

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 2017 appropriation. If any further changes are made to this plan it will be reflected in a revised posting.



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PRESIDENT'S MALARIA INITIATIVE

TANZANIA

Malaria Operational Plan FY 2017

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ABBREVIATIONS and ACRONYMS

ACT	Artemisinin-based combination therapy
ADDO	Accredited drug dispensary outlet
AL	Artemether-lumefantrine
ANC	Antenatal care
ASAQ	Artesunate-amodiaquine
BCC	Behavior change communication
BRN	Big Results Now initiative
CD	Continuous distribution (of ITNs)
CDC	Centers for Disease Control and Prevention
CM	Case Management
CHMT	Council Health Management Team
CPICI	Comprehensive Platform for Integrated Communication Initiatives
DFID	Department for International Development
DHMT	District Health Management Team
DHS	Demographic and Health Survey
DWL	Durable wall liner
eIDSR	Electronic Infectious Disease Surveillance and Response
eLMIS	Electronic Logistics Management Information System
EPI	Expanded Program on Immunizations
EUV	End-use verification
FANC	Focused Antenatal Care
FELTP	Field Epidemiology and Field Training Program
FBO	Faith-based organization
FY	Fiscal year
Global Fund/GF	Global Fund to Fight AIDS, Tuberculosis and Malaria
GOT	Government of Tanzania
HMIS	Health Management Information System
HSS	Health Systems Strengthening
iCCM	Integrated Community Case Management
IDSR	Infectious Disease Surveillance and Response
IPTp	Intermittent preventive treatment in pregnant women
IRS	Indoor residual spraying
ITN	Insecticide-treated mosquito net
LMU	Logistics Management Unit
MCN	Malaria case notification
MEEDS	Malaria Epidemic Early Detection System
MIP	Malaria in pregnancy
MIS	Malaria Indicator Survey
MNCH	Maternal, newborn, and child health
MOHCDGEC	Ministry of Health, Community Development, Gender, Elderly and Children
MOHSW	Ministry of Health and Social Welfare
MPR	Malaria Program Review
MOP	Malaria Operational Plan
MSD	Medical Stores Department
NBS	National Bureau of Statistics
NHL	National Health Laboratory

NHLQATC	National Health Laboratory and Quality Assurance Training Center
NMCP	National Malaria Control Program
PEPFAR	President's Emergency Plan for AIDS Relief
PHCC	Primary health care center
PHCU	Primary health care unit
PCV	Peace Corps volunteer
PMI	President's Malaria Initiative
PO-RALG	President's Office– Regional Administration and Local Government
PMTCT	Prevention of mother to child transmission
PS3	Public Sector System Strengthening project
QA/QC	Quality assurance/quality control
RBF	Results-based financing
RBM	Roll Back Malaria
RCH	Reproductive and child health
RDT/mRDT	Rapid diagnostic test/malaria rapid diagnostic test
RHMT	Regional health management team
SBCC	Social and Behavior Change Communication
SHCC	Shehia Health Custodian Committee
SM&E	Surveillance, monitoring and evaluation
SNP	School net program
SP	Sulfadoxine-pyrimethamine
SPA/TSPA/SPAm	Service Provision Assessment/Tanzanian Service Provision Assessment/Service Provision Assessment for malaria
THMIS	Tanzania HIV and Malaria Indicator Survey
TNVS	Tanzania National Voucher Scheme
TOT	Training of trainers
TWG	Technical Working Group
UCC	Universal Coverage Campaign (of ITNs)
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USG	United States Government
WHO	World Health Organization
ZAMEP	Zanzibar Malaria Elimination Program

I. EXECUTIVE SUMMARY

When it was launched in 2005, the goal of the President's Malaria Initiative (PMI) was to reduce malaria-related mortality by 50% across 15 high-burden countries in sub-Saharan Africa through a rapid scale-up of four proven and highly effective malaria prevention and treatment measures: insecticide-treated mosquito nets (ITNs); indoor residual spraying (IRS); accurate diagnosis and prompt treatment with artemisinin-based combination therapies (ACTs); and intermittent preventive treatment of pregnant women (IPTp). With the passage of the Tom Lantos and Henry J. Hyde Global Leadership against HIV/AIDS, Tuberculosis, and Malaria Act in 2008, PMI developed a U.S. Government Malaria Strategy for 2009–2014. This strategy included a long-term vision for malaria control in which sustained high coverage with malaria prevention and treatment interventions would progressively lead to malaria-free zones in Africa, with the ultimate goal of worldwide malaria eradication by 2040–2050. Consistent with this strategy and the increase in annual appropriations supporting PMI, four new sub-Saharan African countries and one regional program in the Greater Mekong Subregion of Southeast Asia were added in 2011. The contributions of PMI, together with those of other partners, have led to dramatic improvements in the coverage of malaria control interventions in PMI-supported countries, and all 15 original countries have documented substantial declines in all-cause mortality rates among children less than five years of age.

In 2015, PMI launched the next six-year strategy, setting forth a bold and ambitious goal and objectives. The PMI Strategy for 2015–2020 takes into account the progress over the past decade and the new challenges that have arisen. Malaria prevention and control remains a major U.S. foreign assistance objective and PMI's Strategy fully aligns with the U.S. Government's vision of ending preventable child and maternal deaths and ending extreme poverty. It is also in line with the goals articulated in the RBM Partnership's second generation global malaria action plan, *Action and Investment to defeat Malaria (AIM) 2016–2030: for a Malaria-Free World* and WHO's updated *Global Technical Strategy: 2016–2030*. Under the PMI Strategy 2015–2020, the U.S. Government's goal is to work with PMI-supported countries and partners to further reduce malaria deaths and substantially decrease malaria morbidity, towards the long-term goal of elimination.

Tanzania was selected as a PMI focus country in FY 2006.

This FY 2017 Malaria Operational Plan (MOP) presents a detailed implementation plan for Tanzania based on the strategies of PMI and the National Malaria Control Program (NMCP) and the Zanzibar Malaria Elimination Program (ZAMEP) strategy. It was developed in consultation with the NMCP, 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, ZAMEP, and PMI, and provides a description of activities that are planned with FY 2017 funding.

The proposed FY 2017 PMI budget for Tanzania is \$45 million. PMI will support the following intervention areas with these funds:

Entomologic monitoring and insecticide resistance management: PMI continues to support routine entomologic monitoring on Mainland and Zanzibar consisting of: 1) Yearly monitoring of resistance to insecticides used for vector control; 2) Monthly Cone bioassay monitoring of residual insecticidal activity on sprayed walls in the Lake Zone and Zanzibar; 3) Monitoring of vector species abundance and distribution, resting behavior and sporozoite rates at established sentinel sites both on the Mainland and Zanzibar. PMI will continue to support the NMCP in quality assurance of their national entomologic surveillance activity contingent on continued Global Fund investment in the program.

Insecticide-treated nets (ITNs): The second ITN universal coverage campaign (UCC) for the Tanzania Mainland, delivering over 26 million ITNs to 22 of the 25 malaria endemic regions, began in mid-2015 and is scheduled for completion by June 2016. PMI procured ITNs covering two regions, with the remainder procured through Global Fund and DFID. As a means of sustaining universal coverage on the Mainland, PMI is supporting continuous delivery channels, two through the routine health service delivery and an annual delivery through primary schools.

The routine health service delivery points will be at a woman's first antenatal clinic visit and at infants' first measles vaccination visit. This new approach to deliver ITNs free of charge and directly through the health facilities was launched in Mtwara region in May 2016 and will be expanded to an additional six regions by late 2016/early 2017.

A pilot for a school-based ITN distribution program in three regions in the south of the country, Ruvuma, Lindi, and Mtwara, has proven the capacity of this channel to broadly deliver nets to the community in these regions. About 500,000 ITNs have now been delivered annually in 2013, 2014 and 2015 through the school-based net program to all primary and secondary schools in those regions. Evaluations for the school net program (SNP) rounds one and two (2013 and 2014) provided strong evidence of success. An evaluation of the SNP 2015 was completed in May 2016 and a fourth round of SNP, which will be expanded to four additional regions in the Lake Zone, will be rollout in August 2016.

With support from DFID, Global Fund and PMI, Zanzibar is undertaking its second universal coverage campaign (UCC), distributing about 790,000 ITNs between October 2015 and October 2016. Zanzibar launched a robust continuous delivery program in June 2014 that relies on several channels, including: antenatal care (ANC) and vaccination clinic delivery, as well as community-based delivery and delivery as part of malaria case detection. A process evaluation of the continuous distribution channels was completed in April 2016 and results will be available later in 2016.

With FY 2016 funding, PMI will support the expansion of the continuous distribution to two additional regions on the mainland, one in the Lake Zone and one in the West. With FY 2017 funds PMI will procure and support the distribution of about 2.5 million ITNs through ANC, vaccination clinics, and SNP in nine regions with historically high malaria prevalence in the Lake Zone, West and South. On Zanzibar, PMI will procure and support continuous distribution of about 180,000 ITNs, through ANC, vaccination clinics and community-based channels.

Indoor residual spraying (IRS):

The NMCP Strategic Plan 2015-2020 calls for application of quality non-pyrethroid IRS in selected areas. Over the period 2014 to 2016 PMI has annually sprayed between 385,000 and 487,000 structures in the Lake Zone, protecting about 1.9 million inhabitants each year.

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 recommends targeted spraying in districts showing high malaria transmission, then shifting to focal spraying once malaria transmission is highly localized and sound surveillance can identify those hot spots. Zanzibar has also adopted a strategy of focal spraying of hot spots proactively based on previous evidence of persistent transmission in an area. In 2016, PMI supported spraying in Zanzibar to cover about 27,000 structures, protecting about 130,000 individuals. This is down from about 60,000 structures in the two previous years, a move that was in conjunction with the commitment to an ITN universal coverage campaign completed in May 2016.

In 2017, 2018 and 2019, PMI will use the opportunity of the NGenIRS subsidy to slightly expand the reach of IRS in the Lake Zone to reach about 500,000 structures and protect about 2 million individuals in areas with high pyrethroid resistance and persistently high prevalence of malaria. Zanzibar will continue to use focal spraying and will also have a somewhat higher target of 40,000 structures protecting about 150,000 inhabitants. PMI will continue to support spraying in Geita through a public-private partnership with Geita Gold Mine. Based on continued vector susceptibility to pirimiphos-methyl CS and the absence of a viable alternative, pirimiphos-methyl CS will be used in 2017 for the fourth consecutive year instead of implementation of an earlier recommendation for a rotation in 2017 to different non-pyrethroid insecticide. Tanzania partners will continue to monitor this situation and will utilize the latest tools available for determining resistance to pirimiphos-methyl CS to guide future decisions on insecticides to be used in the future.

Malaria in pregnancy (MIP): The World Health Organization (WHO) recommends control and prevention of MIP via a three-pronged approach: distribution of ITNs through antenatal care clinics, provision of IPTp with sulfadoxine-pyrimethamine (SP), 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 adopted a policy of screening pregnant women by rapid diagnostic test (RDT) at ANC visits and treating those testing positive according to national guidelines.

The IPTp3+ policy was officially adopted by the MOHSW in 2014 and training of staff at public dispensaries, hospitals, and health centers has been completed. In 2015, PMI partners conducted training and supervision of over 221 health facility staff across 14 districts in Kagera and Mara Regions and all 13 district CHMTs and all PMTCT/RCH clinics in Lindi (223 clinics) and Mtwara (206 clinics). PMI also supported the completion and evaluation of Phase I of the Safe Motherhood Campaign, which was designed to improve uptake of all ANC services, including IPTp and LLINs, through a multimedia campaign.

With FY 2017 funds, PMI will support continued training and supervision for IPTp3+ and case management integrated with family planning, maternal and child health, and HIV programming. BCC to boost ITN use, ANC attendance, and IPTp uptake will continue. PMI will support provision of long-lasting ITNs to pregnant women through continuous distribution at ANC on the Mainland and Zanzibar.

Case management: The goal of the Tanzanian malaria control strategy is to achieve and maintain universal access to high quality malaria diagnostic testing and treatment in both public and private health facilities. Since 2006 PMI has supported both Mainland Tanzania and Zanzibar to 1) procure and implement RDT testing in public health facilities, 2) improve the testing performance of both malaria microscopy and RDT via trainings and supportive supervision, 3) disseminate revised diagnosis and treatment guidelines, 4) procure ACTs and injectable artesunate for treatment of severe malaria, and 5) improve supply chain management. In addition PMI funded drug efficacy monitoring to verify that *in vivo* efficacy of ACT remains high.

With FY 2017 funds PMI will procure commodities including mRDT, ACT, and injectable artesunate and continue to support mRDT and microscopy quality assurance and quality control systems. This latter activity will include maintenance of a National Slide Bank on the Mainland. PMI will support the NMCP to scale up the introduction of mRDT in accredited drug dispensary outlets (ADDOs) and to improve case management of febrile illnesses including malaria. PMI will support facility-based provision of integrated health services for improved malaria diagnosis and treatment and will provide support for implementation of adjunctive treatment with single low-dose primaquine in Zanzibar. PMI will continue to support strengthening of pharmaceutical management and the supply chain system in both Mainland and Zanzibar.

Health systems strengthening and capacity building: PMI and the Government of Tanzania (GOT) 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 prioritize 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.

With FY 2017 funds, PMI will provide support to Tanzania's government led results-based financing (RBF) activity, by supporting performance payments to facilities for provision of high quality malaria services and to supply chain actors for on time provision of key malaria commodities. PMI will continue to support the NMCP and ZAMEP in capacity building activities and will continue its support 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. In addition, the Peace Corps continues to support BCC and surveillance activities and to effectively engage with their communities to approach malaria education and prevention in innovative ways.

Social and behavior change communication (SBCC): PMI's SBCC investments focus on key messaging around testing and treatment with the Not Every Fever is Malaria Campaign, prevention and treatment of malaria in pregnancy with the Safe Motherhood Campaign, the school net program, health facility based LLINs distribution and the Malaria Safe initiative to engage private companies in promoting malaria prevention and control for their employees and communities. In addition, PMI supports the Community Change Agent platform to directly reach nearly 1 million people with messages on proper net use, care and repair; adherence to diagnostic testing results and treatment; IRS, and malaria in pregnancy. In Zanzibar, PMI supports ZAMEP's SBCC unit to communicate messages on imported malaria cases, active case detection and response and continuous net distribution.

SBCC efforts in FY 2017 will continue to focus on malaria case management, the IPTp3+ roll out, health facility based LLINs distribution, the school net distribution project, IRS, and increased engagement of private companies on the Mainland. SBCC efforts through mass media and interpersonal communication will also focus on engaging communities to work together to ensure households are accessing, using and caring for their nets as well as accessing health facilities for testing and treatment and MIP services. Based on malaria stratification, SBCC messaging and interventions will be tailored to respond to each region and district's unique situation. In Zanzibar, PMI will continue to support the ZAMEP SBCC unit and the communication campaigns for imported malaria cases, continuous

distribution of nets and to support the case detection and response teams with messages to promote preventive measures and prompt care-seeking.

Surveillance, monitoring and evaluation (SM&E): Monitoring and evaluation (M&E): Key objectives of the Tanzanian malaria strategy are to achieve and maintain 100% reporting of routine and periodic malaria indicators, to have a well-functioning early epidemic detection system and to strengthen monitoring and evaluation of malaria control activities and strategies. PMI has extensively supported the NMCP and ZAMEP to expand and improve the Health Information Management System (HMIS) and District Health Information 2 Software (DHIS 2), infectious disease surveillance and response (IDSR) systems, routine monitoring systems, and the Malaria Epidemic Early Detection System (MEEDS) and malaria case notification (MCN) in Zanzibar. PMI also contributed substantial funding to several nationwide periodic surveys including the DHS, which is conducted every 4-5 years, the 2007 and 2011 THMIS, and the SPA carried out in 2006 and 2014.

To further epidemic detection and control, with FY 2017 funding PMI will work with other initiatives such as the Global Health Security activities for the rollout and strengthening of the electronic Infectious Disease Surveillance and Response (IDSR) system and continue to support the maintenance of the MEEDS and outbreak response system in Zanzibar. PMI will also support a routine system strengthening activity to improve malaria data quality and use within the HMIS and will provide funds to the NMCP and ZAMEP to conduct and oversee integrated supportive supervision and to coordinate technical working groups for all malaria control interventions. A new Malaria Indicator Survey (MIS) is planned for 2017, which PMI will support in conjunction with other partners.

Operational research (OR): The Mainland has engaged in PMI-supported OR activities in past years including the monitoring of parasitemia prevalence among pregnant women and infants in the Lake Zone. This OR activity was supported with FY 2011 funds, completed in December 2013, and presented at a conference in 2014¹. A manuscript is currently in preparation. With core funds, PMI is currently supporting a multi-year, two-arm cluster randomized trial study that aims to assess the protective efficacy of a non-pyrethroid insecticide impregnated durable wall liner (DWL) plus ITNs, vs ITNs alone. With FY 2014 funds, PMI is supporting two studies: one to explore the relationship between net damage, insecticide concentration, and feeding inhibition in susceptible and resistant vectors in semi-field trials; the second study is designed to identify motivators and existing barriers to net care and repair from local user contexts. No new OR activities are proposed with FY 2017 funding.

¹ <http://www.abstractsonline.com/Plan/ViewAbstract.aspx?sKey=9ad599c5-4e95-4590-9867-895b715dea84&cKey=1d8aebd6-da1a-4a82-a9c8-332c05b8b089&mKey=%7bCEAFE81A-9B33-4623-A1BB-85D31108B94B%7d>

II. STRATEGY

1. Introduction

When it was launched in 2005, the goal of PMI was to reduce malaria-related mortality by 50% across 15 high-burden countries in sub-Saharan Africa through a rapid scale-up of four proven and highly effective malaria prevention and treatment measures: insecticide-treated mosquito nets (ITNs); indoor residual spraying (IRS); accurate diagnosis and prompt treatment with artemisinin-based combination therapies (ACTs); and intermittent preventive treatment of pregnant women (IPTp). With the passage of the Tom Lantos and Henry J. Hyde Global Leadership against HIV/AIDS, Tuberculosis, and Malaria Act in 2008, PMI developed a U.S. Government Malaria Strategy for 2009–2014. This strategy included a long-term vision for malaria control in which sustained high coverage with malaria prevention and treatment interventions would progressively lead to malaria-free zones in Africa, with the ultimate goal of worldwide malaria eradication by 2040-2050. Consistent with this strategy and the increase in annual appropriations supporting PMI, four new sub-Saharan African countries and one regional program in the Greater Mekong Subregion of Southeast Asia were added in 2011. The contributions of PMI, together with those of other partners, have led to dramatic improvements in the coverage of malaria control interventions in PMI-supported countries, and all 15 original countries have documented substantial declines in all-cause mortality rates among children less than five years of age.

In 2015, PMI launched the next six-year strategy, setting forth a bold and ambitious goal and objectives. The PMI Strategy for 2015-2020 takes into account the progress over the past decade and the new challenges that have arisen. Malaria prevention and control remains a major U.S. foreign assistance objective and PMI's Strategy fully aligns with the U.S. Government's vision of ending preventable child and maternal deaths and ending extreme poverty. It is also in line with the goals articulated in the RBM Partnership's second generation global malaria action plan, *Action and Investment to defeat Malaria (AIM) 2016-2030: for a Malaria-Free World* and WHO's updated *Global Technical Strategy: 2016-2030*. Under the PMI Strategy 2015-2020, the U.S. Government's goal is to work with PMI-supported countries and partners to further reduce malaria deaths and substantially decrease malaria morbidity, towards the long-term goal of elimination.

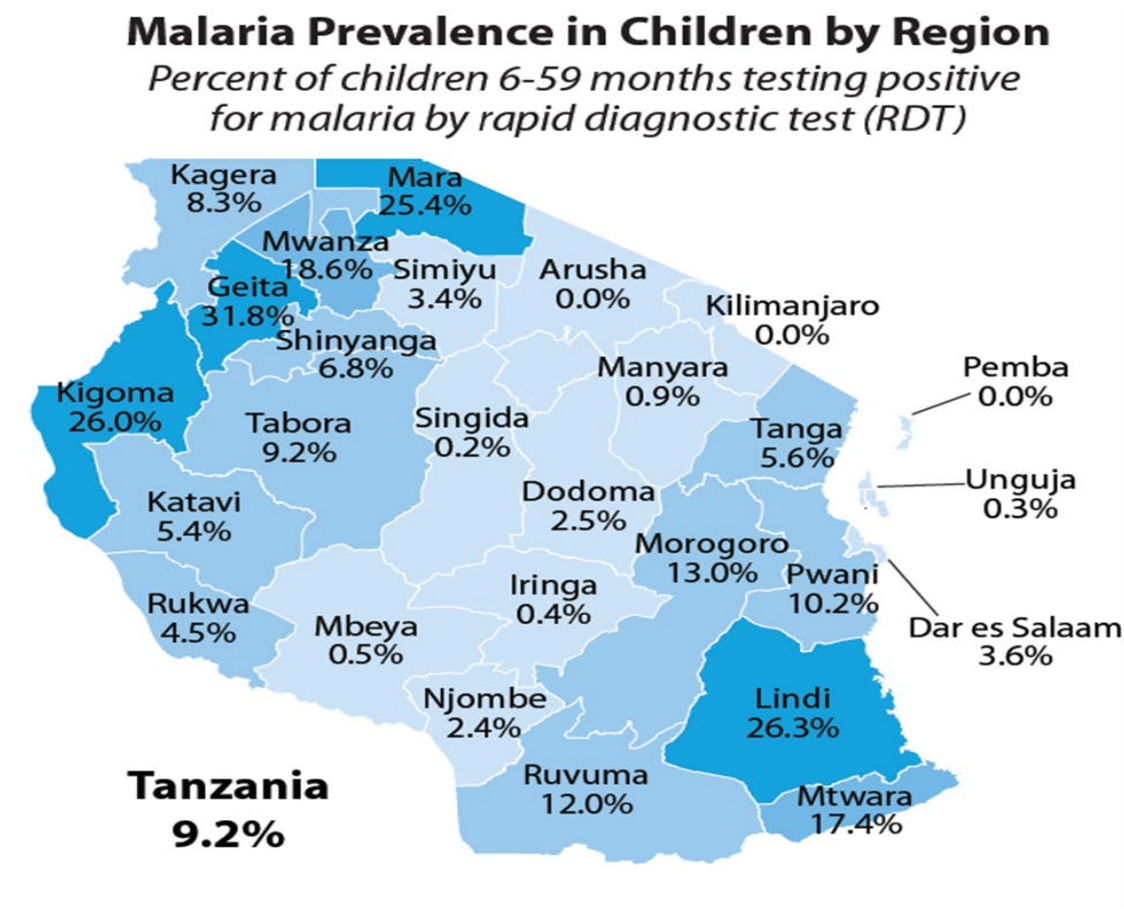
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2. Malaria situation in Tanzania

Ninety-three percent of the population on the Mainland and the entire population of Zanzibar live in areas where malaria is transmitted. 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*.

Figure 1. Malaria Prevalence in Children by Region



Source: 2011-2012 Tanzania HIV and Malaria Indicator Survey (THMIS)

The principal vectors of malaria in Tanzania are mosquitoes of the *Anopheles gambiae* complex (*An. gambiae* s.s. and *An. arabiensis*), with *An. arabiensis* increasing to 80% of the vector population in the Lake Zone sentinel site collections in 2015. In Zanzibar, high coverage of ITNs and IRS has also resulted in a shift in the malaria vector population from *An. gambiae* to predominantly *An. arabiensis* and reflects the predominant out-door biting pattern observed on both Pemba and Unguja. *An. funestus* has been on the rise in parts of both islands of Zanzibar.

The 2011–2012 Tanzania HIV/AIDS Malaria Indicator Survey (THMIS) showed that 9% (via MRDT) and 4% (via microscopy) 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 from <1% in the highlands of

Arusha to 26% along the Lake Victoria shores (Figure 1). The same survey showed a much lower malaria prevalence of 0.2% (via MRDT) and 0.4% (via microscopy) in Zanzibar. On the Mainland, more than 26% of all outpatient attendances are attributable to malaria, resulting in an estimated 7.7 million confirmed and clinical outpatient malaria cases annually, 3.4 and 4.3 million cases for under-five and above five years of age respectively. According to the World Malaria Report (2014), 8,526 malaria deaths are reported 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 81/1000 live births in 2010.

Table 1. Infant and Under-five Mortality Rates for Five-year Periods Preceding Nationwide Household Surveys, Tanzania

	1999	2004-05	2007-08	2009-10
	DHS	DHS	THMIS	DHS
Infant mortality rate	99	68	58	51
(95% C.I.)	(85-113)	(61-75)	(50-65)	(44-57)
Under-five mortality rate	147	112	91	81
(95% C.I.)	(128-165)	(103-122)	(83-100)	(72-90)

The trend analysis of 1999 -2012 demographic surveys shows that the under-five mortality 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 *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).

3. Country health system delivery structure and Ministry of Health, Community Development, Gender, Elderly and Children (MOHCDGEC)

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 and malaria strategic plan. The National Malaria Control Program (NMCP) serves the Mainland, while the Zanzibar Malaria Elimination Program (ZAMEP) serves Zanzibar.

The Mainland’s NMCP has established several committees to coordinate and direct national malaria control policies and priorities. The National Malaria Steering Committee is the body that is expected to provide strategic and policy direction for malaria activities on the Mainland. It is chaired by the Chief Medical Officer and includes representatives from leading stakeholders. The ITN strategies and policies are coordinated through the National Insecticide-Treated Nets Program. A diagnostics and case management working group guides NMCP policies/strategies for strengthening and expanding malaria

case management. Surveillance, monitoring and evaluation (SM&E) and behavior change communication (BCC) technical working groups (TWGs) are also active. PMI is represented on each of the technical working groups.

The ZAMEP provides leadership for malaria activities on Zanzibar and has established Technical Working Groups for all major intervention areas, i.e. vector control, case management and diagnosis, BCC and SM&E. These working groups are now operational.. PMI will be represented on these technical working groups. PMI is also supporting the establishment of a Technical Advisory Group, comprised of both local and international experts, to help guide ZAMEP's pre-elimination activities. It is expected that this group will be convened in late 2016.

On the mainland, the government of Tanzania (GOT) operates a decentralized health system. At the national level, the Ministry of Health, Community Development, Gender, Elderly, and Children (MOHCDGEC; formerly Ministry of Health and Social Welfare and changed by the new administration after the November 2015 elections) establishes the policy framework for all health interventions. The MOHCDGEC is responsible for supervision and regulation for all health services throughout the country, as well as playing a direct role in the management of tertiary health services.

At the regional level, the implementation of health policies and interventions is organized around three functional levels: council (primary level), regional (secondary level), and referral hospitals (tertiary level). Within the framework of the ongoing local government reforms, regional councils have full responsibilities for delivering health services within their areas of jurisdiction, and report administratively to the President's Office – Regional Administration and Local Government (PO-RALG). Under the new national administration, PO-RALG has the authority to strengthen the recruitment, deployment, placement, and retention process to ensure equitable distribution of health sector workers at all levels; improve the working environment for staff at all levels; educate employers and employees on schemes of service, appointments, and conditions of service; and strengthen human resource supervision.

Under this system, the councils have full mandate for planning, implementation, monitoring and evaluation of health services. Each council has a District Medical Officer who heads the Council Health Management Team (CHMT) and is answerable to the District Executive Director, the head of the council. CHMTs are responsible for provision of services in dispensaries, health centers and district or District Designated Hospitals.

The Regional Health Management Teams (RHMTs) are responsible for interpreting health policies at the regional level. Under the new administration, RHMTs and the CHMTs will have the important role of providing supportive supervision and mentoring services to the health sector workers involved in task sharing implementation, including the new cadre of community health workers.

In the Zanzibar Ministry of Health, the Minister and his Deputy provide policy direction for health service delivery that is executed through the offices of the Principal Secretary and the Director General for Medical Services. At the central level four directorates have been established to support specific Ministry of Health departments/Units/Sections and Programs, i.e. Planning, Policy and Research; Administration and Personnel; Curative Services; and the Directorate for Preventive Services and Health Promotion which includes the Zanzibar Malaria Elimination Program.

Health service delivery in Zanzibar is through a hierarchy of health facilities categorized into public, private and government institutional health facilities managed by military and defense forces. This

system allows for a chain of referrals from a basic primary health care facility to the referral hospital. This is characterized by three levels: primary (Primary Health Care Units and Primary Health Care Centres), secondary (District Hospitals), and tertiary (Mnazi Mmoja and other specialized hospitals).

There are 149 Primary Health Care Units (PHCU); 34 are categorized as PHCU+ that provide additional services such as dental, pharmacy, delivery and laboratory services, four are Primary Health Care Centres (PHCCs) that provide all the services of the PHCU+ with the additional of inpatient care and X-ray; three are district hospitals and three are tertiary level facilities located in Pemba that provide second-line referral services.

The ZAMEP is supporting districts through Zonal Health Management Teams. There are two zones in Zanzibar and each has its District Health Management Team (DHMT) headed by a District Medical Officer who is overall in charge of health, including malaria. The DHMTs monitor the malaria situation in the villages (*shehias*) on monthly and quarterly basis through Shehia Health Custodian Committees (SHCC). Most *shehias* have functional SHCC. The SHCC acts as the advisory board for all health affairs in their locality. The committee collaborates with health workers in planning and implementation of malaria services delivered to the community.

On mainland Tanzania there are about 7,480 health facilities, of which 83% are public/FBO sector (MOHSW 2015). The system is in the form of a pyramid: on top are specialized hospitals owned by the Ministry and at the bottom are primary health care facilities. Almost 85% of the population gets their health services from primary health care facilities (MOHSW 2013); however, these facilities face a lot of challenges in delivering services including poor infrastructure, shortage of skilled staff and essential medicines.

Table 2: Health facilities in Mainland

Facility type	Public/FBO	Parastatal	Private	Total
Hospital	240	-	39	279
Health Center	614	29 ²	78	721
Dispensary	5,819	168	1,123	6,480
Total	6,673	197	1,240	7,480

Source: MOHSW, Health Sector Strategic Plan (HSSP IV) July 2015-June 2020

4. National malaria control strategy

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. ZAMEP has similar organizational units and a comparable staff.

² Hospitals and Health Center data is combined in HSSP IV

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 will 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 convened. The ITN strategies and policies are coordinated through the National Insecticide Treated Nets Program. A diagnostics and case management technical working group guides NMCP policies/strategies for strengthening and expanding malaria case management. A surveillance and monitoring and evaluation (SM&E) technical working group was re-formed in 2014. PMI is represented on each of these working groups.

The NMCP strategic plan for 2015-2020 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 SBCC 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 intervention to protect at least 85% of the population living in areas selected using evidence-based criteria, 3) to scale-up larviciding interventions by 2020 in 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 (LGAs) in all districts.

Supportive interventions

The main objectives are: 1) improve SBCC so that by 2020, 80% of all population 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.

Big Results Now (BRN) Initiative

As part of the Tanzania Government's effort to transition the country from low to middle-income economy, in February 2015, Tanzanian President Jakaya Kikwete unveiled the Big Results Now (BRN) initiative. BRN is a comprehensive system of implementation that focuses on six priority areas of the economy: 1) energy and natural gas, 2) agriculture, 3) water, 4) education, 5) transport, and 6) mobilization of resources.³The BRN initiative aims at adopting new methods of working under a specified timeframe for delivery of the step-change required. The health sector was added after the initial announcement and the intention is to implement four priorities: 1) equal distribution of skilled health workers from the lower level of primary health care, 2) improved quality of services, 3) increased availability of important drugs and health equipment, and 4) strengthen reproductive health of mother and child by reducing at least 60% of mortality rate by the year 2018.⁴

The health component of BRN builds on Tanzania's Sharpened One Plan and the Reproductive, Maternal, Newborn and Child Health (RMNCH) Scorecard launched by President Kikwete, 15 May 2014.⁵

The Sharpened One Plan aims to:

- Address the unmet need for family planning
- Address the gaps for coverage and quality of care at birth
- Continue the progress already achieved in child health

Based on the data, this plan also advocates for a particular focus on women from the Western and Lake Zones who are being underserved in terms of family planning services, and on rural, poor women and newborns who are not receiving adequate care at birth.⁶ The map below shows the regions adopted by the BRN for health interventions. These include many of the highest malaria endemic regions in the country. Overarching health programs, such as results-based financing (RBF) and health system strengthening activities (HSS) will be implemented with support from the larger USAID health portfolio as well as PMI. PMI activities will support work across these three key intervention areas in all regions except for Singida and Katavi.

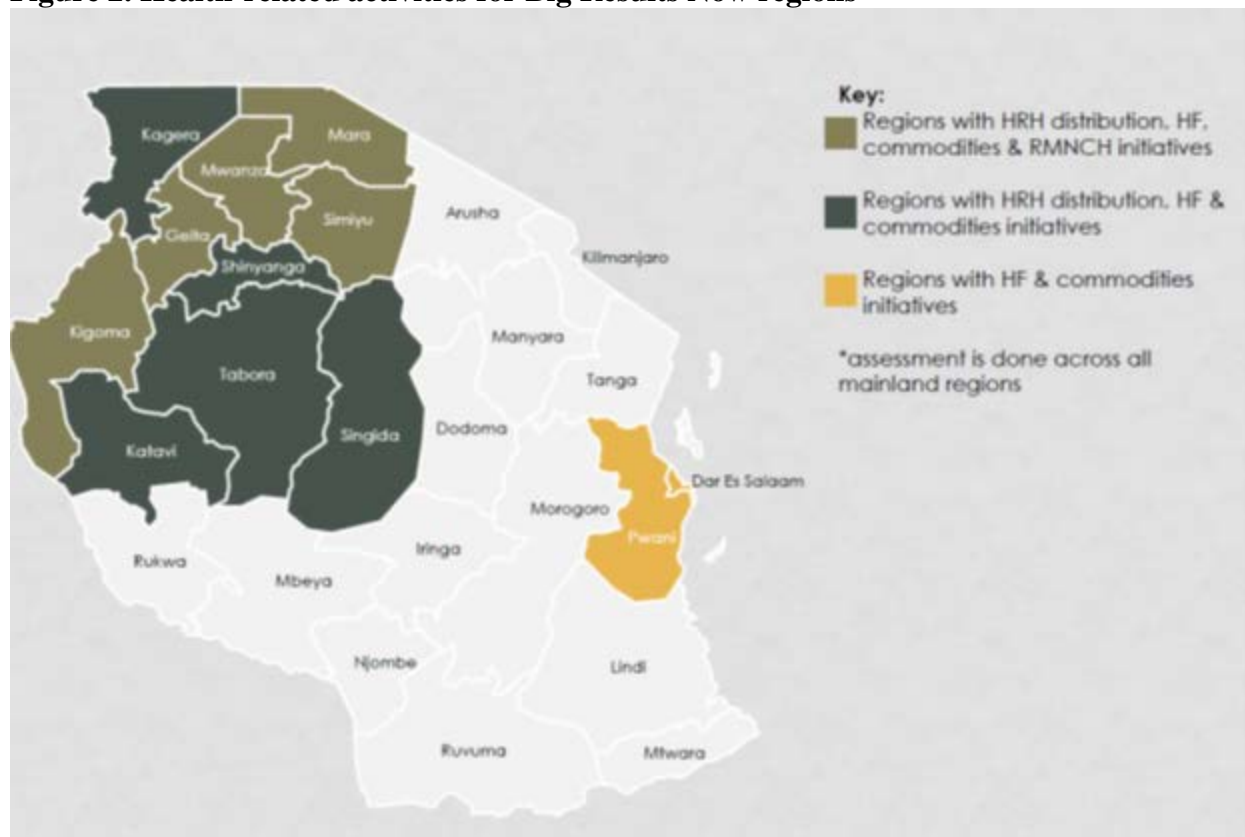
³<http://www.pmoralg.go.tz/quick-menu/brn/>

⁴<http://www.pesatimes.co.tz/news/governance/-big-results-now--initiative-targets-health-sector/tanzania>

⁵<http://www.afro.who.int/en/tanzania/press-materials/item/6565-the-united-republic-of-tanzania-launches-the-sharpened-one-plan-and-the-rmnch-score-card-to-prevent-maternal-newborn-and-child-mortality.html>

⁶ <http://www.mamaye.or.tz/en/evidence/sharpened-one-plan-2014-2015>

Figure 2. Health-related activities for Big Results Now regions



Zanzibar

The ZAMEP's 2013-2018 Strategic Plan focuses on pre-elimination and its vision 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 *shelia* (village) levels by 2018
- To conduct relevant operational research to evaluate and optimize ongoing activities and monitor resistance to antimalarials and insecticides

5. Updates in the strategy section

N/A

6. 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 resources⁷, 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, United Nations' Children's Fund (UNICEF), African Development Bank, Japan International Cooperation Agency, Danish International Development Agency (Danida), the United Kingdom's Department for International Development (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.⁸ A combined Malaria and HSS grant for \$162 million was approved for January 2016 to December 2017. The grant includes \$45.5 million for vector control, \$72.5 million for case management and \$39.6 million for health system strengthening. Global Fund also approved a grant of \$5.6 million to support malaria activities on Zanzibar for 2015 through 2017.

PMI, the Global Fund, DFID, and the Swiss Agency for Development and Cooperation provide funding for the ITN strategy on the Mainland and Zanzibar. From 2015 – 2016 in Zanzibar, DFID, the Global Fund and PMI are jointly providing about 790,000 ITNs for a UCC to reach all households on Unguja and Pemba.

For case management, PMI and the Global Fund provide all funding for ACTs and rapid diagnostic tests (RDTs) for the NMCP and the ZAMEP. In 2016 and 2017, the Global Fund will procure most of the ACTs and RDTs needed for Tanzania. PMI will provide \$2 million for ACTs and \$1 million for RDTs to help fill the gap in 2018. PMI will also provide technical assistance for quantification, procurement planning, and monitoring of ACTs and RDTs.

⁷ Zanzibar Malaria Strategic Plan 11 (2013-2018)

⁸ <http://www.theglobalfund.org/en/fundingmodel/allocationprocess/allocations/>

Major non-PMI External Sources of Funding for Malaria Control Mainland and Zanzibar, 2014-present

Source	Amount (millions)	Period Covered	What is covered
Global Fund New Funding Model (Mainland)	\$162	January 2016 - December 2017	Sustaining universal ITN 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, M&E, Health System Strengthening
Global Fund New Funding Model (Zanzibar)	\$5.6	January 2015 – December 2017	Supporting mass ITN distribution campaign and sustaining universal coverage with continuous distribution channels, improved malaria case management through the use of RDTs and ACTs in the public and private sectors, SBCC, supply chain strengthening and drug quality monitoring, HMIS strengthening.
Swiss Agency for Development & Cooperation	\$6	2013 – 2017	Technical Assistance to ITN and Case Management cells within NMCP

Private Sector

Through the Global Fund, the Clinton Foundation has provided technical assistance to the NMCP and the ZAMEP to introduce ACT and RDTs into the private sector. With FY 2016 and FY 2017 funding, PMI will support the NMCP to scale up this program. Beginning in FY 2012, PMI partnered with Geita Gold Mine to spray houses in Geita District. Geita Gold Mine provided funds to the local government for operational costs and 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 partnership facilitated IRS in the urban and peri-urban wards of Kalangalala and Mtakuja in Geita District, Geita Region.

With support from PMI in 2014 and 2015, Malaria Safe, an initiative that encourages private sector participation in malaria education, prevention, and advocacy, now has a membership of 65 companies in Tanzania. Malaria Safe works with NMCP and partners to support World Malaria Day activities. A number Malaria Safe companies provide long-lasting ITNs and case management services to their employees. In 2016 the Malaria Safe companies took on full responsibility for the secretariat and coordination meetings, the ministerial steering committee, and expansion of the program to include new companies. Although support for Malaria Safe ends in 2016, PMI will continue to engage and coordinate with the Malaria Safe companies' activities.

Collaboration with Other USG Programs

PMI works in collaboration with the 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 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.

7. PMI goal, objectives, strategic areas, and key indicators

Under the PMI Strategy for 2015-2020, the U.S. Government's goal is to work with PMI-supported countries and partners to further reduce malaria deaths and substantially decrease malaria morbidity, towards the long-term goal of elimination. Building upon the progress to date in PMI-supported countries, PMI will work with NMCPs and partners to accomplish the following objectives by 2020:

1. Reduce malaria mortality by one-third from 2015 levels in PMI-supported countries, achieving a greater than 80% reduction from PMI's original 2000 baseline levels.
2. Reduce malaria morbidity in PMI-supported countries by 40% from 2015 levels.
3. Assist at least five PMI-supported countries to meet the World Health Organization's (WHO) criteria for national or sub-national pre-elimination.⁹

These objectives will be accomplished by emphasizing five core areas of strategic focus:

1. Achieving and sustaining scale of proven interventions
2. Adapting to changing epidemiology and incorporating new tools
3. Improving countries' capacity to collect and use information
4. Mitigating risk against the current malaria control gains
5. Building capacity and health systems towards full country ownership

To track progress toward achieving and sustaining scale of proven interventions (area of strategic focus #1), PMI will continue to track the key indicators recommended by the Roll Back Malaria Monitoring and Evaluation Reference Group (RBM MERG) as listed below:

- Proportion of households with at least one ITN
- Proportion of households with at least one ITN for every two people
- Proportion of children under five years old who slept under an ITN the previous night
- Proportion of pregnant women who slept under an ITN the previous night
- Proportion of households in targeted districts protected by IRS
- Proportion of children under five years old with fever in the last two weeks for whom advice or treatment was sought
- Proportion of children under five with fever in the last two weeks who had a finger or heel stick

⁹ http://whqlibdoc.who.int/publications/2007/9789241596084_eng.pdf

- Proportion receiving an ACT among children under five years old with fever in the last two weeks who received any antimalarial drugs
- Proportion of women who received two or more doses of IPTp for malaria during ANC visits during their last pregnancy

8. Progress on coverage/impact indicators to date

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 Demographic and Health Survey (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 parasite prevalence 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. PMI supported the 2015-2016 DHS, which is currently undergoing data analysis.

Table 3: Malaria Control Intervention Coverage and Impact Indicators in Tanzania from 2004/05 to 2011/12

Coverage Indicators	Mainland				Zanzibar			
	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	92	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	-	14	27	21	-	9	4	1

years old with fever in the last two weeks who received treatment with ACTs within 24 hours of onset fever								
Targeted houses adequately sprayed with a residual insecticide in the last 12 months	-	-	95	-	-	94	96	87

Impact Indicators	Mainland				Zanzibar			
	2004-05 DHS	2007-08 MIS	2000-10 DHS	2011-12 MIS	2004-05 DHS	2007-08 MIS	2009-10 DHS	2011-12 MIS
All-cause under-five mortality rate	112	92	81	-	101	79	73	-
Malaria parasite 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%

¹Based on results of Paracheck PfTM SD Bioline Malaria AG Pf/Pan RDT, in 2007/8 and 2011/12, respectively.

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*). In Zanzibar the Impact evaluation conducted in Zanzibar shows that in children 6-59 months on Unguja and Pemba islands severe anemia decreased during 2004/5 and 2011/12 and malaria parasite prevalence remained below 1% during 2007/9-2011/12. However, both the severe anemia and malaria parasite prevalence declines are not statistically significant. In a separate series of surveys in North A and Micheweni districts *P. falciparum* parasite prevalence reduced by 97% in 2012 as compared to 2003 and remained below 1% in both districts. Confirmed malaria case incidence confirmed declined rapidly between 2005 and 2010. Malaria admissions accounted for 30%- 50% of all admissions in 2000 but it was about 5% in 2012. Malaria-attributed deaths accounted for ab-out 50% of all hospital deaths in the year 2000 but no confirmed malaria-attributed deaths have been reported since 2011. The full report will be released towards the end of 2016 to include data with the evaluation endline as the year 2015.

9. Other relevant evidence on progress

The results of the 2014-2015 Tanzania Service Provision Assessment (TSPA) were released in February 2016. The general objective of the TSPA was to collect information on the delivery of health care services in Tanzania and to examine the readiness of facilities to provide quality health services in the areas of child health, maternal and newborn care, family planning, sexually transmitted infections, HIV

and AIDS, tuberculosis, malaria, and chronic diseases. Results showed that 99% of facilities offered malaria diagnostic and/or treatment services, with an average of 86% (95% of hospitals, 94% of health centers, 82% of dispensaries and clinics) having at least one form of malaria diagnostic capacity, either mRDT or microscopy. At the time of survey 72% of all facilities had copies of the National Malaria Diagnostic and Treatment Guidelines available in the facility and 88% had first-line antimalarial medicine available in the facility on the day of the visit.

III. OPERATIONAL PLAN

Through the Global Health Initiative and PMI, the United States Government (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, RBM, 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, ZAMEP, and other partners based upon the NMCP's and ZAMEP's strategic goals and priorities. The level of support for each of the interventions takes into consideration the contributions from the Government of Tanzania and other donors such as 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. PMI supports all interventions in the NMCP strategic plan except for environmental management and larviciding.

In Zanzibar, decreasing malaria prevalence has prompted the ZAMEP to adopt a new malaria 2013-2018 Strategic Plan, 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 that relate to the changing epidemiology. PMI supports all aspects of the ZAMEP strategic plan, except for environmental management and larviciding.

1. Vector monitoring and control

NMCP/ZAMEP/PMI objectives

Vector control is central to the strategic plans for the NMCP and ZAMEP. Both programs call for universal access to long lasting ITNs, to be supplemented by IRS in suitable epidemiological areas. Both programs support universal coverage campaigns to reach high ITN access and the use of continuous distribution channels, including delivery through ANC and vaccination clinics, to maintain high coverage. Both programs also recognize the need for strong entomological data that can be used to guide insecticide resistance management plans.

a. Entomologic monitoring and insecticide resistance management

PMI continues to support routine entomologic monitoring on Mainland and Zanzibar consisting of: 1) yearly monitoring of resistance to insecticides used for vector control; 2) monthly Cone bioassay monitoring of residual insecticidal activity on sprayed walls in the Lake Zone and Zanzibar; 3) monitoring of vector species abundance and distribution, resting behavior and sporozoite rates at

established sentinel sites both on the mainland and Zanzibar. In addition, PMI will continue to support the NMCP in quality assurance of their national entomologic surveillance activity contingent on continued Global Fund investment in the program.

Progress since PMI was launched

Mainland

The national resistance monitoring on the Mainland, supported by PMI currently consists of 23 sentinel districts across the Mainland. These include PMI IRS districts in the regions of Mara, Mwanza, Geita and Kagera Regions. 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 IRS districts. Monthly mosquito collections performed by the regional/district health authorities are sent to NIMR- Mwanza for processing and analysis. In 2015 the number of entomologic sentinel sites was increased from five sentinel sites in Geita, Mwanza, and Mara Regions to seven sentinel sites Geita, Mwanza, Mara and Kagera Regions to reflect changes in IRS activities. In addition, cone wall bioassays are conducted to monitor residual insecticide activity of the insecticide used for IRS.

Zanzibar

Entomologic monitoring

From 2005 – 2012 the ZAMEP conducted longitudinal entomologic monitoring in four sentinel sites in Unguja and three in Pemba. Analysis of the Malaria Epidemic Early Detection System (MEEDS) data from 2009-2012 identified areas of persistent malaria transmission. In November 2013, entomologic monitoring was expanded to a total of 22 sentinel sites, 12 in Unguja and 10 sites in Pemba to evaluate these areas of persistent malaria transmissions, to provide information on vector species and density, human blood feeding index and malaria infection rates in the various vector species. In addition, ZAMEP also conducts IRS monitoring activities includes residual efficacy testing and insecticide resistance monitoring. Efficacy testing is conducted using ZAMEP's colony of susceptible *An. gambiae* s.s. The number of sites followed in 2017 will be 10 total, five on Unguja and five on Pemba.

Progress during the last 12-18 months

Mainland

In 2014, the NMCP received funding from the Global Fund to set up a national entomology surveillance program in their Malaria Surveillance Framework as part of their Malaria Strategic Plan 2015-2020. Originally the NMCP worked with 62 Local Government Authorities and Local District Councils to establish the parameters for monthly longitudinal entomologic surveillance. Each district was provided with entomological equipment and a motorcycle to facilitate the collection and supervision of the surveillance of two to three sentinel sites; two sites for populations between 200,000 – 500,000 persons and three sentinel sites for populations >500,000. Vector Control Officers from each site were given a two-week training. However Global Fund approved funding for only 28 sentinel districts and the implementation was delayed from June 2015 to June 2016 due to delay in funding. Monthly longitudinal entomologic surveillance with CDC light traps indoors and bucket traps for indoor and outdoor collections is aimed at collecting information on mosquito densities, species composition and malaria infection rates. The Local District Councils have selected community-owned resource persons (CORP), one for each village, two in smaller districts three in those >500,000

population. The CORPs will be responsible for the monthly collections of 3 days per month in three houses per village. The District Vector Control Officers will be responsible for the morphological identification of the mosquitoes, packing and shipping the samples to a laboratory for species identification and malaria parasite testing. The NMCP plans to hold refresher training in April 2016 and implement the surveillance program by the June 2016. In 2016, PMI provided support for oversight and quality assurance for all activities from mosquito field collection, data collection and information quality through its partners. This program will be supported by Global Fund through 2017 and may receive additional Global Fund support in 2018.

National Institute for Medical Research (NIMR)-Amani has a total of 23 sentinel sites for insecticide resistance monitoring. NIMR-Amani reported national insecticide resistance testing in 20 of those sites in 2015. The surveillance was conducted with the WHO standard assay for permethrin, deltamethrin, DDT, bendiocarb and pirimiphos-methyl. Data from 20 sites include PMI-supported IRS areas of Geita (Geita Region), Ngara and Muleba (Kagera Region), and Musoma (Mara Region). Results, presented for all sites with a lower than 98% mortality, indicate that the number of sites with resistance is increasing. Permethrin resistance, ranging from 30% to 81% survivorship was detected in 7 of the 20 sites, including Musoma (40%) and Muleba (30%). Possible permethrin resistance (3.3% - 6.7%) was seen in 4 of the 20 sites, which included Magu (6.7%). Resistance to deltamethrin was recorded in 11 sites, ranging from 15% - 66.7% which included Muleba (38.7%) and Musoma (18.7%). Possible resistance (6.7%) was detected in one site. Bendiocarb resistance was detected in two sites (19% and 18.3%) with possible resistance in Muleba (2.5%). Resistance to DDT (7% - 51%) was detected including Muleba (12.5%) and Geita (20%). Two other sites showed possible DDT resistance of 9% - 7%. The insecticide resistance testing for pirimiphos-methyl will be repeated in 2016 as there is some doubt of the stability of the insecticide that was used in the tests.

A total of 10,340 mosquitoes collected were morphologically identified as *An. gambiae* s.l. Of these 2,972 were identified to species by molecular assays. *An. arabiensis* made up 52% and *An. gambiae* s.s 48% of the sample. In addition the mosquitoes were tested for the *kdr* insecticide resistance mechanism by molecular assays and enzymatic resistance mechanisms were tested using biochemical assays. East *kdr* mutation was detected only in Muleba. Enzymatic resistance testing showed elevated esterase activity in resistant mosquitoes compared to susceptible ones in Muleba, Geita, Magu and Ngara. Elevated oxidase activity was detected in five sites including the PMI-IRS sites of Ngara, Magu, and Muleba. Elevated glutathione γ -transferase activity that may affect pyrethroid and DDT susceptibility was seen in Muleba only.

Monitoring of the pirimiphos-methyl CS residual efficacy of the 2015 IRS in the Lake Zone was conducted beginning in April 2015, starting at 3-10 weeks post-IRS in 6 houses with different wall types at each sentinel site. In general wall material were wood, mud, burnt brick, cement, white washed and painted oil surfaces but not all wall types were represented at each site. There were seven sentinel sites, one in Geita Region, two in Mwanza Region, one in Mara Region and three in Kagera Region. The cone bioassays using susceptible *An. gambiae* s.s. from the NIMR-Mwanza facility were tested on different wall surfaces sprayed with pirimiphos-methyl CS. Residual indicated painted walls, wood and burnt brick wall types retained >80% residual efficacy up for approximately 10 months post-spray. Cement, mud and white wash wall surfaces retained >80% efficacy between 7-9 month post-IRS.

In 2015, IRS was focused on seven Lake Zone districts of Kagera (Biharamulo, Chato, Muleba and Ngara Districts) Mara (Roya District) and Mwanza Regions (Magu and Misungwi). Entomologic monitoring was carried out in all seven of these districts. The changes in sentinel sites reflect the changes in areas where PMI implemented IRS in 2015. Indoor light traps and outdoor clay-pot traps

continued to be used for monthly collections in 12 houses per sentinel site. Mosquito species identification was carried out by molecular assays (PCR) and enzyme-linked immunosorbent assays (ELISA) were used to detect malaria parasites in the mosquitoes.

Of 808 Anophelines collected at the seven sites between May – November 2015, 90% were from the *An. gambiae* complex (11.4% *An. gambiae* s.s., and 78.6 % *An. arabiensis*) and 10% were from the *An. funestus* complex (8.5% *An. rivulorum*, 1.2% *An. funestus* s.s, 0.3% *An. parensis*). In the past there were variations in vector species composition between regions. For example in 2014, predominantly mosquitoes from the *An. funestus* complex were collected (40.8% of total collected) in the Kagera and Geita Regions. In contrast, mainly mosquitoes from the *An. gambiae* complex were collected (58.5%) in the Mwanza and Mara Regions. In 2015, *An. arabiensis* of the *An.gambiae* complex was the predominant mosquito species collected, followed by *An. gambiae* s.s and *An. rivulorum* of the *An. funestus* complex. 3,179 mosquitoes were processed for ELISA and the malaria infection rate ranged from 0 – 1.09%. No infected mosquitoes were found in Muleba (38 mosquitoes collected) and Ngara (20 mosquitoes). Chato had the highest infection rate of 1.09% (9/830 mosquitoes)

Zanzibar

Entomologic Monitoring

Historically, ZAMEP outsourced molecular species identification of the mosquito material to national and international laboratories. To address concerns about the timeliness of obtaining data, long-term sustainability and to improve local laboratory capacity, PMI supported the installation of molecular capabilities at ZAMEP. In 2014-2015, two rooms at the ZAMEP office in Unguja were refurbished and in August 2015 a molecular and immunodiagnostic laboratory was established. This laboratory has the capacity to support both epidemiological and entomological surveillance. Since the establishment of this facility, ZAMEP has performed on-site entomological laboratory assays for molecular mosquito species identification, detection of target site mutations of insecticide resistance mechanisms (*kdr*), and malaria infectivity rates in mosquitoes. In addition it will be performing blood meal analysis and biochemical assays for enzymatic insecticide resistance mechanisms.

In 2015, ZAMEP conducted yearly insecticide resistance monitoring in both islands at seven of the 22 entomological sentinel sites, three on Pemba and four on Unguja. In Pemba the sentinel sites were located at Tumbe (Micheweni District), Bopwe (Wete District) and Unwandani (Chake District). Resistance assays were performed using the standard WHO assays for: lambda-cyhalothrin, deltamethrin, permethrin, bendiocarb, pirimiphos-methyl and alpha-cypermethrin. In addition Pemba performed permethrin insecticide resistance intensity assay testing with the CDC bottle assay at concentrations of 1x, 2x and 5x the diagnostic dose and resistance mechanism investigation using the CDC bottle assay with PBO synergist. High levels of pyrethroid resistance were found in all three sentinel sites in Pemba. Permethrin resistance at the three sites was; Tumbe (47%), Bopwe (71%) and Uwandani (57%). Deltamethrin resistance was also found in Tumbe (20%), Bopwe (80%) and Uwandani (69%). Lambda-cyhalothrin resistance was Tumbe (65%), Bopwe (81%) and Uwandani (73%) and alphacypermethrin resistance was Tumbe (34%), Bopwe (78%) and Uwandani (87%). No resistance was found at the three sites for bendiocarb and pirimiphos-methyl. Testing with permethrin intensity assay showed that the mosquito populations were resistant to concentrations of 2x the diagnostic dose. The highest resistance intensity was in Bopwe and Uwandani with 54% of the population surviving and Tumbe at 39% at 2x the diagnostic dose. There was 100% mortality to permethrin at a concentration 5x the diagnostic dose. Using the PBO synergist, there was 100% mortality of the mosquitoes in all three sentinel sites, indicating that the pyrethroid resistance is from a metabolic oxidase mechanism.

In Unguja the sentinel sites were Uzini (Central District), Donge (North A District), Panga Tupu (North B District) and Mwera (West District), however not all insecticides were tested in all the sites. Permethrin and lambda-cyhalothrin tested in Uzini, indicated resistance at 23% and 77% respectively. Resistance to alpha-cypermethrin was detected in Donge (33%) but no resistance to bendiocarb and pirimiphos-methyl. No resistance was detected to bendiocarb in Panga Tupu. In Mwere, resistance was detected for three pyrethroids, permethrin (24%), lambda-cyhalothrin (30%) and alpha-cypermethrin (12%) but no resistance was detected for deltamethrin. Mosquitoes are currently being tested for target site mutations of insecticide resistance mechanisms (*kdr*). The continued widespread pyrethroid resistance in Unguja and Pemba, in spite of rotation with two IRS spray rounds with bendiocarb followed by three rounds of pirimiphos-methyl CS, per WHO recommendations for insecticide resistance mitigation, is concerning. This situation should be monitored closely as this may impact the efficacy of long-lasting ITNs. Residual efficacy of pirimiphos-methyl CS was monitored monthly using the WHO cone bioassay with different wall surfaces (mud, lime wash, oil painted, water-based painted, cement and stone blocks). Two- to five-day old susceptible *An. gambiae* s.s. mosquitoes from the insectaries in Pemba and Unguja were used. Residual efficacy of pirimiphos-methyl CS in Pemba and Unguja indicated that efficacy was maintained at >80% up to seven months post-spray. The decrease in efficacy was the highest in mud walls.

Vector abundance in Zanzibar is linked with the rainy season and is bimodal. The highest densities are in April-June corresponding to the long rains. There is an increase in mosquito populations during the short-rains between October-December. Due to the relatively recent establishment of the molecular laboratory, there is currently a back-log of mosquito samples to be analyzed. Of the 394 mosquitoes from Pemba analyzed to date, 88% were *An. arabiensis* and 8.4% were *An. merus*. Small numbers of mosquitoes, *An. vaneedeni* (1.3%) and *An. rivulorum* (1.3%) from the *An. funestus* complex were found. Specimens of *An. maculipalis* and *An. rufipes* were also found. In Unguja, of 168 specimens analyzed, there was a predominance of *An. arabiensis* (78.5%) and *An. merus* (15.5%) from the *An. gambiae* complex and *An. rivulorum* (6%) from the *An. funestus* complex. *An. arabiensis* continues to be the predominant vector in Pemba and in Unguja. This is consistent with the 2015 man-landing collections which indicate that 94% of the mosquitoes in Pemba were collected out-doors and 67% of the mosquitoes in Unguja were collected outdoors. *An. funestus* was also being detected in both Pemba and Unguja. 764 mosquitoes from Pemba and 515 mosquitoes from Unguja were tested by ELISA and none were found to be positive for malaria infection.

Table 4: Summary of entomological activities in Tanzania in the last 12 months

<i>Entomological Activities</i>	<i>Mainland</i> <i>(Implementing partner)</i>	<i>Zanzibar</i> <i>(Implementing partner)</i>
Insecticide Resistance Monitoring	23 national sentinel site (NIMR-Amani)	7 sites (ZAMEP)
IRS efficacy monitoring	7 sites (NIMR-Mwanza)	5 sites (ZAMEP)
Longitudinal entomological monitoring PMI supported	7 sites (NIMR-Mwanza)	10 sites* (ZAMEP)
Longitudinal entomological monitoring Global Fund supported	28 national sites (NMCP)	0

* In 2015 there were 22 sites, this has been reduced to 10 in 2016.

Plans and justification

PMI's entomological support to Zanzibar includes IRS efficacy monitoring, insecticide resistance testing and longitudinal monitoring at 10 sites in Zanzibar. PMI will continue to support the molecular and immunodiagnostic laboratory at ZAMEP with reagents/supplies and maintenance costs. On the Mainland in PMI IRS areas in the Lake Region, support will be for IRS efficacy and longitudinal entomological monitoring. PMI will continue to support the national insecticide resistance monitoring program at 23 mainland sentinel sites. PMI will also provide quality assurance for the NMCP's 28 Global Fund supported entomological monitoring sites across the Mainland.

Proposed activities with FY 2017 funding: (\$903,700)

Mainland

- Entomologic monitoring.* This includes longitudinal monitoring in the Lake Region in PMI supported IRS and WHO bioassays to monitor insecticide residual efficacy. PMI will continue to provide laboratory support for the analysis. (\$264,200)
- National Insecticide Monitoring.* Insecticide resistance monitoring at 23 national sentinel sites, Certain sites will be selected for testing 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. (\$250,000)
- Quality Assurance for the national entomological surveillance at 28 district councils.* The national entomological surveillance will be funded by Global Fund until 2017 and may receive additional support in 2018. PMI support will provide oversight and quality assurance for all activities from mosquito field collection, data collection and information quality. PMI expects to have periodic reports from NMCP on the results from the Global Fund supported 28 entomological monitoring sites. PMI funding is contingent on continued Global Fund support for this activity after 2017. (\$40,000)

Zanzibar

1. *Entomologic monitoring.* PMI will continue support to the ZAMEP in entomologic monitoring including insecticide resistance testing, longitudinal monitoring, insecticide efficacy evaluations for IRS and laboratory processing of mosquitoes at ZAMEP. PMI will support ten sentinel sites for longitudinal monitoring focusing on hot-spot areas and will be based on the latest entomological and epidemiological data. (\$236,000)
2. *Molecular and Immunodiagnostic Laboratory support.* PMI will continue to assist ZAMEP in analysis of samples from entomologic activities. This will include reagent/supplies, operational costs and maintenance of the molecular and immunodiagnostic laboratory. (\$70,000)

Mainland and Zanzibar

1. *Technical assistance for entomological monitoring.* CDC staff will conduct three TA visits to support entomological monitoring for Mainland and Zanzibar, to provide technical assistance to achieve the necessary routine entomologic monitoring and monitoring of post spray activities, laboratory activities for sample processing and data collection/analysis. This will include support to ZAMEP for the LLIN durability and monitoring program (\$43,500)

b. Insecticide-treated nets

NMCP/ZAMEP/PMI objectives

Mainland

The NMCP's strategic objective for Integrated Malaria Vector Control for 2015-2020, as presented in the Tanzania National Malaria Strategic Plan: 2015-2020, 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, increasing the percentage of households with at least one long-lasting ITN for every two persons from a baseline of 74% in 2012 to 85% in 2020. Specific targets for 2020 for net use include: increased use among all household residents from 67% in 2012 to 80%, increased use among children under five years of age from 71% to 85%, and among pregnant women from 73% to 85%.

For ITNs these objectives will be met using four strategic interventions: 1) Implement a universal coverage campaign to bring ITN coverage to greater than 80%; 2) Implement continuous distribution mechanisms to keep ITN coverage high; 3) Implement targeted distribution to vulnerable groups of infants and pregnant women; and 4) Create an enabling environment to revive the commercial market for ITNs. To meet the first objective a universal coverage campaign began in 2015 and, except for Dar es Salaam, was completed in June 2016. A 2011 study to assess the capacity of continuous distribution channels to maintain high coverage following a ITN universal coverage campaign found that delivery to pregnant women through ANC and children at vaccination clinics, in combination with an annual school-based distribution, would achieve and maintain high access (about 85%) with the lowest cost per net delivered and result in the fewest excess nets. The school-based distribution represents a complementary channel intended to function as an effective mechanism to reach households with school-aged children. The NMCP began piloting an annual School Net Program (SNP) in three regions

in the south of the country in 2013 and each year from 2013 to 2016 has delivered about 500,000 ITNs, mostly to primary school children.

Targeted distribution through ANC and vaccination clinics was accomplished through the Tanzania National Voucher Scheme until mid-2014. A new delivery of ITNs free of charge during these routine health facility visits was established in 2016 with PMI support. Under the Strategic Plan the continuous distribution approach will be regularly monitored and evaluated and if necessary, the model will be adapted and revised. A comprehensive analysis of the results from evaluations of SNP-1 and SNP-2 was presented to the NMCP and partners in June 2016. Based on the positive outcomes and in compliance with the Strategic Plan, the school-based approach will be rolled out nationally. The roll-out will begin with high malaria endemic regions in the Lake Zone. Relative to the ITN commercial market, the NMCP and partners will continue to look for promising means of improving the retail market environment.

Zanzibar

In the Zanzibar Malaria Strategic Plan III 2013 – 2018, the ZAMEP adopted the WHO definition of universal coverage as one ITN per two people. ITN targets outlined in the Zanzibar malaria strategic plan include increasing access to long-lasting ITNs 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 increasing use 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. Although adopted much earlier, these continuous distribution approaches were launched in June 2014, along with a community distribution approach. This channel delivers ITNs 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. ITNs are also provided on an as-needed basis to households with confirmed malaria cases as part of the malaria case notification strategy. A process evaluation of the continuous distribution channels will be completed in 2016.

Progress since PMI was launched

Mainland

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

Universal coverage campaign (UCC): The last universal coverage campaign consisted of two phases. The first phase, 2009-2010 delivered about 9 million ITNs to families with children under five years of age. In 2011 an additional 17.6 million ITNs were distributed to households nationwide with the goal of ensuring that all sleeping spaces were covered. The success of these mass campaigns is reflected in an increase of ownership of at least one ITN from 52% in 2008 (DHS 2007/2008) to 91% in the 2012 (THMIS 2011/2012).

School-based net distribution program: Delivery of ITNs through schools was originally seen as a supplementary channel needed along with ITN delivery through ANC and vaccination clinic to maintain high coverage following mass universal campaigns. Delivery of ITNs through the Tanzania school net program (SNP) were originally expected to keep coverage high following the Tanzania universal coverage campaign that ended in 2011. The first SNP was delayed and did not begin until mid-2013. The first three annual SNP campaigns in three regions in the south (Mtwara, Lindi and Ruvuma) each

delivered about 500,000 ITNs. The first two years, 2013 and 2014, included alternate grades in primary schools and two grades in secondary schools. In 2015, secondary schools were dropped and additional primary school grades were added to achieve the desired coverage in each of the three regions.

ITN distribution through ANC and vaccination clinics: For a decade, the Tanzania National Voucher Scheme served as the key mechanism for distribution of ITNs to pregnant women at antenatal clinics (ANC) and to children at vaccination clinics. In mid-2014 following the collapse of the voucher scheme, the NMCP in collaboration with PMI and other partners developed an alternative approach that is designed to provide ITN free of charge to pregnant women at their first antenatal clinic (ANC) visit and to children at their first measles vaccination visit.

Zanzibar

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 DHS 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 in some areas of Zanzibar behavioral issues are a major factor contributing to low use. An example of this is in Kaskazini Pemba District where access (the proportion of the population living with one ITN per two people) 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 of the population that slept the previous night under an ITN or in a dwelling sprayed with IRS in the past 12 months (2011/2012 THMIS).

Figure 3. Trends in ownership of at least one ITN per residence

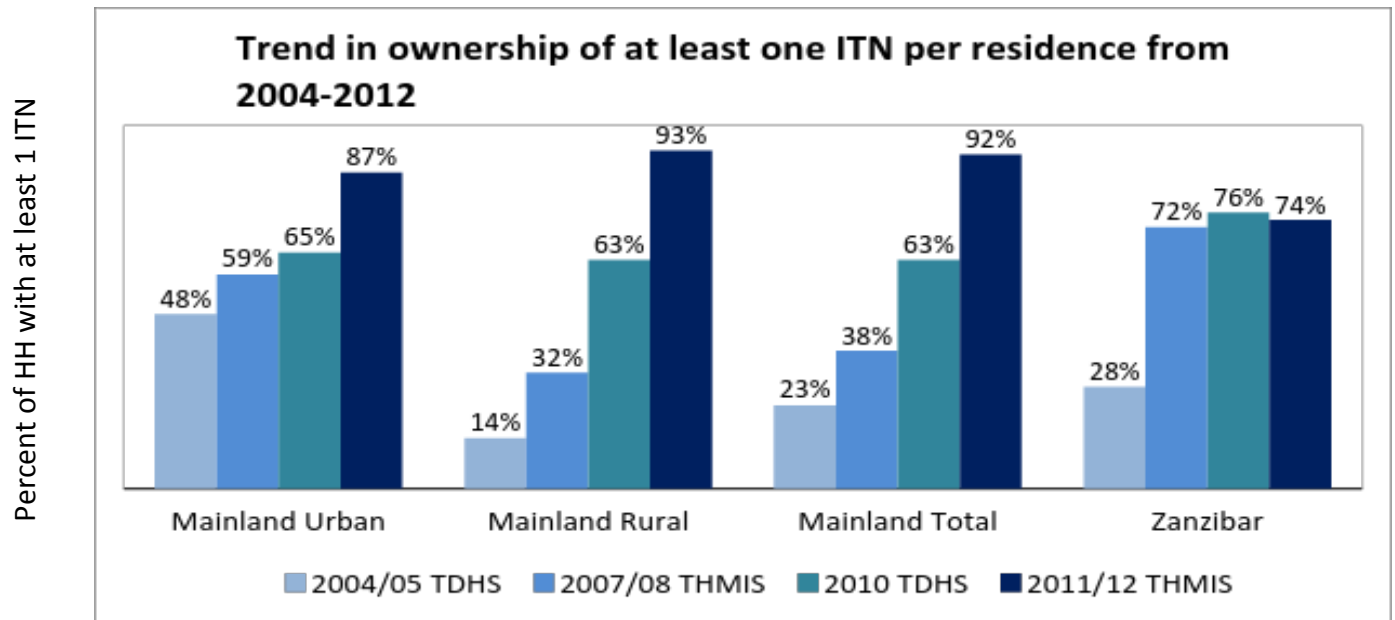
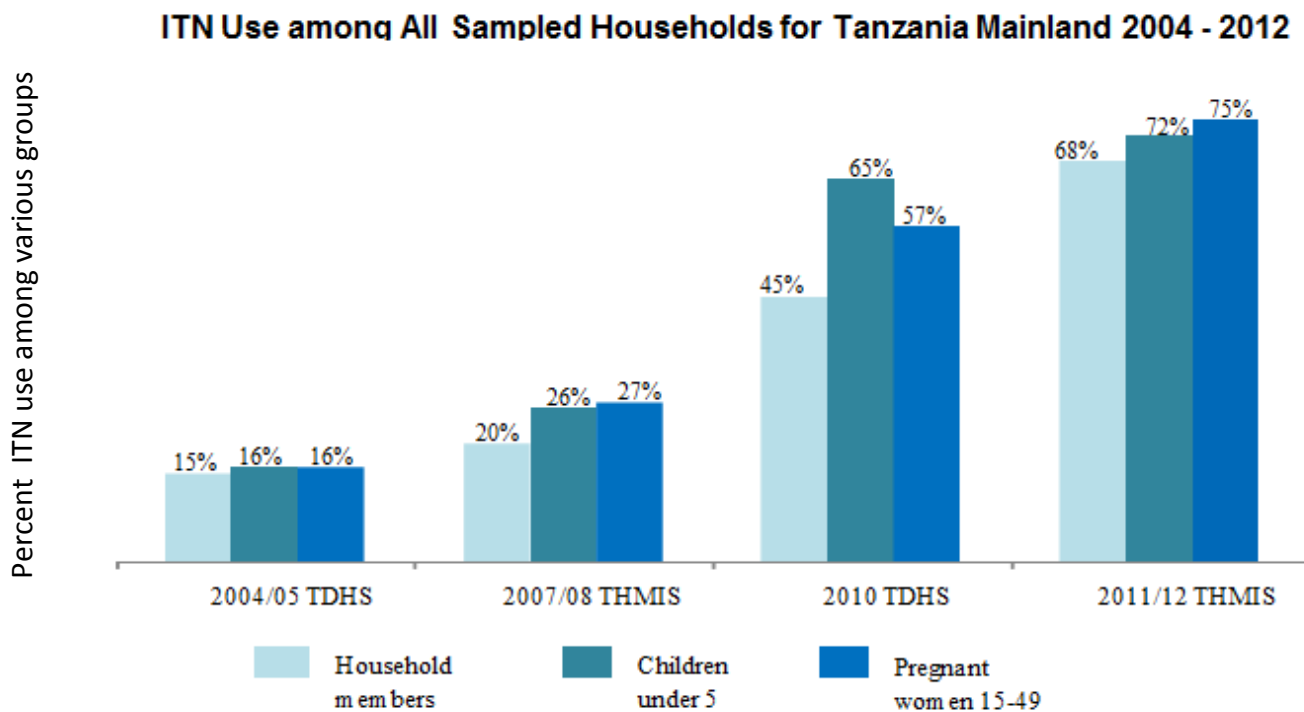


Figure 4. Trends in ITN use over time



Progress during the last 12-18 months

Mainland

Universal coverage campaign

A universal coverage campaign began in mid-2015 and will deliver over 26 million ITNs, one ITN for every two people, across 22 of the 25 regions on the Mainland. The total needed to cover the country was revised upwards twice as it became apparent that census figures were below the registration tallies. The UCC was completed, except for Dar es Salaam, July 2016. PMI contributed 2.1 million ITNs to cover the regions for Kigoma and Kagera.

Continuous Distribution Channels

School Net Program

A third round of the SNP was completed in August 2015, reaching primary school children in all 1,919 primary schools in Ruvuma, Linde and Mtwara. With PMI support for both ITN procurement and delivery, SNP-3 reached almost 500,000 students with ITNs in a modified approach from previous years. Based on experience from the first two rounds, secondary schools were dropped from the program due to the low number of students reached and the costs of reaching those additional schools. An evaluation was carried out in April 2015 that compared two districts receiving ITNs through the SNP program in SNP-1 and SNP-2 and two districts in the Lake Zone that did not. Some key findings included a significant increase among household ownership of an SNP net in the SNP districts from 17% to 31% after SNP-1 and SNP-2 respectively. This evaluation also found that compared to non-SNP districts, the populations in SNP districts has significantly higher access to an ITN after two rounds of SNP, 65% versus 38%. An evaluation of ITN ownership and access following SNP-3 was undertaken in May 2016 and results will be available later in 2016. In 2016 SNP-4 will be expanded to Kagera, Geita, Mwanza and Mara in the Lake Zone, delivering about 530,000 ITNs to children in grades 1 and 7 across those regions.

PMI, with NMCP and other key GOT institutions and partners, has played a leading role in the development of a new approach for the delivery of ITN free of charge to pregnant women and children at routine health facility visits. Key GOT partners in this new approach include the NMCP, the President's Office– Regional Administration and Local Government (PO-RALG) and the Medical Stores Department (MSD). The GOT is committed to a system that delivers ITNs from each MSD Zonal warehouse directly to all health facilities in the respective zones and to the eventual transfer of full responsibility for this system from PMI and Global Fund to MSD.

A staged rollout has been developed for this new approach. In mid-2016 PMI, in collaboration with NMCP and MSD, will begin distribution through ANC and vaccination clinics in two regions, Mtwara and Mwanza, reaching a potential total of over 380,000 pregnant women and infants on an annual basis. This will be expanded to five additional regions in late 2016 and early 2017 (Lindi, Ruvuma, Mara, Kagera, and Geita), reaching a potential additional 400,000 pregnant women and infants. Two other regions, Kigoma and Simiyu, will be added in mid-2017, reaching a potential of an estimated 415,000. The total potential nets delivered annually based on 2017 population figures for these nine regions is 1.6 million, which include many of the highest malaria endemic areas in Tanzania.

Zanzibar

Universal coverage campaign

Zanzibar received 469,360 ITNs from DFID, 85,000 from Global Fund and 85,000 from PMI for a universal coverage campaign. These ITNs will be delivered by July 2016. PMI will supply an additional 65,000 ITNs that will arrive and be delivered in a second phase of the UCC, reaching those areas with the lowest incidence of malaria.

Continuous Distribution Channels

In June 2014, Zanzibar launched its ITN continuous distribution strategy and as of December 2015 has delivered about 65,000 ITNs through ANC, 60,000 through vaccination clinics and over 160,000 through the community-based distribution approach.

Commodity gap analysis

Table 4: ITN Gap Analysis - Mainland

Calendar Year	2016	2017	2018
National Total Targeted Population	48,531,167	49,841,509	51,187,230
PMI Target Population¹	<i>12,895,422</i>	<i>17,950,799</i>	<i>18,385,123</i>
Continuous Distribution Needs²			
National Channel #1: ANC ³	2,084,588	2,140,872	2,198,675
PMI ITNs needs for Mainland	<i>335,210</i>	<i>682,281</i>	<i>802,221</i>
National Channel #2: EPI ⁴	2,095,177	2,151,747	2,209,844
PMI ITNs needs for Mainland	<i>355,662</i>	<i>747,048</i>	<i>878,373</i>
National Channel #3: School based ⁵	880,000	1,001,631	1,304,654
PMI ITNs needs for Mainland⁶	<i>880,000</i>	<i>1,001,631</i>	<i>1,056,720</i>
<i>Estimated Total Need for Continuous</i>	<i>5,059,765</i>	<i>5,294,250</i>	<i>5,713,173</i>
PMI Estimated Need for Mainland	<i>1,570,873</i>	<i>2,430,960</i>	<i>2,737,315</i>
Mass Distribution Needs			
Mass distribution campaign	12,140,466	0	0
<i>Estimated Total Need for Campaign⁷</i>	<i>12,140,466</i>	<i>0</i>	<i>0</i>
Total Calculated Need:			5,713,173
Routine and Campaign	16,320,231	4,292,619	

Partner Contributions			
ITNs from Global Fund NFM (mass campaign only)	9,957,466	0	0
ITNs from Global Fund NFM (ANC and EPI clinics) ⁸	617,465	1,335,910	0
ITNs from DFID	2,183,000	0	0
ITNs from PMI	1,250,000	2,430,960	2,488,468
Total ITNs Available	14,007,931	3,766,870	2,489,394
Total ITN Surplus (Gap)	-2,312,300	-525,749	-3,223,779
<i>PMI Estimated ITN Surplus (Gap)</i>	<i>-320,873</i>	<i>0</i>	<i>-247,921</i>

Footnotes:

1. In 2016 and early 2017 PMI takes on responsibility for ANC, EPI and school delivery in seven of the highest malaria endemic areas on the Mainland (four in the Lake Zone and three in the South); in mid-2017, PMI takes on responsibility for ANC, EPI and school delivery in an additional two regions (one in the West and another in the Lake Zone).
2. Continuous distribution needs are based on modeling using NetCALC taking into account the completion of a UCC in mid-2016.
3. The need for ANC is based on DHIS2 reported ANC attendance for each health facility and the assumption that delivery through this channel will continue throughout and immediately following a universal coverage campaign and is carried out in all regions.
4. The need for EPI is based on DHIS2 reported measles vaccinations delivered by each health facility and the assumption that delivery through this channel will continue throughout and immediately following a universal coverage campaign and is carried out in all regions.
5. The quantity of ITNs needed for the school net program in the 22 regions receiving ITNs through the UCC is calculated as the difference between the NetCALC projected need and the ANC and EPI delivery target. This also assumes that all women attending ANC and infants receiving measles vaccinations receive an ITN.
6. For the three southern regions that did not receive nets through the UCC, the need for school nets is greater. Also, the coverage for ANC and vaccination clinics will be expanded from two to seven PMI regions in late 2016. The quantity shown in this row of SNP will cover the needs not met through the ANC and vaccination clinic channels.
7. The three Southern Regions that are covered annually by the school net program were not included in the universal coverage campaign. The total need for the country is calculated as the total population, less the population in those three regions, divided by 1.8 and spread over the two years of the rolling campaign. The urban areas of Dar es Salaam were left out reducing the nets needed by about 500,000.
8. The Global Fund contributions under the New Funding Mechanism for 2018 to 2021 are not yet known.

Plans and justification

Mainland

Continuous distribution – School Net Program (upon NMCP adoption of school net distribution), ANC and vaccine clinics

Zanzibar

Continuous distribution – Community-based, ANC and vaccination clinics

Following a UCC in Zanzibar that was completed in May 2016, PMI will fully support distribution through ANC, EPI and a community approach to maintain high coverage.

Net durability and efficacy will be followed on a subset of ITNs delivered during the Zanzibar UCC from April through June 2016. This will require data collection over 36 months, with the last collection in May/June 2019. ZAMEP, with technical assistance from PMI, will play a lead role in this activity.

Proposed activities with FY 2017 funding: (\$14,734,000)

Mainland

1. *Procure 2,489,394 ITNs for distribution in 9 regions through ANC and vaccination clinics, and to school children through SNP in the South (3 regions) and Lake Zone (6 regions) at an estimated cost/ITN of \$3.30 for procurement. (\$8,215,000)*
2. *Support for quantification, logistic, supply chain monitoring, accountability, reporting, and training of health facility and school personnel for delivery of ITNs to all health facilities for distribution through ANC and vaccination clinics, and to primary schools in nine regions for distribution through the School Net Program. (\$5,565,000)*

Zanzibar

1. *Procure 183,000 ITNs for Zanzibar continuous distribution: ITNs for continuous distribution to pregnant women through ANC clinics, to infants through vaccination clinics, and through community-based approaches. (\$604,000)*
2. *Support for distribution of ITNs through continuous channels: PMI will support distribution of ITNs through health facility routine services and through a community-based approach. (\$200,000)*
3. *Support for ITN efficacy and physical durability monitoring of nets distributed as part of the Zanzibar UCC taking place in April and May 2016. (\$150,000)*

c. Indoor residual spraying

NMCP/ZAMEP/PMI objectives

Mainland

The NMCP Strategic Plan 2015-2020 calls for application of quality IRS in selected areas and maintenance of coverage at near the current level of 14% in Mainland Tanzania. To maintain optimal protection with ITNs, the NMCP recommends that non-pyrethroid insecticides be used for IRS.

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 in districts showing high malaria transmission, then shifting 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 has also adopted a strategy of focal spraying of hot spots both proactively based on previous evidence of persistent transmission in an area.

Mainland and Zanzibar

IRS activities in Tanzania 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.

Tanzania has been proposed as a country for the UNITAID funded NGenIRS Project in 2017. This market intervention project includes a short-term co-payment to accelerate the reduction of price for long-lasting insecticides. The price reduction will enable Tanzania to maintain recently expanded coverage of long-lasting IRS from baseline levels, and participation in the NGenIRS Project confirms Tanzania's commitment to do so.

Progress since PMI was launched

Mainland

Since 2007, the NMCP has focused spraying in 18 high endemic districts in Lake Zone. This zone was selected based on the Lake Zone having an overall malaria prevalence of 34% among children under five years of age, the highest overall prevalence in Tanzania at that time (2007/2008 THMIS). The situation in 2010 was unchanged with the Lake Zone having the highest under-five mortality rate in Tanzania (109/1,000 live births) (2010 DHS).

Blanket spraying at district level in the highest malaria endemic districts, combined with high ITN coverage following the ITN universal coverage campaigns (2009 to 2011), were contributing factors to the dramatic drop in prevalence among children under five year of age from 34% in 2007/2008 (THMIS) to 15% in 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 increasing evidence of resistance to pyrethroids following the 2012 spray rounds, the insecticide was changed from pyrethroid to a carbamate (bendiocarb) in 2013. Based on evidence of resistance to bendiocarb, the insecticide was changed again to pirimiphos-methyl CS, which has been used in 2014, 2015, and 2016.

Zanzibar

After six rounds of blanket spraying (2006-2011), Zanzibar moved to a combination of target and focal spraying for two years (2012-2013). For each round, household coverage was over 90%. Low malaria prevalence, combined with robust and reliable surveillance and entomological monitoring systems, allowed Zanzibar to adopt an entirely focal spraying approach beginning in 2014. Malaria incidence at village levels is used as the criteria for IRS. Zanzibar has used the same insecticides over this period as described above for the Lake Zone.

IRS Scale-down phases and timing in Zanzibar: 2006-2015

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

Table 6. PMI-supported IRS activities in the Lake Zone, Tanzania: 2013-2018

Year	No. Districts Sprayed	Insecticide Used	No. Structures Sprayed	Coverage Rate	Population Protected
2013	18 (targeted)	Pyrethroid (P) 11 districts	659,146 (P and C areas)	95%	3,496,421 (P and C areas)
		Carbamate (C) 18 districts	114,783 (re-spray C areas)		555,932 (re-spray C areas)
2014	6 (targeted)	Pirimiphos-Methyl CS (OP)	385,252	92%	1,918,180
2015	7 (targeted)	Pirimiphos-Methyl CS (OP)	419,753	94%	2,110,198
2016	8 (targeted)	Pirimiphos-Methyl CS (OP)	487,553	95%	1,912,391
2017	9 (targeted)	Pirimiphos-Methyl CS (OP)	~500,000	~90%	~2,000,000
2018	9 (targeted)	Pirimiphos-Methyl CS (OP)	~500,000	~90%	~2,000,000

Table 7: PMI-supported IRS activities on Zanzibar: 2013-2018

Year	No. Districts Sprayed	Insecticide Used	No. Structures Sprayed	Coverage Rate	Population Protected
2013	9 (targeted)	Carbamate (C)	51,904	96%	250,505
2014	8 (focal)	Pirimiphos-Methyl CS (OP)	62,076	95%	312,340
2015	8 (focal)	Pirimiphos-Methyl CS (OP)	66,497	95%	339,135
2016	8 (focal)	Pirimiphos-Methyl CS (OP)	27,644	95%	130,170
2017	8 (focal)	Pirimiphos-Methyl CS (OP)	40,000	~90%	~150,000
2018	8 (focal)	Pirimiphos-Methyl CS (OP)	40,000	~90%	~150,000

Progress during the last 12-18 months**Mainland**

From February - April 2016, PMI sprayed 487,553 structures in the Lake Zone, protecting approximately 1.9 million people. 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.

Zanzibar

In 2016, Zanzibar continued the focal spraying reaching all villages (*shehias*) that showed malaria incidence of more than 8 cases/1,000 population. Just over 27,000 structures were sprayed, protecting over 130,000 people. This was fewer than the numbers reached in 2015. The reduction was related to adopting a higher cut off mark in anticipation that the universal ITN campaign would provide additional protection across all incidence levels.

Plans and justification

The IRS in 2017 and 2018 will be the fourth and fifth consecutive year of spraying with pirimiphos-methyl, respectively. In consultation with the NMCP, the ZAMEP, and key partners, an earlier decision was reversed and pirimiphos-methyl will be recommended for use in the 2017 spray round. This is based on stronger evidence of resistance to carbamates than to pirimiphos-methyl and the lack of other viable options. This decision will be revisited based on resistance testing results and the availability of new WHO Pesticide Evaluation Scheme approved insecticides on the market in the coming years. PMI will continue to support IRS efficacy and longitudinal monitoring in seven sites in the Lake Zone.

Tanzania has been proposed as a country for the UNITAID funded NgenIRS Project in 2017. This market intervention project includes a short term co-payment to accelerate the reduction of price for long-lasting insecticides. The price reduction will enable Tanzania to expand coverage of long-lasting IRS from baseline levels, and participation in the NGenIRS Project confirms Tanzania's commitment to do so. The spray targets listed below include the expanded number of structures under the NGenIRS Project.

Mainland

PMI has funded IRS in Tanzania for nine years, but with limited resources it is not possible to support large-scale use of both approaches. Thus the role of IRS in Tanzania has been evolving in recent years from that of a major control intervention to an intervention with more targeted applications. The role of IRS is now seen as a tool to mitigate mosquito resistance to pyrethroids and to supplement ITNs in areas of persistent, high malaria transmission in the Lake Zone. The UNITAID funded NgenIRS Project will allow Tanzania to expand to a ninth district districts in the Lake Zone in 2017.

The principal criteria used to determine which areas to spray in the Lake Zone include: 1) overall malaria positivity rates, 2) incidence, as determined using health facility reports and recent census data and 3) results from recent school surveys. 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 available for selecting IRS areas.

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. With the completion of a second UCC for ITNs in 2016, IRS will continue to play a supplementary role and will be used to target hot spots.

Proposed activities with FY 2017 funding: (\$10,585,000)

Mainland

1. *Procure insecticide and support spraying in the Lake Zone.* Support targeted IRS in the Lake Zone reaching approximately 500,000 structures and protecting about 2 million people. PMI proposes to continue with pirimiphos-methyl formulation in light of the absence of viable alternatives at this point. PMI will also continue to support the public-private partnership with Geita Gold Mine. (\$10,000,000)

Zanzibar

1. *Focal spraying.* PMI will support focal spraying in hot spots, covering about 40,000 structures and protecting 150,000 people. (\$550,000)

Environmental Monitoring

1. *Environmental Monitoring of compliance of PMI-supported IRS with USG and national environmental regulations and guidelines.* (\$35,000)

2. 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 3+ doses of IPTp, 85% use of ITNs by pregnant women, and 100% prompt case management of malaria infections in pregnancy.

ITNs

Until mid-2014, the TNVS provided e-coupons to women at ANC visits that were redeemable at nearby retail outlets on the Mainland. This system will be replaced by direct provision of LLIN at first ANC visit beginning in mid-2016. Zanzibar has 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 MOHCDGEC has adopted the updated WHO policy of IPTp3+, which is to give three or more doses of SP monthly until the day of delivery, administered as directly observed therapy during ANC visits. In addition, MOHCDGEC has a policy of screening women by RDT at their first ANC visit and treating those who test positive according to national guidelines. Moreover, if a woman is treated for malaria with an antimalarial at the ANC visit or in the 4 weeks before, it is not necessary to give her SP. Instead, she should be instructed to return in about a month for her next ANC visit and IPTp-SP should be given at that time.

Zanzibar

Given the low prevalence of malaria in women at time of delivery (0.8%), Zanzibar no longer implements IPTp and has adopted a policy of screening pregnant women by RDT at ANC visits and treating those testing positive according to national guidelines.

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. To ensure constant supply of these commodities, PMI and other stakeholders have participated in discussions to mobilize funds for procurement of RCH commodities including iron/folate. The GOT has committed to procure these commodities as part of its investments in maternal and child health. The PMI team will continue to work with GOT and donors to make sure appropriate budgets are allocated accordingly.

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 ACTs.

Progress since PMI was launched

The TNVS, which provided highly subsidized ITNs to pregnant women on the Mainland, was introduced in 2004 as part of a keep-up strategy between universal campaigns. The TNVS achieved its goal of distributing 2 million nets in 2013 but was defunded in 2014 after reports of provider fraud. 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. Zanzibar implemented continuous distribution in 2014 via ANC as part of a strategy that also includes routine net distribution at EPI visits, reactive case detection visits, and community-based distribution as needed.

Since 2004, 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, 7,309 providers and training of trainers (ToTs) from 3,540 facilities have been trained on FANC clinical skills, 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 2004. Training in antenatal care continues when DHMTs 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 remained consistently low at approximately 30% (see table below). The Malaria in Pregnancy Task Force, a group composed of members from the NMCP, the Reproductive and Child Health group and other relevant stakeholders, has been working to address challenges in SP availability and IPTp uptake, and supported the adoption and rollout of IPTp3+ policy. The Ministry-led Safe Motherhood Campaign (*Wazazi Nipendeni*), launched in 2012, has been spreading IPTp messages through multimedia campaigns. PMI has supported implementing partners to conduct several activities in several regions of the Lake Zone and the Southern Zone. These activities include orienting Council and Regional Health Management Teams on MIP, improved supportive supervision for case management, monitoring of stock status of MIP commodities, and periodic data review and quality assessment meetings. The combination of MIP activities and change in IPTp3+ policy has led to measurable improvement in IPTp2 uptake. HMIS data showed that in 2014 IPTp2 and IPTp4 uptake were 34.3% and 2.1% respectively, rising to 56.7% and 22.7 % by the following year.

Progress during the last 12-18 months

After the TNVS was stopped in 2014, PMI supported a scoping exercise to identify new approaches for routine distribution. Based on this exercise, the MOHCDGEC, PO-RALG, and development partners established the broad outlines of a system to deliver ITNs, free of charge, to women at ANC clinics. PMI is the principal donor for this new system which is being rolled out in high malaria endemic areas in the Lake Zone (Regions of Mwanza, Geita, Kagera, and Mara) and the South (Regions of Mtwara, Lindi, and Ruvuma) in 2016. Further details can be found in the ITN section of the MOP. In June 2014,

Zanzibar launched its ITN continuous distribution strategy and delivered as of December 2015 has delivered 65,325 ITNs through ANC clinics.

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. The IPTp3+ policy was officially adopted by the MOHCDGEC in October 2014 and PMI supported the training of 338 staff at public dispensaries during Phase II of the rollout in 2014-2015 (staff at public hospitals and health centers were trained in advance of policy adoption). HMIS registers have also been updated to record up to four doses of IPTp and the PMI team plans to assess gaps, challenges, and lessons learned from this update.

In 2015, PMI partners conducted pre-service MIP education at 10 health training institutions and quality improvement through training and supervision in 16 districts in Kagera (115 clinics) and Mara Regions (106 clinics) on FANC, including MIP and the updated IPTp3+ policy. The Linking Initiatives For Elimination of pediatric HIV (LIFE) program is leveraging existing PMTCT and MNCH platforms to train staff and improve quality of MIP services in all 14 district CHMTs and all PMTCT/RCH clinics in Lindi (223 clinics) and Mtwara (206 clinics). Both projects also perform quarterly tracking of SP stocks at health facilities and conduct feedback meetings with regional and District Health Management Teams to improve SP availability.

PMI also supported the completion and evaluation of Phase I of the Safe Motherhood Campaign, which was designed to improve uptake of all ANC services, including IPTp and LLINs, through a multimedia campaign. Phase II of the campaign, emphasizing IPTp3+, was launched in mid-2015 and builds on lessons learned from the first phase, including a focus on potential complications caused by MIP, which were not well known by women. Phase II utilizes channels at the community and local level where underserved women are reached (rather than relying on mass media), refines the SMS campaign to reach a greater proportion of women, and links messaging campaigns with service providers so that they are aware of the content of the interventions and can reiterate/complement the messages during visits.

Table 8: Status of IPTp policy in Tanzania

WHO policy updated to reflect 2012 guidance	2014
Status of training on updated IPTp policy	Completed
Number of health care workers trained on new policy in the last year	403
Are the revised guidelines available at the facility level?	Yes
ANC registers updated to capture 3 doses of IPTp-SP?	Yes
HMIS/ DHIS updated to capture 3 doses of IPTp-SP?	Yes

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 with the NMCP and providing support for supply chain management to help address this problem and ensure availability at facilities with ANC clinics.

Table 9: SP Gap Analysis for Malaria in Pregnancy

Calendar Year	2016	2017	2018
Total Population	48,531,167	49,841,509	51,187,237
SP Needs			
Total number of pregnant women attending ANC	1,941,247	1,993,660	2,047,489
Total SP Need (in treatments)	11,115,633	12,918,919	13,267,732
Partner Contributions			
SP carried over from previous year	0	0	0
SP from Government	11,115,633	12,918,919	13,267,732
SP from Global Fund	0	0	0
SP from Other Donors	0	0	0
SP planned with PMI funding	0	0	0
Total SP Available	0	0	0
Total SP Surplus (Gap)	0	0	0

Footnotes: Total population data obtained from National census of 2012 and a growth rate of 2.7% was subjected to each year.

Total Pregnant women=4% of Total population

DHIS used as a source of data

The GOT has committed to procuring SP as part of its investments in maternal and child health. The PMI team anticipates that the GOT will come closer to meeting this commitment than in previous years, following the recent approval of an increase of \$20 million for health commodities in the 2016/17 national budget

Plans and justification

PMI will support continued training and supervision for IPTp3+ and case management integrated with family planning, maternal and child health, and HIV programming. In addition, PMI will continue to support results-based financing (see HSS section for more information) with IPTp2+ and SP availability as indicators, and provide cash incentives to individual health care providers as well as health facilities. SBCC to boost ITN use, ANC attendance, and IPTp uptake will continue. PMI will support provision of long-lasting ITNs to pregnant women through continuous distribution at ANC on the Mainland and Zanzibar.

Proposed activities with FY 2017 funding: (\$1,370,000)

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

1. *Refresher trainings and integrated supportive supervision for MIP interventions.* PMI will continue to support health facility-based activities at ANC clinics in the Lake and Southern Zones. Activities will include training, quality improvement, and supervision of IPTp3+ and malaria case management within the integrated ANC platform. (*\$1,370,000*)
2. *ITN keep-up program at ANC.* PMI will support the procurement and distribution of ITNs for continuous distribution to pregnant women at their first ANC visit. (*Included in ITN budget*)
3. *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

1. *Refresher Supportive supervision at ANC.* PMI will support regular antenatal clinic supervisory visits by ministry staff, which will cover supervision of the test and treat policy and prevention and case management activities. (*Included in integrated supportive supervision budget*)
2. *ITN keep-up program at ANC.* PMI will support the procurement and distribution of ITNs for continuous distribution to pregnant women at their first ANC visit. (*Included in ITN budget*)

3. Case management

a. Diagnosis and treatment

NMCP/ZAMEP/PMI objectives

The goal of the NMCP strategy is to achieve universal access to high quality malaria diagnostic testing and treatment in both public and private health facilities. The national targets for the 2015-2020 National Malaria Medium-Term Strategic Plan for case management are to increase to 80% the proportion of

people with signs and symptoms of malaria 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. The medicine of choice for treatment of severe malaria is injectable artesunate. The NMCP's continuing priorities for 2017 are: to improve the quality of diagnostic and case management services; to maintain and improve antimalarial drug supplies in the public sector; to improve access, quality, and affordable ACTs in the private sector; to strengthen the pharmacovigilance system; and to strengthen therapeutic drug efficacy monitoring.

As on the Mainland, the Zanzibar malaria strategy calls for parasitological confirmation for all patients with fever. Through PMI support, ZAMEP has been able to enhance microscopy at hospitals and larger facilities and to provide mRDT testing training to all government and some private health facilities. This has enabled the program to meet its objective of operating the well-functioning Malaria Early Epidemic Detection System (MEEDS; see Monitoring and Evaluation section for more information).

Both the NMCP and ZAMEP diagnostic and treatment guidelines call for referral of patients with severe malaria from lower level facilities to the nearest health center after first giving the patient an intramuscular injection of artesunate. Intramuscular artemether or quinine can be used as second-line drugs if artesunate is not available. Use of rectal artesunate is also permitted if injection is not feasible.

Progress since PMI was launched

Mainland

ACTs were officially launched in Mainland Tanzania on December 15, 2006. The NMCP adopted artemether-lumefantrine (AL) as the first-line drug with artesunate-amodiaquine (ASAQ) as an alternative, second line drug for the treatment of uncomplicated malaria. Recently dihydroartemisinin-piperquin (DP) has also been recommended as an alternative ACT. In 2013 the NMCP revised the national treatment guidelines to include injectable artesunate for the treatment of severe malaria. 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 supported the training of 3,955 health workers in comprehensive malaria case management, including management of severe malaria and malaria in pregnancy. PMI also supported the NMCP to do nationwide training of healthcare workers on the new treatment guidelines. To date 819 public health centers and hospitals, and 4,869 public dispensaries have been covered.

Since 2006, PMI has supported the procurement and scale-up of RDTs, assisted the MOHCDGEC's Diagnostic Services Section to conduct comprehensive malaria diagnostics training sessions at the National Health Laboratory and Quality Assurance Training Center (NHLQATC), and worked with partners to develop a Malaria Reference Laboratory within the NHLQATC. PMI supported therapeutic efficacy monitoring conducted at eight sentinel sites in 2011 and 2012 to assess in vivo efficacy of ACT. 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 efficacy at 28 days of two ACT combinations studied, AL and ASAQ, was over 95%. PMI is again supporting therapeutic efficacy monitoring at 4 sites in 2016 and at 4 additional sites in 2017.

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 in 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 Medical Stores Department (MSD), Tanzania's central medical store, sends random samples of RDT kits to Ifakara Health Institute as part of their internal quality checks of stored products before shipment to the MSD 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.¹⁰ The NMCP intends to improve the quality of malaria diagnosis via the continuance of RDT and microscopy training and the establishment of a functional QA/QC system within the existing healthcare system infrastructure. PMI has extensively supported NMCP in this goal. From November 2009 through August 2013 PMI partners supported the NMCP to conduct 10 2-week 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 one 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 evaluation showed that RDT testing accuracy at baseline was poor to extremely poor. Deficiencies noted included: incorrect sample and buffer volumes, incorrect incubation times, and improper identification of invalid test results. These findings were primarily attributed to an absence of effective program RDT testing policies and ineffective training rather than a lack of motivation among HCW. This project was used as the basis for the NMCP's current QA/QC program. PMI also allocated money to establish a National Malaria Slide Bank to be located at the National Health Laboratory. The protocol for the slide bank was approved in 2014, sample collection completed in 2015, and external validation of the collected slides will be completed by mid-2016. As part of the plan for the slide bank the NMCP has also worked with partners to develop 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. Implementation of this proposed system is pending validation of the slide bank. The NMCP intends to use Global Fund support to continue microscopy training and QA/QC implementation.

NMCP, with technical support from partners, completed a pilot implementation in 2014 of RDT testing accuracy QA/QC in Kagera and Pwani Districts. With support from a partner, the NMCP completed implementation of this RDT testing accuracy QA system throughout the rest of the Mainland.

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 the use of injectable artesunate for treatment of severe malaria. Through the support of the Global Fund and first-line buyers, the availability of quality, affordable ACT is facilitated in the private sector via a co-pay mechanism.

¹⁰ WHO: Informal Consultation on Quality Control of Malaria Microscopy, 2006; Reyburn, H., et al; The contribution of microscopy to targeting antimalarial treatment in a low transmission area of Tanzania. 2006; McMorro ML, et al. Challenges in Routine Implementation and Quality Control of Rapid Diagnostic Tests for Malaria–Rufiji District, Tanzania. 2008

NMCP's anticipated implementation strategies include expansion of RDT diagnostic services to Accredited Drug Dispensing Outlet (ADDOs). There are nearly 4,000 ADDOs and another 2,000 outlets awaiting accreditation by the government. The majority are located in rural areas where access to malaria commodities and testing services is limited. A pilot program of RDT introduction to ADDOs in 3 districts trained 342 workers in 292 ADDOs to properly stock and perform RDT testing. The program conducted before and after intervention surveys. Results showed that 1) nearly half of people seeking treatment for fever in the intervention districts chose to test for malaria in the ADDOs, 2) most ADDO dispensers performed the test competently, 3) nearly all patients tested adhered to the recommended treatment based on their test results and 4) the rational use of ACTs (i.e., the percentage of people taking an ACT only after receiving a positive test result) improved. These encouraging findings led to consensus between the MOHCDGEC and various development and implementing partners, that the program should be scaled-up. The NMCP has been working with the Pharmacy Council to review pertinent policy and regulations and to agree upon an implementation plan for effective scale-up of RDT in ADDOs.

PMI supported the Tibu Homa Project of integrated service delivery 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. The project closed in December 2015 and disseminated the results. The results showed that 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 health care worker in the first 24 hours after onset of fever. Supply chain management in the Tibu Homa supported facilities also improved. Lessons learned from the Tibu Homa Project will be incorporated into the Comprehensive Health Services Delivery program that will be initiated in 2017.

Implementation of integrated Community Case Management (iCCM) is a goal of the MOHCDGEC, with a focus on childhood illnesses including malaria, diarrhea, and pneumonia. The NMCP participated in the development of the National Community Based Health Program Policy Guidelines to further expand health service activities using Village/Community Health Workers (VHW/CHW) with improved linkages to nearby public health facilities. The first small group of ~ 200 CHWs is currently in training and will qualify by the end of 2016. The comprehensive training course will take about 9 months and the ultimate scope of permitted CHW activities is still being developed. One of the components of the CHW Service Delivery Package (SDP) is management of fever. The current proposal from the Technical Advisory Committee is for CHW to perform mRDT and provide 1st line antimalarials to confirmed cases. It is expected that this proposal will be considered by the MOHCDGEC and be incorporated into the CHW curriculum. CHWs are public servants and will be linked to and considered as an extended arm of the nearby public health facilities. PMI prior year funds will be used to complement in-service training and supportive supervision for malaria interventions.

Zanzibar

ACTs were deployed for the first time in Zanzibar in 2003 and the current first-line treatment for uncomplicated malaria is ASAQ. The second-line treatment is AL. Injectable artesunate is the drug of choice for severe malaria with quinine or artemether as acceptable alternatives in situations where artesunate is not available. 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. PMI provided support to ZAMEP to disseminate the updated guidelines and conduct refresher trainings.

Malaria microscopy QA/QC was established in 2005 at 23 public health facilities in Zanzibar and as of 2015 had been expanded to 77 (51 public, 8 private, 4 faith-based organizations, 14 military). ZAMEP collects slides from health facilities on a monthly basis and 10% of negative and 100% of positive slides are re-examined in a blinded manner by the ZAMEP laboratory. Significant quality improvement has been noted with microscopy testing sensitivity increasing from 89.8% in 2012 to 96.7% in 2014. To help improve RDT performance, ZAMEP in conjunction with partners instituted a system of quarterly RDT QC which covered 146 health facilities and 190 testing sites in 2014.

Progress during the last 12-18 months

Mainland

As noted above, the NMCP and PMI partners have continued to implement a system to improve RDT testing accuracy nationwide. This QA/QC system relies upon trained personnel from district and regional health management teams to conduct supportive supervision at quarterly intervals targeting at least two healthcare workers in each public health facility that performs RDT testing. This system focuses on five key quality indices: 1) correct blood volume, 2) correct buffer volume, 3) correct reading time, 4) recognizing invalid test results, and 5) correct labeling of the RDT device. With the aid of PMI through an implementing partner, the NMCP rolled out the model to 15 regions, including all of the Lake Zone and the Southern Zone. Eventual implementation in the remaining nine regions of the Mainland is expected to be complete by June 2016. In addition to the mRDT QA/QC, PMI supported implementation of a program of Outreach Training and Supportive Supervision (OTSS) that aims to improve health care worker (HCW) performance through individual observation and supervision. The OTSS system focuses on improving the clinical skills of individual clinicians and ensuring adherence to established IMCI and malaria diagnostic and treatment guidelines. OTSS uses trained personnel from district and regional health management teams to observe individual HCW as they attend a patient from initial history taking and physical exam through laboratory diagnosis and treatment plan. This is linked to the other core components of providing quality malaria test procedures via adherence to the established mRDT TA QC program and verification of stock status of malaria commodities and supplies. The OTSS supervisors use electronic tablets with comprehensive checklists and they provide immediate feedback to the HCW. In 2015, two rounds of OTSS were conducted in the Lake Zone in over 750 facilities, reaching over 2,000 HWs with on-site supervision. The implementing partner and NMCP are working together to analyze results of the initial implementation with the ultimate goal of adapting the tool to be used nationwide.

The protocol for the National Slide Bank was approved in 2014 and 80 sets of 240 blood slides each have been collected. The verification of the slide sets and the design of the reporting database are nearing completion and expected to be ready in mid-2016. NMCP is working with the NHL and partners to develop the slide bank external QA/QC program and the NHL will support training courses on blood film preparation and diagnosis to lab technicians at the regional level with eventual implementation down to the district level.

After successfully completing dissemination of the National Diagnostic and Treatment Guidelines to public hospitals and health centers in 2015, the NMCP with PMI support completed dissemination to 4,869 public dispensaries that same year in all regions of Mainland Tanzania. The training objectives are 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, 3) to

orient healthcare workers about the increased IPTp dosing schedule and 4) to introduce the use of RDT and dispensing registers. PMI funds were used to support Zonal Training Centers to sensitize regional and council management teams about the guidelines and to train additional staff in all public health centers and dispensaries.

Therapeutic efficacy monitoring to assess continued in-vivo efficacy of ACT was initiated in April 2016 at 4 sites and should be completed by June 2016. The remaining 4 sites will conduct monitoring in 2017. This study will not only measure the clinical and parasitological efficacy of ALU but will also differentiate recrudescence from new infection by PCR analysis which will be conducted at NIMR Tanga.

Zanzibar

By the first quarter of 2016, 153 health facilities in Zanzibar used mRDTs as a diagnostic method and 88 laboratories (50 public, 17 private, 13 military, 8 NGO) participated in the malaria microscopy QA/QC system. In 2015 40 of 60 (66.7%) of malaria microscopists in both islands of Unguja and Pemba received training from ZAMEP. Quality of microscopy continued to improve with a documented sensitivity of 98.7% in 2015 as compared to 96.7% the previous year. Similarly, mRDT QA/QC results have shown excellent performance in the domains examined (patient ID, date, and time correctly labeled; reading zone coloration legible, no evidence of blood splatter, control lines present) with 2015 4th quarter results all in the range of 92-98%. ZAMEP conducted quarterly supervisory visits to all district hospitals and health centers and held large stakeholder meetings to provide feedback to the districts about microscopy and RDT performance.

As mentioned above, the revised ZAMEP Diagnostic and Treatment Guidelines were finalized in April 2014 and a total of 375 healthcare workers were trained between June and August of that year. Ongoing refresher training and initial training of new HCW continues with PMI support. In 2015, 198 of 250 targeted HCW (79.2%) received training on the Diagnostic and Treatment guidelines and 85 of 90 (95.5%) of health facilities received post-training supervision visits.

Although the use of single-dose primaquine has been included in the guidelines it has not yet been operationalized due to difficulties finding suppliers able to provide small quantities and pediatric dosages. WHO has recently agreed to facilitate the procurement process and ZAMEP has submitted the requisite quantification and formal request.

ZAMEP assessed the availability of first-line antimalarials in all public health facilities and found that all had at least one category available for treatment of uncomplicated cases. Yet stockouts at individual facilities can occur so a system was put in place to re-distribute antimalarials between facilities as needed. During supervisory visits ZAMEP also assessed the quality of case management. It is documented in the January-February 2016 Case Management Supervision Report that 47 of 47 (100%) of HCW interviewed had good knowledge on the management of both uncomplicated and severe malaria. Moreover, all health facilities visited had a copy of the Malaria Diagnostic and Treatment Guidelines readily available. However, a ZAMEP review conducted at 3 health facilities showed that there continue to be problems with documentation of ACT consumption and rational use with discrepancies between cases reported to the MEEDS and MCN systems as compared to laboratory and pharmacy dispensing registers.

Table 10: mRDT Gap Analysis-Mainland

Calendar Year	2016	2017	2018
RDT Needs			
Total country population	48,531,167	49,841,509	51,187,237
Population at risk for malaria	48,531,167	49,841,509	51,187,237
Total number of projected fever cases	15,030,321	15,436,140	15,852,915
Percent of fever cases tested with an RDT	85%	85%	90%
Total RDT Needs	15,330,927	18,548,883	20,516,538
Partner Contributions			
RDTs carried over from previous year	15,061,950	17,314,918	8,346,564
RDTs from Government	-	-	-
RDTs from Global Fund	15,660,145	7,780,529	-
RDTs from Other Donors	-	-	-
RDTs planned with PMI funding	1,923,750	1,800,000	3,240,000
Total RDTs Available	32,645,845	26,895,447	11,586,564
Total RDT Surplus (Gap)	17,314,918	8,346,564	(8,929,974)

Footnotes: A meeting amongst NMCP, Global Fund and PMI to review the updated procurement plan identified inconsistencies related to need and commitments versus actual disbursements of funds in a timely manner to meet the expected needs. Thus, in spite of the appearances of surpluses year to year, in practice the surpluses have not occurred and PMI has been asked to fill gaps between GF procurements. PMI will work more closely with the NMCP and GF to analyze commodity quantifications, and future orders will be regularly reassessed and adjusted as needed.

Population projections are from the national census done in 2012 with an extrapolation of 2.7% population growth.

Total fever cases are obtained from DHIS

RDT's carried over = Stock on Hand at the end of the year, December 31st (from pipeline).

The GF contributions are commitments made with the uncertainty of timing of disbursements. RDTs/ACTs planned with PMI funding are included in case there are delays with GF planned procurements (same for Tables 11 and 12 below)

Calendar years used reflect Tanzania's financial years, i.e. July to June

The percentage of tests conducted using mRDTs dropped from 90% to 85% last year. After analyzing the DHIS data, the trend of using mRDTs is expected to increase gradually and reach 90% in 2018.

Table 11: mRDT Gap Analysis-Zanzibar

Calendar Year	2016	2017	2018
RDT Needs			
Target population at risk for malaria	1,528,063	1,569,321	1,613,262
Total number projected fever cases.	155,505	207,197	258,889
Active case detection (ACD)*	71,067	122,758	174,450
Percent of fever cases confirmed with microscopy	10%	10%	10%
Percent of fever cases confirmed with RDT	90%	90%	90%
Total cases confirmed with RDTs	139,955	186,477	233,000
RDT wastage, QC and training (9%)	18,992	27,831	36,671
Total RDT Needs	230,013	337,066	444,120
Partner Contributions			
RDTs carried over (deficit) from previous year	373,486	472,573	135,507
RDTs from MOH	0	0	0
RDTs from Global Fund	0	0	0
RDTs from Other Donors	0	0	0
RDTs planned with PMI funding**	329,100	0	488,889
Total RDTs Available	702,586	472,573	624,396
Total RDT Surplus (Gap)	472,573	135,507	180,276

Footnotes:

Fever cases are expected to increase due to the following reasons:

- Expansion of Malaria Case Notification (MCN) and household screenings
- Involvement of private sector in MEEDs will contribute to increased case detection
- Plan to conduct port of entry screening (voluntary screening) for arrivals at sea port and airport
- Involvement of special institutions, HFs and specialized hospitals such as Military hospitals

ACD figures were calculated by estimating mass screening at Shehia levels regardless of symptoms of malaria and previous year screening results.

Table 12: ACT Gap Analysis - Mainland

Calendar Year	Calendar Year		
	2016	2017	2018
ACT Needs			
Total country population	48,531,167	49,841,509	51,187,229
Population at risk for malaria	48,531,167	49,841,509	51,187,229
Total projected number of malaria cases	7,795,210	12,078,434	12,423,122
Total ACT Needs	9,354,246	12,078,434	12,423,122
Partner Contributions			
ACTs carried over from previous year	2,550,090	5,609,796	4,213,620
ACTs from Government	-	-	-
ACTs from Global Fund	9,945,245	7,896,728	2,797,219
ACTs from Other Donors	-	-	-
ACTs planned with PMI funding	2,468,707	2,785,530	1,472,727
Total ACTs Available	14,964,042	16,292,054	8,483,567
Total ACT Surplus (Gap)	5,609,796	4,213,620	(3,939,556)

Footnotes:

Population projections are from the national census done in 2012 with an extrapolation of 2.7% population growth. Total malaria projected cases are obtained from incidence and prevalence 2003-2013 report from HMIS
 ACT's carried over = Stock On Hand at the end of the year December 31st (from pipeline)

A meeting amongst NMCP, Global Fund and PMI to review the updated procurement plan identified inconsistencies related to need and commitments versus actual disbursements of funds. In spite of the appearances of surpluses year to year as shown in the table, in practice surpluses have not occurred and PMI has been asked to fill gaps between GF procurements. PMI will work more closely with the NMCP and GF to analyze commodity quantifications and future orders will be regularly reassessed and adjusted as needed.

Plans and justification

Mainland

Tanzania procures most, but not all, of its needed malaria commodities through the Global Fund. PMI will support the procurement of some malaria drugs intended for the public sector, specifically ACT treatments and injectable artesunate for the treatment of severe malaria.

PMI will continue to support procurement of RDTs and the maintenance of nationwide RDT testing accuracy QA/QC systems. The RDT QA/QC system relies on periodic supportive supervision performed by district and regional health teams and the training of those supervisors nationwide is in progress. Maintenance of this system will require ongoing financial support. PMI has fully funded the establishment of the National Malaria Slide Bank which is the foundation of the proposed microscopy external quality assurance system. FY 2017 funds will be used to maintain the bank and to support lab technician training.

Optimizing case management of febrile illness remains an ongoing challenge in Tanzania as it is throughout much of Africa. PMI intends to support improvement of both facility and community-based malaria case management with an emphasis on integration of service delivery with other major health priorities. PMI funds will also be used to support the incorporation of a QA system for case management of febrile illness into case management programs and build on lessons learned from the current partners' ongoing Outreach Training and Supportive Supervision (OTSS) program.

Following the encouraging results of the pilot introduction of RDT services in ADDOs the MOHCDGEC/NMCP is planning to support the introduction of RDT services in ADDOs once approved by the Pharmacy Council. Implementation will be primarily supported by the Global Fund and is expected to cover training, surveillance, and supervision/monitoring of ADDOs in 21 of 26 administrative regions while PMI funds will be used to support the NMCP to conduct technical trainings in the remaining 5 regions and support the rollout of RDTs including training, data collection, and supervision.

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.

Zanzibar

As in previous years, PMI will continue to support procurement of RDTs for Zanzibar. PMI will also continue to support the maintenance of a system to strengthen both RDT and microscopy performance and QA/QC at public as well as private facilities in Pemba and Unguja. This is primarily performed via monthly (microscopy) or quarterly (RDT) supportive supervision of health facility personnel. While all public laboratories in Zanzibar participate in the malaria microscopy program only 17 of 72 private facilities do. PMI will therefore support ZAMEP to expand microscopy QA/QC to the remaining private facilities in Zanzibar.

PMI will continue to support case management training and supervision with a particular emphasis on rational use of ACTs, implementation of primaquine including dosing for young children, and pharmacovigilance.

Proposed activities with FY 2017 funding: (\$7,685,300)

Mainland

1. *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 plans to procure 1.47 million ACT treatments to ensure no stockouts. (\$2,000,000)
2. *Artesunate procurement.* PMI will procure injectable artesunate (920,455 vials) to fill the gap not covered by the Global Fund. (\$1,000,000)
3. *RDT procurement.* PMI will procure 1.8 million RDTs (Pf for public health facilities. (\$1,000,000)
4. *Quality Service Package.* PMI will support facility-based provision of integrated health services for improved diagnosis and treatment of febrile illnesses in two zones which are highly malaria endemic regions; Lake zone (7 regions) and Southern zone (3 regions). The remaining regions of Tanzania mainland will be covered by the NMCP through supportive supervision and mentorship (please see item 6 RDTs and microscopy QA/QC). (\$2,200,000)
5. *Scale-up of RDT introduction in ADDOs.* PMI will support the NMCP to provide technical training, supervision and quality assurance for mRDT use in ADDOs. (\$200,000)
6. *RDT and microscopy Quality Assurance and Quality Control.* Support to NMCP for supervision of the nationwide mRDT diagnostic QA/QC system as well as maintenance and deployment of the National Slide Bank for microscopy QA/QC. The National Malaria Slide Bank will be housed at NIMR and overseen by NMCP (\$500,000)
7. *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. Funds will also be used to support microscopy QA to ensure that the TES data is of highest quality. PMI funds will also be used to establish a nationwide database for clinical data and samples. This central repository for clinical data and specimens will facilitate temporal analysis of drug efficacy and trends of resistance to ACTs and other drugs using molecular markers. It will also prevent loss of data and samples and make the data readily accessible to NMCP and other partners. The repository would be housed and overseen by the National Institute for Medical Research.(\$300,000)

Zanzibar

1. *RDT procurement.* PMI will procure approximately 488,889 RDTs(Pf) for use in public health facilities. In addition, these supplies may be used for reactive case detection and response in the event of unusual increases in reported cases identified through the MEEDS. (\$222,000)
2. *RDT and Microscopy Quality Assurance and Quality Control.* PMI will support the maintenance and supervision of QA/QC systems for both RDT and microscopy. This will include technical assistance to ZAMEP via the partner as well as direct funds to ZAMEP to support supervision and periodic feedback meetings to all districts about performance. (\$130,000)
3. *Support for case management including primaquine rollout.* These funds will support training and supervision of HCW, printing and distribution of materials including participant and facilitator manuals, treatment charts, and adverse drug reaction forms. (\$120,000)
4. *Laboratory supplies for malaria microscopy.* Funds will be used to procure laboratory consumables (slides, immersion oil, etc.) to help cover shortages in public health facilities. (\$13,300)

b. Pharmaceutical management

NMCP/ZAMEP/PMI objectives

The NMCP objective for pharmaceutical management is to ensure an uninterrupted supply of quality malaria commodities throughout the Mainland and Zanzibar. Procurement and supply management on the Mainland and Zanzibar are supported by the Government of Tanzania, Global Fund, and PMI. The MOHCDGEC has set minimum and maximum standards for stock availability at six and nine months, respectively.

Progress since PMI was launched

PMI supports the strengthening of the logistics system for ordering essential medicines, which includes ACTs, artesunate, and RDTs and is also working to improve the distribution system for essential medicines. PMI continues to support end-use verification (EUV). This routine monitoring and evaluation exercise aimed at assessing the availability of antimalarial drugs, case management practices and logistics systems. It has been conducted on a quarterly basis for three consecutive years across 220 facilities in 18 districts in mainland Tanzania health facilities. Starting October 2014, the activity was extended to Zanzibar and Pemba covering 110 facilities. EUV surveys show that there has been steady reduction in the percentage of facilities experiencing a stockout of antimalarials or RDT on the day of assessment but some stockouts remain, particularly for sulfadoxine/pyrimethamine, which PMI has not procured. In general, a combination of the ILS Gateway roll out, the Logistics Management Unit (LMU), the electronic logistics management information system (eLMIS) and having full supply of key malaria products at the national level have led to this reduction.

PMI through its supply chain implementing partner continues to build capacity within the national system, stakeholders and institutions in supply chain management. The LMU, a part of the MOHCDGEC and supported by our implementing partner provides mentoring and on-the-job training to health facility personnel and the CHMT on logistics issues. They also support MSD zones on zonal orders and respond to questions and address challenges from facilities on stock availability. They support redistribution of commodities and monitor the commodity pipeline at Medical Stores Department (MSD) and health facility to avoid stock imbalances. MSD distribution processes continue to be a challenge and are one of the main causes for continued stockouts at health facilities.

PMI has co-funded the LMU's development of a Performance Monitoring Plan for key indicators including on-time delivery and order fill rate. Measuring these indicators and raising awareness of this performance will provide the LMU and other stakeholders to holding the Medical Stores Department accountable. On an annual basis, with support from PMI and other partners, NMCP, ZAMEP and MSD conduct a quantification of malaria commodities and monitor the supply plan for the whole country. Bi-annual reviews are conducted to update stock status tables and procurement plans. This exercise has assisted the MOHCDGEC, NMCP, MSD, and the Pharmaceutical Services Section to manage the commodity pipeline for the country.

Progress during the last 12-18 months

Mainland

Through its procurement contractor, PMI facilitated the procurement of antimalarials and other malaria commodities. A total of \$ 19,017,711 was spent on procurement during the period from January 2015

through December, 2015. PMI was able to procure 3,032,136 treatments of ACTs, 4,616,418 RDTs, and 1,559,683 artesunate injection vials.

PMI continued to support national quantification review of malaria commodities for the forecast period dating July 2015-June 2018. Forecast accuracy for quarter one was 96.7%, quarter two 94.7%, quarter three 97.1% and quarter four 90.2%. Through bi-annual reviews, a funding gap of \$7.6M for ACTs and artesunate injection was identified. Funds were released by PMI and procurement of all required shipments for the year was done.

PMI also continued to support the end-use verification activity at the end of each quarter. The index of availability of all four ACT presentations has improved from 96% to 97%, indicating that despite the high stockout rate of individual ACTs presentations, a vast majority (at least 94%) of facilities were able to treat patients with ACTs. MSD has recently added a customer satisfaction module to the EUV to better understand and address health facility performance.

Zanzibar

As on the Mainland, PMI provides support to ZAMEP in forecasting, quantification, and procurement planning for ACTs and RDTs. In May 2015, PMI supported the Ministry of Health in Zanzibar to conduct the national quantification of malaria commodities for the forecast period of July 2015-June 2018. A funding gap of \$ 4,558 for ACTs was noted. PMI supported the procurement of 615,275 RDTs for Zanzibar in 2015 and assisted ZAMEP with the establishment of their own Logistics Management Unit. A total of 15 staff positions have been allocated by the Ministry to the LMU and it has been operational since July 2015. In addition, PMI has supported the development of a supply chain performance monitoring plan and rolled out end-use verification surveys. The Zanzibar-specific eLMIS was also rolled out to all districts in 2014. All of these activities were cost-shared with PEPFAR and other USAID health funds.

Plans and justification

To improve the availability of needed commodities at all levels, PMI will continue to support forecasting, quantification, and procurement planning for ACTs, artesunate injection and RDTs and supports the MSD and MOHCDGEC 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 facilities. With support from PMI and other partners, an eLMIS was rolled out and is currently in use. PMI will continue to support strengthening of eLMIS in making sure it generates quality data for decision making at different levels. At the health facility level, stock status/ stock management information is used to understand what they need to order, quantity of commodities they are supposed to maintain at a certain period of time and know where there are over and under stocks of commodities at different facilities to inform redistribution of commodities from one facility which is overstock to the other which is under stocked. This redistribution exercise ensures stock availability and minimizes risk of drug expiries at health facilities. At the central level, the eLMIS system, in combination with other sources of data such as demographics, gives consumption data to help with quantification (the data was used in the recent quantification exercise). In addition, support will be given to establish a governance platform to manage system changes and updates and also streamline quantification activities through the use of up-to-date data generated from the eLMIS. Support will also be provided to institutionalize supply chain data use and improve data quality. The LMU will continue to monitor their performance monitoring plan and target supportive supervision where performance in the supply chain is deemed poor.

As identified in the last Global Fund audit, the current logistic system needs to be redesigned in order to improve availability of commodities at lower levels. PMI's response includes support for an assessment and redesign of the current logistics system supporting malaria commodities with the objective of improving availability of commodities at health facilities. This is intended to be a modest redesign of the pharmaceutical management system to quickly address key known weaknesses. A more complete, longer term overhaul of the existing system is needed.

The results-based financing (RBF) program (see HSS section for details), to be implemented in Shinyanga and expanded to Pwani and Kagera, will include supply chain performance indicators at MSD central. The indicators included are damaged or expired commodity rate, order fill rate to zones, fleet utilization, and on time delivery rate. At MSD zonal stores the indicators tracked will include order fill rate for district approved orders, on time delivery rate, put away accuracy, inventory accuracy, order lead time, and damaged or expired commodity rate in Mwanza and Dar es Salaam. Those indicators will be traced at the facility level where the program will also track availability of tracer medicines, supplies, vaccines and stock management according to national guidelines (available in stock ledger vs physical stock and months of stock on hand of tracer commodities). This focus on outcome-based incentives is intended to incentivize MSD to provide quality services. Tracer medicines included in the RBF scheme include all formulations of ACT and RDTs. PMI incentives to health facilities (75% of total) and individuals (25% of total) will be paid based on results that rely on both quantitative and qualitative indicators of performance.

In Zanzibar, PMI will support ZAMEP to collect consumption and logistics data needed for annual quantification and procurement planning, strengthening the Zanzibar Integrated System (ZILS) that manage antimalarials and mRDTs to improve data quality; strengthen the LMU capacity in Zanzibar.

Proposed activities with FY 2017 funding: (\$1,000,000)

Mainland

1. *Strengthen pharmaceutical management and supply chain system.* PMI will support improved quantification for RDTs and antimalarial drugs, transportation, storage, record keeping and will continue to support end-use verification surveys. In addition PMI will support assessment, review and redesign of the current logistics system supporting malaria commodities in order to improve availability of commodities at all levels, in particular health facility level. (\$800,000)

Zanzibar

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

4. Health system strengthening and capacity building

PMI supports a broad array of health system strengthening activities which cut across intervention areas, such as training of health workers, supply chain management and health information systems strengthening, drug quality monitoring, and NCMP capacity building.

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 was launched

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, and 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, and 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.

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 Field Epidemiology and Laboratory Training Program (FELTP). FELTP is a public health training program to build 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 MoHCDGEC in collaboration with Muhimbili University of Health and Allied Sciences and National Institute for Medical Research.

During the two-year program, FELTP trainees are embedded within the MoHCDGEC 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 6 graduating classes of 72 FELTP students, out of whom, 63 have been returned to government institutions and hold positions such as head of the Epidemiology Units in Tanzania mainland and Zanzibar, while others have been promoted to be District and Regional Medical Officers (D/RMO). For example, the RMO in

Kagera has played a crucial role in the implementation and oversight of the IRS program in the Lake Zone. The remaining 9 graduates are employed in the private sector. Following the approval of the new task shifting policy which highlighted introduction of Technical Committees at regional and district levels, FELTP graduates are expected to chair these technical committees thereby contributing to the oversight of important malaria related issues including surveillance, disease control, and commodities and initiating discussions in these meetings which might have impact on malaria interventions. The sixth cohort of 14 trainees graduated in December 2015.

Since 2011 PMI has supported Peace Corps in its fight against malaria as part of the Stomp Out Malaria campaign. Peace Corps has incorporated basic malaria information into all mandatory trainings and offers in-service Malaria Training of Trainers (TOT) for those interested in getting more in-depth knowledge. The Volunteer led Tanzania Malaria Team consists of 8 volunteer Malaria Coordinators and offers on the ground support and resources while also supporting all training activities. The team hosted the Stomp-Out-Malaria's World Malaria Month Challenge for Volunteers. The challenge, hosted annually which encouraged PCVs to think outside of the box on ways to best engage their communities with malaria messaging. New methods ranged from distributing bed nets at boarding schools to travelling to clinics during baby weighing days and teaching mothers about malaria prevention and treatment. Lessons learned in the field have been incorporated in the Malaria TOT held twice annually for Volunteers and their counterparts. Best practices are also highlighted on the Peace Corps Tanzania's Malaria bulletin, a newsletter that highlights best practices conducted by PCVs in Tanzania. Peace Corps Volunteers (PCV) work closely with the NMCP's implementing partners and other NGOs, with a focus on school net program awareness creation and behavior change activities, IRS-related data collection and analysis, and management of trainings as part of a malaria curriculum called 'Malaria Skillz'. They also participate in World Malaria Day events.

Progress during the last 12-18 months

Capacity building for NMCP and ZAMEP

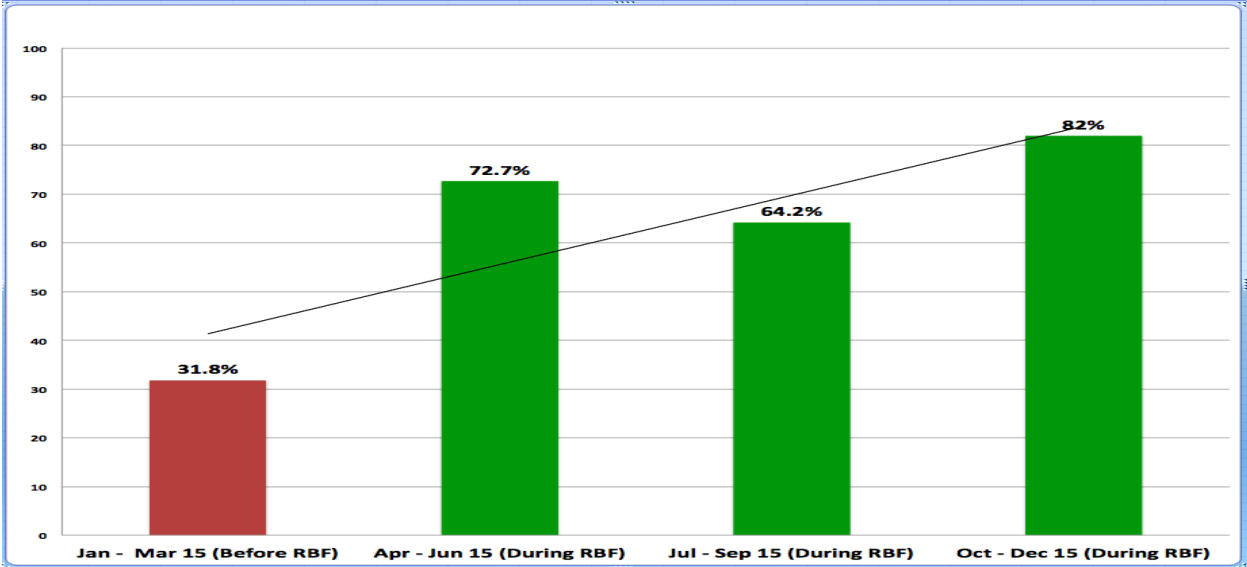
In the past 12 months, both the NMCP and ZAMEP have engaged in various activities to increase capacity of NMCP staff in various areas, including international or national level training in accounting, monitoring and evaluation, malaria diagnostics, entomology, computer skills, etc. Representatives from NMCP and ZAMEP also gain a broader understanding of key malaria issues in sub-Saharan Africa by participating actively in international meetings, such as the annual American Society of Tropical Medicine and Hygiene meetings, Roll Back Malaria Technical Working Group meetings (both Vector Control and Communication Community for Practice groups), an International SBCC meeting, as well as regional medical and vector-borne diseases conferences. At the 2015 American Society of Tropical Medicine and Hygiene meeting, ZAMEP staff presented on efficacy of IRS, implications of knowledge, attitude, practices and behavior in eliminating malaria, and the role of entomological surveillance in elimination. At this meeting, the NMCP staff presented on capacity building and decentralization of IRS operations on the Mainland, on the highly successful 'Not every fever is malaria' behavior change campaign, and on community based entomological monitoring.

Results Based Financing (RBF)

The Government of Tanzania has decided to implement Results Based Financing (RBF) as a part of a larger Government of Tanzania initiative, Big Results Now. The purpose of introducing RBF in the country is to incentivize improved quality of services and quality improvements in participating health facilities (i.e., dispensaries, health centers, and hospitals) and to encourage enhanced support from Council Health Management Teams (CHMTs), Regional Health Management Teams (RHMTs) and Medical Stores Department (MSD) Zonal Stores. USAID and PMI, in conjunction with Government of Tanzania, are supporting the RBF program in nine regions. The RBF activity supports performance

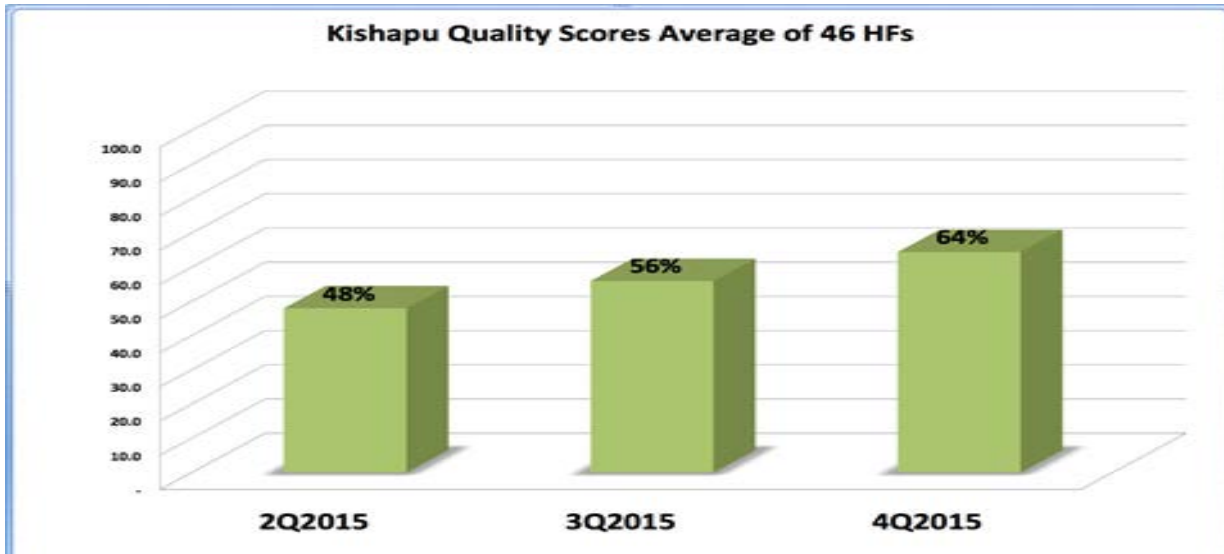
payments to facilities for provision of high quality malaria services and to supply chain actors for on time provision of key malaria commodities. The RBF pilot in the Shinyanga region of Tanzania, which started in 2015 has already demonstrated some improvements in malaria programming. One of the key indicators in RBF is IPTp2 coverage for malaria in pregnancy. Facilities are paid for successfully administering doses of IPTp to pregnant women per the national policy. In turn, when the facility receives bonuses for improved indicators, they use the money to procure medicines, including SP. The goal is to increase IPTp2 and IPTp3 indicators. After eight months, the pilot has shown increases in IPTp intake in facilities implementing RBF (Figure 5).

Figure 5. IPTp2 coverage in 3 quarters of RBF implementation in Kishapu



RBF also tracks quality scores at participating facilities. A quality score is assigned to a health facility based on basic infrastructure such as a functioning water system, electricity connection or solar panels, basic supplies such as gloves and cleaning supplies, functional laboratory including availability of trained personnel, malaria reagents, and functioning microscope, and adequate management of drugs and supplies, among others. This includes no observed stockouts of AL and mRDTs. The quality score (%) is multiplied by the quantitative achievement to arrive at the total incentive payment for a facility, thereby incentivizing both quantity of services provided as well as the quality of those services. RBF health facilities in the pilot district of Kishapu, Shinyanga, Region, are showing improvements in quality scores (Figure 6).

Figure 6. Quality scores in Kishapu District over 3 quarters



Source: MOHCDGEC HSS team presentation at FY 2017 MOP consultative meeting

The RBF quality checklist is carried out quarterly and will eventually be implemented at every facility (total: 1,500). In addition to the checklist items mentioned above, the quarterly visit will include a case management indicator that tracks one malaria case from identification of symptoms through treatment to ensure the case was handled appropriately. This will take place at every facility four times per year and when fully rolled out will give a sample of 6,000 malaria cases annually.

PMI, the NMCP, and RBF are in agreement to introduce and pilot additional case management indicators as their component data points are added into the current routine Health Management Information System (HMIS). Currently approximately 40% of all malaria cases reported through the HMIS is unconfirmed. A laboratory register has been developed and piloted in selected districts with the aim of being rolled out nationwide by the end of the calendar year. Similarly, a pharmacy dispensing register with tally and summary sheets will be rolled out soon afterward. The goal is full integration of both registers into the electronic HMIS database. The matched laboratory and clinical data will then be used to monitor the proportion of suspected malaria cases that are confirmed.

Public Sector System Strengthening (PS3) project

With FY 2015 and FY 2016 funding, PMI is supporting the USAID Public Sector System Strengthening (PS3) project which started in July 2015. It complements RBF programming and will holistically address systems issues at both the national and district levels associated with four WHO building blocks. Specifically, PMI funds are being 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, PS3 will work with the Tanzania Supply Chain Management project to 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. Its geographic focus will be 13 regions on the Tanzania Mainland,

inclusive of seven high prevalence malaria regions.¹¹ PMI funds are being used for a number of HSS interventions including supporting districts to plan for the right number and skill mix of facility and community based providers for malaria services, and supporting districts and the national level to financially plan for providing these services. In addition, PS3's efforts will include expanding the availability of key health services by establishing the hiring and distribution mechanisms for the community health worker cadre. A strong information system is key to understanding the progress made against malaria and for identifying pockets of greatest need for additional intervention. PS3 will strengthen the integration and use of information systems for decision-making, particularly at the district level. These HSS interventions are critical to the success and sustainability of the malaria response.

FELTP

In the past 12 months, FELTP graduated its sixth cohort of residents and enrolled the eighth cohort since the program began in 2008. Residents have undertaken field placement assignments and conducted evaluations of various malaria activities including an assessment of malaria commodities and quality of services provided in the health facilities and Accredited Drug Dispensing Outlets (ADDO) in Mbeya, Tanzania in 2015; the determinants of uptake of three or more doses of sulfadoxine pyrimethamine for Intermittent Preventive Therapy in Pregnancy in Mwanza Region, Tanzania in 2016; assessment of a malaria surveillance project among Burundian asylum seekers in Kigoma and data quality assessment of the Electronic Integrated Disease Surveillance and Response (eIDSR) system. Residents presented their findings at several conferences and all wrote dissertations.

Each trainee participates in several outbreak investigations in Tanzania, thereby developing their skills for future malaria outbreak investigations. Between 2014 and 2015 residents participated in 17 outbreak investigations including one in Buhigwe District that proved to be an outbreak of salmonellosis with co-infection with other febrile illnesses including malaria. 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.

PMI staff work with the Tanzania FELTP Resident Advisor to facilitate linkages between Tanzania FELTP residents, the NMCP and implementing partners to ensure that residents take advantage of available opportunities and experiences in the area of malaria control in Tanzania. PMI staff helps to identify meaningful and appropriate field placements and research areas that allow the residents to select thesis /topics around malaria.

Peace Corps

PMI supports three Peace Corps Volunteers (PCV) who work very closely with the NMCP's implementing partners and other NGOs. During the past 18 months 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 malaria education 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 SBCC materials.

In 2015, 23 Volunteers and their 23 counterparts from government and the communities attended the Malaria TOT. The continually evolving TOT ensures that PCVs and their counterparts have all the

¹¹Seven targeted malaria regions: Kagera, Kigoma, Lindi, Mara, Mtwara, Mwanza and Shinyanga

knowledge, skills and resources they need while teaching about malaria in the field. This initiative has led to all 220 PCVs (100%) serving in the sectors of Education, Agriculture, Health and Global Health Service Partnership to be trained in malaria basics. In August 2015, Volunteers in Lindi, Mtwara and Ruvuma joined forces with JHU to help prepare their villages for the annual School Net Program (SNP). Of 24 Volunteers in these regions, 22 participated in the pre-distribution sensitization projects. PCVs and counterparts travelled to schools all throughout their area to help prepare students, usually using the JHU *Patapata* radio program to start the discussion. As a part of the SNP program, Volunteers helped reach over a thousand students.

Peace Corps Volunteers worked on implementation of three key activities: the Tanzania Vector Control Scale up Project (TVCS), the Electronic Integrated Disease Surveillance and Response Program (eIDSR), and the SP Resistance Study. The PCV role as a Malaria Surveillance Officer was to support the surveillance team, which was tasked with the monitoring and evaluation component of TVCS, facilitated and supervised the eIDSR program, and implemented the SP resistance study.

Through the various activities Volunteers and their counterparts undertook in 2015, they reached over 17,000 people with SBCC around malaria prevention and treatment, not only delivering malaria messages but also empowering their communities to join the fight to stomp out malaria.

Plans and justification

The Tanzanian Mission's Country Development Coordination Strategy prioritizes a holistic and integrated approach to achieving and sustaining results in alignment with broader development objectives. 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.

With FY 2017 funds, PMI will provide support for Tanzania's government led results based financing (RBF) activity by supporting performance payments to facilities for provision of high quality malaria services and to supply chain actors for on time provision of key malaria commodities. RBF is a GOT-led project that provides performance payments to improve the quantity and quality of health services at dispensary, health center, district hospital, CHMT, and RHMT levels. The 19 quantitative indicators are all collected within the DHIS2, which over time improves data quality and promotes sustainability of the approach. A quality checklist applied quarterly will be used to determine the final incentive paid to each facility, with 75% of the incentive used for facility level improvements and 25% distributed among employees. The RBF scheme also includes a supply chain component, which incentivizes MSD central and zonal units to improve indicators such as order fill rate, expired commodity rate, lead time, and on time delivery rate for artemether-lumefantrine 1x6, 2x6, 3x6, 4x6; SP; artesunate injection; and RDTs. The scheme has a strong verification component including internal verification by the Regional Administrative Secretary and other stakeholders, and external verification by the Controller Auditor General. Implementation will be supported by the USAID Public Sector Systems Strengthening (PS3) and facility-based partners. RBF will specifically improve malaria prevention, case detection, and control by incentivizing household visits by CHWs (including messages on ITN use and linking sick household members to facilities), provision of IPTp, improvements in quality of care (including implementation of standard operating procedures for malaria testing and treatment), and availability of malaria commodities.

Zanzibar has made tremendous gains in malaria reduction over the past 15 years, with more than 18,000 confirmed cases in 2001, dropping to below 2,000 cases in 2006 and remaining in the range of several

thousand cases per year over the past decade with no malaria attributable deaths since 2011. This residual level of malaria persist in spite of high coverage with preventive interventions and a highly functional reactive case detection system designed to reach households of all cases within 48 hours of the diagnosis of a case. PMI propose establishing and supporting the secretariat for an expert advisory committee that will meet twice yearly to review the latest evidence and provide high level advice to move Zanzibar closer to elimination.

In addition, PMI Tanzania will continue to support capacity-building for the NMCP and ZAMEP as well as Peace Corps and FELTP.

Proposed activities with FY 2017 funding: (\$1,148,000)

Mainland

1. *Capacity building for NMCP.* Strengthen capacity of NMCP by building up staff knowledge and skills via attendance at conferences, participation in short-terms trainings, study tour and other educational programs, other needs as determined by the training needs assessment currently being done by the NMCP. (\$150,000)
2. *Results-based Financing (RBF).* PMI will continue to support the RBF program to improve malaria prevention, case detection, and control activities by incentivizing health care providers to work towards improvements in quality of care (including implementation of standard operating procedures for malaria testing and treatment), and availability of malaria commodities. This activity is co-funded with other USAID sectors. (\$683,000)
3. *Peace Corps Volunteers: SBCC and Malaria Surveillance.* PMI will potentially support up to three Peace Corps Volunteers (\$10,000 each) to work with the NMCP and PMI implementing partners. PMI will provide funds Small Project Assistance grants (\$10,000) that are available on a competitive basis to support PCVs' community-based SBCC malaria activities. The funds will be spent on a ratio of 75% direct volunteer costs and 25% community based projects. (\$40,000)
4. *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 MOHCDGEC assignments that directly influence malaria control policies and practices. (\$150,000)

Zanzibar

1. *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, study tour and other educational programs, and other needs as determined by the ZAMEP team. (\$110,000)
2. *Establishment of Malaria Expert Committee:* PMI will support a malaria expert advisory committee to help ZAMEP analyze and evaluate local data and give guidance on moving towards elimination. This Advisory Committee will be made up of global malaria experts from the government, the donor community, and the private sector to provide high-level technical guidance to ZAMEP on how to reach the goal of achieving pre-elimination/elimination of malaria in Zanzibar. (\$15,000)

Table 13: Health Systems Strengthening Activities

HSS Building Block	Technical Area	Description of Activity
Health Services	MIP	Refresher trainings and integrated supportive supervision for MIP interventions in eight regions
	Case Management	Support for case management trainings, including primaquine roll out
	Case Management	Support mRDT and microscopy quality assurance and quality control systems; including maintenance of the National Archive of Malaria Slides (NAMS).
Health Workforce	Case Management	Introduction and scale-up of RDTs in ADDOs
	FELTP	Support to FELTP trainees with focus on malaria
	Health System Strengthening	Strengthen capacity of the NMCP and ZAMEP by building staff knowledge and skills via attendance at conferences, participation in short-terms trainings, study tour and other educational programs, and other needs as determined by the teams
Health Information	Entomological monitoring	Support routine entomologic monitoring on Mainland and Zanzibar consisting of: 1) Yearly monitoring of insecticide resistance monitoring of products used for vector control; 2) Monthly Cone bioassay monitoring of residual insecticidal activity on sprayed walls in the Lake Zone and Zanzibar; 3) Monitoring of vector species abundance and distribution, resting behavior and sporozoite rates at established sentinel sites.
	M&E	Continue to support maintenance of Malaria Early Epidemic Detection System (MEEDS) reporting and outbreak preparedness/ response
	M&E	Support the NMCP to conduct semi-annual assessments of quality of malaria-related services and malaria commodities availability in 25 sentinel districts via the service provision assessment of Malaria (SPAm)
	M&E	Support Routine System Strengthening to improve malaria data quality and use within HMIS in order to monitor changes in malaria burden over time and inform program planning.
Essential Medical Products, Vaccines, and Technologies	Insecticide treated nets	Supporting continuous distribution of nets through antenatal clinics, routine immunization services, and schools.
	Pharmaceutical Management	Support improved forecasting, procurement, quality control, storage and distribution of malaria commodities, such as insecticide-treated nets, artemisinin-based combination therapies and rapid diagnostic tests;
		Support routine in vivo efficacy monitoring of artemether-lumefantrine and second-line treatments at four to five sites.

		PMI will support the NMCP to scale up the introduction of mRDT in accredited drug dispensary outlets (ADDOS) and to improve case management of febrile illnesses including malaria.
	Health System Strengthening	Support for Tanzania’s government led results based financing (RBF) activity by supporting performance payments to facilities for provision of high quality malaria services and to supply chain actors for on time provision of key malaria commodities.

5. Social and behavior change communication

NMCP/ZAMEP/PMI objectives

The NMCP and ZAMEP social and behavior change communication (SBCC) strategic plans aim to advocate for and communicate positive behaviors for malaria control in mainland Tanzania and malaria elimination in Zanzibar. Both ZAMEP and NMCP’s SBCC strategic plans serve as a guide to coordinate efforts, messages and activities for all malaria implementing partners. The Mainland SBCC strategy has been updated to cover the period from 2015-2020 and aligns with the Malaria Strategic Plan covering 2015-2020. The Zanzibar SBCC strategy covers the period from 2013-2018.

These communication strategies address the areas of prevention, particularly consistent use of ITNs, as well as care and repair following the universal coverage campaigns on both the Mainland and Zanzibar. The NMCP program in particular faces challenges in demand creation for testing and acceptance of mRDT results among health care providers and clients. To address this issue, NMCP, with PMI support, launched the “not every fever is malaria” campaign using various communication channels. In addition, SBCC includes high level political advocacy, local government level advocacy for planning, budgeting and coordination of 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 SBCC strategies also target the regional and national media to create partnerships to advocate for and create awareness of malaria interventions.

With the current SBCC strategy expiring in 2018, PMI will support ZAMEP to develop of the next Zanzibar SBCC strategy.

Progress since PMI was launched

PMI support of SBCC activities has contributed to important findings. The 2011/12 THMIS reported that 92% of women knew a symptom of malaria, and awareness of malaria is universal at over 98%. Eighty-three percent of women and 91% of men had heard or seen the Malaria Haikubaliki (Malaria is not acceptable) slogan used on all malaria SBCC in Tanzania, and 57% of women and 67% of men had heard or seen a malaria prevention message. The survey also found that women understand that pregnant women are at high risk of malaria (90%), that they could protect their children from malaria (82%), and that it was important to sleep under a net every night (93%).

Since inception, PMI has supported communication strategies for both Mainland and Zanzibar to 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. SBCC messages have also focused on the changing malaria situation in Zanzibar and in certain regions of the Mainland, such as the Lake Zone and Southern Zone. Zanzibar SBCC messages have focused 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. PMI has also supported SBCC messages to address imported malaria cases in Zanzibar.

PMI also supports efforts targeting the media to create partnerships to improve advocacy and awareness of malaria interventions, as well as engaging the private sector through the Malaria Safe initiative that aims to educate and engage their employees in malaria prevention and control efforts. PMI also partners with Peace Corps Volunteers who support the implementation of the Tanzania National Malaria Strategic Plan.

To date, PMI has supported the following activities/campaigns;

- 1). The Safe Motherhood Campaign (*Wazazi Nipendeni*) that delivered malaria and other health messages to pregnant women, focusing on IPTp and ITN use during pregnancy.
- 2). The SBCC component of the school-based net distribution program in the Southern Zone of Tanzania.
- 3). A new test-and-treat SBCC campaign focused on getting healthcare workers to test all fevers. The slogan for this campaign is “Not all fevers are malaria, get tested”.
- 4). Community mobilization through the Community Change Agent (CCA) platform. CCAs directly deliver messages to the community on proper ITN use; care of nets; testing, treatment, and dose completion; as well as malaria in pregnancy and IRS. They emphasize messages of increasing IPTp3+ and testing all persons with fevers.

Progress during the last 12-18 months

Mainland

Test and Treat Campaign

PMI funds supported the test-and-treat SBCC campaign focused on getting people to test all fevers. This campaign was based on findings in the 2011-2012 THMIS that showed while malaria rates have been decreasing, the rate of fever has stayed the same. Thus the campaign slogan, “not all fevers are malaria, get tested” was developed and the campaign targets both provider behaviors at health facilities and consumer demand at the community level. The first phase of 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. After one year of implementation of the campaign, a qualitative assessment was conducted to inform development of the second phase of the campaign. One key

feedback from the qualitative assessment was the fact that while clients were going to the health facilities for testing when they have fever/illness, the main challenge is with health service providers who do not trust the mRDT test results. Based on this feedback, the second phase of the “not all fevers are malaria” campaign was designed to improve knowledge and trust by health care professionals and clients in the use of mRDT as an accurate test for malaria.

PMI also used data from a nationally representative quarterly survey called Omnibus to better understand the impact of the “not all fevers are malaria” campaign on client behaviors. The Omnibus survey collected data across age groups, rural-urban settings, and social economic status tracking the reach and exposure to the campaign, the recall of campaign messages, and the actions taken by listenership and the trends across different channels in all audience groups. Data from the December 2015 report showed that 58% of respondents had heard or seen the campaign. Of those, 72% could correctly identify the main message of the campaign to “get tested when you have a fever”, and 52% said they knew they should “get tested when you think you have malaria”.

Safe Motherhood Campaign

PMI continued to support the national integrated multimedia Safe Motherhood Campaign locally known as *Wazazi Nipendeni* (Love Me Parents) that included a focus on IPTp and ITN use during pregnancy. The campaign uses SMS platform to send weekly messages to service providers and health workers. As of December 2015, there were 1,204,358 registered users in the SMS platform and 72 million text messages with various messages sent to registrants. Of the total registered users, 36% were general information seekers, 14% supporters, 14% mothers of newborn and lastly 36% were pregnant mothers. Demonstrating user friendliness of the platform, 97% of all registrants self-registered themselves while 3% were assisted to register into the platform.

Pregnant women and their supporters who subscribe to the service 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 SP for IPTp, and develop an individual birth plan. The campaign channels include TV and radio messaging, provision of printed materials to over 3,000 clinics across the country including posters and SP reminder cards.

The campaign is monitored quarterly through Omnibus surveys, clinic data, and SMS registration reporting. The December 2015 Omnibus survey shows that in general, 35.4% of respondents were exposed to the campaign. The results further shows that people in urban settings are more likely to be exposed to campaign messages (46.2%) than rural based people (29.9%). In terms of access to information as far as gender is concerned, there is good equity between males (35.2%) and females (35.6%). Survey results shows that people with secondary and post-secondary education (46.5% and 55.6%) are more likely to be exposed to messages on the various issues that campaign communicates as opposed to people with none education (12.5%).

In November 2013, a post-hoc evaluation of the campaign was conducted, consisting of exit interviews at ANCs with pregnant women and women who had given birth within the last 6 months. The evaluation found that exposure to a large number of campaign sources had impact on increasing delivery at a health facility and sleeping under a net, while overall message exposure had influence on taking SP and knowledge about malaria prevention during pregnancy. The majority of surveyed women (60.2%) first visited ANC before reaching 16 weeks in their pregnancy – the recommended timing. The most

frequently cited reason for delayed attendance among all respondents was that they did not see the need for attending the clinic so early in their pregnancy.

Moreover, a large percentage of women (69.8%) were aware of at least one malaria prevention strategy in pregnancy, and 89.3% of the total sample (N=1,708) reported owning a mosquito bed net. For each increase in message sources to which a woman was exposed, there was about a 61% greater likelihood the woman slept under a mosquito net the previous night, even controlling for all other demographic variables. Similar positive results were observed with regards to taking malaria prevention medications—the campaign had a significant impact on exposed women. The more message sources that women had been exposed to, there was about an 8% greater likelihood the woman received an SP dose. The more message sources women had been exposed to, there was about a 23% greater likelihood the woman received two or more SP doses.

The second phase of the campaign was developed based on the post hoc evaluation. Key issues that were highlighted during the post hoc evaluation included i) significant lack of education and employment and low socio-economic status among surveyed women—new campaign needs to target low literacy, low social economic status, rural populations ii) respondents didn't know why they should take SP doses – new campaign should give reasons on why pregnant women should take SP and why it should be 3+ doses. Based on these insights, phase two of the Safe Motherhood campaign was developed and is currently on air. A comprehensive community resource kit termed “journey of hope” was developed to address the low literacy challenge that was highlighted during phase one of the campaign. The comprehensive community resource kit includes many health areas with a specific module on malaria treatment and malaria in pregnancy. Each module has participatory games and activities intended for use with small groups less than 25. The module has been designed to either use as stand-alone or used in combination

School Net Program (SNP)

PMI funds supported the SBCC efforts for the third round of the school-based net distribution program in the Southern Zone of Tanzania. This included the airing of promotional radio spots, 24 episodes on children's radio program, and print and promotional materials for the children, their schools, and community. The campaign accompanied the issuing of nets through the schools to a number of classes. The findings from evaluation of SNP-2 showed that SBCC activities were effective. Household heads were asked whether they ever heard about the SNP, overall across all three regions awareness was very high at 91% (92%, Mtwara, 91%, Lindi while in Ruvuma it was 90%), which signifies a good exposure to program messages. School children, friends/neighbors, and radio were cited as the main sources of that information. Messages communicated to the school children about the issued ITNs included, but not limited to “the net is for the household” and “the net could be given to another household if the child's household had extra net(s)”. Those messages were also printed on the bag that carried the net. Despite those efforts, most children informed their parents that the net was his/hers. Household sleeping behavior indicated, however, that nets were shared among household members and that a small fraction of nets were given to other households, mainly to close relatives. A household survey was conducted several months after distribution of ITNs from the SNP. Of the nets from SNP that were in the household on the day of interview, 554 (81%) were used the previous night. Generally, in all regions sharing the net from SNP was common and over 50% of those nets were shared with the recipient of the net or used entirely by other household members without the recipient.

Malaria Safe Initiative

In 2014, PMI started to support the Malaria Safe, an initiative supported by the Bill and Melinda Gates Foundation . The project aims to engage private companies in promoting malaria prevention and control for their employees. In 2015, there were 13 new companies joining the initiative making the total active companies in the initiative to be 65. Malaria Safe companies educate their employees on malaria and have provided 2,180 nets to employees and their families. These companies also provide malaria prevention and treatment messages, reaching about 4,206 employees across the 65 active Malaria Safe companies in 2015. Furthermore, a national Steering Committee was established and a framework for action developed and adopted by the companies. The NMCP has institutionalized Malaria Safe by including it as one of the main indicators for multi-sectorial component in the new Malaria Strategic Plan. The NMCP target is to have 100 Malaria Safe companies by 2020. The Malaria Safe initiative is now operating and growing independent of PMI funding.

Community Mobilization

PMI supported community mobilization in six regions last year. Through the Community Change Agent platform, 285,662 people were reached directly with messages on ITN use, care of nets, IRS, malaria in pregnancy, and malaria testing, treatment, and dose completion. The network includes all wards (837) in the districts and the Community Change Agents (CCAs) at the ward level identified two volunteers per village for all the villages in the ward. Currently there are 6,884 volunteers who support the Community Change Agents and help mobilize events or group discussions as well as work with the health facilities and support other health activities. Through this expanded network, the major focus for malaria is on increasing IPTp3+ and testing all fevers. In the six PMI supported regions, CCAs are referring community members to the health facilities for services.

Zanzibar

In Zanzibar, PMI has supported the SBCC unit of the ZAMEP to operationalize the new communication strategy that aligns with the ZAMEP's new malaria strategy. The focus was on including SBCC as one of the components of the active case detection response team. At the moment, when the District Malaria Surveillance Officer is following up on a health facility reported case, they conduct an SBCC session on malaria prevention and treatment with the index house as well as surrounding households. In addition, PMI supported the development of the new continuous distribution (CD) strategy for long-lasting ITNs. ZAMEP launched the CD strategy in June 2013. In late 2015, PMI has supported the design and implementation of an SBCC campaign to address imported malaria cases. TV spots are being aired at the airport as well as at the sea port and print materials have also been placed in all points of entry and exit in Zanzibar. Key messages that are being communicated include the declining prevalence of malaria in Zanzibar, the fact that many malaria cases have a travel history in a few weeks' time, sleeping under the net every night and testing malaria after feeling malaria symptoms. Zanzibar's School Health Club activity will be implemented beginning in late 2016. The main aim is to provide health education to school children as key agents for change in the community. To complement this activity, ZAMEP will be rolling out malaria prevention and treatment training and materials to teachers and school clubs in both Unguja and Pemba.

Currently PMI is supporting a process evaluation of the CD and findings will inform the ZAMEP decisions on Zanzibar's continuous distribution strategy implementation process.

Plans and justification

Mainland

SBCC efforts will continue to focus on case management, malaria in pregnancy with IPTp3+ promotion, school net distribution project in the nine PMI focused regions (Mwanza, Mara, Kagera, Geita, Simiyu, Kigoma, Lindi, Mtwara and Ruvuma) as well as promoting the health facility based LLINs distribution. SBCC efforts through mass media and interpersonal communication will also focus on engaging communities to work together to ensure households are accessing, using and caring for their nets as well as accessing health facilities for testing and treatment. For ANC visits, messages will focus on increasing use of IPTp by encouraging pregnant women to get at least three doses of SP and consistently sleep under an ITN during their pregnancy. Based on malaria stratification, SBCC messaging and interventions will be tailored to respond to each region and district's unique situation. District leaders will also be targeted with SBCC 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 component.

Based on feedback from the field that more focus needs to be directed to health service providers who are already trained on the new SP policy, efforts will be made to target SBCC messages to health service providers to overcome bias and barriers against SP provision, as well as using a quality improvement model at the clinic level to ensure that stock outs of SP and other malaria commodities become a rare occurrence. PMI will continue to support SBCC in PMI focus regions. SBCC efforts will support SNP in the nine regions with proper net use, care and repair messaging and activities. SBCC efforts also will be directed toward promoting health facility based LLINs distribution to pregnant women and children coming for measles vaccination. For IRS, SBCC messages will be threefold. First, messages will continue to alert people to IRS being done in their districts/areas; second, messages will target places that are no longer a part of the IRS campaign to explain why; third, messages will focus on addressing bed bugs, flies and other insects that appear after IRS. Messaging will focus on encouraging the community to accept the sprayers and having their homes sprayed, as well messages about the importance of using both spraying and net use together; previously these messages were separated.

PMI will support distribution of LLINs to pregnant women and children coming for the first measles dose beginning in mid-2016. PMI is designing an SBCC campaign to promote the health facility based LLINs distribution that is replacing the discounted voucher program popularly known as Hati Punguzo. Since the health facility based distribution will start in two regions (Mwanza and Mtwara), main channels that will be used included local radio stations, community wide events, community mobilization through CCAs as well as print materials to remind pregnant women and parents/care takers to ask for their nets as well as health care workers to give nets for free to pregnant women and parents/care takers.

The SBCC campaigns that will be carried out with CPICI project will incorporate outcome indicators into monitoring and evaluations plans.

Zanzibar

PMI will continue to support the SBCC unit of the ZAMEP and the communication campaigns for imported malaria cases and continuous distribution of nets. Net use campaigns as well as the CD strategy will continue to be implemented with a focus on messaging for low transmission and pre-elimination as well as net care messaging. PMI will also continue to strengthen the capacity of ZAMEP SBCC unit to work with the active case detection team to ensure the SBCC component is implemented well and continues to engage and empower households with suspected malaria to take the steps necessary to protect the household members, to ensure testing when there is a fever, and to go to the clinic within 24 hours when there is fever. In 2016, PMI is conducting a process evaluation of the bed net continuous distribution process. Based on the process evaluation findings, PMI will support SBCC efforts to support the revised CD strategy.

Proposed activities with FY 2017 funding: (\$2,200,000)

Mainland

1. *ITN keep-up strategy*: Support to SBCC to promote the scale-up of the school-based bed net program and health facility bed net distribution. Mass media is targeted to reach 75% of households in the SNP districts. Funding will be spent on radio (40%), print materials (20%), and community mobilization (40%). The breakdown by media is informed by the latest campaign evaluation surveys as well as the annual ‘Tanzania All Media and Product Survey’ that assesses media consumption patterns in Tanzania. (\$600,000)
2. *SBCC for IRS*: Mobilize districts and communities, communicating change in IRS strategy, such as moving from blanket to targeted and to focal spraying, communicating changes in insecticide being used and addressing concerns about bed bug and flies after IRS. Funding will be spent on radio (20%), print materials (40%), and community mobilization (40%). (\$100,000)
3. *Early malaria testing and treatment compliance*: To advocate for and mobilize service providers and communities for improved testing, compliance to malaria diagnostic and treatment guidelines, including 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%). (\$600,000)
4. *SBCC for IPTp3+*: SBCC will be used to help continue the roll out of IPTp3+ with service provider and pregnant women. The purpose of the campaign is two folds; create informed clients and to overcome providers bias and barriers. The money will support mass media, print materials, interpersonal communication skills and community mobilization activities. Funding will be spent on provider interpersonal communication and job aides (20%), mass media (50%), and community mobilization (30%). (\$600,000)
5. *National level and community based organizations coordination*: To better coordinate the efforts of various malaria SBCC partners and ensure both consistency and harmonization of communication efforts, PMI will support NMCP to have a fully functional national level SBCC working group and a vibrant SBCC team that monitors what is going on in the districts as increasingly more district based activities are being implemented by CBOs. Funding will cover the cost for national meetings with CBOs implementing malaria SBCC activities in respective district. (\$50,000)
6. *Regional and district SBCC coordination*: Based on a varying malaria situation in Tanzania, better SBCC coordination is required at the lower level. PMI will support the NMCP to work with regional malaria SBCC platforms/working groups that will be a forum to prepare and harmonize district-based malaria SBCC plan with all partners at the district level. (\$50,000)

Zanzibar

SBCC support for multiple activities: SBCC for imported malaria cases, ITNs continuous distribution, SBCC during active case detection, malaria diagnostic testing, adherence to treatment regimens, education and mobilization for outbreak response; continued support to school health activities, and communications around insecticide rotation and IRS campaigns. Funding will be spent on mass media (40%), print materials (20%) and community mobilization (40%). (\$200,000)

6. Surveillance, monitoring, and evaluation

NMCP/ZAMEP/PMI objectives

Epidemic Surveillance & Response

Mainland

The malaria risk 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 malaria cases do occur. Thus, the Mainland is working towards developing a sustainable Malaria Early Epidemic Detection System (MEEDS) that can detect sudden increases in malaria cases. The NMCP's principal objectives for epidemic surveillance are: 1) Improve quality, completeness, and timeliness of malaria indicators within the routine health information system to reach 90% of health facilities reporting monthly through the HMIS by 2020, 2) Design and support the implementation of a comprehensive malaria surveillance and response system for epidemic-prone districts to ensure that 80% of malaria epidemics are investigated within two weeks from the onset by 2020.

Zanzibar

PMI continues to focus attention and resources to epidemic surveillance and response activities in Zanzibar which is in the malaria pre-elimination phase. In FY 2008, PMI provided technical and financial support to the ZAMEP to develop and implement 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 two age categories (< 5 and ≥ 5 years of 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 is processed by the server and packaged into two useful formats: 1) text messages with weekly data summary 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.

MEEDS is a demonstration of PMI's continued commitment to developing and sustaining effective malaria surveillance systems. PMI remains the largest contributor to MEEDS since the establishment in 2008. Since the inception of MEEDS, human resource costs (i.e. salary for ZAMEP staff, health workers and DMSOs, etc.) and infrastructures costs such as office space have been and continue to be covered by the GOT. Thus all the Zanzibar facilities (public and private) are routinely reporting on MEEDS. Global Fund will begin contributing to maintaining the MEEDs by covering 40% of the cost for data transmission component.

The longevity of the MEEDS program is dependent on two factors: the timeline/goal for elimination and the capacity of the HMIS system. The malaria elimination in Zanzibar feasibility study strongly

recommends “keeping the MEEDS as a separate system until the HMIS is deemed strong enough and/or elimination has been achieved.” However, the MEEDS program was originally only envisioned to be functional in Zanzibar until malaria was eliminated. Initial discussions are underway in Zanzibar regarding the future of the MEEDS program in the mid to long-term future.

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 SBCC materials on the need for early malaria testing and adherence to anti-malarial treatment. DMSOs ascertain ITN use and provide coupons for a free ITN as needed as well as identify visible mosquito 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) Establish a comprehensive framework for collecting, processing and storing essential malaria indicators from periodic service delivery and programmatic surveys 2) Establish and maintain a comprehensive and effective malaria knowledge management system to collate, interpret, disseminate, and promote the use of quality malaria data for evidence-based decision making at national and district level.

Nationwide (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 supported 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 MOHCDGEC (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 and the Governments of Tanzania and Zanzibar for 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 variety of demographic and health indicators, including core malaria intervention coverage indicators, anemia, and all-cause under-five child mortality. It is conducted by the National Bureau of Statistics (NBS) with technical assistance from partners. Field data collection for the 2015 survey has been completed and the results are expected to be disseminated by mid to late 2016.

Malaria Indicator Survey (MIS). The MIS survey assesses core indicators for malaria intervention coverage and malaria morbidity. 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 malaria parasite and HIV prevalence without any added cost. However, new PEPFAR requirements call for a different sampling that precludes combining the AIS and MIS. Therefore a Malaria Module was included in the DHS in 2015/16. The DHS field work was conducted during September 2015 - February 2016 and currently data analysis is ongoing. The DHS preliminary results are expected to be released in mid to late 2016. Another MIS is planned for 2017/2018, two years following the inclusion of the Malaria Module in DHS 2015/16.

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. 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 12 districts across four regions using PMI support and seven districts were covered by MOHCDGEC. The eIDSR uses an Unstructured Supplementary Service Data (USSD) application to transmit data to DHIS2 platform for subsequent analysis, and reporting. Under the Global Health Security Agenda, CDC is working with Tanzania to improve the performance and quality of IDSR to prevent, detect and respond to infectious disease threats.

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), which is part of the Tanzania Monitoring & Evaluation Management Service (TMEMS), 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 which is then certified by the A/COR. PMI will continue to support the TMEMS which is a Mission wide database. TMEMS also provides support in data quality assurance for key indicators, and provides data analysis to improve decision-making, planning and implementation of malaria activities.

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.

Progress since PMI was launched

Mainland

Monitoring and Evaluation

PMI support for M&E and survey related activities started in 2006 and focused on the following areas: 1) the Health Management Information System (HMIS) and routine services statistics, 2) Demographic and Health Surveys (DHS), 3) Malaria Indicator Surveys (MIS), 4) Service Provision Assessments (SPA), 5) Integrated Disease Surveillance and Response (IDSR), 6) the Implementing Partner Reporting System (IPRS), 7) the Monitoring and Evaluation Strengthening Initiative (MESI), 8) End-Use Verification Surveys (EUV), 9) Entomologic monitoring, 10) supporting Malaria Program Review (MPR) and 11) Impact evaluation.

Among the PMI supported surveys are the Tanzania HIV and Malaria Indicator Survey (THMIS 2007-08, 2011-12) and 2015-2016 DHS/MIS which was launched in July 2015. Performance monitoring has been a PMI priority to ensure that data collected and reported by implementing partners are of high quality to inform management decisions. This has been realized through supporting routine data quality assessments of all PMI indicators and financial support to manage the IPRS which is a web based information system where PMI partners enter program data on a quarterly basis. This system has been a source for Tanzania PMI reports. In 2012 PMI also supported the SPA which was implemented in FY 2014. PMI also supported a one-year pilot in 2014 of sentinel population malaria surveillance among pregnant women and infants in the Lake Zone.

In 2010 Tanzania was the first PMI focus country to carry out an in-depth evaluation of the impact of the scale up of malaria control interventions on all-cause under-five mortality. This evaluation was conducted in collaboration with the NMCP, the Roll Back Malaria (RBM) partnership, WHO and the Ifakara Health Institute.

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 MPR identified gaps which the NMCP has been working to address. The next MPR is planned for 2017.

In 2013, PMI supported a pilot of the electronic IDSR (eIDSR) in 12 districts and to date it has been implemented in approximately one-third of regions. These weekly reports will be important in monitoring malaria control efforts especially in regions where malaria prevalence is declining.

Zanzibar

Monitoring and Evaluation

PMI has been supporting surveillance activities in Zanzibar such as the MEEDS (passive surveillance) and the Malaria Case Notification (MCN) system of active malaria case notification and follow-up.

Since inception, PMI has continued to support and strengthen several monitoring and evaluation activities for Zanzibar:

- The Malaria Early Epidemic Detection System (MEEDS) is designed to identify and enable a rapid response to increases in malaria transmission. Health facility-based early epidemic

detection sites now exist in 217 sites, consisting of all public and private health facilities in Zanzibar. This system has already detected several small outbreaks which triggered investigations.

- The Malaria Case Notification (MCN) system was implemented 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 first detected. Screening for malaria parasites is currently done for index case household members and for residents of nearby households.
- An Impact Evaluation was conducted in Zanzibar for which the full report will be released towards the end of 2016 to include data with the evaluation endline as the year 2015. The preliminary results in Zanzibar show that the scale-up and maintenance of high vector control coverage and availability of antimalarial treatments have contributed to keeping malaria parasite prevalence below 1% between 2007 and 2012 and contributed to the eight-fold decline in confirmed malaria incidence in children under five years of age between 2005 and 2010. Likewise, hospital admissions for malaria have fallen from 30-50% of all admissions in 2000 to about 5% in 2012. Malaria-attributed deaths accounted for approximately half of all hospital deaths in 2000, but no confirmed malaria-attributed deaths have been reported since 2009. These achievements in malaria control are enabling Zanzibar to move towards malaria elimination.

Progress during the last 12-18 months

Mainland

Monitoring and Evaluation

The basic HMIS/DHIS2 system has been successfully rolled out countrywide as of December 2013. PMI supported the successful pilot of the eIDSR system in 12 districts across four regions of Tanzania through its implementing partner and will continue to support the rollout to facilities and provide technical assistance in the Lake Zone and eventually in other regions.

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. NMCP's Malaria SME Strategic Plan 2015-2020 is expected to be released within 2016. With PMI support, the NMCP has reconstituted the Surveillance, Monitoring & Evaluation technical working group which meets on a quarterly basis and held 2 meetings to-date of the wider SME network.

With FY 2012 funds, PMI contributed \$450,000 to support the second national facility-based survey—the Tanzania Service Provision Assessment (SPA). The survey fieldwork was conducted during October 2014 - March 2015 and the final report was released in February 2016, which found nearly 25% of facilities offering curative care for sick children have all components of malaria service readiness (diagnostic capacity, treatment guidelines, first line antimalarial, and trained personnel). These findings have also been stratified for each region, which will help improve the availability, readiness, and quality of malaria services at the regional level. In addition to the periodic nationwide SPA, the NMCP instituted the Service Provision Assessment for Malaria (SPAm) in January 2015 as a tool to monitor malaria-specific quality of care more intensively and frequently than the SPA. Indicators originate from sentinel districts and are analyzed on an annual basis. SPAm activities include medical records review to ascertain completeness and appropriateness of care, observation of individual healthcare workers as they attend patients, and patient interviews to determine satisfaction with medical services and commodity availability. The SPAm is fully funded by Global Fund, but is administered and run by NMCP.

Currently, 25 districts participate in SPAm data collection with the assistance of regional administration and district council teams. In the framework of SPAm, a sample of private drug outlets selling malaria commodities are visited twice per year to monitor availability and the composition and market share of different antimalarials and diagnostics. The aim of the private arm of the SPAm is to track the availability of the pre-qualified recommended antimalarials, especially the ones procured under the GF co-payment mechanism. Retail prices are also monitored.

PMI supported the integration of malaria indicators into the electronic IDSR surveillance system and its piloting in 12 districts across four regions of Tanzania. As it has still not been fully implemented nationwide continued reliance on paper-based reporting will continue until the system is fully rolled out. In addition to the malaria prevalence indicators in the HMIS/DHIS2, NMCP in collaboration with the HMIS unit has developed the HMIS Laboratory and Dispensing registers to capture both diagnosis and consumption data in health facilities. The tools have been piloted and NMCP has started distributing them countrywide with the expectation of completion by 2017. The HMIS unit has added new indicators to better quantify at the health facility level the number of patients with a positive malaria test who are dispensed antimalarial drugs.

PMI identified Tanzania as a site for the pilot routine information system strengthening activity. The main objective is to improve malaria data quality and use within the HMIS in order to monitor changes in malaria burden over time and inform program planning. Use of these data will ultimately strengthen national programs and improve health outcomes. This activity is being implemented in three phases including: 1) Planning, 2) Implementation, and 3) Evaluation. During the first phase malaria data quality problems were identified, prioritized and a work plan was developed for addressing the problems in a collaborative manner with all stakeholders. The second phase, implementation, was conducted in collaboration with the MOHCDGEC. The pilot for the implementation project was conducted in Pwani region in August and September of 2015. The NMCP used the results of the pilot to refine a data quality assessment tool which will be incorporated into supervisory activities nationwide beginning in 2016.

Along with other USAID health programs PMI co-funded with FY 2014 funds 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 (TCCP). Findings from these evaluations will inform future programmatic planning. The TCCP evaluation has been completed (see *SBCC section* for results). The Tibu Homa endline evaluation is currently in progress with results expected to be available later in 2016.

Zanzibar

Epidemic response

As of 2016 the MEEDS system covers a total of 235 reporting sites, consisting of all 158 government and 77 private health facilities in Zanzibar. A data quality assessment showed that the completeness of reporting has reached 100% with >80% of reports being submitted within the same reporting week. There is >90% agreement between MEEDS and HMIS data. The ZAMEP recommends the addition of at least one DMSO to specific districts such as West, Central and North B which tend to have larger numbers of cases particularly during peak transmission seasons.

In 2015 a total of 4,803 cases of malaria were reported in Zanzibar. Of these, 4,031 were detected through passive surveillance at health facilities and the remaining through active surveillance via the MCN system (750) and focal screening and treatment (22). Of the 4,031 cases identified through passive surveillance, 3,521 (87%) were investigated by DMSOs via the MCN. Through this reactive case investigation, a total of 14,748 household members were tested for parasitemia and 750 (5.0%) who

tested positive were treated with ACTs. Fifty four percent (54%) of the 4,286 cases interviewed by DMSOs reported travel outside Zanzibar within the previous month, indicating that a substantial number of infections were likely acquired outside of Zanzibar. The overall functioning of the MCN is good with 63% of cases notified within 24 hours of diagnosis and 87% of cases followed-up at the household level. 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 effort; on family/household members of notified cases (conduct household screening and treatment), villages where cases detected within a week are ≥ 5 (Highly focal; conduct screening and treatment for the entire village) and *shehias* where cases detected within a week are ≥ 10 (Focal: conduct screening and testing for the entire *shehia*).

Table 14: Surveillance, Monitoring, and Evaluation Data Sources

Data Source	Survey Activities	Year								
		2010	2011	2012	2013	2014	2015	2016	2017	2018
National-level Household surveys	Demographic Health Survey (DHS)						X	X		
	Malaria Indicator Survey (MIS)		X				X		X	X
Health Facility and Other Surveys	SPA survey			X					X	
	EUV survey					X	X	X	X	X
Malaria Surveillance and Routine System Support	MEEDS (Zanzibar)		X	X	X	X	X	X	X	X
	Integrated Disease Surveillance and Response (IDSR)		X	X	X	X	X	X	X	X
	District Health Information Software 2 (DHIS2)					X	X	X	X	X
Therapeutic Efficacy monitoring	<i>In vivo</i> efficacy testing	X	X	X	X	X	X	X	X	X
Other Data Sources	Malaria Impact Evaluation	X				X				

Table 15: Routine Surveillance Indicators

Indicators	Value	Comments
1. Total number of reported malaria cases Data source:		
Total diagnostically confirmed cases	6,349,235	
Total clinical/presumed/unconfirmed cases	2,365,663	
<i>If available, report separately for outpatients and inpatients</i>		
Outpatient number of reported malaria cases	5,593,157	
Diagnostically confirmed	2,142,157	
Clinical/presumed/unconfirmed	7,735,314	
Inpatient number of reported malaria cases	979,584	

Diagnostically confirmed	756,078	
Clinical/presumed/unconfirmed	223,506	
2. Total number of reported malaria deaths Data source:		
Diagnostically confirmed	5,461	
Clinical/presumed/unconfirmed	1,106	
3. Malaria test positivity rate (outpatients) Data source:		
Numerator: Number of outpatient confirmed malaria cases	5,593,157	
Denominator: Number of outpatients receiving a diagnostic test for malaria (RDT or microscopy)	-	Not available in DHIS2
4. Completeness of monthly health facility reporting Data source: DHIS2		
OPD		
Numerator: Number of monthly reports received from health facilities	78,371	
Denominator: Number of health facility reports expected (i.e., number of facilities expected to report multiplied by the number of months considered)	85,476	
IPD		
Numerator: Number of monthly reports received from health facilities	10,101	
Denominator: Number of health facility reports expected (i.e., number of facilities expected to report multiplied by the number of months considered)	11,016	

Data source: National Malaria Control Program, Tanzania

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 continued

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 MOHCDGEC, 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 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.

Zanzibar

PMI will support the maintenance of MEEDS at all government and private health 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.

Proposed activities with FY 2017 funding: (\$2,894,000)

Epidemic Surveillance and Response (\$550,000)

Mainland

None

Zanzibar

Support passive surveillance through MEEDS and active surveillance through malaria case notification (MCN) and household screening and treatment. Funds will be used to support the data communication network and to maintain malaria epidemic preparedness and response including case follow-up and investigation. Potential event-based responses include: reactive and proactive case detection through focal or mass screening and treatment; mass treatment of fever cases in the affected community; focal IRS; and supplies for management of both uncomplicated and severe malaria. Response activities will require coordination with other interventions to ensure availability of buffer stocks and periodic rotation of commodities. *(\$550,000)*

Monitoring and Evaluation (\$2,414,000)

Mainland

1. *Routine System Strengthening.* PMI will continue support the RSS activity to improve malaria data quality and use within HMIS in order to monitor changes in malaria burden over time and inform program planning. Use of these data will ultimately strengthen national programs and improve health outcomes. PMI funds will support national teams lead by NMCP to

conduct validation of data generated by health facilities in sampled regions and districts. This activity is to be performed on a quarterly basis; it will include assessments of the accuracy, completeness and timeliness of data recording and results reporting. Tools and guidelines have already been developed using the pilot project funded by PMI. Currently NMCP through WHO support is reviewing DQA tools and facilitate the finalization of guidelines and manuals. NMCP is expecting GF support to cover capacity building of district team/CHMTs who are expected to conduct DQA exercise. (\$200,000)

Zanzibar

1. *Hospital death audits.* Hospital level audits will be conducted at 8 public hospitals. The audits will review all deaths recorded at hospital to assess if the death is attributable to malaria.

This activity is expected to strengthen evidence for “no malaria deaths” as part of documentation needed for pre-elimination setting. (\$10,000)

Mainland and Zanzibar

1. *Support for Malaria Indicator Survey (MIS).* PMI will provide support to the 2017-18 MIS. This study will help to evaluate the ITN Malaria Replacement Campaign (MRC). This is a national population based survey that will provide results for the 31 regions of Tanzania. The survey will use the same standard MIS indicators/questionnaires as in the last DHS/MIS which will include malaria parasite and anemia prevalence and will provide critical outcome and impact data. (\$1,200,000)
2. *Integrated supportive supervision.* PMI will support the NMCP and ZAMEP to oversee integrated supportive supervision. Funds will also be used for coordination of Technical Working Groups (TWGs) for all interventions supported by ZAMEP and NMCP. (\$440,000)
3. *Service Provision Assessment for Malaria (SPAm).* PMI will support the NMCP to conduct semi-annual assessments of quality of malaria-related services and malaria commodities availability in 25 sentinel districts. (\$250,000)
4. *Implementing Partner Reporting System (IPRS).* PMI will continue to support the IPRS through the USAID Mission wide M&E project award Tanzania Monitoring & Evaluation Management Service (TMEMS) (formerly Monitoring, Evaluation and Learning Program (MELP)) as the central data collection point for all implementing partners. Funds will be used to assist implementing partners develop performance management plans, support data quality assessments of key malaria indicators and its analysis. (\$294,000)
5. *Technical assistance for M&E.* CDC staff will conduct two TA visits to assist with strengthening malaria surveillance and other monitoring activities, including technical expertise in malaria program reviews, national and special surveys, and routine health information systems. (\$20,000)

7. Operational research

Table 16: PMI-funded Operational Research Studies

Completed OR Studies			
Title	Start date	End date	Budget
Placental parasitemia among women who have not had intermittent preventive treatment (IPTp) for malaria in Zanzibar	08/2011	12/2013	\$122,150
Ongoing OR Studies			
Title	Start date	End date	Budget
The effectiveness of non-pyrethroid insecticide-treated durable wall liners as a method for malaria control in endemic rural Tanzania: <i>Cluster-randomized trial</i>	07/2013	08/2016	\$1,576,000 (Core-funded)
Determining the effect of holes of different sizes and varying concentrations of insecticide in bednets on personal and community protection using pyrethroid resistant and pyrethroid susceptible <i>Anopheles gambiae</i>	07/2016	12/2016	\$162,918
Decoding perceptions, barriers and motivators of net care and repair in Tanzania	12/2015	12/2016	\$97,560
Planned OR Studies			
Title	Start date	End date	Budget
No studies planned with FY 2017 funding			

NMCP objectives

Development of a national malaria operational research agenda is underway and will include essential research initiatives to guide the strategic plan implementation and provide evidence for innovative initiatives. The agenda and the identified operational research priorities will form the bases for resource mobilization. A provisional research priority list is presented in the National Malaria Strategic Plan 2014-2020 and includes research on outdoor biting, insecticide resistance, chemoprevention, introduction of a malaria vaccine, interaction of ACTs and antiretrovirals, and therapeutic efficacy studies.

Progress since PMI was launched

Placental parasitemia among women who have not had intermittent preventive treatment (IPTp) for malaria in Zanzibar

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 2014¹² and served as the basis for the ZAMEP decision to discontinue IPTp in Zanzibar.

The Effectiveness of Non-Pyrethroid Insecticide-Treated Durable Wall Liners as a Method for Malaria Control in Endemic Rural Tanzania: *Cluster Randomized Trial*

This is a multi-year study led by the National Institute of Medical Research (NIMR) Amani Centre with administrative support from TRAction. This study is funded primarily by PMI core funds, with additional support for ITN procurement provided by PMI Tanzania. The original study design called for a three-arm cluster randomized trial to assess the protective efficacy of a DWL with two non-pyrethroid insecticides plus ITN, ITNs plus IRS, and ITNs alone. The study was put on temporary hold to allow for an external team to intensively review the study and make recommendations for improvements. As a result the study was revised to remove the IRS arm in favor of a two-arm study of DWL plus ITN vs ITN alone and the age of the incidence cohort was extended from 6-59 months to up to 11 years old. Nets were distributed in July 2015, installation of DWL began in August 2015, and the cohort was enrolled in November 2015. Monthly follow up is currently underway.

Progress during the last 12-18 months

Determining the effect of holes of different sizes and varying concentrations of insecticide in bednets on personal and community protection using Pyrethroid resistant and Pyrethroid susceptible *Anopheles gambiae*

This study was approved by the OR Committee in 2014 and will be implemented by the Swiss Tropical and Public Health Institute and Ifakara Health Institute using MOP FY 2014 funds. It has been delayed due to issues related to establishing and maintaining a colony of resistant mosquitoes and due to limited opportunity to use of a semi-field study site at Ifakara Health Institute. The study is now set to begin in July 2016 and be completed by the end of 2016. The study will explore the relationship between net damage, remaining insecticide, and feeding inhibition in susceptible and resistant vectors in hut trials. The results will help to define a) the cut-offs to be used to determine “end of useful life” and b) how the cut-offs need to be adjusted with increasing vector resistance. The study will look at the determinants of net entry for local malaria vectors, in order to better advise industry on ITN design, and provide data useful to behavior change campaigns (SBCC) on net care for Afro-tropical countries with malaria transmission by susceptible *Anopheles arabiensis* and resistant populations of *Anopheles gambiae* s.s.

Decoding perceptions, barriers and motivators of net care and repair in Tanzania

This study, approved by the OR Committee in June 2015, is a joint effort by Ifakara Health Institute, London School of Hygiene and Tropical Medicine, Tanzania National Malaria Control Program and Swiss Tropical and Public Health Institute. The study began in December 2015 and will be completed in

¹² <http://www.ajtmh.org/content/91/2/367.long>

December 2016. It will investigate net care and repair practices in households in southern Tanzania through a mix of qualitative research methods. It will highlight potential motivators and existing barriers to net care and repair from local user contexts. The study objectives are: 1. To understand local understanding of net care and repair behaviors in Tanzania. 2. To investigate actions associated with different net damage attributes (number, size and location of holes). 3. To elucidate motivators and barriers to repairing nets. 4. To explore perceptions on how to overcome barriers to net care and repair.

Plans and justification

N/A

Proposed activities with FY 2017 funding: (\$0)

N/A

8. Staffing and administration

Two health professionals serve as resident advisors to oversee PMI in Tanzania, one representing CDC and one representing USAID. In addition, three Foreign Service Nationals (FSNs) work as part of the PMI team, two Program Management Specialist and one M&E Officer. All PMI staff members are part of a single interagency team led by the USAID 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.

The PMI professional staff work together to oversee all technical and administrative aspects of PMI, 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 Program Management Specialists, with support from the Resident Advisors, are responsible for the administrative management of the contracts and grants for PMI activities. The M&E Officer provides technical support to the monitoring and evaluation portfolio for all PMI activities and works with MOHCDGEC counterparts.

The PMI lead in country is the USAID Mission Director. The day-to-day lead for PMI is delegated to the USAID Health Office Community-Based Services Team Lead and thus the two PMI resident advisors, one from USAID and one from CDC, report to the USAID Health Office Community-Based Services Team Lead 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.

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 US Global Malaria Coordinator.

Proposed activities with FY 2017 funding: (\$2,410,000)

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. *(\$1,750,000)*

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

Table 1: Budget Breakdown by Mechanism
President's Malaria Initiative - Tanzania Mainland and Zanzibar
Planned Malaria Obligations for FY 2017

Mechanism	Geographic Area	Activity	Budget (\$)	%
TBD IRS/NIMR-Mwanza	Mainland	Bio-efficacy and longitudinal ento monitoring IRS for Lake Zone	264,200	0.59%
TBD IRS/NIMR Amani	Mainland	Insecticide Resistance Monitoring	250,000	0.56%
TBD - IRS Project	Zanzibar	Entomological and insecticide resistance monitoring	236,000	0.52%
TBD - IRS Project	Zanzibar	PCR reagents and lab supplies, lab maintenance	70,000	0.16%
TBD G2G Mainland	Mainland	Capacity Building	150,000	0.33%
TBD G2G Mainland	Mainland	mRDT & Microscopy strengthening including QA/QC system	500,000	1.11%
TBD G2G Mainland	Mainland	Integrated supportive supervision	300,000	0.67%
TBD G2G Mainland	Mainland	Service Provision Assessment for Malaria (SPAm)	250,000	0.56%
GHSC-PSM	Lake Zone and South	ITN keep-up program	8,215,000	18.26%
GHSC-PSM	Zanzibar	ITN keep-up program	604,000	1.34%
GHSC-PSM	Mainland	ACT procurement	2,000,000	4.44%
GHSC-PSM	Mainland	Injectable artesunate	1,000,000	2.22%
GHSC-PSM	Mainland	mRDT procurement	1,000,000	2.22%

GHSC-PSM	Zanzibar	mRDT procurement	222,000	0.49%
GHSC-PSM	Zanzibar	Procure lab supplies	13,300	0.03%
Vector Works	Lake Zone and South	ITN keep-up program	5,565,000	12.37%
Vector Works	Zanzibar	ITN keep-up program	200,000	0.44%
Vector Works	Zanzibar	Support for efficacy and physical durability monitoring of LLINs	150,000	0.33%
Vector Works	Zanzibar	Expert Committee to help ZAMEP move towards elimination	15,000	0.03%
TBD - IRS Project	Lake Zone	IRS for Mainland	10,000,000	22.22%
TBD - IRS Project	Zanzibar	IRS for Zanzibar	550,000	1.22%
GEMS II	Nationwide	Environmental Monitoring for IRS	35,000	0.08%
CHSD	Lake and Southern Zones	Continued support for MIP	1,370,000	3.04%
CHSD	Mainland	Quality service package	2,200,000	4.89%
CHSD	Zanzibar	mRDT & Microscopy strengthening including QA/QC system	130,000	0.29%
CHSD	Zanzibar	Support for case management trainings, including primaquine roll out	120,000	0.27%
CHSD	Mainland	Therapeutic drug efficacy monitoring	300,000	0.67%
TBD	Mainland	Scale-up of mRDT in ADDOs	200,000	0.44%

TBD SC-TA	Mainland	Strengthen pharmaceutical management and supply chain system	800,000	1.78%
TBD SC-TA	Zanzibar	Strengthen pharmaceutical management and supply chain system	200,000	0.44%
Comprehensive Platform for Integrated Communication Initiatives (CPICI)	Zanzibar	Capacity Building	110,000	0.24%
Comprehensive Platform for Integrated Communication Initiatives (CPICI)	Mainland	SBCC across all interventions	2,000,000	4.44%
Comprehensive Platform for Integrated Communication Initiatives (CPICI)	Zanzibar	Integrated supportive supervision	140,000	0.31%
Comprehensive Platform for Integrated Communication Initiatives (CPICI)	Zanzibar	SBCC across all interventions	200,000	0.44%
World Bank	Mainland	Results-based Financing (RBF)	683,000	1.52%
Peace Corps	Nationwide	Peace Corps	40,000	0.09%
MEASURE Evaluation bi-lateral/IHI	Mainland	Malaria Vector surveillance/Ento surveillance	40,000	0.09%
MEASURE Evaluation bi-lateral	Zanzibar	Maintain Malaria Early Epidemic Detection System (MEEDS) reporting and outbreak preparedness/ response	250,000	0.56%

MEASURE Evaluation bi-lateral	Zanzibar	Maintain Malaria Early Epidemic Detection System (MEEDS) reporting and outbreak preparedness/ response	300,000	0.67%
MEASURE Evaluation bi-lateral	Mainland	Routine System Strengthening	200,000	0.44%
MEASURE Evaluation bi-lateral	Zanzibar	Hospital death audit	10,000	0.02%
ICF Macro	Nationwide	Malaria Indicator Survey (MIS)	1,200,000	2.67%
TMEMS	Nationwide	Implementing partner reporting system	294,000	0.65%
CDC	Nationwide	Technical Assistance Entomological Monitoring	43,500	0.10%
CDC	Nationwide	Continued support to FELTP	150,000	0.33%
CDC	Nationwide	Technical Assistance for M&E	20,000	0.04%
CDC	0	Salaries and Administrative CDC	660,000	1.47%
USAID	0	Salaries and Administrative USAID	1,750,000	3.89%
Total			45,000,000	100%

Table 2: Budget Breakdown by Activity
President's Malaria Initiative - Tanzania Mainland and Zanzibar
Planned Malaria Obligations for FY 2017

Proposed Activity	Mechanism	Geographic Area	Budget		Description
			Total \$	Commodity \$	
PREVENTIVE ACTIVITIES					
VECTOR MONITORING AND CONTROL					
Entomological Monitoring					
Bio-efficacy and longitudinal ento monitoring IRS for Lake Zone	TBD IRS/NIMR-Mwanza	Mainland	264,200	0	Support longitudinal entomological monitoring in the Lake Region in PMI supported IRS areas and WHO bioassays to monitor insecticide residual efficacy.
Insecticide Resistance Monitoring	TBD IRS/NIMR Amani	Mainland	250,000	0	Support insecticide resistance monitoring at 23 national sentinel sites.
Malaria Vector surveillance/Ento surveillance	MEASURE Evaluation bi-lateral/IHI	Mainland	40,000	0	Provide quality assurance for all activities in the National Entomologic Surveillance program of 28 sites including field collection activities, data collection and information quality
Entomological and insecticide resistance monitoring	TBD - IRS Project	Zanzibar	236,000	0	Support 10 entomological sentinel surveillance sites, IRS quality monitoring, investigating "hot spots", training and supervision of staff as needed
PCR reagents and lab supplies, lab maintenance	TBD - IRS Project	Zanzibar	70,000	0	Purchase supplies for molecular and immunodiagnostic laboratory including reagents/supplies and lab operational and maintenance costs

Technical Assistance Entomological Monitoring	CDC	Nationwide	43,500	0	3 TA visits to support entomological monitoring to NIMR Mwanza and Zanzibar to provide TA for entomologic monitoring, laboratory activities, including ZAMEP's LLIN durability monitoring program
Subtotal Entomological Monitoring			903,700	0	
Insecticide Treated Nets					
ITN keep-up program	GHSC-PSM	Lake Zone and South	8,215,000	8,215,000	Procure 2,489,394 ITNs for distribution in 9 regions through ANC and vaccination clinics, and to school children through SNP in the South (3 regions) and Lake Zone (6 regions)
		Zanzibar	604,000	604,000	Procure 183,000 ITNs for continuous distribution on Zanzibar
ITN keep-up program	Vector Works	Lake Zone and South	5,565,000	0	Support for logistics and management of delivery of ITNs through ANC, EPI and SNP in nine regions of Tanzania
		Zanzibar	200,000	0	Support for logistics and management of distribution including training, transportation and warehousing.
Support for efficacy and physical durability monitoring of LLINs	Vector Works	Zanzibar	150,000	0	Provide operational and technical support for durability and efficacy testing
Subtotal ITNs			14,734,000	8,819,000	

Indoor Residual Spraying					
IRS for Mainland	TBD - IRS Project	Lake Zone	10,000,000	3,200,000	Support targeted IRS in the Lake Zone reaching approximately 500,000 structures and protecting about 2 million people. This includes insecticide, PPE, training, waste collection, spraying, and enforcement of regulations.
IRS for Zanzibar	TBD - IRS Project	Zanzibar	550,000	170,000	Support focal IRS in hot spots reaching approximately 40,000 structures
Environmental Monitoring for IRS	GEMS II	Nationwide	35,000	0	Monitoring of compliance of PMI-supported IRS with USG and national environmental regulations and guidelines
Subtotal IRS			10,585,000	3,370,000	
SUBTOTAL VECTOR MONITORING AND CONTROL			26,222,700	12,189,000	
Malaria in Pregnancy					
Continued support for MIP	CHSD	Lake and Southern Zones	1,370,000	0	Support integrated training and supervision of ANC staff to ensure proper implementation of IPTp3+ and case management of MIP (excluding commodities). This includes working with CHMTs and district teams, involvement of RCH coordinator, and involvement of zonal malaria stores divisions.
Subtotal Malaria in Pregnancy			1,370,000	0	

SUBTOTAL PREVENTIVE			27,592,700	12,189,000	
CASE MANAGEMENT					
Diagnosis and Treatment					
ACT procurement	GHSC-PSM	Mainland	2,000,000	2,000,000	Procure 1.47 million ACT treatments
Injectable artesunate	GHSC-PSM	Mainland	1,000,000	1,000,000	Procure 920,455 vials of injectable artesunate
mRDT procurement	GHSC-PSM	Mainland	1,000,000	1,000,000	Procure approximately 1.8 million RDTs for public health facilities
mRDT procurement	GHSC-PSM	Zanzibar	222,000	222,000	Procure 488,889 RDTs for public health facilities, reactive case detection and response
Quality service package	CHSD	Mainland	2,200,000	0	PMI will support facility-based provision of integrated health services for improved diagnosis and treatment of febrile illness in two zones covering 10 regions.
Scale-up of mRDT in ADDOs	TBD	Mainland	200,000	0	Support to the NMCP to provide technical training, supervision and quality assurance on mRDT use in ADDOs.
mRDT & Microscopy strengthening including QA/QC system	TBD G2G Mainland	Mainland	500,000	0	Support to NMCP for maintenance and use of the National Slide Bank for the nationwide microscopy QA/QC program and supervision for QA/QC of RDTs.

mRDT & Microscopy strengthening including QA/QC system	CHSD	Zanzibar	130,000	0	Support the maintenance and supervision of QA/QC systems for both mRDT and microscopy. This will include technical assistance to ZAMEP via the partner as well as direct funds to ZAMEP to support supervision and periodic feedback meetings to all districts about performance. Includes printing & distribution of guidelines, SOPs, job aids
Support for case management trainings, including primaquine roll out	CHSD	Zanzibar	120,000	0	Trainings, supervision, printing guidelines and SOPs, and pharmacovigilance system as part of the primaquine rollout
Therapeutic drug efficacy monitoring	CHSD	Mainland	300,000	0	TES at 4 of 8 sites and establishment of TES database for clinical data and samples; microscopy QA/QC
Procure lab supplies	GHSC-PSM	Zanzibar	13,300	0	Microscopy lab supplies and consumables
Subtotal Diagnosis and Treatment			7,685,300	4,222,000	

Pharmaceutical Management					
Strengthen pharmaceutical management and supply chain system	TBD SC-TA	Mainland	800,000	0	Strengthen quantification, distribution, storage, inventory management of malaria commodities, and EUV
Strengthen pharmaceutical management and supply chain system	TBD SC-TA	Zanzibar	200,000	0	
Subtotal Pharmaceutical Management			1,000,000	0	
SUBTOTAL CASE MANAGEMENT			8,685,300	4,222,000	
HEALTH SYSTEM STRENGTHENING / CAPACITY BUILDING					
Capacity Building	TBD G2G Mainland	Mainland	150,000	0	Support for capacity building for the NMCP. This includes in-house trainings, attendance at conferences, health promotion unit, and study tours
Capacity Building	Comprehensive Platform for Integrated Communication Initiatives (CPICI)	Zanzibar	110,000	0	Support for capacity building for the ZAMEP. This includes in-house trainings, short-term trainings, attendance at conferences and study tours

Results-based Financing (RBF)	World Bank	Mainland	683,000	0	Contribute to government-wide RBF scheme to improve the quantity and quality of health services including malaria prevention and case management, and availability of malaria commodities at health facilities
Expert Committee to help ZAMEP move towards elimination	Vector Works	Zanzibar	15,000	0	Support a committee of malaria experts to help Zanzibar analyze and evaluate local data and give guidance on moving towards elimination
Peace Corps	Peace Corps	Nationwide	40,000	0	Support for three Peace Corps Volunteers and SPA grant
Continued support to FELTP	CDC	Nationwide	150,000	0	Support to two FELTP trainees with focus on malaria
SUBTOTAL HSS & CAPACITY BUILDING			1,148,000	0	
SOCIAL AND BEHAVIOR CHANGE COMMUNICATION					
SBCC across all interventions	Comprehensive Platform for Integrated Communication Initiatives (CPICI)	Mainland	2,000,000	0	SBCC across all interventions including mass media such as radio, printed materials, community mobilization, supporting community committees, advocacy, commemoration of Malaria Day (25 April)

SBCC across all interventions	Comprehensive Platform for Integrated Communication Initiatives (CPICI)	Zanzibar	200,000	0	SBCC across all interventions including mass media such as radio, printed materials, community mobilization, supporting community (shehias) committees, advocacy, targeted messages for coastal areas, commemoration of Malaria Day (25 April),
SUBTOTAL SBCC			2,200,000	0	
SURVEILLANCE, MONITORING AND EVALUATION					
Epidemic Surveillance and Response					
Maintain Malaria Early Epidemic Detection System (MEEDS) reporting and outbreak preparedness/ response	MEASURE Evaluation bi-lateral	Zanzibar	250,000	0	Operational costs for MEEDS reporting and outbreak response system including technical assistance and support for day-to-day operations, printing of reports
Maintain Malaria Early Epidemic Detection System (MEEDS) reporting and outbreak preparedness/ response	MEASURE Evaluation bi-lateral	Zanzibar	300,000	0	Direct support to ZAMEP to oversee/supervise MEEDS network and the District outbreak response teams (DRT)
Subtotal Epidemic Surveillance and response			550,000	0	
SM&E support					

Routine System Strengthening	MEASURE Evaluation bi-lateral	Mainland	200,000	0	Support the RSS activity to improve malaria data quality and use within HMIS in order to monitor changes in malaria burden over time and inform program planning
Hospital death audit	MEASURE Evaluation bi-lateral	Zanzibar	10,000	0	To help determine whether deaths recorded at all 8 public hospitals are attributable to malaria, facilitate feedback to avert any malaria-related deaths, and contribute to required documentation of absence of malaria deaths for future elimination-related certification.
Malaria Indicator Survey (MIS)	ICF Macro	Nationwide	1,200,000	0	Support for the 2017-18 MIS. This survey will help to evaluate the 2015-2016 LLIN Replacement Campaign, will include malaria prevalence biomarkers and will provide critical outcome and impact data
Integrated supportive supervision	TBD G2G Mainland	Mainland	300,000	0	Integrated supportive supervision and verification of interventions and coordination of Technical Working Groups for all activities by NMCP (Ento, MIP, BCC, M&E...); including data quality audits
Integrated supportive supervision	Comprehensive Platform for Integrated Communication Initiatives (CPICI)	Zanzibar	140,000	0	Integrated supportive supervision and verification of interventions and coordination of Technical Working Groups for all activities by ZAMEP (Ento, MIP, BCC, M&E...); including data quality audits

Service Provision Assessment for Malaria (SPAm)	TBD G2G Mainland	Mainland	250,000	0	Support to the NMCP to monitor quality of care indicators at health facilities in 25 sentinel districts. Includes a sample of private drug outlets selling malaria commodities to monitor availability of recommended antimalarials and diagnostics.
Implementing partner reporting system	TMEMS	Nationwide	294,000	0	Contribute to development of a Mission-wide database of implementing partner data to assist in development of performance management plans and conducting of data quality assessments on key malaria indicators.
Technical Assistance for M&E	CDC	Nationwide	20,000	0	Two TA visits to support strengthening of malaria surveillance and other monitoring activities
Subtotal SM&E support			2,414,000	0	
SUBTOTAL SM&E			2,964,000	0	

OPERATIONS RESEARCH					
N/A			-	-	
			-	-	
SUBTOTAL OR			-	-	
IN-COUNTRY STAFFING AND ADMINISTRATION					
Salaries and Administrative USAID	USAID		1,750,000	0	Support for salaries, benefits, and administrative costs.
Salaries and Administrative CDC	CDC		660,000	0	
SUBTOTAL IN-COUNTRY STAFFING			2,410,000	0	
GRAND TOTAL			45,000,000	19,781,000	

