household Surveys	Demographic Health Survey (DHS)					X	
	Malaria Indicator Survey (THMIS or MIS)	X					
Health Facility and Other Surveys	SARA		X				
	Service Provision Assessment (SPA)				X		
	End-use verification (EUV)	X	X	X	X	X	X
Malaria Surveillance and Routine System Support	MEEDS (Zanzibar)	X	X	X	X	X	X
	Integrated Disease Surveillance and Response (IDSR)			X	X	X	X
Therapeutic Efficacy Testing	<i>In vivo</i> efficacy testing	X			X		
Entomology	Entomological surveillance and resistance monitoring	X	X	X	X	X	X
Other Data Sources	Malaria Impact Evaluation	X (Mainland)			X (Zanzibar)		

## OPERATIONAL RESEARCH

### NCMP/ZAMEP/PMI Objectives

While PMI supports operational research to help guide malaria control activities, neither the NMCP nor the ZAMEP has an official OR strategy.

### Progress in the Past 12 Months

#### *Mainland*

Monitoring parasitemia prevalence among pregnant women and infants. This operations research (OR) activity was funded in the 2011 MOP and completed in December 2013. It was implemented at 54 RCH sites in Kagera, Mwanza, and Mara Regions from December 2012 and March 2013. A total of 18,911 pregnant women attended first ANC and 6,926 infants attended measles vaccination, with 52.9% and 72.6% tested with RDTs, respectively. The overall prevalence of malaria parasitaemia among pregnant women and infants was 12.2% (95% confidence interval [CI] 11.5-12.8) and 10.1% (95% CI 9.3-11.0), respectively.

#### Durable Wall Liner (DWL) study

This is a multi-year study funded primarily by PMI core funds with administrative support from TRAction, with additional support for ITN procurement and IRS for the study area provided by PMI Tanzania. This three-arm cluster randomized trial aims to assess the protective efficacy of a DWL with two non-pyrethroid insecticides plus ITN, ITNs plus IRS, and ITNs alone. The baseline cross-sectional survey was completed in December 2013 and tracking the incidence cohort of 6-59 month old children who will be tested for malaria monthly, will began in April 2014. Distribution of ITNs and installation of the DWL will occur in August 2014. IRS will be carried out in October 2014. Two additional cross-sectional surveys will be conducted in July of 2014 and 2015. In addition to the outcome of malaria, anemia and lymphatic filariasis will be tested in during the cross-sectional surveys and a cost-effectiveness analysis will be performed comparing IRS to DWLs. PMI Tanzania is contributing ITNs and IRS with pirimiphos-methyl CS in this area.

#### **Zanzibar**

Placental parasitemia among women who have not had intermittent preventive treatment (IPTp) for malaria in Zanzibar. The goal of this study was to measure placental parasitemia rates among pregnant women delivering in the selected facilities in Zanzibar who had not received IPTp and to provide cost-benefit analyses to help inform policy decisions on the IPTp program in Zanzibar. This OR activity was funded in 2011. A total of 1,356 women were enrolled in the study from August 2011 – September 2012. Nine had active placental malaria infection as determined by polymerase chain reaction of placental blood, representing an infection rate of 0.6%. One of the women with placental malaria, of unknown HIV status, delivered a stillborn infant; none of the other cases of active infection were associated with poor birth outcomes. The study results were published in 2014.

#### **Budget and Proposed Activities with FY 2015 Funding (\$105,000)**

##### **Mainland**

##### Monitoring malaria epidemiology in areas with insecticide resistance detected among mosquitoes

Scaling-up use of long lasting insecticide treated nets (ITNs) has been the principal vector control strategy employed in Tanzania. Currently, pyrethroids are the only class of insecticide available for use on ITNs. Increasingly, insecticide resistance, particularly to the pyrethroids, has been detected during routine monitoring. It is unclear to what extent the detected levels of pyrethroid resistance threaten the efficacy of the intervention. Epidemiological surveillance will be conducted over a three year period to measure the level of malaria transmission in four sentinel sites where mosquito resistance to insecticides has been detected as well as one site

where resistance has not been detected (control). In addition, hospital data will be collected in order to establish the contribution of malaria to the burden of severe disease in the respective districts. (\$80,000)

**Zanzibar**

Conduct Study of Effects and Outcomes of Addition of Primaquine to ACT Treatment

ACTs are extremely effective in clearing the asexual stages of malaria parasitemia but may not have an effect on the mature gametocytes which are necessary to complete the malaria life cycle in the mosquito vector. WHO recommends the use of single dose primaquine for all patients with confirmed *P. falciparum* infection in settings of low malaria transmission where elimination, as opposed to mere control, is the goal. Accordingly, the ZAMEP plans to revise the case management guidelines to follow the recommendations of the 2012 WHO Evidence Review Group that state that when G6PD testing is not available, a single dose of 0.25 mg base/kg primaquine in addition to ACT on day zero should be given to all patients with falciparum malaria with the exception of pregnant women and infants less than one year of age. The ZAMEP proposes to conduct OR on how to effectively deploy this addition to the treatment regimen and to monitor the occurrence of any adverse effects such as hemolysis among persons with unrecognized G6PD deficiency. This activity is anticipated to begin in 2015 with reprogrammed funds and conclude in 2017. (\$25,000)

**OR Table**

Completed OR Studies			
Title	Start Date	End Date	Budget
Monitoring Parasitemia Prevalence among Pregnant Women and Infants	Jun 1, 2011	Dec 30, 2012	\$180,000 (FY 2011)
Placental Parasitemia Study	Dec 1, 2012	Oct 30, 2013	\$80,000 (FY 2010) + \$55,000 (FY 2012)
Ongoing OR Studies			
Title	Start Date	End Date	Budget
Durable Wall Liner Study	April 1, 2014	Jan 30, 2016	\$373,744 (FY 2013) + \$200,000 (FY 2014)
Proposed OR Studies FY 2015			
Title	Start Date (est.)	End Date (est.)	Budget
Monitoring Malaria in Areas of Insecticide Resistance	Dec 1, 2014	Dec 30, 2016	\$110,880 (FY 2014) + \$80,000 (FY 2015)
Effects of Addition of Primaquine to ACT Treatment	Jan 1, 2015	Dec 30, 2017	\$100,000 (FY 2014) + \$25,000 (FY 2015)

## **BEHAVIOR CHANGE COMMUNICATION**

### **NMCP/ZAMEP/PMI Objectives**

#### ***Mainland and Zanzibar***

The NMCP's and the ZAMEP's BCC goal is to empower the at-risk population to take the steps necessary to minimize their own malaria risk through use of proper prevention activities and to seek proper and timely malaria-treatment if and when needed. The NMCP and ZAMEP BCC strategic plans aim to advocate for and communicate positive behaviors for malaria control. The BCC strategic plans serve as guides to coordinate efforts, messages and activities for all malaria implementing partners. The original mainland BCC strategy was from 2008 – 2013 and is being updated to accompany the latest Malaria Strategic Plan covering 2012-2020. The Zanzibar BCC strategy goes from 2013-2018. The communication strategies address various aspects of health care around malaria prevention, treatment, and control including high level political advocacy; local government level for planning and budgeting for malaria control interventions; service delivery to improve interpersonal communication and compliance to standards; and community and individual level improvements in demand, use, and compliance. The BCC strategies also target the media to create partnerships to improve advocacy and awareness of malaria interventions, as well as engaging the private sector through programs focused on self-protection, prevention, and treatment of employees.

### **Progress in the Past 12 months**

#### ***Mainland***

In October 2012, PMI leveraged USAID, PEPFAR and Maternal and Child Health funds to introduce a national integrated Safe Motherhood (SM) campaign locally known as *Wazazi Nipendeni* (literally translated as “my parents please love me”). The campaign uses SMS technology to send weekly messages to service providers and health workers and pregnant women subscribers receive weekly reminders to go for antenatal care early, test for HIV/AIDS and go for prevention of mother to child transmission (PMTCT+) services, request for the ITN vouchers, request SP for IPTp, and develop an individual birth plan. PMI also supported the SM campaign through radio, TV, and print materials for health clinics. The campaign is monitored quarterly through Omnibus surveys, clinic data, and SMS registration reporting.

The Safe Motherhood Campaign continued to run a multimedia campaign, focusing on IPTp2 and ITN use during pregnancy. The campaign including TV and radio messaging, provision of printed materials to over 3,000 clinics across the country including posters and SP reminder cards, and a text-messaging service to share information related to a woman's trimester of pregnancy and reminders of ANC visits. Safe Motherhood also completed a malaria in pregnancy film titled 'Chumo' and conducted 15 screenings per month in each region of the country, with 500-1,000 attendees per screening. The second phase of the campaign is currently underway with updated materials reflecting the IPTp3+ policy.

An evaluation was conducted in November 2013 using exit interviews with antenatal and postnatal women, and exposure to the campaign was evaluated with Omnibus surveys conducted in December 2012, March 2013, June 2013 and October 2013. The latest Omnibus survey showed that 48% of women had exposure to the campaign (up from 43% in March 2013) and the exit interviews showed exposure was 35.5% of ANC women. The exit interviews also showed that the more message sources that women had been exposed to, there was about a 17% greater likelihood the woman received an SP dose, even controlling for all the other demographic variables. It also showed that 49.7% of postnatal women took two or more doses of SP during their last pregnancy. Close to 85% of women interviewed reported sleeping under a net the night before. Of those exposed to the campaign, the more messages a woman was exposed to there was a 68% more likelihood they slept under a net the night before. The greater exposure to the messaging, the greater knowledge the participants reported having about how to prevent against malaria during pregnancy.

A “Test and Treat” BCC campaign was implemented that focused on getting people to test all fevers. This was based on recent findings in the 2011-2012 THMIS that show while malaria has been decreasing, the rate of fever has stayed the same. Thus the campaign slogan, “Not all fevers are malaria, get tested” was developed. The campaign used broad messaging about getting treated if ill, as well as specific messaging promoting the use of RDTs in private sector clinics. The campaign included radio spots and print materials for the health facilities as well as outreach materials for community volunteers. The Omnibus surveys showed that 51% of respondents had heard or seen the campaign. Of those, 67% could correctly identify the main message of the campaign to “...get tested when you have a fever”, and 40% said they knew they should “get tested when you think you have malaria”. Anecdotal evidence showed that the RDT wholesalers received more orders than anticipated in pilot areas than from areas not reached by the pilot.

PMI funds supported the BCC efforts for the school-based net distribution program (SNP) in the Southern Zone of Tanzania. This included the airing of promotional radio spots, 24 episodes on a children’s radio program, and print and promotional materials for the school children, schools, and community. The campaign accompanied the issuing of nets through the schools to a number of classes. Results of the school net program evaluation showed that exposure to the BCC messages through radio was 43%; 64% reported hearing about the school net program from their child or another child not from their household; and 90% of all respondents to the SNP evaluation had heard the phrase for the campaign: *Malaria Haikubaliki* (“Malaria is not acceptable”).

The private sector is now being engaged through the Malaria Safe Companies Initiative that was started under a Bill and Melinda Gates Foundation project. The project aims to engage private companies in promoting malaria prevention and control for their employees. The Tanzania Capacity and Communication Project with NMCP are the secretariat for the Initiative and the Minister of Health and Social Welfare is the Chair of the Steering Committee. This past year saw 37 companies being active in the initiative, with companies reporting educating their employees on malaria, providing nets to employees and their families, as well as the establishment of the Steering Committee and a framework for action. The NMCP has institutionalized Malaria Safe through including it as one of the main indicators for multi-sectoral component in the new Malaria Strategic Plan. They have a target of 100 companies active in Malaria Safe by 2020.

PMI supported community mobilization in five regions last year. Through the Community Change Agent platform, more than one million people were reached directly with messages on ITN use; care and repair of nets; test, treat, and dose completion; as well as malaria in pregnancy and IRS. The network was expanded to include all wards (701) in the districts and the Community Change Agents at the ward level identified two volunteers per village for all the villages in the ward, currently this includes 5,801 volunteers. These volunteers also have connections with the health facilities. Through this expanded network, there will be a focus on increasing IPTp3+ and testing all fevers.

### ***Zanzibar***

In Zanzibar, PMI has supported the BCC unit of the ZAMEP to develop the new communication strategy that aligns with the ZAMEP's new malaria strategy. The focus of the strategy is to develop and implement communication activities that are focusing on keeping people using preventive strategies as malaria transmission is declining. The strategy also includes communication around malaria diagnosis and proper case management as well as reactive case detection. In addition, PMI supported the development of the new continuous distribution (CD) strategy for long-lasting ITNs. Through a consultative process with several malaria stakeholders at the national and local level, and using the NetCalc modeling techniques, a CD strategy was developed that include the channels of ANC, immunizations, community, and active case detection.

### ***Peace Corps***

PMI supports three Peace Corps Volunteers (PCV) who work very closely with the NMCP's implementing partners and other NGOs: Population Services International (PSI), Johns Hopkins University (JHU), the RTI International (formerly Research Triangle Institute), Grassroot Soccer, and Medicine Education Africa. PCVs focused on school net program awareness creation and behavior change activities, IRS-related data collection and analysis, management of trainings and events as part of a malaria curriculum called Malaria Skillz, and a malaria Rapid Diagnostic Test (RDT) pilot program. During the past 18 months (Dec 2013-March 2014), Peace Corps Volunteers and their counterparts provided education on malaria prevention through social behavior change communication messages, field practice, and use of mobile video unit (MVU) and school interventions strategies such as Pata Pata, the children's radio program. Peace Corps volunteers were also engaged in World Malaria Day events and supported long lasting insecticide treated bed net distributions and hanging demonstration events at clinics and aided in the distribution of malaria BCC materials. Peace Corps Volunteers are currently planning to hold 2 in-depth malaria trainings in August 2014 for new PCVs and their counterparts and are currently developing an off-the-shelf training manual. They are also planning a Tanzania Malaria Heroes Award in conjunction with World Mosquito Day on August 20th, 2014.

### **Plans and justification**

#### ***Mainland***

BCC efforts will continue to focus on case management, malaria in pregnancy with IPTp3+ roll out, and school net distribution project in the Southern Zone. PMI will continue to support the Malaria Safe Companies Initiative with NMCP to facilitate the secretariat and to recruit new

members. BCC efforts will focus on engaging communities to work together to ensure households are accessing and using nets as well as accessing health facilities for testing and treatment. For ANC visits, messages will focus on increasing use of IPTp and encouraging pregnant women to redeem their net vouchers and consistently sleep under an ITN during their pregnancy. District leaders are also being targeted with BCC messages to encourage them to plan and budget for malaria prevention and control activities and to provide the human resources necessary to carry out these activities.

Media (regional and/or district level) activities such as radio and TV will be used to promote the above mentioned areas, and their use will be dependent on the new malaria stratification maps that have been developed for the NMCP's Malaria Strategic Plan. Messages will be targeted to areas that are identified to receive those messages. High prevalence regions will get messages that differ in content than other lower prevalence areas. The intensity may change depending on the areas. This will also influence the expansion of the community mobilization components.

The roll out of the new IPT3+ policy will be continuing and efforts will be made to target BCC messages to providers to overcome their bias and barriers, as well as using a quality improvement model at the clinic level to ensure that stockouts of SP and other malaria commodities become a rare occurrence.

PMI will continue to support the PMI regions with the SNP and the mass distribution campaign. These are the regions that have continued to have lower malaria indicators than the rest of the country. BCC efforts will support the SNP and net use, care and repair messaging. In the mass distribution regions (Kigoma and Kagera), BCC efforts will work with community engagement as well as media. For IRS, BCC messages will be twofold, first, messages will continue to alert people to IRS being done in their districts/areas while a second set of messages will target places that are being dropped from the IRS campaign to explain why. Messaging will focus on encouraging the community to accept the sprayers and having their homes sprayed, as well message about the importance of using both spraying and net use together; previously the messages were separated.

### ***Zanzibar***

PMI will continue to support the BCC unit of the ZAMEP and the communication campaigns for continuous distribution of nets. New approaches to messaging for prevention will be identified such as encouraging travelers to test as they enter Zanzibar from planes or ferries. Net use campaigns will continue to be implemented with a focus on messaging for low transmission and pre-elimination. Active case detection will also have a strengthened BCC component to engage and empower households with suspected malaria to take the steps necessary to protect the householders and to ensure testing when there is a fever, and to go to the clinic within 24 hours when there is fever.

### **Budget and Proposed Activities with FY 2015 Funding (\$2,230,000)**

#### ***Mainland***

*ITN keep-up strategy.* Support to BCC to promote the scale-up of the school-based net program or alternative that the NMCP decides upon. Mass media is targeted to reach 70% of households

in the SNP districts. Funding will be spent on radio (40%), print materials (20%), and community mobilization (40%). (\$400,000)

*IRS.* Mobilize districts and communities, communicating change in IRS strategy, such as moving from blanket to target and to focal spraying, and communicating changes in insecticide being used. Funding will be spent on radio (20%), print materials (40%), and community mobilization (40%). (\$200,000)

*RDT testing and compliance.* To advocate for and mobilize service providers and communities for improved testing, compliance to test results, and compliance to malaria diagnostic and treatment guidelines, and seeking treatment within 24 hours of onset of fever. Funding will be spent on provider interpersonal communication and job aides (25%), radio (40%), and community mobilization (35%). (\$800,000)

*IPTp3+.* BCC will be used to help continue the roll out of IPTp3+ with providers and pregnant women. Informed demand campaigns and materials and campaigns for providers to overcome bias and barriers. The money will support mass media, print materials, interpersonal communication skills and rural communication initiative. Funding will be spent on provider interpersonal communication and job aides (20%), mass media (50%), and community mobilization (30%). (\$600,000)

*Peace Corps Volunteers: BCC and Malaria Surveillance.* PMI will support three Peace Corps Volunteers to work with the NMCP and PMI implementing partners to assist with BCC activities, including distribution and hanging of nets; organizing malaria awareness and behavior change activities, community talks, theatre, radio spots, house-to-house counseling; and to assist with dissemination of health messages. PMI will also support volunteers to engage in malaria surveillance activities, i.e., to assist in developing training materials and tools for implementation of surveillance activities. They will also assist in systematic collection, analysis and interpretation of data. The malaria volunteers will continue to receive technical support from Peace Corps staff, PMI, NMCP through Regional Malaria Intervention Focal Persons and other NGOs. Additionally, PMI will support one 3rd year extension PCV to serve as the national malaria coordinator. (\$30,000)

### **Zanzibar**

*BCC support for multiple activities:* BCC for ITN continuous distribution, malaria diagnostic testing, adherence to treatment regimens, education and mobilization for outbreak response; and communicating insecticide rotation and IRS phase out. Funding will be spent on mass media (40%), print materials (30%) and community mobilization (30%). (\$200,000)

## **HEALTH SYSTEM STRENGTHENING/CAPACITY BUILDING**

### **Health System Strengthening and Integration**

During the past year, PMI supported the health sector at all levels of the system. At the central level, PMI supported the development of the 2014-2020 National Malaria Strategic Plan, its

detailed costing to inform Global Fund concept note submission, and capacity strengthening of Mainland and Zanzibar Ministries of Health malaria control programs for overall planning, management and implementation of malaria control programs. PMI also co-financed the two-year Tanzanian FELTP program where trainees experienced various malaria control activities, including malaria surveillance and outbreak investigations. At the district level, PMI supported strategies for recruitment, retention, and workforce planning at the district level to reduce critical worker shortages in Mainland and Zanzibar. Furthermore through its support of a variety of systems strengthening interventions including the improvement of district level accountability, financial management, data for decision-making, and supportive supervision, PMI contributed to strengthened case management and the reduction of malaria commodity stockouts at facilities.

Along with USAID HIV and other health funds, PMI FY 2015 funding will support critical HSS activities in alignment with national health sector priorities and the Mission's new Country Development Cooperation Strategy (CDCS). FY 2015 funds will continue to support critical human resource, finance, governance, supply chain, and health information systems strengthening activities, as well as FELTP training of epidemiologists and improved lab diagnosis of malaria. New HSS areas for PMI support include 1) Tanzania's upcoming National Results Based Financing for Health initiative (both in Zanzibar and Mainland), which aims to financially reward or purchase health sector results - including those related to Malaria, 2) mobilizing private sector firms to offer malaria services to employees, dependents and affected communities (support coming through a FY 2014 reprogramming request), as well as 3) contributing to the Mission's first-ever rigorous evaluation of HSS interventions and their effects on targeted health program results.

### **NMCP/ZAMEP/PMI Objectives**

The health systems strengthening objectives are to ensure a sustainable, country owned, and integrated approach to malaria control activities. Despite the decline in malaria prevalence, the disease burden due to malaria remains considerable. By supporting health systems interventions, PMI and the Tanzania government aim to bolster the achievement of malaria control results and more importantly to sustain these gains as the country strives towards elimination of malaria. In particular, PMI funds have prioritized the following systems strengthening areas: 1) addressing critical health workforce shortages, 2) improving the availability of needed skills in the workforce to lead malaria control efforts, 3) reducing drug stockouts, 4) decreasing donor dependency for financing of malaria, 5) strengthening accountability and management of health care, and 6) improving data for decision-making.

### **Progress since PMI started in 2006**

PMI support of health systems strengthening in 2006 initially focused on activities closely linked to malaria control, such as information systems strengthening for supply chain, institutional strengthening of planning capabilities of the NMCP and the ZAMEP, capacity building of the National Bureau of Statistics to conduct major surveys like the DHS, SPA, and the THMIS. These efforts have resulted in the recent establishment of the country's first integrated electronic Logistics Management Information System detailing the availability and consumption of commodities, including those related to malaria, from all health facilities. The National Bureau of Statistics ability to lead its first THMIS (which demonstrated malaria prevalence decreasing to

9%) has increased country ownership, institutionalization, and use of routine nationally representative surveys to capture the burden of disease due to Malaria. The success of the bureau's efforts has prompted the USAID Mission to enter into its first ever Government-to-Government health agreement with the bureau for such studies and begin to decrease international technical support over time.

Over the years, PMI has broadened its support of systems strengthening to address workforce shortages, and inadequate management and planning of health services and limited resources. Such efforts, co-funded with other USG funding sources (including funds for PEPFAR, maternal and child health, family planning/reproductive health, and tuberculosis), strengthened human resources planning, budgeting, financial management, accountability at the local government authority level. These efforts influenced districts to integrate malaria in their comprehensive council health plans and as a result 70% of targeted health facilities now use their own cost-sharing funds to contribute to procuring malaria medicines and supplies. In addition, through introduction of health worker recruitment and retention strategies, vacancy rates in the Lake Zone (a targeted region for malaria control) dropped from 40% to 36%.

The African Field Epidemiology Network, the USAID Global Health Bureau, CDC-Atlanta and CDC-Tanzania (with PEPFAR funding) have all worked with PMI and PEFAR since 2007 to develop and strengthen the Tanzania FELTP. FELTP is a public health training program to competencies in applied epidemiology, implementation, evaluation, and management of disease interventions, surveillance strengthening, epidemic preparedness and response, and leadership skills. The Program is managed by the MOHSW in collaboration with Muhimbili University of Health and Allied Sciences and National Institute of Medical Research.

During the two-year program, FELTP trainees are embedded within the MOHSW where they work daily with the staff of specific disease control programs (e.g., NMCP and ZAMEP). Residents have been conducting evaluations of malaria surveillance systems and planned studies on issues related to malaria and malaria diagnostics continuously since program inception. To date, there have been four graduating classes of 44 FELTP students, out of whom, 38 have been returned to government institutions and six are employed in the private sector. The fourth cohort of 12 trainees graduated in December 2013.

### **Progress in the Past 12 Months**

In the past 12 months, PMI's support of systems strengthening clearly impacted the management and delivery of health care at the district level; these efforts are now being institutionalized by the GoT. The PMI-supported systems interventions were numerous and included the strengthening of bottom-up planning in alignment with community needs and priorities (such as malaria), the introduction of internal controls to improve financial accountability of limited resources, the mentoring of district managers to use data from health information systems to inform budget preparations and supportive supervision emphasis. As a result, 85% of targeted districts now yield clean financial audits (as opposed to 44% prior to PMI support) and are by law able to access 20% more funds from the central level – thereby availing greater discretionary spending for districts to spend on priority areas such as malaria. Moreover, through the implementation of financial controls by PMI-supported systems strengthening projects, all district councils are now obliged to spend malaria-planned funds for only malaria related

activities and to not shift these resources to other areas (which had been happening in the past). In doing so, systems strengthening interventions have increased the availability and assurance of funding for malaria at the district level.

Through combined systems strengthening efforts, regions such as Singida, were able to make strides in improving malaria outcomes. For example, Iramba District council now experiences zero “out-of-stock” days for malaria commodities and attributes this success to a holistic set of systems interventions. These include increasing domestic revenue and discretionary spending for health through better management and collection of premium contributions to insurance (e.g. National Health Insurance Fund, Community Health Fund) and facility-based cost-sharing mechanisms. This allowed Iramba to increase its collection from 35% to 80% of projected revenue. With an increase in funding, the district introduced a results based financing approach, whereby quality reports from managers on the status of service delivery and supply chain were financially rewarded. With improved data and management skills through PMI-supported interventions, the district targeted its supportive supervision efforts and efficiently rationalized the use of funds such that if stockouts at the central level occurred, the district was able to shift commodity supplies from facilities with surplus stock to those in need.

To address workforce shortages, PMI funds were used to establish a now nation-wide human resource information system to provide vital workforce statistics (such as vacancies, attrition rates, and projected skills shortages due to retirement, etc.) covering all civil servants in Tanzania. This system has helped districts successfully fill vacancies and lobby for critically needed staff, including those involved in malaria control and case management. For example, Zanzibar’s Ministry of Health increased its health workforce by 27% between 2009 and 2013 as a result of internal advocacy based on HRIS-data. This data is now used in a variety of ways, including for strategic and annual HR planning, development of training plans, deployment decisions, and to justify new staff. The increase in Zanzibar’s health workforce included (but is not limited to) more staff for the following cadres: Medical Officers, Midwives, Public Health Nurses, Laboratory Technicians, Pharmacy Technicians, Clinical Officers, and Orderlies (cleaners and nursing assistants). Moreover, HRIS data now informs the direction of Zanzibar’s pre-service health worker production program. Prior to HRIS, there was no link between the number recruited for each clinical course and the needs of the Ministry, simply because data was not available. Now, with accurate data on the minimum staffing requirements and existing cadre estimates, the local College of Health Sciences is recruiting appropriate numbers of students into the courses of most need to deliver of quality health care to Zanzibaris. Finally, the reliability of HRIS data has shaped the Ministry of Health’s decision to institute retention strategies such as ‘risk and responsibility allowances’ for employees in hardship areas.

Also this past year, PMI promoted additional data for decision-making as it disseminated THMIS data to Tanzania’s (Mainland and Zanzibar) health managers of 9 zones to foster greater understanding of the status of malaria control and its implications for their own districts/councils.

In the past 12 months, FELTP graduated its fourth cohort of residents and enrolled the sixth cohort since the program began in 2008. Residents have undertaken field placement assignments and conducted evaluations of various malaria activities including hospital-based malaria surveillance and an evaluation of ACT consumption in Kiteteo District in Manyara.

They made presentations at several conferences and wrote dissertations that included several on malaria topics such as “Factors Attributing to Malaria Misdiagnosis, anti-malaria and antibiotic use among children under five years of age in Tanga Municipality” and “Factors associated with physical quality and utilization of mosquito bed nets in Lindi, Rural Tanzania”.

All trainees participate in several outbreak investigations in Tanzania, thereby developing their skills for future malaria outbreak investigations. In 2013 residents participated in nine outbreak investigations including one of malaria in Muleba District and another in Dar es Salaam that was initially presumed to be attributable to malaria but which proved to be an outbreak of dengue fever.

The program organized two seminars facilitated by staff from PMI and NMCP on selected topics including, malaria epidemiology and current trends, overview of various malaria data sources and surveillance systems, current policy and implementation challenges in malaria diagnosis and case management, status of current malaria interventions in the Mainland and Zanzibar, and key priorities in the new National Malaria Strategic Plan.

The CDC resident advisor has assisted with mentoring these trainees and participates in classroom teaching (surveillance, study design, outbreak investigation, data analysis).

### **Plans and Justification**

This past year, the Tanzanian Mission finalized its first Health Systems Strengthening Strategy as well as its Country Development Coordination Strategy. Both documents prioritize a holistic and integrated approach to achieving and sustaining results in alignment with broader development objectives. Indeed, as seen from the recent Singida results, a composite of HSS interventions across the WHO Health system building blocks of finance, human resources, governance etc. resulted in increased commodity availability rather than just a focus on addressing supply chain building block alone. Accordingly, PMI funds will be used to address underlying systems challenges to reaching and maintaining malaria results. Such an effort is critical to reaching and sustaining malaria elimination goals.

As such, PMI will co-finance efforts to target, through a single project mechanisms, four WHO building blocks at both the national and district levels. Specifically, PMI funds will be used to - 1) strengthen governance at the national and district levels to use resources transparently, to enable citizen engagement in planning and monitoring, and to produce results in health care, 2) increase domestic resources for health care as well as improve use of funds in terms of effectiveness, efficiency, and obtaining value for money, 3) improve equity in the distribution of health care workers providing quality essential health services, and 4) increase use of available data to inform decision-making processes at both the national and local levels. In addition, PMI will continue to strengthen the supply chain system, including the GoT’s ability to better quantify, forecast, budget, monitor and ensure stock availability at the point of service delivery.

In 2016, PMI funds will be used to support two new systems strengthening areas. First, PMI will mobilize private sector firms, in alignment with the upcoming health care financing strategy, to offer malaria services to employees, dependents and affected communities. Second, PMI will

contribute to the Mission's first-ever rigorous evaluation of HSS interventions and their effects on targeted health program results, including Malaria.

### **Budget and Proposed Activities with FY 2015 Funding (\$1,095,000)**

#### ***Mainland***

*Support to FELTP Program.* PMI will continue support to the FELTP program and contribute to the advanced training of Tanzanian epidemiologists for a 12-month period. The trainees will receive assistance from Resident Advisors and participate in malaria field assignments and investigations throughout Mainland and Zanzibar. PMI will continue to track the placement of FELTP graduates into post-training MOHSW assignments that directly influence malaria control policies and practices. (\$150,000)

*Orientation and training of new Malaria Focal Personnel.* As the NMCP continues to implement improved malaria initiatives, personnel from regional and council health management teams will have expanded responsibilities. PMI will provide support for personnel orientation and training to improve their capacity to support and supervise these activities. (\$100,000)

*National and district level Health Systems Strengthening.* This project will holistically address systems issues associated with the building blocks of human resources for health, governance, finance and information use. Its geographic focus will be the Tanzania Mainland, inclusive of high prevalent malaria regions. PMI funds will be used for a number of HSS interventions including the implementation of the health care financing strategy, capacity building for public financial management at the district level, strengthening financial tracking in facilities to generate revenue, joint planning and coordination across line Ministries and levels in the systems, etc. These HSS interventions are critical to the success and sustainability of the malaria response. For example, the health care financing strategy is Tanzania's long-term approach for generating domestic funding for health care, inclusive of malaria related services as part of a minimum benefit package for all citizens. By strengthening public financial management services at the district level, the project will assure proper use, accountability, and transparency of malaria resources such that they are used for planned malaria interventions rather than being reprogrammed to other areas (which is what happens when there is a lack of appropriate internal controls). Finally, as has been proven in Iramba district as described earlier, through efforts that target the generation of more revenue for discretionary spending, joint planning and coordination, this project will instill the underlying systems, appropriate motivations, and checks and balances to eliminate malaria pharmaceutical stock-outs at the facility level; i.e. with better planning and coordination on stock status, districts can avoid impending stock-outs by using their discretionary funds to redistribute commodities from facilities with sufficient stock to those in need. (\$400,000)

*Health Systems Strengthening evaluation.* USAID/Tanzania will conduct its first rigorous health systems strengthening evaluation of its HSS interventions to meet sustainability and development goals as well as priority health results (including Malaria). This effort will also inform the global literature and knowledge on the subject. Specifically, the evaluation will entail a baseline, midpoint, and endpoint assessment with ongoing process documentation in between

these mentioned milestones. FY 2015 funds will be used to support the process documentation portion of the evaluation. (\$100,000)

*Capacity building for NMCP.* Strengthen capacity of NCMP by building up staff knowledge and skills via attendance at conferences, participation in short-terms trainings and other educational programs, other needs as determined by the training needs assessment currently being done by the NMCP. (\$150,000)

### **Zanzibar**

*Health Systems Strengthening via Zanzibar Ministry of Health results based financing for health initiative.* PMI is currently supporting malaria case notification through training of the Primary Health Care Unit staff in malaria surveillance forms and the hardware to allow for notification of cases. PMI will contribute to a larger USAID Health Office support of performance based financing reform that facilitates registration of all malaria cases at the facility and timely notification. This reform consists of close monitoring, linked with payments that increase the autonomy of the health facility and the motivation of the staff members resulting in improved rates of compliance with diagnostic and treatment guidelines. (\$100,000)

*Capacity building for the ZAMEP.* Strengthen capacity of the ZAMEP by building staff knowledge and skills via attendance at conferences, participation in short-terms trainings and other educational programs, and other needs as determined by the ZAMEP team (\$95,000)

## **STAFFING AND ADMINISTRATION**

### **Background**

Two expatriate health professionals serve as Resident Advisors (RA) to oversee PMI in Tanzania, one representing CDC and the other USAID. In addition, two Foreign Service Nationals (FSNs) Program Management Specialists support the PMI team, one representing CDC and the other USAID. In addition, PMI is providing partial support to a Monitoring & Evaluation (M&E) Officer (USAID FSN). The M&E Officer manages the PMI M&E agenda, PMI program monitoring plan, web-based reporting, data quality audits, and assists implementing partners to develop monitoring and evaluation plans. PMI also provides partial support to specialists in the Office of Acquisition & Assistance (OAA), the Financial Management Office (FMO), and the Program Office. The A&A Specialist attends to the procurement actions for PMI and ensures compliance to USAID contractual and financial regulations. The Financial Analyst provides financial monitoring and analysis to the malaria portfolio. The Program Office staff member provides communications and outreach support to the PMI program. Other U.S. Personal Services Contractors (USPSC) and FSNs are managing PMI funded activities that are integrated in other health and HIV programs but their salaries are covered by non-PMI funds.

All PMI staff members are part of a single interagency team led by the USAID Tanzania Mission Director or his/her designee in country. The PMI team shares responsibility for development and implementation of PMI strategies and work plans, coordination with national authorities, managing collaborating agencies and supervising day-to-day activities. Candidates for Resident

Advisor positions (whether initial hires or replacements) will be evaluated and/or interviewed jointly by USAID and CDC, and both agencies will be involved in hiring decisions, with the final decision made by the individual agency.

PMI professional staff work together to oversee all technical and administrative aspects of the PMI portfolio, including finalizing details of the project design, implementing malaria prevention and treatment activities, monitoring and evaluation of outcomes and impact, reporting of results, and providing guidance to PMI partners.

The PMI lead in country is the USAID Mission Director. The two PMI RAs, one from USAID and one from CDC, report to the Senior USAID Health Officer for day-to-day leadership, and work together as a part of a single interagency team. The technical expertise housed in Atlanta and Washington guides PMI programmatic efforts and thus overall technical guidance for both RAs falls to the PMI staff in Atlanta and Washington. Since CDC resident advisors are CDC employees (CDC USDD—38), responsibility for completing official performance reviews lies with the CDC Country Director who is expected to gather upon input from PMI staff across the two agencies that work closely day in and day out with the CDC RA and, thus are best positioned to comment on the RA's performance.

The two PMI resident advisors are based within the USAID health office and are expected to spend approximately half their time sitting with and providing technical assistance to the national malaria control programs and partners.

Locally-hired staff to support PMI activities either in Ministries or in USAID will be approved by the USAID Mission Director. Because of the need to adhere to specific country policies and USAID accounting regulations, any transfer of PMI funds directly to Ministries or host governments will need to be approved by the USAID Mission Director and Controller, in addition to the USG Global Malaria Coordinator.

### **Proposed Activities with FY 2015 Funding (\$2,544,000)**

PMI will support salaries and travel costs of two PMI Resident Advisors, two FSN PMI Project Management Specialists, the M&E Officer, and support office (OAA, OFM, and the Program Office) staff. Total management and administrative costs, excluding the salary and benefits of the USAID and CDC PMI Resident advisors and locally employed PMI staff is approximately 2% of the total budget.

*USAID administrative and technical support. (\$1,884,000)*

*CDC administrative and technical support. (\$660,000)*

TABLE 1

Table 1 President's Malaria Initiative - <i>Tanzania Mainland and Zanzibar</i> Year 10 (FY 2015) Budget Breakdown by Implementing Partner					
Partner Organization	Geographic Area	Activity	Activity Budget	Total Budget, by Partner	
New malaria bilateral	Mainland	Continuation of LLIN delivery to clients of ANC and EPI	\$10,000,000	<b>\$12,000,000</b>	
New malaria bilateral	Mainland	Logistics costs for delivery of LLINs	\$2,000,000		
TBD	Mainland	Procurement of LLINs for the school-based net program	\$3,000,000	<b>\$8,226,000</b>	
TBD	Zanzibar	Procurement of LLINs for continuous distribution	\$880,000		
TBD	Mainland	Procurement of RDTs	\$900,000		
TBD	Zanzibar	Procurement of RDTs	\$181,000		
TBD	Mainland	Procurement of ACTs	\$1,000,000		
TBD	Mainland	Procurement of injectable artesunate	\$1,315,000		
TBD	Mainland	Malaria Commodity Logistics	\$750,000		
TBD	Zanzibar	Malaria Commodity Logistics	\$200,000		
GEMS II	Nationwide	Environmental Evaluation for IRS	\$35,000		<b>\$35,000</b>
MalariaCare	Mainland	Scale-up of RDT QA/QC system	\$1,250,000		<b>\$1,525,000</b>
MalariaCare	Mainland	Routine Drug Efficacy Monitoring	\$250,000		
MalariaCare	Zanzibar	OR on how to effectively deploy primaquine	\$25,000		
TBD	Zanzibar	MEEDS	\$250,000	<b>\$250,000</b>	
ZAMEP	Zanzibar	Logistics costs for delivery of LLINs	\$250,000	<b>\$1,192,400</b>	
ZAMEP	Zanzibar	RDT and microscopy QA/QC	\$120,000		

ZAMEP	Zanzibar	MEEDS network and the District Outbreak Response Teams.	\$300,000	
ZAMEP	Zanzibar	Entomological monitoring	\$152,400	
ZAMEP	Zanzibar	Operational costs for PCR	\$25,000	
ZAMEP	Zanzibar	Supervision of RDTs & microscopy QA/QC	\$50,000	
ZAMEP	Zanzibar	Capacity Building	\$95,000	
ZAMEP	Zanzibar	BCC across all interventions	\$200,000	
NMCP	Mainland	Malaria Program Review	\$50,000	<b>\$500,000</b>
NMCP	Mainland	Integrated supportive supervision	\$100,000	
NMCP	Mainland	CHMT training on supervisory roles for RDT QA/QC	\$100,000	
NMCP	Mainland	Supervision of RDT QA/QC system	\$100,000	
NMCP	Mainland	Capacity Building	\$150,000	
TBD	Mainland	Strengthen national health care financing	\$400,000	<b>\$2,685,000</b>
TBD	Zanzibar	Strengthen national health care financing	\$100,000	
TBD	Mainland	Implementation and scale-up of iCCM	\$500,000	
TBD	Mainland	Rollout of eIDSR to remaining regions	\$700,000	
TBD	Mainland	HSS evaluation	\$100,000	
TBD	Mainland	Integrated training and supervision of ANC staff	\$235,000	
TBD	Mainland	Scale up facility-based management of febrile illness	\$650,000	
Tanzania Measure Evaluation Associate Award	Mainland	Monitoring of malaria epidemiology through epidemiological surveillance	\$80,000	<b>\$180,000</b>
Tanzania Measure Evaluation Associate Award	Zanzibar	Evaluation of ITNs continuous distribution modality	\$100,000	
IRS2 TO6	Mainland	Targeted IRS in the Lake Zone	\$11,500,000	<b>\$12,100,000</b>

IRS2 TO6	Zanzibar	Focal IRS spraying in hot spots	\$600,000	
RMNCH	Zanzibar	Technical assistance for MIP	\$50,000	<b>\$50,000</b>
Tanzania Social Marketing Program	Mainland	Support the scale-up of RDTs in ADDOs	\$500,000	<b>\$500,000</b>
NIMR	Mainland	Insecticide resistance monitoring	\$350,000	<b>\$650,000</b>
NIMR	Mainland	Longitudinal monitoring	\$300,000	
DHS Program	Nationwide	Early support for the 2016/2017 MIS	\$300,000	<b>\$300,000</b>
Tanzania Capacity and Communication Project	Mainland	BCC across all interventions	\$2,000,000	<b>\$2,000,000</b>
Peace Corps Tanzania	Mainland	Support for three Malaria Volunteers	\$30,000	<b>\$30,000</b>
USAID	Nationwide	Staffing and administration costs	\$1,884,000	<b>\$1,884,000</b>
CDC	Nationwide	Staffing and administration costs	\$660,000	<b>\$892,600</b>
CDC	Nationwide	Support to FELTP trainees	\$150,000	
CDC	Nationwide	Procurement of entomological supplies	\$10,000	
CDC	Nationwide	3 TDYs for entomological monitoring	\$36,300	
CDC	Nationwide	3 TDYs for M & E strengthening	\$36,300	
<b>GRAND TOTAL</b>			<b>\$45,000,000</b>	<b>\$45,000,000</b>

TABLE 2

**Table 2**  
**President's Malaria Initiative - Tanzania Mainland and Zanzibar**  
**Planned Obligations for FY 2015 (\$45,000,000)**

Proposed Activity	Mechanism	Geographic Area	Commodities Amount	PMI Proposed FY 2015	Brief Description of Activity
<b>PREVENTIVE ACTIVITIES</b>					
<b>Insecticide-Treated Nets</b>					
<i>Delivery of ITNs to pregnant women and infants</i>	TBD	Mainland	-	4,300,000	To support logistics cost for continuation of LLIN delivery to clients of ANC and EPI clinics approximately 1,500,000
	TBD	Mainland	5,700,000	5,700,000	Procurement of approximately 1,500,000 nets for ANC and EPI
<i>School Net Program</i>	TBD	Mainland	-	1,250,000	To support logistics costs for delivery of approximately 1,000,000 nets to schools
	TBD	Mainland	3,750,000	3,750,000	Procurement of approximately 1,000,000 nets for the school-based program for 4 regions
<i>ITN keep-up program</i>	TBD	Zanzibar	900,000	900,000	Procurement of approximately 240,000 nets for continuous distribution
	ZAMEP	Zanzibar	-	230,000	To support the operational cost of ANC, EPI, and community-based delivery of 240,000 nets
<i>Evaluation of Zanzibar Continuous Distribution</i>	Tanzania Measure Evaluation Associate	Zanzibar	-	100,000	Evaluation of ITNs continuous distribution modality; this will document the progress of entire continuous distribution scheme

	Award					
<b>Indoor Residual Spraying (IRS)</b>						
<i>IRS for Mainland and Zanzibar</i>	IRS2 TO6	Mainland	6,362,667	6,362,667	6,362,667	Procurement of long-lasting organophosphate insecticide to cover 400,000 structures and protecting approximately 2.1 million persons
			-	-	5,137,333	To support logistics cost for targeted IRS in the Lake Zone reaching approximately 400,000 structures and protecting about 2.1 million persons
		Zanzibar	318,133	318,133	318,133	Procurement of long-lasting organophosphate insecticide to cover 20,000 structures and protecting approximately 100,000 persons
<i>Environmental Monitoring for IRS</i>	GEMS II	Nationwide	0	0	281,867	To support focal spraying in hot spots, covering about 20,000 structures and protecting 100,000 people
			-	-	35,000	Monitoring of compliance of PMI-supported IRS with USG and national environmental regulations and guidelines
<b>Management of Malaria in Pregnancy</b>						
<i>Refresher training and integrative supportive supervision</i>	TBD	Mainland	-	-	235,000	Support integrated training and supervision of ANC staff to ensure proper implementation of IPTp3+ and case management of MIP
<i>Technical Assistance for test and treat</i>	MCSP	Zanzibar	-	-	50,000	Technical assistance for implementation of malaria in pregnancy test and treat policy

SUBTOTAL: Prevention Activities		17,030,800	28,650,000
<b>CASE MANAGEMENT ACTIVITIES</b>			
<b>Diagnostics</b>			
<i>RDT procurement for Mainland and Zanzibar</i>	TBD	Mainland Zanzibar	900,000 181,000
<i>Use of RDTs in ADDOs</i>	Tanzania Social Marketing Program	Mainland	- 500,000
<i>RDT strengthening including QA/QC</i>	MalariaCare	Mainland	- 1,250,000
	NMCP	Mainland	- 100,000
<i>Integrated supportive supervision for health facilities</i>	NMCP	Mainland	100,000
<i>RDT and microscopy strengthening including QA/QC system</i>	ZAMEP	Zanzibar	- 120,000
<i>Integrated supportive supervision for health facilities</i>	ZAMEP	Zanzibar	- 50,000
<b>Malaria Treatment</b>			

<i>ACT procurement</i>	TBD	Mainland	1,000,000	1,000,000	Emergency funding for approximately 2 million AL treatments
<i>Artesunate Injection</i>	TBD	Mainland	1,315,000	1,315,000	PMI will procure injectable artesunate to fill the gap not covered by the Global Fund
<i>IMCI/severe malaria and fever management to children under five years</i>	TBD	Mainland	-	650,000	Strengthen and scale up facility-based management of febrile illness in six regions of the Lake Zone
<i>Strengthen pharmaceutical management and supply chain system</i>	TBD	Mainland	-	750,000	Strengthen quantification, distribution, storage, inventory management of malaria commodities and EUV
	TBD	Zanzibar	-	200,000	Strengthen quantification, distribution, storage, inventory management of malaria commodities
<i>Therapeutic drug efficacy monitoring</i>	MalariaCare	Mainland	-	250,000	Monitoring of 4 sites
<i>Integrated Community Case Management</i>	TBD	Mainland	-	500,000	Rollout of iCCM training and supervision
<b>SUBTOTAL: Case Management</b>			<b>3,396,000</b>	<b>7,866,000</b>	
<b>MONITORING AND EVALUATION</b>					
<b>Epidemic Surveillance and Response</b>					
<i>Continuation of eIDSR rollout</i>	TBD	Mainland	-	700,000	Rollout of eIDSR to remaining 10 regions
<i>Malaria Early Epidemic Detection System (MEEDS) reporting and outbreak response</i>	TBD	Zanzibar	-	250,000	Operational costs for MEEDS reporting and outbreak response system including technical assistance and support for day-to-day, printing of reports

	ZAMEP	Zanzibar	-	300,000	Direct support to ZAMEP to oversee/supervise MEEDS network and the District Outbreak Response Teams
<b>M&amp;E Support</b>					
<i>Malaria program review/midterm evaluation of NMCP strategic plan</i>	NMCP	Mainland	-	50,000	To assist NMCP in doing a malaria program review; co-funded with other donors
<i>Malaria Indicator Survey 2016-2017</i>	ICF Macro/NBS	Nationwide	-	300,000	Early support for the 2016/2017 MIS
<i>Technical Assistance-M&amp;E</i>	CDC	Nationwide	-	36,300	3 TA visits to assist with strengthening of malaria surveillance and other monitoring activities
<b>Entomological Monitoring</b>					
<i>Insecticide resistance monitoring</i>	NIMR	Mainland	-	350,000	Insecticide resistance monitoring on quarterly basis for 11 sentinel sites/year (total 22 sites nationwide)
<i>Longitudinal entomological monitoring for IRS in Lake Zone</i>	NIMR	Mainland	-	300,000	Longitudinal monitoring of seven sites in the Lake Zone
<i>Entomological and insecticide resistance monitoring including PCR</i>	ZAMEP	Zanzibar	-	152,400	Support entomologic sentinel surveillance sites on Unguja and Pemba
	ZAMEP	Zanzibar	-	25,000	Operational costs, maintenance, fuel for generator. To cover PCR for both entomology and diagnostic work.
<i>Procurement of entomology supplies/reagents</i>	CDC	Nationwide	10,000	10,000	Procurement of entomological supplies

<i>Technical Assistance- Entomological monitoring</i>	CDC	Nationwide	-	36,300	3 TA visits to support entomological monitoring to NIMR Mwanza and Zanzibar to provide TA to increase ELISA capability for blood meal analysis
<b>SUBTOTAL: Monitoring &amp; Evaluation</b>			<b>10,000</b>	<b>2,510,000</b>	
<b>OPERATIONAL RESEARCH</b>					
<i>OR on malaria epidemiology in areas with reported mosquito resistance to insecticides in Tanzania 2014-2016</i>	Tanzania Measure Evaluation Associate Award	Mainland	-	80,000	Research to determine the effect of pyrethroid resistance on malaria epidemiology through epidemiological surveillance at sentinel sites and examination of hospital records of severe malaria
<i>OR on how to effectively deploy primaquine for interrupting transmission of P. falciparum in pre-and elimination settings</i>	MalariaCare	Zanzibar	-	25,000	OR on how to effectively deploy this addition to the treatment regimen and to monitor the occurrence of any adverse effects such as hemolysis among persons with unrecognized G6PD deficiency
<b>SUBTOTAL: Operational Research</b>				<b>105,000</b>	
<b>BEHAVIOR CHANGE &amp; COMMUNICATION</b>					
<i>BCC across all intervention areas</i>	Tanzania Capacity and Communication Project	Mainland	-	2,000,000	BCC to increase demand for and correct use of ITNs, (\$400,000), IPTp (\$600,000), ACTs, and mRDTs (\$800,000) in 8 regions as well as BCC for IRS (\$200,000)
<i>Peace Corps Volunteers BCC</i>	Peace Corps Tanzania	Mainland	-	30,000	Support for three Malaria Volunteers

<i>BCC across all intervention areas</i>	ZAMEP	Zanzibar	-	200,000	BCC across all interventions including mass media such as radio, printed materials, community mobilization, advocacy.
<b>SUBTOTAL: Behavior Change &amp; Communication</b>					
<b>HEALTH SYSTEMS STRENGTHENING AND CAPACITY BUILDING</b>					
<i>Continue Support to FELTP</i>	CDC	Nationwide	-	150,000	Support to FELTP trainees with a focus on malaria
<i>Orientation of new malaria focal personnel at the regional and district level</i>	NMCP	Mainland	-	100,000	Support to orient and train personnel from regional and council health management teams to take on supervisory roles for QA/QC of malaria activities
<i>Support health system strengthening</i>	TBD	Mainland	-	400,000	PMI contribution to larger USAID Health Office project to strengthen national health care financing and routine monitoring of financial costs and gaps
	TBD	Mainland	-	100,000	HSS process evaluation to help guide the way forward; to document lessons learned of HSS program
<i>Capacity building for NMCP</i>	NMCP	Mainland	-	150,000	Strengthen capacity of NMCP staff by attending at conferences, short-term trainings, health promotion unit, will be based on training need assessment
<i>Support health system strengthening</i>	TBD	Zanzibar	-	100,000	PMI contribution to larger USAID Health Office project to strengthen national health care financing and routine monitoring of financial costs and gaps

<i>Capacity building for ZAMEP</i>	ZAMEP	Zanzibar	-	95,000	Attendance at conferences, short-term trainings, study tours
<b>SUBTOTAL: Capacity Building</b>					
<b>P. MANAGEMENT AND ADMINISTRATION</b>					
<i>USAID Administration &amp; Technical Support</i>	USAID	Nationwide	-	1,884,000	Support for salaries, benefits, and administration costs
<i>CDC Administration &amp; Technical Support</i>	CDC	Nationwide	-	660,000	
<b>SUBTOTAL: Management and Administration</b>					
<b>GRAND TOTAL</b>					
			<b>20,436,800</b>	<b>45,000,000</b>	