MalariaCare
A USAID PARTNERSHIP

Universal Diagnosis and Treatment to Improve Maternal and Child Health

Project Year 3 Annual Report
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PRESIDENT'S MALARIA INITIATIVE

USAID FROM THE AMERICAN PEOPLE

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Contents

Acronyms

A&C	advocacy and communications
ACT	artemisinin-based combination therapy
aMDRT	advanced malaria diagnostic refresher training
ASAQ	artesunate-amodiaquine
ASTMH	American Society for Tropical Medicine and Hygiene
B8	Provincial Bureau of Laboratory Management (DRC)
CBA	community-based agent
CCMRT	clinical case management refresher training
CHMT	county health management team (Kenya)
CHO	community health officer
CHSU	Community Health Service Unit (Malawi)
CHW	community health worker
CLU	Clinical Laboratory Unit (Ghana)
CNM	Cambodia National Malaria Control Program
D8	Directorate of Laboratory Management (DRC)
DBS	dried blood spot
DHIS2	District Health Information System 2
DHIMS2	district health information management system (Ghana)
DHMT	district health management team
DLP	Direction de Lutte contre le Paludisme (malaria control unit, Madagascar)
DPS	provincial delegation of health
DRC	Democratic Republic of Congo
ECA	external competency assessment
ECAMM	external competency assessment of malaria microscopy
EDS	electronic data system
EPHI	Ethiopian Public Health Institute
ESMPIN	Expanded Social Marketing Project in Nigeria
FHRP	Focus Region Health Project (Ghana)
FMOH	Federal Ministry of Health (Nigeria)
GHS	Ghana Health Service
HFA	health facility assessment
HIHS	High Impact Health Service (Mali)
HIO	health information officer
HNQIS	Health Network Quality Improvement System (Nigeria)
HSO	health service officer
HSS	health service supervisor
HTMC	hospital medicines and therapeutic committee
HWH	Hydas World Health
iCCM	integrated community case management
ICAP	International Center for AIDS Care and Treatment Programs
IEC	information, education, and communication
INRB	Institut National de Recherches Biomédicales (national reference laboratory, DRC)
INRSP	Institut National de Recherche en Santé Publique (national reference laboratory, Mali)

IPM	Institut Pasteur (Madagascar)
IRB	institutional review board
KHRC	Kintampo Health and Research Centre (Ghana)
L1	WHO Level One
L2	WHO Level Two
LGA	local government area (Nigeria)
LLIN	long-lasting insecticide-treated net
LLW	lessons learned workshop
M&E	monitoring and evaluation
MDT	medical detailing team
MDRT	malaria diagnostics refresher training
MIS	management information system
MMW	mobile malaria worker
MOH	Ministry of Health
MOHSW	Ministry of Health and Social Welfare
NAMS	national archive of malaria slides
NAPPMED	Nigeria Association of Patent and Proprietary Medicine Dealers
NMCC	National Malaria Control Center
NMCP	National Malaria Control Program
NRL	National Reference Laboratory
OPD	outpatient department
OTSS	outreach training and supportive supervision
PCN	Pharmacy Council of Nigeria
PCR	polymerase-chain reaction
PHA	Provincial Health Authorities (Mozambique)
PMI	United States President's Malaria Initiative
PMP	performance monitoring plan
PNLMP	Programme National de Lutte contre les Maladies Diarrhéiques (national program for control of diarrheal disease, DRC)
PNLP	Programme National de Lutte contre le Paludisme (national malaria control program, DRC)
PPM	public private mix network
PPME	Policy, Planning, Monitoring and Evaluation division (Ghana Health Service)
PPMV	patent and proprietary medical vendors
PSI	Population Services International
PSK	Population Services Khmer
PY	project year
QA	quality assurance
QA-ACT	
RITM	Research Institute of Tropical Medicine, Manila, Philippines
RBM	Roll Back Malaria
RDT	rapid diagnostic test
SLMTA	strengthening laboratory management toward accreditation program
SFH	Society for Family Health (Nigeria)
SOP	standard operating procedures
SPH	Sun Primary Health (Burma)
SQH	Sun Quality Health (Burma)

TOT	training of trainers
TWG	technical working group
UCAD	Université Cheikh Anta Diop
USAID	US Agency for International Development
WHO	World Health Organization
WHO-AFRO	WHO Regional Office for Africa

Executive summary

MalariaCare, entering its fourth project year, supports the United States President's Malaria Initiative (PMI) in its global effort to reduce malaria morbidity and mortality. MalariaCare, a five-year partnership led by PATH and funded by the United States Agency for International Development (USAID) through PMI, aims to scale up high-quality case management services, both diagnosis and treatment, for malaria and other febrile illnesses. The partnership works in PMI focus countries and other countries to reduce the burden of serious disease and promote healthy communities and families. MalariaCare's strategy is built around three key malaria case management quality assurance intervention axes:

1. Improving the quality of malaria diagnosis using microscopy and rapid diagnostic tests (RDT);
2. Building competency in quality clinical case management;
3. Strengthening quality of data collection and use for decision-making.

During project year three (PY3), MalariaCare continued work in eleven of twelve countries with activities in PY2 (no activity in Guinea in PY3 due to recent Ebola outbreak) and scaled up to add three additional countries (Burma, Kenya, and Mali) to its global portfolio – for a total of 14 during the reporting period. The project builds these quality assurance (QA) systems through training, supportive supervision, development and revision of tools and job aids, and working with health management teams to institute lessons learned across the health system. MalariaCare places emphasis on strengthening capacity for constructive mentoring with continuous feedback to supervisors and providers based on both observation and objective data, and on encouraging the collaboration between clinical and laboratory staff.

MalariaCare is working to build this capacity at all levels of the health care system with the aim of promoting sustainability beyond the life of the project. Maintaining resource intensive activities, such as supportive supervision, beyond the life of the project will necessitate Ministries of Health prioritizing funding toward such activities. While MalariaCare has no control over this, the individual capacity built at the facility level to mentor, communicate more effectively across departments, and collect, analyze and use data should ensure that some successes of the program can be maintained even in a low resource environment.

PY3 attention to measurement and scoring of performance:

During PY3, MalariaCare has emphasized improvements in measurement and has used standardized tools to collect data on key indicators to assess progress toward the achievement of project objectives. Table 1 describes key terms and definitions used throughout the document.

Table 1. MalariaCare key terms and definitions

Key Terms	Definition
Adherence – to negative test results	The percentage of patients with negative malaria diagnostic tests who do not receive an artemisinin combination therapy (ACT). To be considered as meeting the standard for this competency area, the health facility must be 90% compliant with adherence to negative test results. These data are obtained through records review: identifying ten patients with negative diagnostic test results and then reviewing the record to identify whether they were treated with an ACT.
Adherence - to positive test results	The percentage of patients with positive malaria diagnostic tests who receive an ACT. To be considered as meeting the standard for this competency area, the health facility must be 90% compliant with adherence to positive test results. These data are obtained through records review: identifying ten patients with positive diagnostic test results and then reviewing the record to identify whether they were treated with an ACT.
Adherence – treated with ACT and had a positive malaria diagnostic test result	To determine whether all those who received an ACT prescription had a diagnostic test – and a positive result, an additional indicator has been added: The percentage of patients prescribed an ACT who had a positive malaria diagnostic test result. To be considered as meeting the standard for this competency area, the health facility must be 90% compliant with those prescribed ACTs having a positive test. These data are obtained through records review: identifying 10 patients treated with an ACT, then reviewing their record for evidence of a positive diagnostic test.
Clinical Observations	OTSS supervisor observation of a clinical interaction between a provider and patient who has fever.
Microscopy Observations	OTSS supervisor observation of a laboratory staff person preparing, staining, and reading a malaria diagnostic test.
RDT Observations	OTSS supervisor observation of any individual at the health facility who prepares and reads RDT test results.
Health Facility Minimum Standard Score for five key competence areas: • Microscopy Slide Preparation • Microscopy Slide Staining • Microscopy Slide Reading • RDT Preparation and Reading • Clinical Case Management	"Minimum" standards are the select key elements required to provide a basic level of quality of care. To be considered as meeting the minimum standard for each of the following competence areas, the health facility must be 100 percent compliant with all minimum standard items for the competence area.
Health Facility – Overall Score for six key competence areas: • Microscopy Slide Preparation • Microscopy Slide Staining • Microscopy Slide Reading • RDT Preparation and Reading • Clinical Case Management • Adherence to Test Results	Total health facility scores which includes the minimum standard as well as higher level performance skills felt to be important, but not critical, to performing high quality assured malaria case management. To be considered as meeting the overall standard for each of the following competence areas, the health facility must be 90 percent compliant with all checklist items for the competence area. The target is 90 percent compliance to each competence area.

In PY3, the scoring system for monitoring key competencies has been adjusted to allow for measurement of both minimally acceptable performance ("Minimum Standard") and overall performance ("Overall Score") in five foci of competence necessary for quality case management: microscopy slide preparation, microscopy slide staining, microscopy slide reading, malaria RDT preparation and reading, and clinical case management (further described in Table 2). A sixth area of competence – adherence to test results – is measured as a unified standard. The project has developed the dual scoring system to assess the performance level of health workers and facilities. Indicators that contribute to the minimum score are the basic competencies that measure health workers' ability to suspect a diagnosis, order a test for malaria, accurately conduct the test, and adhere to the results – and reflect a basic minimum standard that all health facilities providing malaria outpatient services should be able to meet.

Table 2. Description of minimum standards by competence area as defined by MalariaCare

Competence area	**Definition**	**Steps evaluated to assure minimum competence in a competency area**
Microscopy slide preparation	Blood sample collected and plated on slide	1. Blood sample spread into 1-2 cm diameter circle; can read print placed under the slide 2. Slide air dried before staining
Microscopy slide staining	Staining steps for optimal viewing of low density parasite infection	1. Standard 10 percent Giemsa solution used 2. Thick smear: Stain is immersed for proper amount of time
Microscopy slide reading	Slide read for evidence of parasite infection, density of parasite infection, and identification of infective *Plasmodium* parasite species	1. Clinician/Supervisor agreement on slide positivity
RDT preparation and reading	All steps in blood sample collection, use of the diagnostic device, and appropriate reading of the result	1. An adequate volume of blood is collected 2. Blood dispensed in correct well of RDT device 3. Buffer applied to correct well of RDT device 4. Waited for correct amount of time (20-30 minutes according to manufacturer's instruction) 5. Read test result correctly 6. Recorded results correctly in register
Clinical case management	Clinical provider observes standards six steps of clinical consultation	1. At least one sign of severe disease assessed 2. Supervisor agrees with clinician's assessment of disease severity 3. Supervisor agrees with whether a malaria test should be ordered 4. Correct prescription based on final diagnosis

MalariaCare, recognizes that even when these basic competencies are being met, other aspects of quality are often neglected. Indicators that contribute to the overall score are those that build on the basic core competencies to ensure that febrile case management is being conducted at the highest quality standard.

This dual system was developed to address deficiencies identified in the previous checklist. Data from the previous checklist would penalize the providers for certain less essential steps and would result in lower scores that did not adequately reflect performance. For example, laboratory staff who consistently performed quality diagnostic tests, but did not greet the patient, wash their hands, or change gloves, would be overly penalized for the latter criteria.

While the updated scoring system more accurately measures key aspects of provider performance and achievements against project objectives, using data obtained from the previous checklist, the project has seen consistent improvements over time in both the laboratory and clinical aspects of case management. Although data is available from just one round of OTSS using the updated checklist, as MalariaCare continues its use in PY4 and PY5, it fully expects to be able to: show continued improvement in quality; clarify areas of weakness; and identify specific aspects of project interventions that contribute to sustained high performance. For example, how many supportive supervision visits does it take to achieve project targets, at what frequency, and does performance lag over time despite continued visits? Does proximity of training to other quality assurance activities affect performance? Adherence to negative test results is problematic, and likely due to a lack of trust in the test itself and a long-standing practice of equating fever to malaria. In the coming year, MalariaCare will continue to work with national programs to improve the quality of diagnostic testing, build trust in the test results, and improve the ability to recognize other causes of fever through mentoring and coaching during OTSS visits, clinical case management training, and feedback of data to health management teams.

PY3 highlights of achievements against project objectives

1. Improve the accuracy of diagnostic testing for malaria to greater than 90 percent

MalariaCare has used a combination of advanced malaria diagnostics refresher training (aMDRT) followed by supportive supervision, mentoring, and feedback to develop and maintain a cadre of well-trained microscopists. MalariaCare established minimum passing standards for outreach training and supportive supervision (OTSS) during aMDRT as achieving a World Health Organization (WHO) Level One (L1 >90) or Level Two (L2 >80) equivalent score for both parasite detection and parasite counting. Across MalariaCare countries, 102 (43 percent) supervisors passed the aMDRT, with a minimum of 80 percent in these two criteria. Of the total number passing, 48 achieved a L1 equivalent and 54 achieved a L2 equivalent. Passing rates tended to be higher in countries where MalariaCare has previously conducted basic malaria diagnostic refresher training (bMDRT), compared to countries participating in their first MDRT. Parasite detection scores across MalariaCare countries have been consistently high, while speciation and parasite counting, while often improved, have lagged behind. This is to be expected, as WHO estimates approximately 90 percent of infections in sub-Saharan Africa are caused by *Plasmodium falciparum*, so identification of other species is typically not a priority and they are seldom seen. Furthermore, parasite counting when done at all, historically has been with the 'plus' system – and this standard is slow to change.

Countries showed different levels of progress depending on the history of the program and their baseline level of competency. One example is to look at progress in the key competence of microscopy parasite detection. In Ghana for example, 85 percent of supervisors made L1 or L2 qualification for parasite detection post aMDRT – a country MalariaCare has been working in since the start of the project. In Mozambique - a newer MalariaCare country in which baseline competencies assessment revealed considerable gaps - only 57 percent of supervisors achieved L1 or L2 equivalents for parasite detection by the end of the training. Still, Mozambican supervisors showed a marked increase between pre- and post- test scores, increasing from an average of 67 percent to 79 percent for parasite detection. Indeed, the average post-test score for parasite detection was 85 percent for MDRT participants across MalariaCare supported countries, which is between a WHO L1 (>90 percent) and L2 (>80).

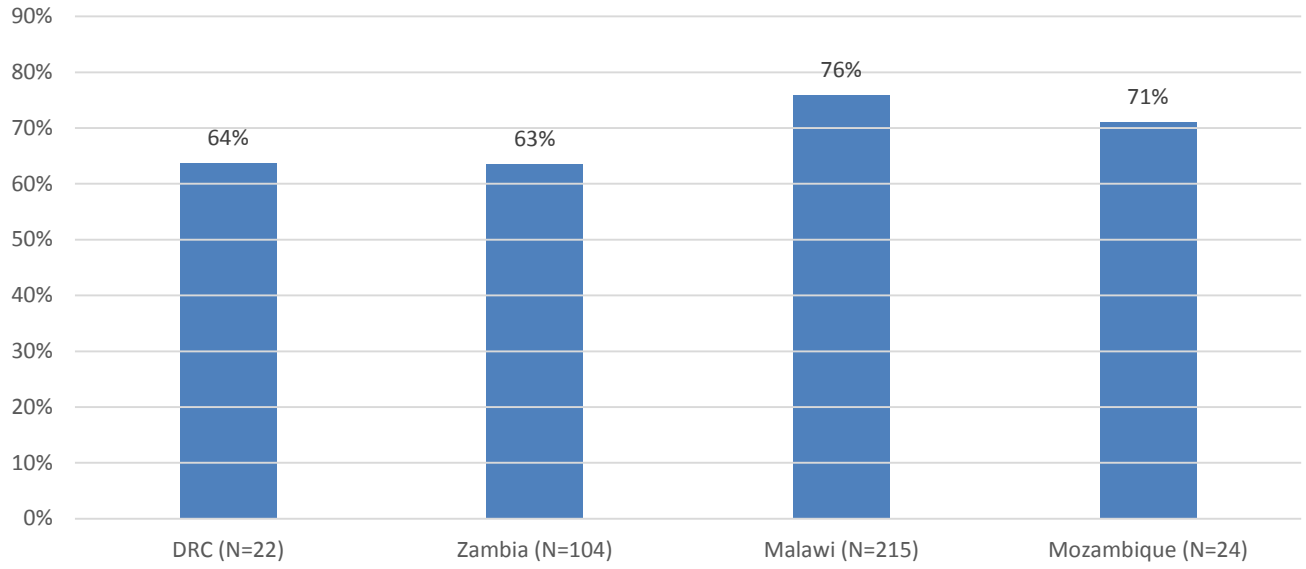
Across project countries, microscopy skills are generally improving with input from repeated visits. Using the original MalariaCare checklist, the proportion of facilities meeting at least 90 percent of standards for overall microscopy, increased from 45 percent to 51 percent for 37 Zambian facilities, and from 29 percent to 57 percent for seven Democratic Republic of Congo (DRC) facilities from the first to the third visit. Across most MalariaCare countries, while seeing all aspects of microscopy improve with repeated visits, scores for parasite identification (part of the minimum score for microscopy) were much higher than scores for parasite counting and species identification.

MalariaCare has worked to improve the performance of RDT testing. Using the revised checklist, the project evaluated health facility performance on six key indicators that represent the minimum necessary steps to correctly perform an RDT. At the most recent visits this year, 49 percent of facilities in Malawi (n=231), 59 percent of facilities in Mozambique (n=27), 65 percent of facilities in Zambia (n=150), and 71 percent of facilities in Tanzania (n=71) demonstrated 100 percent compliance across all observations with these minimum standards. MalariaCare will continue to track progress on both the minimum standard score and overall score and target efforts towards facilities and competency areas that need the greatest support.

2. Increase percentage of patients suspected to have malaria or febrile illness who receive a diagnostic test for malaria.

The first step in accurate diagnosis and treatment is the clinicians' ability to suspect malaria in patients presenting with fever. To better address this in PY3, MalariaCare introduced a revised clinical checklist and clinical mentoring activities to better complement the diagnostic component of the project. In addition, the project conducted a total of 110 clinical case management refresher training (CCMRT) sessions across 6 countries, training a total of 3,260 clinical providers in recognizing and testing febrile cases for malaria, initiating early treatment and conducting appropriate follow up of both uncomplicated and severe malaria. CCMRT was followed up with on-the-job mentoring during clinical OTSS. In all, MalariaCare-supported OTSS teams visited 5,070 facilities across the portfolio, providing mentorship to an average of one to four clinical providers per facility. The most recent rounds of OTSS showed that, on average, 64 percent of clinicians in the DRC, 63 percent in Zambia and 76 percent in Malawi ordered an antimalarial test when confronted with a febrile patient – a condition suggested for testing in three countries national guidelines (see Figure 1 below). This indicates that clinicians appear to be underutilizing testing, and need even more attention than their laboratory colleagues. MalariaCare will continue to monitor this key indicator in successive rounds of OTSS.

Figure 1. Performance on ordering malaria tests from most recent MalariaCare OTSS visit



Responding to a request from the National Malaria Control Program (NMCP), MalariaCare supported the NMCP in Malawi to conduct 98 CCMRT to train 3,036 frontline health workers (primarily nurses and clinical officers) across 13 districts on the recently revised case management guidelines as a prelude to the introduction of artesunate as first line treatment of severe malaria. On average, participants met the 80 percent target on four out of the six competencies. The two competencies on which participants did not meet the 80 percent performance target were: *calculating the correct dose of injectable artesunate* (average post-test score was 53 percent, 19 percent of participants meeting the 80 percent threshold) and *identification of the correct drug to treat patients with artesunate-lumefantrine (AL) failure* (average post test score of 76 percent, 62 percent meeting threshold). See Malawi country section for details of the results of this training.

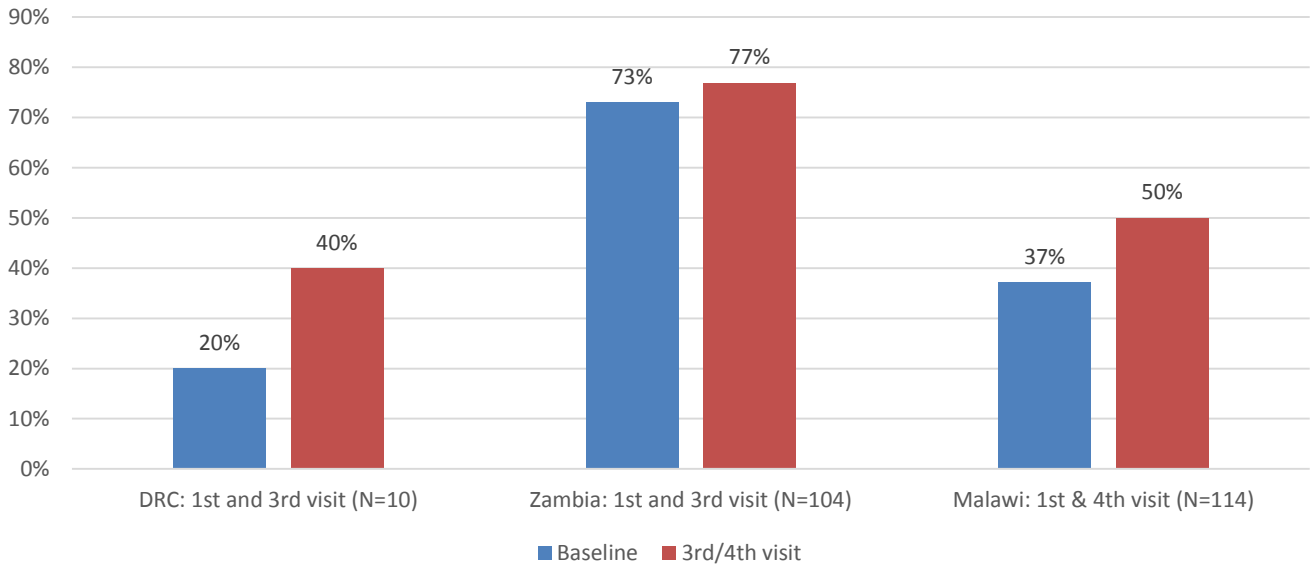
3. Increase percentage of patients who receive appropriate treatment for malaria or other febrile illnesses - consistent with the result of the diagnostic test.

MalariaCare focused on building clinicians' capacity to adhere to test results and national guidelines for treatment of uncomplicated and severe malaria. Adherence was evaluated from both a diagnostic and treatment standpoint: adherence to negative test results by not treating with an ACT, adherence to positive test results by treating with an ACT, and patients prescribed ACTs having had a prior positive test. By collecting and analyzing data that examines adherence in both 'directions', MalariaCare is better able to target the behaviors, skills, or problems in the lab or the clinic that may be contributing to lack of adherence.

One of the persistent challenges observed in baseline data from several countries has been the clinicians' lack of adherence to negative malaria test results. In some countries, clinicians still use antimalarial drugs other than artemisinin-based combination therapy (ACT) in spite of clear national guidelines. Through training and collaborative review of registers during OTSS, MalariaCare worked with providers to improve both confidence and adherence to RDT testing and increased the use of ACTs. MalariaCare also worked to improve providers' skills in differential diagnosis and prescribing appropriate treatment in cases of a negative malaria test. Analysis of OTSS results shows that these efforts are beginning to have an impact (see Figure 2 below). Adherence to negative test results increased significantly, from 20 percent to 40 percent in DRC, and from 37 percent to 50

percent in Malawi. Adherence to negative test results in Zambia started out quite high – possibly associated with earlier education and adoption of a test based approach and a consequent higher provider confidence in negative test results - and have improved up to 77 percent.

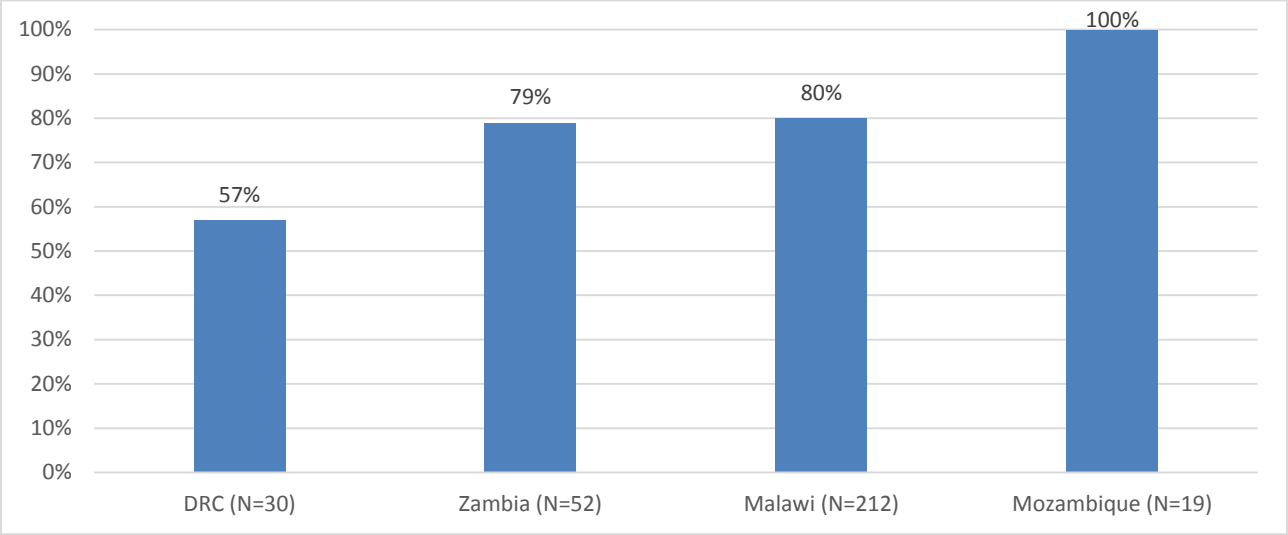
Figure 2. Adherence to negative test results without an ACT prescription for first and third/fourth MalariaCare OTSS visit[1]



Provider adherence to positive test with administering ACTs was quite good for some countries, but remains problematic in others. Zambia, Malawi, and Mozambique for example, showed adherence among 79, 80, and 100 percent of health facilities, respectively. DRC health facilities, however, showed significantly lower compliance to treatment with an ACT (see Figure 3 below). In DRC, a substantial portion of test positive patients appear to continue being treated with alternative therapies – primarily oral quinine.

[1]Trend data is not available for Mozambique due to missing data across visits.

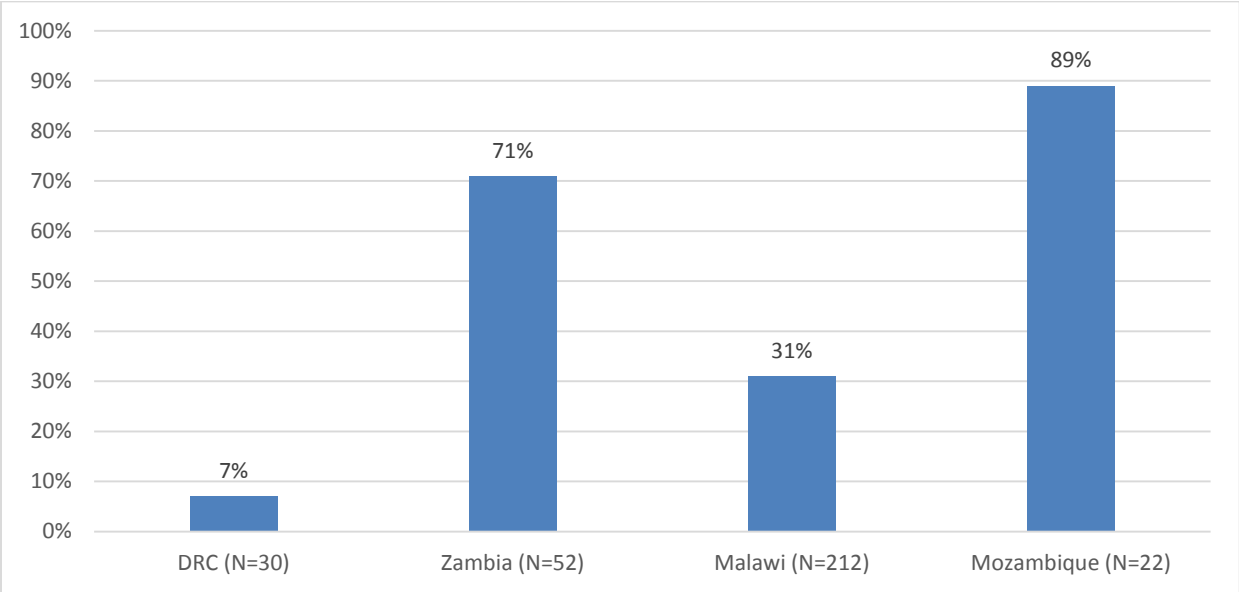
Figure 3: Adherence to positive test results with ACT prescriptions for most recent MalariaCare OTSS visit[2]



A third approach to evaluating adherence – evaluating whether those prescribed an ACT also had a positive malaria diagnostic test result – allows assessment from the treatment side and provides an estimate of how many patients are receiving ACTs when they have a negative malaria test or they are treated based strictly on clinical diagnosis (and not through use of a test result). The project target is 90 percent compliance to receiving a positive test result in all patients treated with an ACT. Figure 4 shows data from four countries – DRC, Zambia, Malawi and Mozambique. What is clear is that in all these countries, a significant portion of patients treated with ACTs are not being treated based on positive test results. In the DRC, for example, among the 30 facilities who had a visit PY3 and had adherence recorded, adherence to negative test results was 7 percent, indicating that a substantial proportion of patents with either a negative test of no test done are being prescribed an ACT. Note also that the adherence to correct ACT prescription practice based on a positive test result has a significant amount of variability across countries – ranging from 7 percent in DRC to 89 percent in Mozambique.

[2] The number of facilities included in the trend data (Figure 2) and the number included in the most recent visit (Figure 3 and 4) vary as the third/fourth round of OTSS had not been conducted in all facilities. Additionally, missing or inconsistent data limits trend data analysis only to those facilities with data across all three/four visits.

Figure 4: Proportion of health facilities meeting 90% compliance standard for ACT prescriptions having a positive test result for most recent MalariaCare OTSS visit



The differences in country adherence are currently under analysis – but in the first review it appears that in the cohort that are treated with an ACT but do not have a positive malaria test, approximately 1/3 are patients who have a negative malaria test and 2/3 are patients where no test results could be found, meaning they are either diagnosed based only on clinical criteria (no diagnostic test used) or that supervisors were unable to link the laboratory and OPD registers to find the test result for that patient. Nonetheless, even if poor record keeping is reflected in this data, it likely implies, for example in DRC and Malawi, that clinical diagnosis remains a very common practice and the test results are being ignored. Mozambique appears to be reaching target, and the cause of this success is currently under investigation.

4. Strengthen laboratory systems at the country level for detecting malaria and other infectious diseases.

Recognizing that provider performance is inherently linked to the capacity of the health system to provide the support structures needed for providers to perform their duties, MalariaCare has supported NMCPs to strengthen key components of case management systems.

- To enable NMCPs to certify expert microscopists through an internationally recognized competency assessment exercise, MalariaCare supported eight participants to the WHO sponsored External Competency Assessment for Malaria Microscopy (ECAMM) in Nairobi Kenya. These staff play a key role in the delivery of diagnostic services at all levels of the QA structure. Their main functions are to act as master trainers and conduct country-led competency assessments and trainings in malaria microscopy, supervise laboratory technicians, and establish national standards/guidelines. As a way to improve ECAMM outcome, only those lab staff who achieve a minimum score of a WHO L2 equivalent during an aMDRT course were selected to attend. In Ghana and Malawi a pre-ECAMM training program was introduced. The pre-training program

included an aMDRT course followed by continuous training and monitoring using reference slides and a WHO malaria microscopy training CD. Since the introduction of this program, the average ECAMM participant score is WHO L2. Of those who participated in the ECAMM process, 7 out of 8 (87.5 percent) participants achieved a minimum of WHO L1 or L2 accreditation.

- MalariaCare has been working closely with the WHO to scale up ECAMM across Africa, especially to francophone countries. This project year, four PMI-supported L1 and L2 microscopists from Ethiopia (L1), Mali (L1), Malawi (L2), and Senegal (L2) passed the ECAMM training-of-trainers (TOT) course hosted by the WHO. In January 2016, MalariaCare and the WHO will support a francophone ECAMM in Dakar, Senegal, led by two new trainers from Senegal and Mali.

- MalariaCare continues to support the development of national archives of malaria slides (NAMS) in the DRC, Malawi, and Zambia. Well-characterized and high-quality reference slides are needed to conduct malaria microscopy training that includes an assessment of competency, and continuous training and monitoring activities to support QA systems. In PY3, all three NAMS protocols were revised and approved by national-level institutional review boards, such as in the DRC and Zambia, or an appointed NAMS Task Force, as is the case in Malawi. Procurement of NAMS equipment and supplies started, and shipments are scheduled to arrive in country during the first quarter of project year four (PY4). It is anticipated that by the end of PY4 all NAMS donors will have been identified and slides produced. Validation of NAMS donor species identity and parasite densities are scheduled to be completed project year five (PY5) with subsequent NAMS management training to follow later in the year.

- In PY3, MalariaCare developed an electronic data system that was piloted in five countries (Mozambique, Ghana, Tanzania, Zambia, and Malawi). The system uploads clinical and laboratory data into a District Health Information System (DHIS2) formatted database stored in a cloud-based server. The data is then immediately accessible to country teams and MalariaCare through password protected internet access. The idea is to allow pinpoint evaluation of current status of individual health facilities as well as allowing for a more birds-eye view of progress at district and provincial levels.

- During PY3, MalariaCare worked to strengthen integrated community case management (iCCM) of malaria and other febrile illnesses in Ghana and the DRC. In Ghana, district health officers trained in PY2 provided cascade training on malaria RDTs to 331 community health officers (CHOs) and 1,084 community-based agents (CBAs) in 16 districts. MalariaCare then expanded the CHO internship program to ten districts in five regions. Overall, CHO scores pertaining to appropriate patient assessment of febrile illness more than doubled at post-test. MalariaCare also supported the NMCP to roll out a national round of community level OTSS in Ghana by providing national iCCM guideline refresher training to 84 national and regional officers. These were then cascaded to 652 district-level supervisors who carried out supervision visits nationwide. In the DRC, an assessment of nine accessible rural health zones was conducted in order to select 53 subsites for further iCCM support in PY4.

- In the greater Mekong sub-region (GMS), the project has continued to support national efforts to better link the public and private health sector responses to malaria in both Burma and Cambodia. In Burma, the project trained 187 licensed private-sector general practitioners across 16 townships to support case management services in underserved areas. In Cambodia, the project also supported a network of private providers across eight high-burden provinces, reviewing 64,652 suspected malaria cases tested with RDTs. Of those, 15.5

percent tested positive for malaria, and of those, 99.6 percent were treated correctly after receiving the test result.

- In Nigeria, MalariaCare has continued to work closely with partners to assess the ability of trained private-sector health providers (patent and proprietary medical vendors (PPMVs)) to manage cases of malaria and other febrile illnesses in accordance with national health standards. During the reporting period 26 qualified pilot supervisors were trained and the location of target area PPMVs and their registration status were determined. The pilot is planned for implementation in PY4.

Background

The MalariaCare team aims to achieve the following objectives:

- Greater than 90 percent accuracy of diagnostic testing the public sector.
- Increase the percentage of suspected malaria patients who receive a diagnostic test for malaria.
- Increase the percentage of patients who receive appropriate treatment for malaria or other febrile illness, consistent with test results.
- Strengthen health systems at the country level for the diagnosis of malaria and other infectious diseases.

MalariaCare is led by PATH and supported by three other organizations: Medical Care Development International, Population Services International (PSI), and Save the Children. Each partner has extensive experience in designing and implementing malaria control programs in high-burden countries. The MalariaCare team's expertise includes laboratory strengthening, malaria diagnosis and treatment, program evaluation and research, and community-based management of disease in both the public and private sectors.

Introduction

This annual progress report describes accomplishments toward achieving MalariaCare's objectives, intermediate results, and milestones during PY3, covering the period from October 1, 2014, through September 30, 2015. The report also describes challenges faced by the MalariaCare team and next steps. The report is organized by global and country achievements. Appendix A includes MalariaCare's performance monitoring plans (PMP) which present progress toward reaching specific targets.

The global achievements section describes progress toward reaching the project's PY3 core work plan objectives. Global work plan areas are:

- Project operations
- Monitoring and evaluation (M&E)
- Advocacy and communications
- Technical leadership

The section on country achievements summarizes MalariaCare's activities and progress toward improving diagnosis and treatment of malaria and other illnesses in the 15 countries listed below and depicted in Figure 5. Accomplishments are described by each project objective.

- Burma
- Cambodia
- DRC
- Ethiopia
- Ghana
- Guinea
- Kenya
- Liberia
- Madagascar
- Malawi
- Mali
- Mozambique
- Nigeria
- Tanzania
- Zambia

Figure 5. Project year three MalariaCare Countries

Global achievements

Project operations

As the MalariaCare portfolio expands, the operations team has continued to facilitate partner communications, share lessons learned through advisory group meetings, and recruit additional staff to support project activities in the field.

Key accomplishments

- Conducted successful introductory planning trips to new MalariaCare country programs in Kenya and Mali.
- Maintained frequent communications between MalariaCare and the PMI headquarters team by submitting biweekly update reports and conducting meetings accordingly.
- Convened six technical advisory group meetings to develop technical strategies to revise the project's QA strategy, refine supervision checklists, plan for implementation of the electronic data system, and discuss working group meetings attended by members of the advisory group. The advisory group includes members from all four MalariaCare partner organizations.
- Convened four operations advisory group meetings with representation from all partners. The group met to review country-level operations and helped streamline work planning, reporting, budgeting and invoicing processes. Solutions to country-specific operational issues and needs were also discussed during biweekly check-in calls with each country team.
- Improved project capacity to comply with donor requirements by supporting a global finance and administration team member to participate in USAID rules and regulations training.
- To support MalariaCare's growing portfolio, four positions have been added to the global team: a program associate, a senior program assistant, and a monitor and evaluation team co-lead. These positions help to improve operational and technical support to ensure effective management of activities in MalariaCare countries and build capacity to tell our story with strong, reliable and timely data.

The MalariaCare field operations team supports each country operation on a day-to-day basis, with staff assigned by country to support the project's in-country teams. The field operations team will continue to coordinate the technical support provided by MalariaCare's other teams, and make sure that all partners work in accordance with established plans.

Challenges

The processing of subagreements or contracts, including for pass-through activities, is time-consuming, involving multiple approval levels. It has led to some implementation delays in several countries.

Next steps

MalariaCare continues to apply adequate risk management measures by providing improved oversight and coordination support to in-country teams. In countries where increasing scopes of work require stronger in-country capacity, MalariaCare has recruited, or is in the process of recruiting, additional field-based finance and administrative staff. The project team will continue focusing on the effective management of project operations across all supported countries, and on communications to keep PMI and all project partners informed of progress and challenges, and to address those challenges timely.

Monitoring and Evaluation

Monitoring and evaluation (M&E) work supports the design and implementation of project strategies and activities that champion PMI objectives, ensures that project performance indicators align with PMI and the Roll Back Malaria (RBM) Partnership indicators, and allows project management to continually review project performance and contribution to global efforts in order to scale up improved case management of malaria and other febrile illnesses.

Key accomplishments

In PY3, core M&E activities centered on revising the OTSS data collection system. This included full implementation of the checklist piloted in PY2, the development of a scoring system and summary indicators for each OTSS focus area (microscopy, RDT, adherence, and clinical case management), and the piloting of data collection through the newly developed MalariaCare electronic data system (EDS). The MalariaCare EDS utilizes the DHIS2 application platform, which allows for the development of third-party applications, coupled with a custom-built Android application to enter and analyze OTSS data.

Key Features of the EDS

- *Multi-user functionality* – Modules designed around MalariaCare's focus areas act as stand-alone components that can be completed by different supervisors simultaneously for combined clinical and lab supervision.
- *Auto-generated scores for immediate feedback* – After completing an observation, supervisors can review the composite scores (in percentage form) for microscopy, RDT, and clinical case management to help assess and improve the healthcare worker's overall performance.
- *Completion tracker* – A user-friendly landing page provides supervisors with a summary of their progress towards completion of the checklist (per module).
- *Remote data sending* – As long as there is network availability, data can be sent as soon as the assessment is completed.
- *Real-time data review* – Once entered, data is immediately available in the online DHIS2 platform for validation by anyone who has access to the MalariaCare EDS.
- *Secure data transmission* – Users are provided with a login and password that must be entered to send their completed checklists, which prevents unauthorized use of the system.

- *Large amount of data storage for tracking facilities over time* – Once an assessment has been submitted, data can be reviewed on the same tablet so that supervisors can follow the progress of an individual facility over time, and follow-up with facilities on identified problem areas and key action items.

EDS Implementation

- In PY3, MalariaCare began rolling out the EDS by holding its first "end user" training in five countries (Ghana, Malawi, Mozambique, Tanzania and Zambia), training government supervisors on using the system when completing the OTSS checklist. The training also included the provision of immediate and effective feedback, and mentoring to healthcare workers on malaria diagnosis and treatment practices. Following the training, the first round of OTSS using the EDS tablets was conducted in 449 facilities across four countries, excluding Zambia which will conduct its first EDS OTSS in early PY4. In each country, the EDS application functioned well and supervisors were able to successfully complete and submit their OTSS checklists without loss of any data.

In Malawi, a district supervisor uses results from the EDS post-assessment application to provide mentoring to a clinical officer. Photo credit: PATH

- In Malawi, for example, the first country to implement EDS at a national scale, supervisors were asked to send comments through an electronic survey during the first few days of using the EDS, and afterwards whenever they had a question or problem with the system as part of the EDS evaluation. Of the 276 submissions, 100 percent of the supervisors reported that they would prefer using the EDS over a paper-based checklist. Some reasons that supervisors mentioned for preferring the tablet included: being better able to skip items not applicable to an observation; much simplified process to send the data (supervisors merely pressed "send" on their tablets vs. struggling to transmit paper checklists by post); and being able to use the completion tracker feature that helped them see their progress-to-complete in real-time for the required fields. In fact, initial analyses comparing checklist completion rates in Malawi during Round 11 OTSS, which used paper-based checklists and Round 12, the first EDS implementation revealed a reduction in missing data for documenting adherence to negative test results - from 23 percent to 7 percent. For RDT observations, the proportion missing observations dropped from 9 percent to 6 percent.

  Some initial challenges during the training and roll-out occurred, which the teams were able to overcome:

  - Technical glitches with the skip patterns resulted in system freezes and incorrect composite scores being shown on the tablet. However, this did not result in any data loss and the development team is currently working to address this.
  - Poor internet connectivity during the process of sending data resulted in duplicate data being sent to the DHIS2 database. This is currently being addressed and will be corrected in future EDS OTSS rounds.

The training also revealed areas to strengthen future EDS end user training. Key lessons learned that will be incorporated into all EDS training going forward include:

- A simplified clinical observation checklist to more closely match the observation process and reduce the number of skip patterns. This will enable supervisors to more easily follow the checklist and reduce the technical difficulties with its functionality.
- More role plays and field visits for building practical supervision skills. This will include exercises on how to give effective feedback and utilize the EDS as part of the mentoring process, and provides supervisors with real "on-the-ground" experience using the tablet to get more comfortable with the system.
- Additional guidance on how to develop measurable and effective action plans collaboratively with health facility staff and how to follow-up on those plans once created.
- Creation of generic logins for each district/province with a field for supervisors to enter their names in the checklist for monitoring. Some supervisors had difficulty remembering their username and password, so having a generic login that could be used by any supervisor in the district would enable a support person to grant someone access to the system as needed in the field. When using generic logins supervisors are still asked to enter their name and phone number to verify who is completing each checklist module.
- In Tanzania, future trainings should be conducted in Kiswahili, as several participants seemed to struggle to understand what was being said in English.

Overall, the EDS was successfully tested in all five of the initial EDS countries. In PY4, EDS will enable MalariaCare staff, government officials, and stakeholders to more easily collect and better utilize OTSS data, while simultaneously enhancing the supervision and mentoring process for OTSS supervisors in the field.

Challenges

As in the past, the collection and processing of data for reporting and decision-making continued to be challenging. Timeliness, completeness and accuracy of data varies by country. With paper-based checklists, feedback on completeness and accuracy of data was delayed and, thus, limited MalariaCare's ability to ensure a complete set of data on all project indicators. EDS, while not solving all of these data collection issues, allows the team to identify incomplete data quickly for timely feedback and action. Expanded M&E human resources capacity within MalariaCare and the roll-out of the EDS are already starting to improve the data process cycle. While the EDS is also meant to address this problem, among other challenges, MalariaCare is further developing systems to strengthen communication and feedback loops between the field and the global team around data processing, to improve both data quality and data use within country programs.

Next steps

In PY4, MalariaCare will continue to perform the EDS end user training in the four EDS countries that have not yet reached full-scale (Ghana, Mozambique, Tanzania and Zambia). To enhance data use, dashboards will be developed based on the project's primary indicators and data user training for governments and program staff to effectively utilize the OTSS data for programmatic decision-making. Building on the lessons learned in the first five countries, EDS will be expanded to two new countries – Kenya and Mali. Now that the system has been tested and shown to function well across several countries, the MalariaCare global team will work closely with field teams to ensure that staff are fully conversant in the functionality of the administration and maintenance of the EDS, and are able to take on important roles to manage and maintain a functional system. MalariaCare will also engage across country programs to regularly utilize the EDS data. To ensure sustainability of this system

after the life of the project, MalariaCare will continue to train and work with key government officials and departments within each of the EDS countries to develop a clear plan for capacity development and eventual handover of the system.

With increased M&E human resources capacity, in the form of a second M&E team co-lead, an additional global M&E officer, and at least one new in-country M&E position in Tanzania, the MalariaCare M&E team will have increased capacity to work closely with the technical and field teams to support additional analyses of all programmatic data, and develop publications based on key programmatic findings.

Advocacy and communications

MalariaCare's advocacy and communications activities aim to increase access to technical and programmatic information, and support USAID communication with missions and governments. During PY3, the project advanced global discussions on malaria case management and disseminated helpful information and tools to PMI staff, local service providers, and other global health colleagues to improve malaria diagnosis and treatment programs.

Key accomplishments

- Organized two global webinars -- *Quality of malaria rapid diagnostic testing in the field* and *communication and training to improve the quality of malaria case management*. Both were well-attended during the live event and both have been archived for continuing access at http://malariacare.org/resources
- Three posters were accepted for the American Society of Tropical Medicine and Hygiene's (ASTMH) annual conference 2015. The posters showcased MalariaCare work in Malawi, Nigeria and the DRC.
- Worked with the Ghana team to develop a new malaria bulletin in close partnership with the Ghana Health Service (GHS). Development of this publication was led by Ghana staff and circulated widely throughout the country.

MalariaCare webinars have proven to be very popular. The recent session on Communication and Training had one of the highest attendance rates, including international participants, and the most live questions from participants to date.

- Added three new country case studies to the project website at: http://malariacare.org/case-studies/. Additional case studies are being developed.
- Maintained, routinely updated, and expanded the MalariaCare website. New country fact sheets, photos and technical resources have been added.
- Promoted the webinars, program briefs, and fact sheets through a series of MalariaCare e-bulletins.

Challenges

No significant challenges to report.

Next steps

A special focus for PY4 and PY5 will be generating peer-reviewed publications on MalariaCare field work and findings. The advocacy and communication (A&C) team will assist the technical team in producing, editing, placing, and promoting the documents. The A&C team also will continue to organize new webinars, add fact sheets and case studies to the website, maintain and expand the website and continue to broadcast e-bulletins.

Technical leadership

MalariaCare's technical leadership activities aim to improve comprehensive care of the febrile patient, with a primary focus on malaria and other life-threatening illnesses such as pneumonia, diarrhea and sepsis. Technical leadership activities were focused on improving the quality and implementation of field activities, and sharing technical lessons and approaches across project-supported countries through webinars, country newsletters, and reports. Key accomplishments described below, based on the latest available evidence and best practices, are meant to encourage improved collaboration, understanding, trust, and learning between clinical and laboratory staff while improving skills and competencies with the goal of improving overall management of the febrile patient.

Key accomplishments

- Completed development of a clinical care checklist to compliment the laboratory checklist that includes sections on observation of febrile case management meant to encourage mentoring, and collection of key clinical indicators to guide the targeting of resources based on deficiencies and poor performance.
- Developed the first two in a series of four mentoring modules to be used during OTSS visits, to provide both clinical and laboratory staff with continuing medical education such as learning on severe malaria. The initial module focuses on building capacity in triage, diagnosis, and treatment of severe malaria and targets clinical staff from low- to mid-level health facilities; the second focuses on laboratory staff, emphasizing the importance of microscopy in the management of patients with severe malaria. The initial module has been translated into French and Portuguese and roll-out will start in PY4.
- Completed development of annual OTSS checklists and introduced the checklists into OTSS activities in Mozambique in January 2015.
- Developed a training of supervisors manual that introduces national program and OTSS supervisors to the full breadth of MalariaCare QA mechanisms, while preparing them to conduct OTSS rounds.
- Introduced a formal observation checklist and feedback form for evaluating supervisors during both training of trainers (TOTs) and OTSS rounds to provide feedback for improvement on all aspects of supportive supervision, including mentoring and data collection activities.
- Developed a strategy for publication targets in PY4 and PY5 to share the lessons learned of the project.
- Following successful roll-out of the health facility internship program in Ghana, the project rolled out a peer-to-peer mentoring strategy in Ghana that links staff from high-performing facilities with staff from low-performing facilities to provide one-on-one support in the mentee's actual work setting. This program will also be rolled out in Mozambique in 2015 and potentially other countries in PY4. It is designed to encourage

local decision-making and to provide for low cost mentoring that could be implemented by district health management teams after MalariaCare ends.

- Participated in the RBM case management working group meeting with global partners in Geneva to review current evidence and global strategies as related to diagnostics and treatment including field lot testing of RDTs.

Challenges

Responding timely and adequately to technical needs across MalariaCare's rapidly expanding portfolio is challenging. While OTSS data indicates improvement in case management indicators, current staff capacity limits MalariaCare's ability to validate these improvements onsite in country. To address this, MalariaCare has shifted tasks internally to free up technical staff time to focus on these activities.

Next steps

In the first half of PY4, the technical team will work with the M&E and operational teams to consolidate the accomplishments of PY3 with two primary goals: 1) to continue improving the quality of clinical and laboratory case management of the febrile patient; and 2) to develop a framework for the publication of peer-reviewed articles to share lessons from the projects' multi-country experience with countries and the global case management community. Through the development and introduction of additional mentoring modules focused on key case management principles, a more rigorous evaluation and selection of supervisors themselves, and more rapid feedback facilitated by the EDS, the team will continue to facilitate a more participatory and collaborative approach to OTSS for clinical and laboratory staff. Within this approach, the project team will also continue to facilitate a solutions-driven format for QA activities that will be enhanced by the immediate availability of data in countries where the EDS is being rolled out. The team will evaluate supervisors on their mentoring and data collection skills to provide them with constructive feedback and better enable program technical staff to validate the quality of OTSS visits. MalariaCare will use a supervisor evaluation form to guide this process which will take place during observation of supervisors in role-play and practice consultation observations at facilities during the TOT week, and during random spot checks during OTSS visits.

MalariaCare will continue to provide both global malaria case management leadership and targeted technical assistance to PMI focus countries to apply these global standards for improved facility- and community-level case management. The team will also continue to consolidate and refine technical assistance documents and strategies that have national and global reach—including policies and guidelines for case management QA, algorithms and guidelines for management of fever. Team members will also continue to participate in key global dialogues such as the RBM and WHO technical working groups for case management, malaria diagnostics QA, artemisinin resistance technical expert group, and CORE group meeting, as well as conferences such as ASTMH. Finally, the project will expand the mechanisms through which the team shares results of our work, currently through webinars, country reports, poster presentations, and annual reports, to include at least 3-5 peer-reviewed publications in PY4 and the development of at least one scientific symposium at the 2016 ASTMH meeting.

Country achievements

Burma

Introduction

In Burma, PSI receives pass-through funding to continue and expand the work being done through Sun Primary Health (SPH), a network of rural health care workers, and Sun Quality Health (SQH), a network of private physicians. MalariaCare started work in Burma in May 2015, following the approval of the work plan. Since April 2014, CAP-3D, a USAID-funded program, had supported the efforts of SQH and SPH. The Sun Network franchises currently include 2,717 community health workers, 1,353 private doctors, 39 diagnostic professionals, and four counselors/social workers. In PY3, MalariaCare added malaria case management to the integrated package of services provided by the Sun networks. Other services provided by Sun—family planning, diarrhea, and pneumonia services—are currently supported by the Global Fund and the Millennium Development Goal Fund. MalariaCare continued to build upon activities being implemented by the network and added a malaria diagnosis and treatment (case management) to the training of clinic providers and rural health workers. In PY3, the project supported malaria services in 16 high-burden, malaria-endemic townships through 19 private doctors (SQH) and 280 community health workers (SPH) within the networks.

Key accomplishments

- Supported RDT testing of 16,820 suspected malaria cases by Sun providers in PY3. Of these tested, 280 malaria cases were identified, of which 272 cases were treated by providers according to national guidelines. The remaining eight malaria cases were referred to other facilities, including hospitals, as suspected severe malaria cases.

- Recruited and trained one SQH doctor in Terchileik Township at Shan State. The training session included malaria diagnosis and treatment, proper waste management, improving recording and reporting of malaria cases and implementing best practices for steady supply chain management that are in line with national guidelines and standards.

- From January through April 2015, conducted area mapping and advocacy for SQH recruitment in the following townships: Ngape, Pinlaung, Laikha, Loikaw, Demoso and Hpruso.

- Recruited and trained 187 SPH providers across 16 townships. The SPH training focused on diagnosis and treatment of uncomplicated malaria in accordance with the national guidelines and referral practices.

- Conducted active case detection through mobile trips to improve case detection of malaria in select areas of intervention townships, specifically those areas which have limited access to formal health services. A total of 26 SPH providers completed three mobile trips to an average of seven townships per month. Each mobile trip was carried out by two SPH providers and one health service supervisor. During these trips, the team

performed RDT testing to all people from that area/village who had a fever in the week prior and/or during the day of the visit, and to those who requested testing. Six out of 2,771 cases tested were diagnosed as positive for malaria during the mobile trips, and were treated according to the national guidelines.

- Finalized and procured provider and client targeted information, education, and communication (IEC) materials. Malaria treatment guideline charts were updated and pamphlets for end-users were developed to encourage patients to always sleep under a long-lasting insecticide-treated net (LLIN); to seek treatment from a trained provider within 24 hours of onset of fever; to demand RDT testing for malaria diagnosis; and to complete the full course of QA-ACT treatment once prescribed . Moving forward, the project will update IEC materials according to updated iterations of the national guidelines.

- Disseminated job aid materials to SPH and SQH providers to facilitate quality case management including: solar lamps to help SPH providers read and interpret RDT testing results at night time; plastic drug boxes and raincoats to protect the drugs from getting wet and damaged during rainy season when SPH providers carry out home visit services; sharp boxes; and disposable gloves.

- Conducted monitoring and supportive supervision for SPH and SQH providers. Senior health service officers (HSOs) visited all SQH providers monthly to provide onsite technical training as well as to provide supportive supervision focused on adherence to treatment guidelines. HSOs and health service supervisors (HSSs) conducted monthly monitoring visits to SPH providers in 16 townships. During these visits HSOs and HSSs collected data on on-time reporting and commodity supplies at the provider level using a monitoring checklist[3].

- Ten HSSs were recruited to supervise and monitor the SPH providers for performance and activities.

- Managed and analyzed provider data through the management information system (MIS). Routine data collected (i.e. malaria client record forms with number of cases tested, confirmed, treated, etc.) during supervision and monitoring visits was presented at internal "health club" meetings to assess progress to date, identify shortfalls in performance, and determine action items to address these shortfalls.

[3] Monitoring checklist include knowledge assessment, general assessment to clients, observation of RDT testing procedure and case management. These checklists are used by HSSs in SPH monitoring visit.

Challenges

Challenge	Solution
Unable to recruit as many SQH doctors and SPH providers as planned: 20 SQH recruited (Goal: 20-25) and 265 SPH recruited (Goal: 320). This was due to the remoteness of some townships making recruitment difficult, on-going security issues in some sectors, and delays in receiving approval from local authorities. In some townships, they were no private physicians or if present they had been recruited to another organization.	The project will step up advocacy and recruitment – particularly for SPH – in the current townships so as to improve coverage in these areas.

Next steps

In PY4, the project will continue to support malaria case management activities in the 16th township and expand to a 17th high-burden township. Activities will expand to include not only routine case detection but also active case detection through mobile trips. During these trips, the mobile team will facilitate health education sessions with the community, focusing on key areas of malaria prevention and treatment. MalariaCare will recruit and train additional SQH and SPH providers, and provide refresher training to providers already enrolled in the program. Each cohort of SPH village health workers will be linked to a SQH general practitioner in the nearest township to provide mentoring and guidance.

Cambodia

In Cambodia, MalariaCare serves as a funding pass-through mechanism enabling partner Population Services International/Population Services Khmer (PSI/PSK) to improve QA systems for malaria case management and associated information systems in the private sector.

Key accomplishments

Objective 1: Improved targeting of support to private-sector health care providers treating febrile illness through established QA protocols.

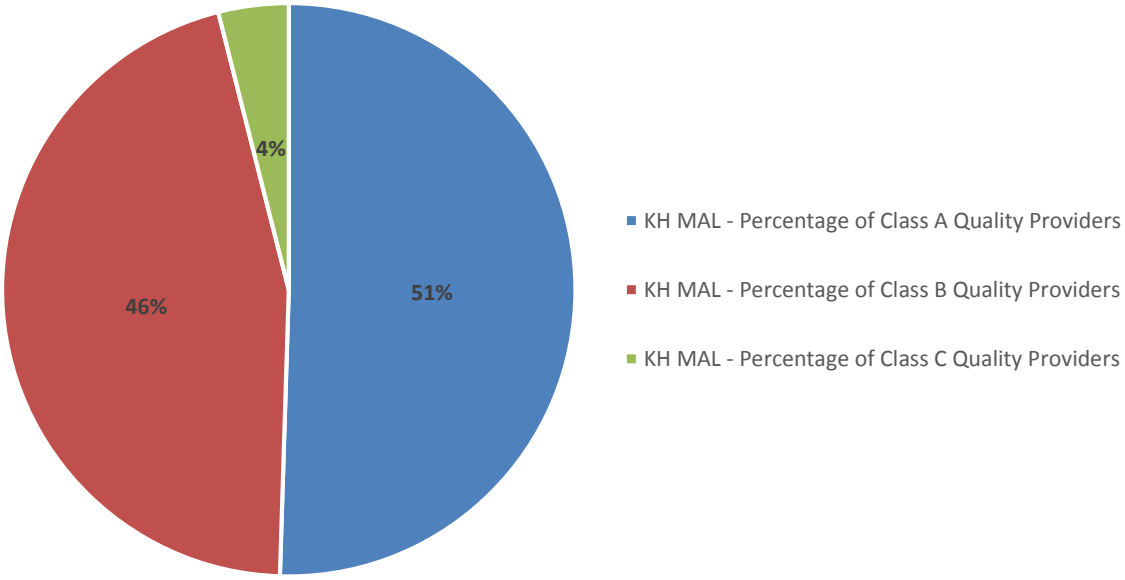
To better target support to private sector health providers in the project's network, which consists of private sector health providers and mobile malaria workers (MMWs), a comprehensive QA checklist has been developed to help assess where providers are along the pathway to high quality case management performance. The checklist is a digitized and available offline on a tablet. The tool is being used to monitor program performance and, in particular, the services that patients are receiving and where providers need to take corrective action. This QA system allows for the identification of under-performing providers, who are then prioritized to receive support

from the project's medical detailing teams (MDTs). Supervisors can monitor provider performance and provide feedback.

- Developed new tools to enhance the quality of provider assessments. The new tools include: 1) standard operating procedures for QA officers; 2) a QA dashboard that is part of the broader DHIS2 dashboard; and 3) dashboards tailored to individual QA officers. During the reporting period, 445 providers [376 public private mix network (PPM) providers and 69 MMWs] were assessed by QA officers. Each provider was then assigned to one of three classes, depending on their level and needs: class A to receive a visit every six months, class B to receive a visit every three months, and class C to receive a visit every 30 days. See Figure 6 below.

PPM provider conducting RDT testing. Photo credit: PSK, Cambodia

Figure 6. Summary of provider quality of care classifications (MalariaCare, Cambodia)



*KH MAL = Khmer Malaria

- **Conducted supportive supervision visits.** Supervision visits were conducted in close collaboration with the Cambodia National Malaria Control Program (CNM). The CNM observes QA officer and individual provider performance, and tracks the number of positive caseloads. Data flows into the national information system in two ways: 1) through reports submitted at operational district level; and 2) directly from project data systems to the central level. These two channels combined allow for data validation.

The quality of care scores among PPM providers and MMWs are shown in Figures 7 and 8 below. Providers scored lowest on assessing danger signs/signs of severe illness (14.3 percent). As a result, medical detailers have begun providing targeted follow-up in these areas. There are a number of hypotheses as to why the danger signs component is consistently low, most of which relate more to the mode of assessment than to actual provider knowledge. For example, during the assessment, providers are required to vocalize certain questions, such as "are you able to eat or drink?" However, most would not ask a patient whether s/he is "comatose" as this is visually observed. Often, those conducting the assessment will mark the provider down if they do not vocalize these observations. The project team is working with supervisors to address this issue. Also explored is lack of job aids/tools as a potential contributing factor; however, it seems that all providers are well equipped. Discussions are underway to help determine a more accurate way of assessing danger signs, possibly using prompt cards, through direct questioning after the case observation, or using simulation. Figures 7 and 8 below provide a more detailed picture of Round One (2014) and Round Two (2015) findings.

CNM PPM Manager, Mam Boravan (right), observing a QA assessment. Photo credit: PSK Cambodia

Figure 7. Provider quality of care classifications, MalariaCare Cambodia OTSS Round 1 (2014)

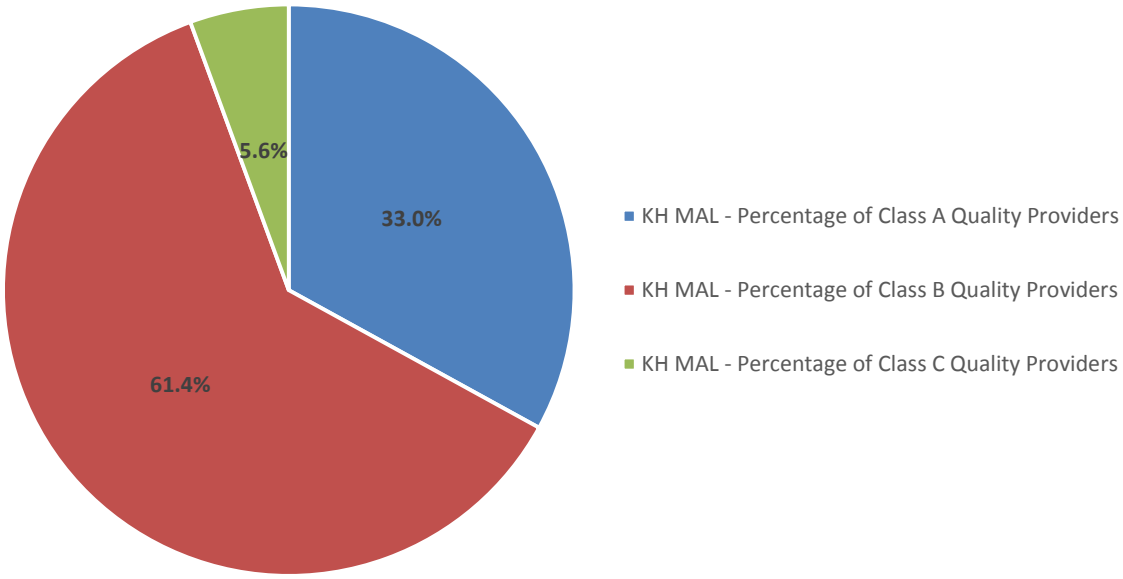
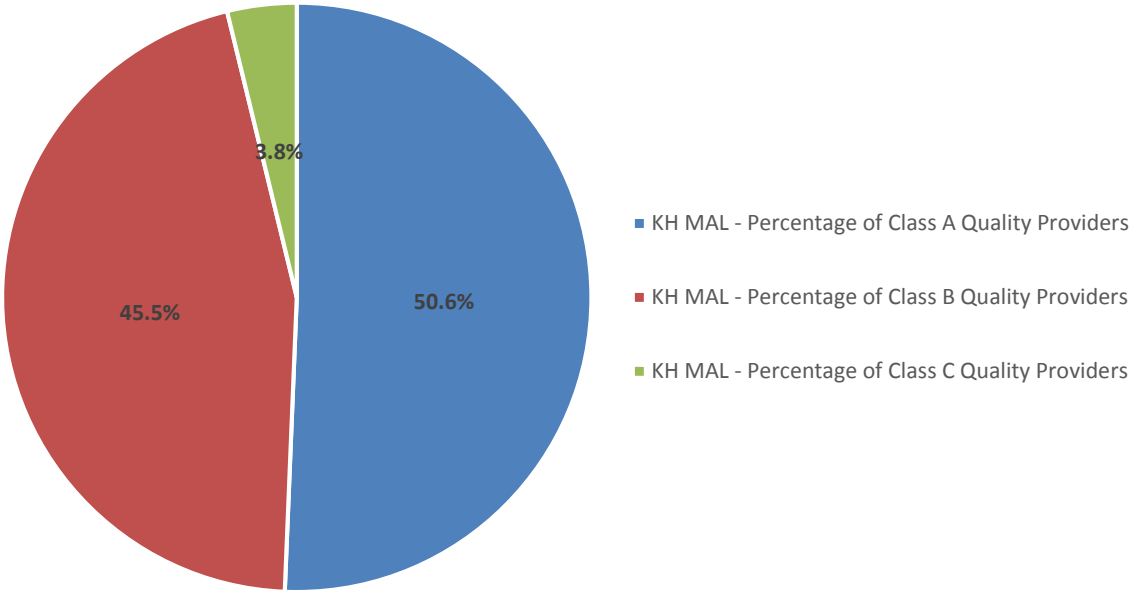


Figure 8. Quality of care score breakdown by provider type, MalariaCare Cambodia OTSS Round 2 (2015)

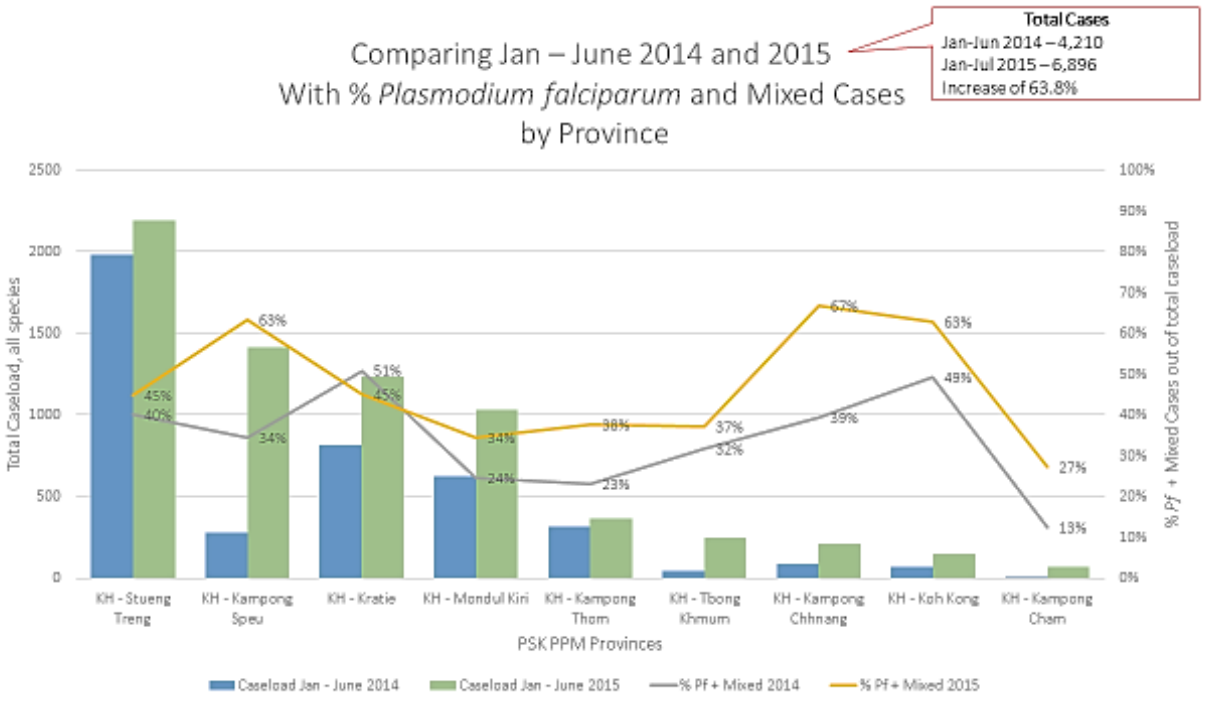


Objective 2: Strengthening malaria surveillance data collection.

The foundation for any effective health intervention is the availability of a quality data set, which provides routine reports on key performance indicators and is presented in a way that allows decision-makers to monitor performance and identify implementation issues. Collecting this data is vital to providing the CNM with a more accurate picture of the national malaria caseload, including the geographical areas – and ultimately the outlets - that require targeted support.

- **Enhanced data collection tools.** During the reporting period, the project team updated daily patient registers to better capture critical data points, such as suspected origin of infection, and developed an electronic caseload phone application to assist providers. A surveillance dashboard is being developed, and a surveillance sub-technical working group is being established. Figure 9 below shows how the tools from both Year Two and Year Three of MalariaCare programming play a key role in identifying changes in both national epidemiology, and the impact of such interventions.

Figure 9. MalariaCare Cambodia caseload comparisons from January - June, 2014 and 2015



Comparing January – June 2014 and 2015, the caseload of providers in the network has increased by 64 percent. This could be attributed to a number of factors:

- Increased number of providers offering treatment (more providers offering diagnostic services and reporting positive cases into the system) across program Year one and Year two.
- Programmatic maturity, leading to improved testing practices and more accurate reporting
- Improved treatment seeking behavior resulting, as based on anecdotal feedback, from greater trust in providers and their services, and the program reputation/successful behavior change communication[4]

- Incomplete cure (in limited cases) – the project has anecdotal reports of clients presenting more than once after treatment, citing ineffective treatment (these clients were in Kampong Speu and were referred). It is unclear if these were cases that recrudesced, new infections, or delayed parasite clearance/cure as a result of drug resistance. MalariaCare will continue looking into these potential contributing factors.
- Crackdown on unregistered/unlicensed providers – more patients seeking PPMs

[4] Quality Assurance Officers collect qualitative data surrounding beliefs and perceptions, and many providers have reported increased client load after having joined the PPM network, capitalizing on the network reputation for high quality drugs and services.

The ability to track and analyze this data is a direct result of the MalariaCare investment, and the DHIS2 platform has allowed for improved data management and ease of sharing and communicating with the national program.

- During the QA assessments, the option may exist to assess a real case (in the instance that a patient with fever has presented and consents to have the consultation observed); otherwise, a provider – patient interaction is simulated. During the reporting period, 95.9 percent of the assessments that were conducted used a simulated provider - patient interaction, and involved RDTs based on "symptoms." Of observed real cases, 78.3 percent involved blood testing with RDTs based on symptoms. These results are outlined further in Table 3.

Table 3. Diagnostic test for malaria based on symptoms and correct action taken based on illness

Indicator	Simulated case	Real case
RDT undertaken based on symptoms	95.9%	78.3%
Correct classification of illness	93.6%	87.0%
Correct action taken based on illness classification	95.4%	82.6%

  - The remaining providers tested all of their patients because they were based in areas of higher risk of malaria, or because of verbally conveyed travel history. This data demonstrates that simulated cases score higher on the predetermined indicators than the real cases. This is likely due to the fact that real cases are perhaps more complex than the simulation, and patients may not provide the obvious diagnostic clues that the simulated patients do. This data can be used to help inform assessment adjustments to ensure that scores generated after simulated cases accurately reflect the providers' case management abilities.

  - Overall, 95.4 percent of simulated cases perform correct action taken based on illness classification during simulated cases assessment (see Table 3. Among 15.5 percent who have positive results, 99.6 percent were treated after receiving the test result and around 1 percent were referred to public health facilities because of one the following reasons: pregnancy; under five years of age; lack of ACTs at facility; and/or a diagnosis of severe malaria.

  - Among providers in the project network, 64,652 suspected malaria cases were tested with RDTs. Of those tested, 15.5 percent were positive, broken down as 42.1 percent *Plasmodium falciparum,* 48.7 percent *Plasmodium vivax,* and 9.2 percent mixed infection.

Challenges

Challenge	Solution
While QA data can be easily uploaded to the DHIS2 dashboard, there are occasional glitches with the system that make local analysis challenging. The team managing DHIS2 is currently based in the United States, and so there is often lengthy communication to	To address this, the QA officer team will continue to monitor data issues and work closely with the coordinator and MIS team to troubleshoot, which will be reported up the chain to the main DHIS2 focal point. There is significant investment in DHIS2

make changes and updates in the system. In addition, distance and internet access can contribute to delays.	globally which will lead to capacity building at the platform level.
Due to bottlenecks in the CNM's public sector data management system, it has been difficult, until recently, to access data from the public sector (including health facility and community level data).	To address this, the project has continued to work closely with CNM to gather and share information that is currently available. The CNM anticipates changes to their information management systems in the coming months, so it is expected that this information will be available for incorporation before the end of PY4.
Following implementation of the Global Fund's new funding model in Cambodia, the CNM will now oversee implementation of the PPM program in provinces with a Tier 1 designation (detected artemisinin resistance, with the potential roll-out of Artesunate Mefloquine as first line treatment in six designated provinces). Currently, the project manages 217 PPM providers in Tier 1 areas.	To address this, the project team will work closely with CNM management to transition these providers. The CNM implementation approach will be different, with PPM providers operating as village malaria workers (receiving free vs. subsidized commodities and attending bi-monthly meetings for report submission and stock collection). In addition, the CNM has indicated that it might request project support to conduct a baseline QA assessment of all providers in the tier 1 catchment area, providing an opportunity to assess registered and licensed providers across the network.

Next steps

Over the next few months, the project will focus on scaling up the systems and tools developed thus far to enhance information systems and strengthen Cambodia's ability to use public and private sector data for decision making. The primary focus will be on supporting roll-out of the real time case reporting application, supported by MalariaCare, the Bill and Melinda Gates Foundation and the Global Fund. The application has been finalized, smart phones have been purchased, pilot providers identified, and a launch planned for the fourth quarter of 2015. This application is expected to dramatically improve the ease of reporting from providers, allowing for a case report that involves pushing five buttons on a smart phone. The data flows directly to the project's dashboard, and could be routed directly to CNM once they land on a data warehousing software. Electronic reports will be validated with the used RDTs collected during the testing procedures, and that are saved and collected on a routine basis. Providers will receive sufficient credit to provide reports throughout the month. This real time reporting is essential for a robust surveillance system, as it allows a joint team of PSI/PSK and provincial malaria unit staff to identify anomalous spikes in caseload, and conduct an appropriate and timely response and case/foci investigation. The aim is to also replicate the application for use among public sector village malaria workers as well.

Figure 10. Primary screens for the caseload reporting application highlighting options to enter (from left to right) test results, patient gender and age, malaria speciation, treatment administered and origin of malaria (MalariaCare, Cambodia)

Democratic Republic of Congo

Introduction

In the DRC, MalariaCare supports the Programme National de Lutte Contre le Paludisme (National Malaria Control Program—PNLP) and other malaria-linked entities of the Ministry of Health (MOH) in implementing the national malaria policy. Under this policy, every febrile patient, regardless of age, should undergo parasitological testing for malaria using microscopy or an RDT. During PY3, MalariaCare continued to work on improving the quality of diagnosis of malaria and increased its focus on clinical case management of malaria through training, strengthening on-site health facility monitoring and mentorship, performing an assessment on the initiation of community level case management, and strengthening the infrastructural capacity of reference laboratories.

Key accomplishments

Objective 1: The accuracy of diagnostic testing for malaria is improved to greater than 90 percent.

- Supported a national stakeholders workshop to finalize the "National Guidelines for Quality Assurance of Malaria Diagnostics" in coordination with the Institut Nationale de echerches Biomédicales (National Institute for Biomedical Research—INRB), provincial reference laboratories, the Directorate of Laboratory Management (D8), the Provincial Bureau of Laboratory Management (B8), and other national partners. MalariaCare distributed these new guidelines to each if its 44 target health zones (health zones) - including all targeted health facilities - during other recent activities.

Objective 2: Increased percentage of patients suspected to have malaria or a febrile illness who receive a diagnostic test for malaria.

- To introduce project focus regions to the RDT training and RDT QA program, MalariaCare collaborated with the PNLP and INRB to conduct one-day sensitization meetings for provincial and health zone management team leaders (administrative lead, clinical lead and diagnostic lead) within each province. Some of these meetings were conducted in coordination with other key PMI malaria case management implementing partners, particularly PMI-EP/PSI and SIAPS/MSH.

- Trained 181 provincial and health zone supervisors from each of the project's 44 target health zones on RDT QA and OTSS supervision skills. This was an increase from the originally-targeted 172 supervisors, in response to a request from the PNLP to increase the number of participants in Katanga, Kasai Occidental and Kinshasa to ensure sufficient availability of supervisors to cover the health zones. These individuals – a microscopist, a clinician, and two health zone management team members from each health zone – then cascaded the RDT QA training down to individuals from ten health facilities in each of their health zones. These new supervisors had mean knowledge pre-test scores of 44 percent (10-81 range) and mean post-test scores of 71 percent (38-96 range) – a 61 percent improvement in the mean over baseline. Notably, Kinshasa started with lower baseline scores at 33 percent (10-70 range), had a post-test score mean of 52 percent (38-71 range), but did have a 58 percent improvement in the mean from baseline. One reason may be that in Kinshasa, the principal malaria diagnostic test remains microscopy, and they are less familiar with the use of RDTs. Further progress in Kinshasa as compared to the other provinces bears continuing observation, particularly given the ability of MalariaCare's team to focus more intensely on this province as needed. A comprehensive breakdown of pre- and post-test scores by province is shown in Table 4 below.

A practical session on RDT QA in Kinshasa. Photo credit: Jean Yves Mukamba

Table 4. RDT QA TOT pre- and post-test results (MalariaCare, DRC)

Province	Number of individuals trained	Average pre-test score (range)	Average post-test score (range)
Haut Katanga	96	48% [19% - 81%]	75% [52% - 95%]
Haut Lomami	16	40% [30% - 60%]	70% [50% - 95%]
Kasaï Central	8	42% [28% - 48%]	76% [56% - 96%]
Kasaï Oriental + Lomami	16	54% [21% - 79%]	76% [41% - 94%]
Kinshasa	21	33% [10% - 70%]	52% [38% - 71%]
Lualaba	24	44% [26% - 67%]	76% [60% - 93%]
Total	**181**	**43.5% [10% - 81%]**	**70.8% [38% - 96%]**

- Supported the health zone supervisors to cascade RDT QA training for individual health facilities in their health zones. This one-day training, which targets staff from 10 facilities in health zones with a high malaria case load, includes training on kit storage and testing procedure, common technical errors, and use of test results in clinical decision making. In PY3, MalariaCare supported the rollout of this cascade training in 29 of the targeted 44 health zones, reaching 290 head nurses who are expected to return to their facilities and provide on the job training to those responsible for conducting RDTs. Due to a shortened implementation timeline in PY3, this activity will be completed in the remaining 15 health zones during PY4.

A provider reviewing the proper method for taking a blood sample for an RDT. Photo credit: André Bope

Objective 3: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illness--consistent with the result of the diagnostic test.

- Completed the first two rounds of joint laboratory/clinical OTSS (prior rounds were laboratory only), providing onsite mentoring to 39 health workers at 17 health facilities in Round Five (October 2014), and to 305 workers at 41 facilities in Round Six (May/June 2015). During these visits, supervisors reviewed microscopy and RDT skills with relevant staff, reviewed clinician case management skills, and provided feedback on identified issues and challenges within facilities. The following graphs show minimum and overall laboratory and clinical performance during each facility's most recent OTSS visit.

Figure 11a. Proportion of facilities meeting the *minimum* standards for diagnostic competency at most recent MalariaCare DRC OTSS visit

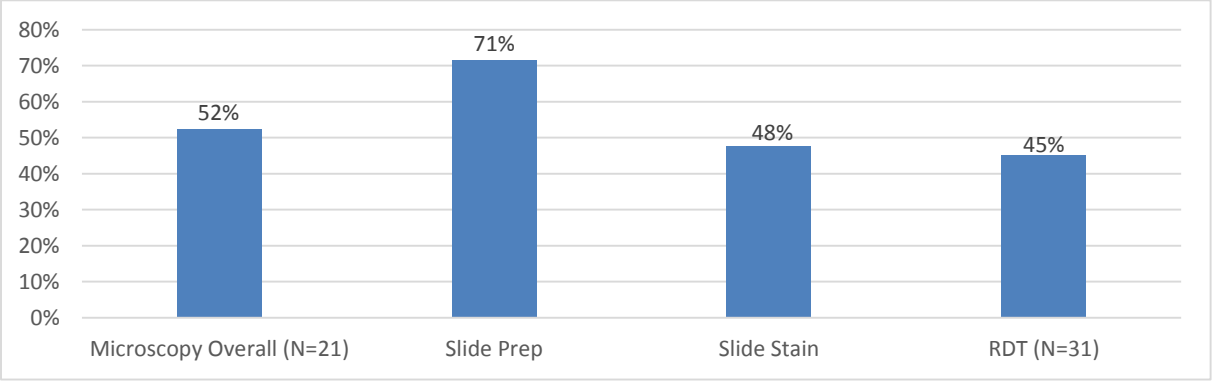
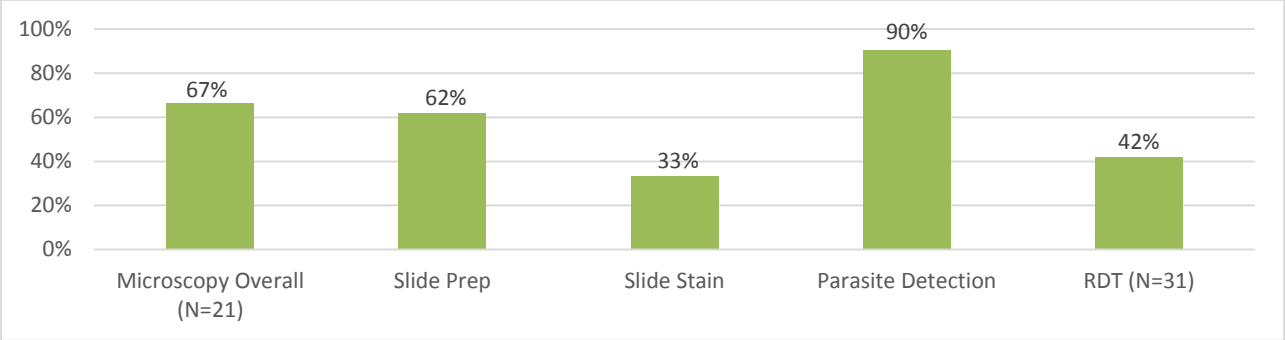


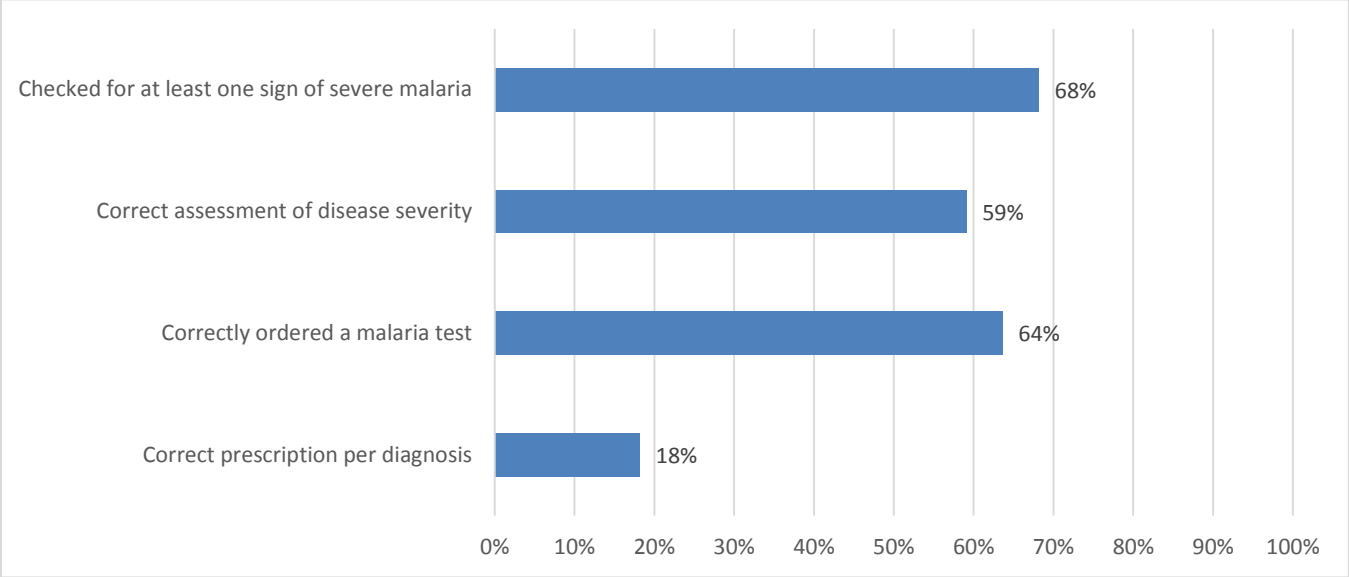
Figure 11b. Proportion of facilities meeting the *overall* standards for diagnostic competency at most recent MalariaCare DRC OTSS visit



*Parasite detection has only an overall score, and thus minimum score is not presented for this indicator.

Figures 11a and 11b show data for assessment of laboratory workers on four main competencies: slide preparation, slide staining, parasite detection, and RDT use by both project minimum and overall standards, respectively. The results as captured in current checklist data are mixed and show that about 50 percent and 67 percent of facilities meet minimum and overall standards, respectively, in microscopy, and slightly lower scores for RDTs for both minimum (45 percent) and overall standards (42 percent). The cause of these findings is not completely understood and is under ongoing analysis.

Figure 12. Clinical observation score: proportion of MalariaCare targeted facilities in DRC meeting minimum standard indicators (N=22)



Data elements collected for evaluation of competency for clinical case management during the most recent round of OTSS are described above in Figure. 12. Of note is the finding that less than 20 percent (18 percent) of correctly-diagnosed cases (for a negative test result, no antimalarial prescribed and for a positive test result, an appropriate antimalarial prescribed in the correct dosage) appear to be treated appropriately with ACTs. The cause of this finding is not completely understood and is under analysis. One likely contributor is the finding that

many providers still prescribe oral quinine – instead of an ACT – for uncomplicated malaria. The project will be focusing intensely moving forward on better understand and correcting this problem. A positive note is that the providers appear to be assessing the majority of patients for evidence of disease severity and severe malaria.

One of the key requirements of quality clinical case management is ensuring that clinicians prescribe the appropriate malaria treatment in accordance with the diagnostic test result and the national guidelines. Figure 13 below illustrates the proportion of facilities that met the targeted 90 percent or higher adherence to test results at the most recent OTSS visit.

Figure 13. Proportion of facilities meeting 90 percent adherence to test results, at most recent MalariaCare DRC OTSS visit (N=30)

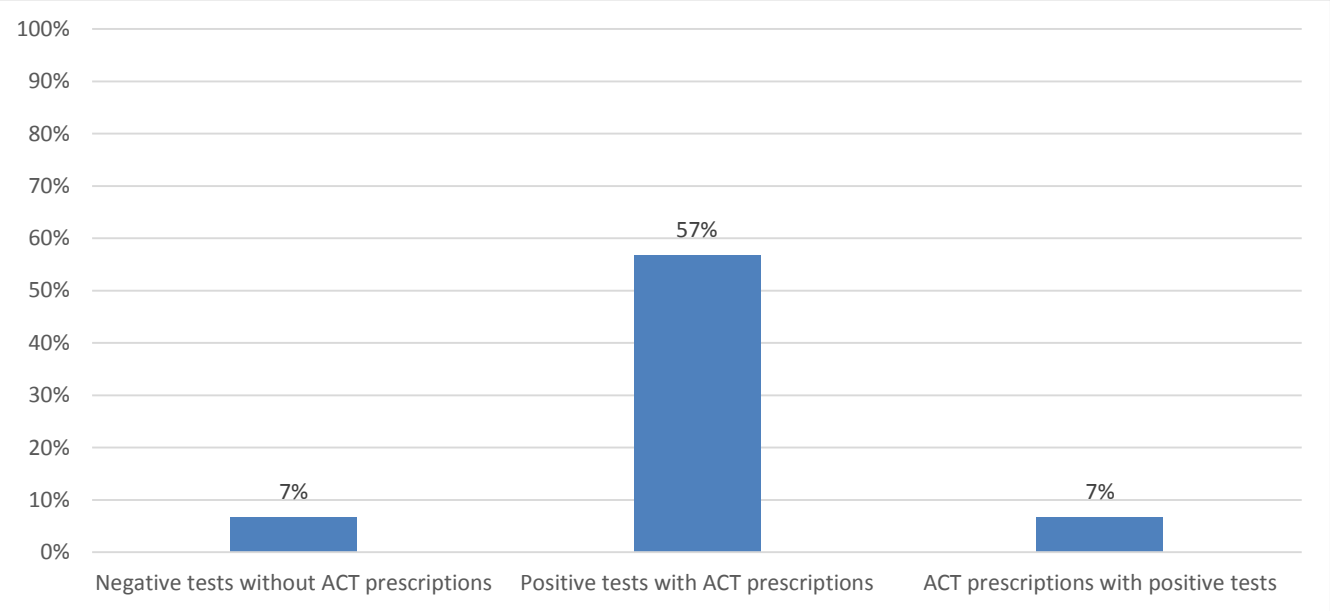
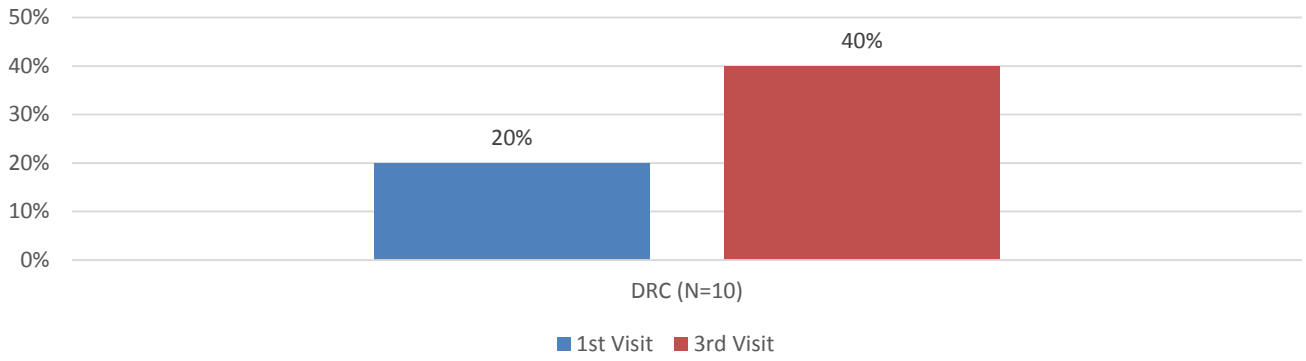


Figure 13 provides data on clinician adherence using three standard methods. When evaluating adherence to a negative test result only seven percent of facilities reached the target, and 93 percent of the sampled facilities were inappropriately prescribing an ACT despite negative test results. Conversely, when evaluating adherence to positive test results, 57 percent of facilities accurately prescribed ACTs, whereas 43 percent of facilities did not accurately prescribe an ACT. The team suspects that most of these patients were prescribed another antimalarial – predominantly oral quinine – but the data is under further analysis. The third measure of adherence – percentage of ACT treated patients with evidence of a positive diagnostic test – reveals that only six percent of patients are meeting this standard. In other words, when reviewing the records of those prescribed an ACT, 93 percent of these are treated without evidence of a positive test. While the causes are not completely understood, likely possibilities under investigation include treatment with ACTs despite negative test results, treatment based only on clinical criteria, and inability to find a positive test result in the records. Further analysis is underway and will help define areas for more targeted adherence mentoring.

As adherence to negative test results was included in the prior version of the checklist, the team is able to analyze trends for this indicator over multiple OTSS visits. The project compared the results from a facility's first and third visits – which provides the largest sample and consistent set of facilities. Adherence to negative test results

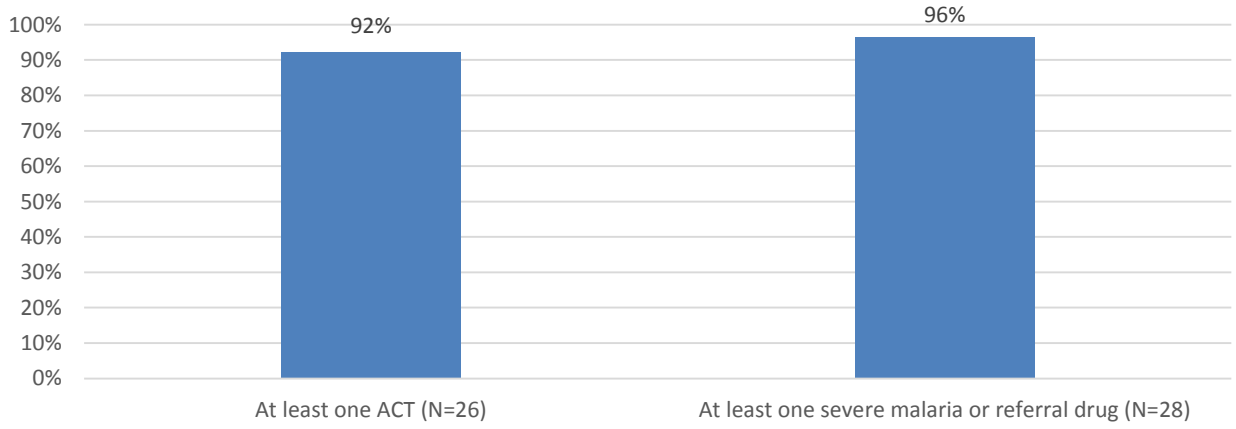
has improved with multiple OTSS visits – where 20 percent of facilities met the adherence standard at the first visit and 40 percent of facilities met the standard by the third OTSS visit (see Figure 14 below).

Figure 14. Proportion of health facilities reaching at least 90 percent adherence to negative test results, comparison of first and third MalariaCare DRC OTSS visits, (N=10)



One of the factors influencing prescription of appropriate anti-malarial drugs is the availability of drugs at the facility. An important condition for accurate and successful malaria diagnosis and treatment is the availability of ACTs and other malaria drugs. Figure 15 below illustrates the proportion of facilities with ACTs in stock at the time of the most recent OTSS visit. Ninety-six (96) percent of facilities had at least one severe malaria or referral drug and 92 percent had at least one ACT at the most recent visit.

Figure 15. Proportion of facilities with at least one key drug in stock at most recent MalariaCare DRC OTSS visit



- MalariaCare prepared for the expansion of QA interventions to include iCCM activities by conducting a rapid assessment of iCCM practices in nine target health zones in Katanga province. Following a literature review, a two-week field assessment was carried out in coordination with the Programme National de Lutte contre les Maladies Diarrhéiques (National Program for Control of Diarrheal Disease—PNMLD), the PNLP and the Katanga provincial health division. Using PNMLD criteria – iCCM sites must include a local population of 1,500 people and be at least five kilometers away from the nearest health center – the team selected 53 iCCM

sites in the nine target health zones. The key findings of this rapid assessment that were shared with the leadership of the provincial delegation of health (DPS) included:

- The need to strengthen leadership within the DPS in charge of the iCCM strategy. MalariaCare will support the DPS in its leadership role in this area, including identifying potential partners to supply the other medicines required for iCCM.
- The need to establish regular partner coordination meetings in the province, including MalariaCare, SIAPs, Measure, and Association de Santé Familiale (Family Health Association), to improve coordination.
- The absence of an established medicine task force under the leadership of the DPS able to rapidly react to address issues related to distribution of drugs for iCCM
- The need to ensure that all the supplies and materials for iCCM sites are available before the training of community health workers (relais communautaires).

Following the assessment, an implementation plan for iCCM activities was developed, which takes into account available resources and partners working in Katanga. Whereas MalariaCare will focus mainly on the community management of malaria, the Katanga health division has committed to advocate for a comprehensive approach, also including diarrhea and respiratory illnesses. It is as yet uncertain which partners would be available to support this broader agenda.

Objective 4: Strengthened laboratory systems at the country level for detecting malaria and other infectious diseases.

- NAMS development has moved forward with procurement of supplies and the drafting of a memorandum of understanding with the INRB. MalariaCare will start slide set development in the first part of PY4.

- The project developed the terms of reference for the national malaria case management working group. These terms of reference have been adopted by the technical working group at the PNLP. MalariaCare will provide financial support for local transportation, refreshments, and printed materials needed for the group to meet quarterly in PY4 and provide technical input as a member of the working group.

- MalariaCare supported the parasitology department at the INRB through the accreditation process called strengthening laboratory management toward accreditation (SLMTA) by providing the necessary laboratory consumables to the INRB. The project also supported external SLMTA training for the Katanga provincial reference laboratory director.

- Supported the rehabilitation of the INRB in order to improve national level diagnostic capacity and the monitoring function of the national reference laboratory.

Challenges

Challenge	Solution
Delayed development and approval of the work plan due to significant increase of its scope, and	An addendum was submitted to PMI with adjustments to PY3 targets and timelines for

delays in recruitment of the team led to a shortened effective time frame for implementation.	proposed activities. In addition, with a full country team in place, the project anticipates an accelerated implementation schedule in PY4.
Limited number of project staff compared to the geographic scope of work and the scattered locations of supported health zones.	Staffing levels have increased, with staff based in the Katanga province. In addition, per recommendation of the Mission, the project plans to transfer responsibility for five Kasai health zones to PMI partners working more intensely in these provinces. This will allow MalariaCare to focus its attention on health zones in Katanga province.
A number of MalariaCare's target health zones are rural and difficult to access. This leads to increased costs due to longer travel times for implementation.	MalariaCare is working to collaborate closely with other PMI partners to reduce costs by coordinating activities to share transportation costs.
As noted on a recent CDC diagnostics QA evaluation trip, although corrections done during OTSS visits help to resolve onsite challenges, there are challenges in sharing and using the data collected during OTSS for further activity planning, due to the rapid expansion of the scope of MalariaCare activities in PY3.	Prior to the launch of OTSS in PY4, MalariaCare will finalize a detailed implementation plan for joint clinical/laboratory OTSS at the referral level and clinical OTSS at the health zone level. This plan will focus on defining logistics for collecting and entering OTSS checklist data, training supervisors to provide meaningful feedback and develop improvement plans, and establish timelines for data analysis and reporting, which will be used for programmatic planning and shared with the NMCP and mission.

Lessons Learned

Implementing malaria case management QA as an integral part of iCCM can have significant impact. However, it requires substantial coordination with partners in charge of the different components of iCCM. OTSS to community health workers requires much investment given the spread of community health workers and difficult access to their location. Linking community health worker supervision to any facility-based activities involving these workers may reduce the cost.

Next steps

Work with the PNLP to continue to implement activities originally planned to occur in PY3, including joint laboratory/clinical OTSS at the provincial level, conducting lessons learned workshops with key stakeholders in each province, RDT QA training for individual health facilities in the remaining target health zones, and support the INRB and five newly-established provincial laboratories with key equipment and supplies to strengthen malaria diagnostic capacity. MalariaCare will also introduce clinical OTSS with modules on RDT testing at health zone level in 44 health zones, and continue to expand the establishment of iCCM sites in selected health zones.

Ethiopia

Introduction

In PY3, MalariaCare continued to support the Ethiopian Public Health Institute (EPHI) to strengthen QA systems for microscopic diagnosis of malaria. The EPHI plays a key role in the delivery of diagnostic services including QA at every level of the health care system. Since 2009, EPHI, with the support of PMI, has focused on building human and material resources necessary for operationalizing its overall QA plan at the central level. In support of this objective, EPHI, in collaboration with MalariaCare and the International Center for AIDS Care and Treatment Programs (ICAP), is currently working on two major activities:

1. Finalize the validation of a NAMS that will be used to support training and assessment of malaria microscopists.
2. Support the accreditation of an expert group of microscopists who will oversee training and QA activities.

Key accomplishments

- Supported EPHI in the collection and microscopy characterization of malaria infected patient samples.
- Continued to assist EPHI to characterize and validate all NAMS donors using polymerase chain reaction (PCR) technology.
- Supported EPHI staff to develop molecular characterization capacity during a skills transfer visit to Cheikh Anta Diop University (UCAD) in Senegal.
- Assisted EPHI to borrow slides from the Research Institute of Tropical Medicine (RITM) in Manila, Philippines, to support the preparatory ECAMM training
- Procured training materials including WHO bench aids, the WHO malaria microscopy training CD, manuals for malaria microscopy training for learners and tutors to support the preparatory ECAMM training.

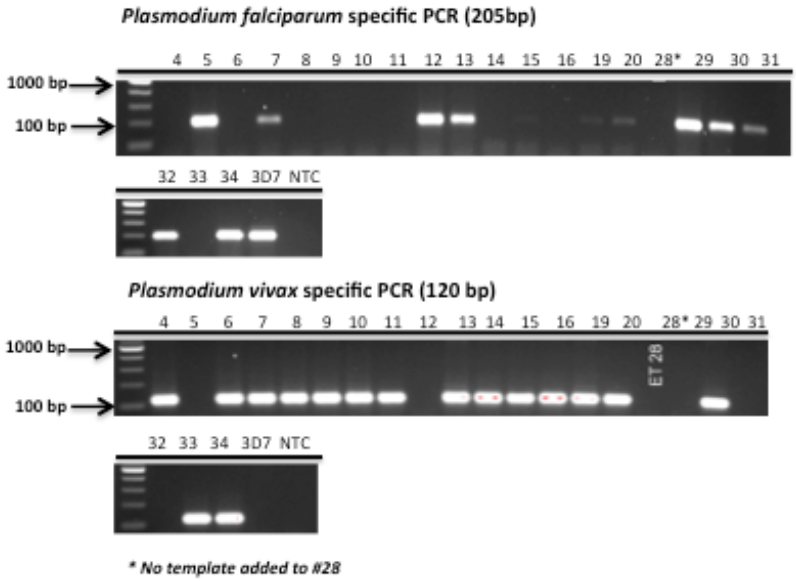
Objective 4: Strengthened laboratory systems at the country level for detecting malaria and other infectious diseases.

In May 2015, a technical expert from UCAD provided a five-day training for three EPHI staff in the molecular biology department focused on basic molecular techniques needed for performing PCR to support the NAMS validation. The objective of the training was to provide EPHI with the technical capacity to conduct species-specific PCR in order to validate NAMS donors species identification. Specific learning objectives included DNA extraction, preparation of primer stocks and working stocks, nested PCR for species identification, preparation of agarose gel and electrophoresis, and visualization of PCR products.

The results for PCR analysis of 21 microscopy confirmed *Plasmodium* infected donors for the NAMS is shown below. The gels show five Pf monoinfected donors, nine *Pv* monoinfections, and seven mixed *Pf/Pv* infections. There were no detectable infections with *P. malariae* nor *P. ovale*.

Figure 16: Species-specific PCR results from UCAD/EPHI

A. PCR speciation gels



B. Distribution of PCR results by species

Species	*P. falciparum*	*P. vivax*	*P. malariae or P. ovale*	*P. ovale*	*Mixed Pf/Pv*
Number of infected samples	5	9	0	0	7
Patient #	5, 12, 29, 31, 32	4, 6, 8, 9, 10, 11, 14, 16, 33			7, 13, 15, 19, 20, 30, 34

Challenges

Challenge	Solution
Although EPHI is sufficiently equipped with PCR machines (including a gradient PCR machine), there remains a lack of adequate power supply to simultaneously run multiple machines. A particular problem, was the inability to run multiple gel electrophoresis runs at once. This slows the pace of testing, despite having adequate equipment to perform at a high rate of output.	For future trainings, will plan to use additional power sources (e.g. generators), to improve testing efficiency.

Gel images at EPHI were not annotated properly and therefore the PCR will have to be repeated to ensure they can replicate UCAD's results. There is also a need to duplicate results prior to sending to RITM for validation of parasite density.	PCR will be repeated at EPHI in early November. UCAD has also agreed to repeat the PCR of donor samples in order to have confirmed PCR results prior to sending the samples to RITM for validation.
A number of dried blood spots (DBS) are still missing from the donor collection. In order for these donors to be validated using the WHO protocol, PCR should be performed.	The project is working with EPHI and ICAP to track down the missing samples. These samples include negative and other non-Pf species, which are an important group in the donor collection. MalariaCare will work with the WHO to identify other possible options for validation if these samples cannot be located.

Lessons Learned

Developing the Ethiopia NAMS has been a challenge because of the different supporting partners involved from the beginning of the project. Initially, Hydas World Health (HWH) provided training on mass slide production through the IMaD project. After IMaD ended, HWH and ICAP supported sample collection and validation under a separate contract. Currently, MalariaCare and ICAP are supporting WHO slide validation and training. The various transitions have delayed project implication. Going forward, it is recommended that a project have at least three remaining years of funding for uninterrupted support of the development of a national slide bank.

Next steps

During PY4, MalariaCare will work with EPHI to finalize the validation of the NAMS by expert microscopy. Both EPHI and UCAD will repeat PCR of all NAMS donors that have DBS samples to ensure that results can be replicated prior to shipping to RITM for validation. For donors that the DBS samples cannot be located, MalariaCare will work with the WHO to identify an alternative validation protocol for species identification. To fully validate Ethiopia's NAMS for density, MalariaCare will support shipping of all 34 donor samples to six WHO-designated microscopists for slide validation. Upon completion, Ethiopia will have a fully-characterized and validated NAMS at WHO standard for use in future training and proficiency testing.

MalariaCare will also support the development of a core group of diagnostic experts at the national and regional levels who will be responsible for planning, implementation, and monitoring of QA program. To develop a core group in Ethiopia, MalariaCare in collaboration with ICAP will support ECAMM preparedness training and WHO-AFRO (Africa Regional Office) accreditation of up to twelve national and regional microscopy experts through an ECAMM) course that will be held at the beginning of December, 2015.

Ghana

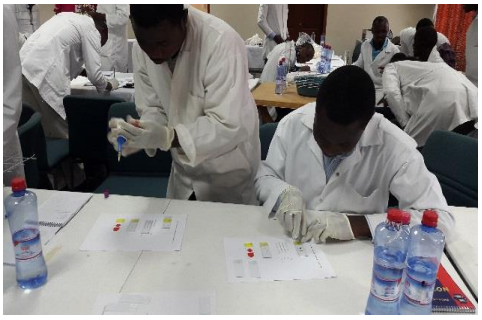
Introduction

During PY3, MalariaCare Ghana developed a work plan designed to improve case management for malaria and other febrile illnesses in MalariaCare's focus regions. MalariaCare implements diagnostic capacity strengthening activities in all ten regions, and works in the Upper East, Upper West, Brong Ahafo, Ashanti, and Eastern regions to improve the quality or malaria clinical care and M&E. Key activities implemented focus on strengthening malaria diagnostics, improving clinical care of malaria, supporting health information management systems, and building the technical management capacity of malaria programs nationwide. MalariaCare's technical approach includes developing and strengthening QA mechanisms through onsite supervision and training for laboratory, clinical, and M&E staff at health facilities, cascade training, lessons-learned workshops (LLWs), and other peer-review and support mechanisms such as targeted mentorship and CHO internship programs.

Key accomplishments

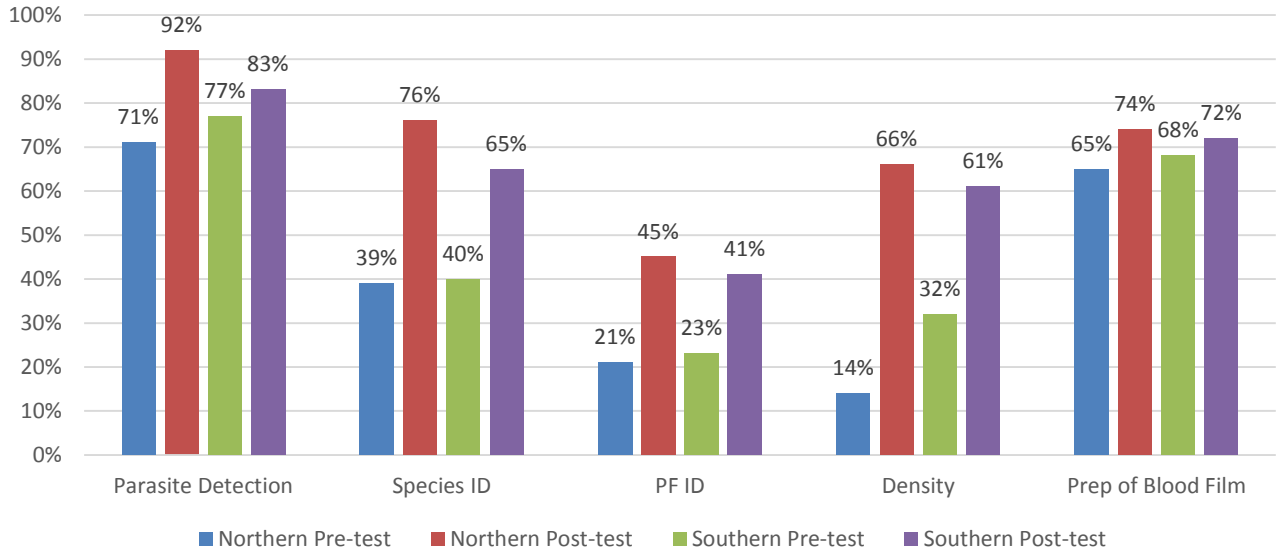
Objective 1: Scale up and improve access to and availability of high-quality malaria diagnostic services, with a focus on the lower health facility level

- Supported an advanced malaria diagnostics refresher training (aMDRT) for 40 laboratory supervisors, who will be responsible for conducting supervision visits and regional-level diagnostics training. This training occurred in two groups by geographic distinction, Northern and Southern. Overall performance for both groups in malaria microscopy was good. For both groups, parasite detection—the key component of microscopy diagnosis—was good (average score was 87 percent, with 29 of the 40 participants scoring above 85 percent). However, when assessed across all skills (parasite detection, species ID, and quantitation) only 9 of 40 (23 percent) passed WHO L2 minimum scores for expert microscopists. Significant improvement was observed between pre- and post-tests for agreement, Pf identification, and density, across all training groups (Figure 17). Species identification and quantitative methods for counting have only recently been introduced as part of regular practice, hence the low scores. Training in these areas will be strengthened in PY4.



Participants preparing blood films for malaria microscopy. Photo credit: MalariaCare Ghana

Figure 17. Average percentage of class performance for microscopy skills during pre- and post-tests (MalariaCare Ghana, MDRT)



- Supported regional MDRT for 243 laboratory professionals, which were facilitated by the aMDRT participants with support from master trainers. Fifty-eight (58) percent of participants met the target score for competency in malaria microscopy (see PMP Indicator 2).

- Supported the training of 44 lecturers and laboratory technicians in two pre-service institutions (University of Development Studies and University of Cape Coast) on malaria case management with emphasis on microscopy. The training, which aims to provide knowledge and competency in both technical and management aspects of malaria diagnosis, also covered topics such as quality control of stains, record keeping, microscope maintenance, and quality of reagents and supplies. These lecturers and laboratory staff are now better equipped to provide the most up-to-date malaria case management education to their students.

- Supported the revision and distribution of the National Guidelines for Laboratory Diagnosis of Malaria, as well as revised RDT training materials to accommodate the temporary shift from single-use buffer RDT kits to multi-use buffer kits. Following this revision, 41 biomedical scientists from the regional level were given update training on RDT use with the new kits. These scientists cascaded the update training to RDT providers in their regions via case management training.

- Supported Kintampo Health and Research Centre (KHRC) to characterize and validate all NAMS donors by PCR. The molecular validation of all 38 NAMS donors was completed in March 2015. The Ghana NAMS currently consists of 6,084 well-characterized and high-quality blood films. The archive contains malaria species endemic to Ghana, high and low parasite densities of *P. falciparum*, mixed infections, and negative samples. In PY4, MalariaCare will support WHO-level validation of the slide bank – the last step in developing a national archive.

- Supported four biomedical scientists who are laboratory staff to participate in the WHO ECAMM training in Nairobi, Kenya. Three participants received WHO L2 accreditation, and one received WHO L 4 accreditation. All participants obtained a WHO L1-equivalent score on parasite detection; and two obtained a WHO L1-equivalent score on species identification (the other two obtained a L2-equivalent score). The weak competency among Ghana participants was clearly quantification, which mirrors the results of the aMDRT held earlier in the year: the average score of all four participants on this indicator was 48.5 percent. In PY4, the parasite counting modules of microscopy refresher training will be strengthened to improve this competency.

Objective 2: Scale up and improve access to and availability of high-quality malaria treatment, with a focus on the lower health facility level

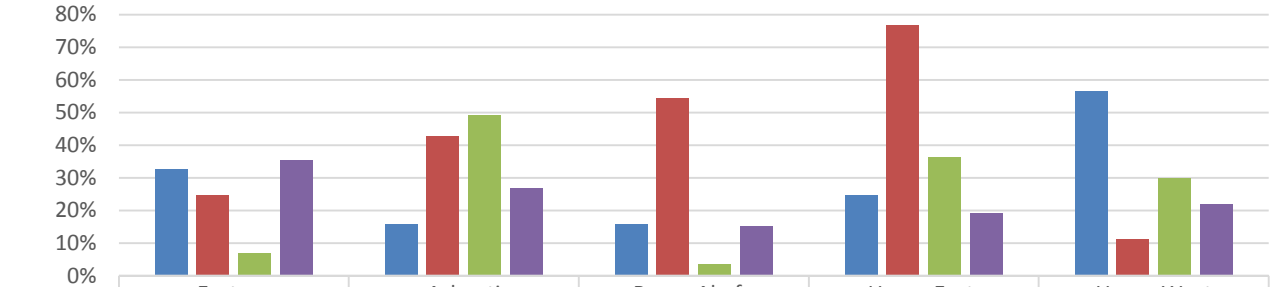
- MalariaCare developed and rolled out a supportive supervision standards of practice program made up of presentations on topics such as communication, the supervision process, and on-the-job training. This was used to train over 200 clinical and M&E OTSS supervisors from MalariaCare's five focus regions. This training allowed for the creation of a larger pool of regional supervisors, and allows MalariaCare to select supervisors based on observed performance.

- The project collaborated with the NMCP to organize training on the revised national case management guidelines (see PMP Indicator 20). A total of 1,478 health providers were trained on these guidelines, and 188 providers from the four teaching hospitals trained on RDT use and triaging severe malaria. Attendance by medical doctors and physicians assistants at this training was low, possibly due to disinterest or heavy workload. In response, funds were reprogrammed from the planned support for a therapeutic efficacy study (already being supported by the Global Fund) to provide seven one-day sessions in Ashanti and Brong Ahafo regions specifically targeting these two cadres, and accredited by the Medical and Dental Council to fulfill continuing education requirements. With this additional incentive of continuing education credits for attendance, 362 doctors and physicians assistants participated in the additional training.

- As part of a wider national effort, MalariaCare supported district-level officers to train 331 CHOs and 1,084 CBAs from 16 districts in Ashanti and Eastern regions on the correct use of RDTs, the management of malaria, acute respiratory infections and diarrhea per the revised iCCM guidelines.

- The project conducted two full rounds of joint clinical/M&E OTSS. A third round, used as a pilot for EDS in Ghana, was conducted in two districts per region in the five regions. A total of 13,981 healthcare providers received onsite supervision and mentoring during the two rounds of OTSS (Rounds Three and Four) to 3,578 health facilities, covering 84 percent of the facilities targeted (MalariaCare aimed to support visits to 80 percent of all facilities in each region). Visits during PY3 revealed that despite a massive fire at the central medical stores in January, RDT availability remained above 90 percent in all regions except for Ashanti, which reported 80 percent availability during both rounds. During Round Four of the OTSS, availability of rectal artesunate, a pre-referral antimalarial medicine, was less than 40 percent in all five regions (see Figure 18). This raises concerns of capacity for initial management of severe malaria at lower level health facilities before referral, as parenteral artesunate is not allowed to be administered at that level.

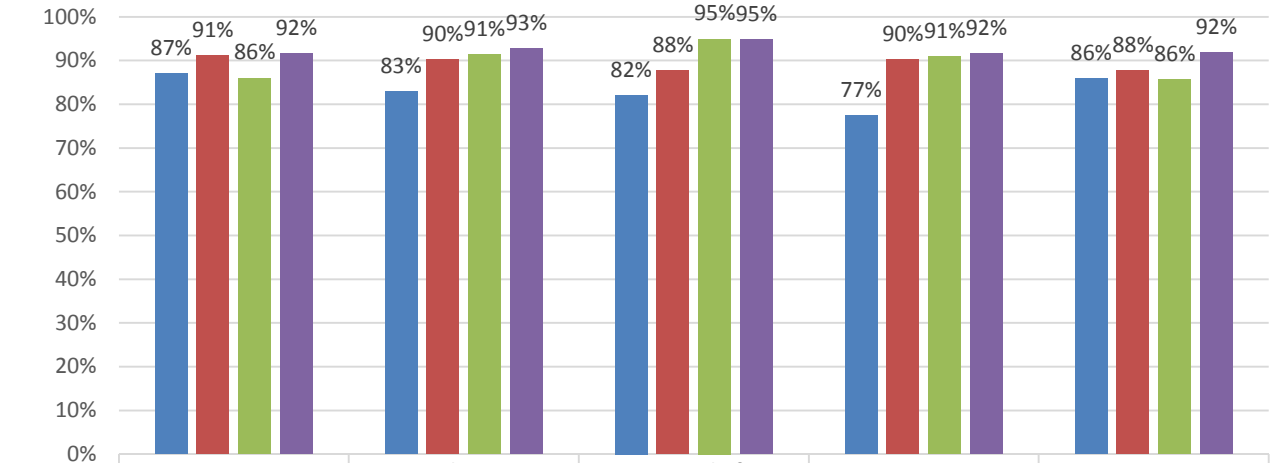
Figure 18. OTSS findings on availability of artesunate suppository in facilities (MalariaCare, Ghana)



	Eastern	Ashanti	Brong Ahafo	Upper East	Upper West
Round 1	32.54	15.69	15.69	24.86	56.62
Round 2	24.76	42.86	54.55	76.9	11.11
Round 3	6.77	49.38	3.45	36.28	29.89
Round 4	35.4	26.8	15.22	19.27	21.98

Regional findings showed that at least 90 percent of workers observed correctly ordered a malaria test to diagnose febrile cases (see PMP Indicator 13). RDT performance increased in each region with average of 91 percent of observed workers demonstrating the required level of competence in using an RDT (see PMP Indicator 11). Figure 19 below illustrates average RDT performance scores over the last four rounds of OTSS. The region with the lowest average RDT competency score, Upper East, obtained an average score of 87.51 percent, with the highest region, Brong Ahafo, receiving an average score of 89.9 percent. In each region except Brong Ahafo (which remained nearly the same as Round Three), improvement was made from the previous round of OTSS. However, the measure of improvement varied between regions: a 6.2 percent average score increase in Upper West was the greatest improvement, and a .71 percent increase in Upper East the least.

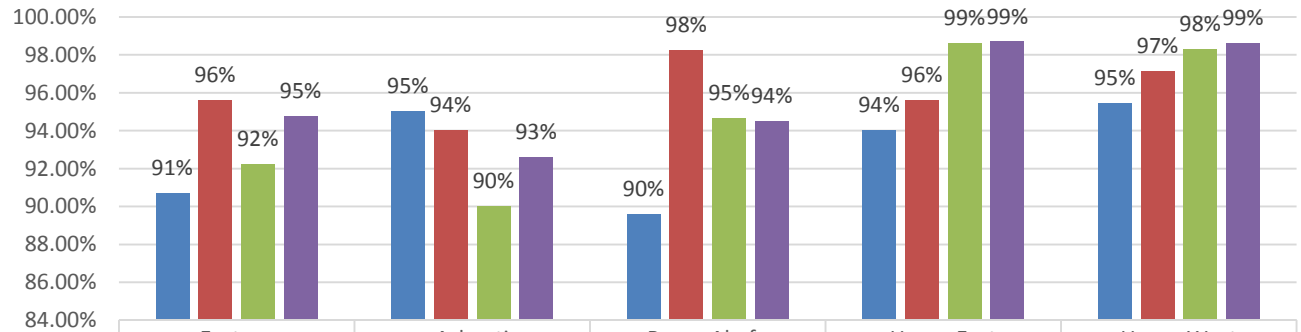
Figure 19. OTSS findings on competency in performing a malaria rapid diagnostic test (MalariaCare, Ghana)



	Eastern	Ashanti	Brong Ahafo	Upper East	Upper West
Round 1	87	83	82.1	77.36	86
Round 2	91.03	90.18	87.77	90.18	87.74
Round 3	86.02	91.405	94.93	90.9	85.6
Round 4	91.67	92.79	94.8	91.61	91.79

Findings from the comparison of four rounds of OTSS indicates that performance on appropriate classification of fever was above 89 percent in all four rounds (see Figure 20 below), however a steady improvement in score by visit number is not evident, however not all facilities are reached consistently over consecutive rounds of OTSS. For example, Round Four included at least half of the facilities visited in the Round Three, but not all.

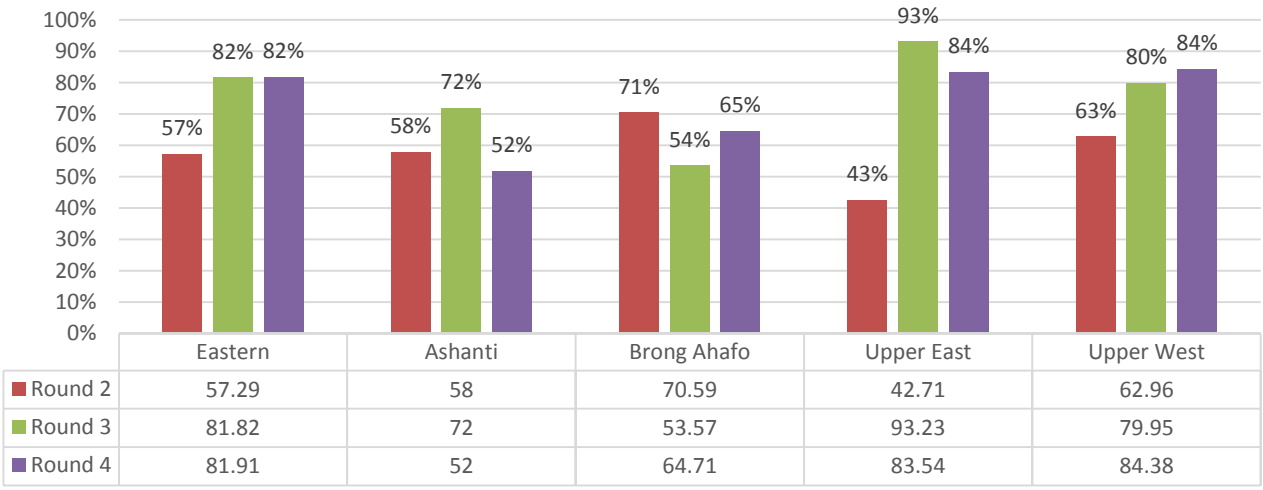
Figure 20. OTSS findings on appropriate clinical classification of fever (MalariaCare, Ghana)



	Eastern	Ashanti	Brong Ahafo	Upper East	Upper West
Round 1	90.67	95	89.6	94	95.45
Round 2	95.58	94	98.22	95.61	97.13
Round 3	92.21	90	94.63	98.58	98.31
Round 4	94.76	92.59	94.47	98.68	98.59

Adherence to negative test results (see Figure 21 below) remains an area of lower performance, with no great improvement from the prior round. In PY4, reasons for the drop in adherence will be assessed and additional efforts will be made to support the worst-performing regions (Ashanti and Brong Ahafo) to improve adherence to test results.

Figure 21. OTSS Findings on adherence to negative test results* (MalariaCare, Ghana)



	Eastern	Ashanti	Brong Ahafo	Upper East	Upper West
Round 2	57.29	58	70.59	42.71	62.96
Round 3	81.82	72	53.57	93.23	79.95
Round 4	81.91	52	64.71	83.54	84.38

*the indicator "adherence to negative test results" was not on the checklist for round one of OTSS in PY2

- Introduced a targeted mentorship program aimed to provide further on-the-job training and supervision to staff with performance weaknesses identified during OTSS Round Three. Mentors were selected and trained to focus on improving adherence to malaria diagnosis protocols, identifying other causes of febrile illness, and documentation and reporting to 44 facilities in Upper East and Ashanti region. A total of 144 health care providers benefited from the mentorship. An assessment of this program is planned to occur in PY4.

- Supported the NMCP's pilot of nationwide OTSS at the community-level, which provided onsite mentoring and supervision to 10,393 CBAs. MalariaCare trained supervisors at the national and district-levels, assisted in the design of an electronic interface for data entry, and provided support for analyzing the data collected. This was followed by a MalariaCare supported refresher training on the revised national iCCM guidelines for 17 national officers and 67 regional officers. These participants, then, cascaded training to 652 district-level supervisors nationwide.

- Supported the training of 27 mentors from four district hospitals to implement the CHO internship program in 11 districts. A total of 51 CHOs were assigned to four district hospitals to receive mentorship from 27 mentors selected by MalariaCare. Knowledge in febrile illness case management was evaluated via pre-and post-tests and increased from 35.5 to 77 percent. A follow-up assessment form was distributed to supervisors during OTSS Round Four, who assessed the interns six weeks after their internship. These assessments generally showed improvements in history taking and identification of other causes of febrile illness by the interns. A deeper qualitative evaluation of the internship will be completed in PY4 during the project year's first round of OTSS.

Objective 3: Improve the accuracy, reliability, and availability of health information management systems.

- Collaborated with the GHS Policy, Planning, Monitoring and Evaluation Division (PPME), the NMCP, and the Systems for Health project to harmonize each partner's 2015 work plans. This has eliminated duplication of activities and helped to identify gaps in strengthening M&E. The PPME will engage new partners and funders in order to fill in the identified gaps.

- Coordinated with the PPME and NMCP to conduct an orientation and practical district health information management system (DHIMS2) session for 106 health information officers (HIO) and newly-hired records officers drawn from all regions in the country (see PMP Indicator 23). These new staff, who normally receive no orientation on data management prior to reporting to their post, were trained on malaria data capture and reporting, practical use of DHIMS2 and standard operating procedures in malaria data use.

- Conducted Rounds Three and Four of M&E OTSS jointly with clinical supervision visits in five regions, providing mentorship to a total of 3,488 workers in Round Three, and 2,813 workers in Round Four. During these visits, HIO supervisors from district teams coached health facility staff on the use of consulting room registers, which is the source document for morbidity data, including malaria. Data quality audits on malaria data were also conducted during OTSS visits. When assessed on their ability to accurately capture and report malaria data, average performance of workers in charge of data management at the facility level was 93 percent in Round Four – an improvement from 90 percent from the previous round of OTSS. Overall, 87 percent of the staff observed were assessed to be competent (a performance score of 85 percent or higher), an improvement from 67 percent of staff attaining competency during Round One.


District OTSS team reviewing consulting room register at a health facility. Photo credit: MalariaCare Ghana

- Successfully piloted EDS in 98 health facilities in selected districts from each region. Two participants from each region were trained on the tablet-based system, and in turn provided the same training to two district-level teams made up of five supervisors each in their respective regions. These supervisors were then supported to conduct OTSS visits using the new EDS platform. Lessons learned from this pilot will be incorporated into the full rollout of the EDS system in PY4, but some include:
    - For effective use of the tablets, districts should select supervisors with computer literacy.
    - OTSS visits should be conducted immediately after any EDS or OTSS training to maintain knowledge retention and reduce the possibility of errors.
    - Allocate half of the second training day to practical sessions at nearby health facilities for participants to pilot the devices and get a better understanding of the electronic tool before data collection.


Participants training on the Electronic Data System. Photo credit: MalariaCare Ghana

- Training of district level supervisors should be performed in smaller groups (with fewer supervisors to a trainer) so that facilitators can attend to and address any problems or concerns and for effective learning to take place.

Objective 4: Strengthen technical management ability at the regional level for implementing programs and activities.

- Conducted four regional-level LLWs for 402 supervisory team members to coordinate data analysis and encourage use of OTSS data for decision-making. The participants of the workshop highlighted best practices found and generated reports outlining specific recommendations and next steps to address gaps identified.

- Coordinated with the NMCP and the PPME to conduct a national data quality audit that assessed the quality of malaria data reported by health facilities, including data recording, aggregation, validation, verification, and entry into DHIMS2. During this audit and during both rounds of M&E OTSS, ten newly-created districts were identified as lacking the basic IT infrastructure necessary to appropriately report into DHIMS2. MalariaCare then provided computers to these district health management teams (DHMTs) to help ensure effective reporting of malaria data and improve on the data management in general.

Support to the Focus Region Health Project (FHRP) regions

MalariaCare continued to provide support to the FRHP regions (Western, Central, and Greater Accra) up to the second quarter of PY3. During this time, MalariaCare provided a one-day case management refresher training for 63 medical officers in the Greater Accra region; provided RDT training to 3,080 providers in all three regions; and trained 281 regional and district-level supervisors in Central and Western regions on supervision skills. These supervisors conducted OTSS visits to 840 facilities in their regions to strengthen health facility capacity to provide quality care.

Challenges

Challenge	Solution
Delays in establishing the planned government-to-government funding mechanism hindered implementation of laboratory OTSS, which consequently stalled the planned targeted mentorship and proficiency testing panels that were to be implemented alongside laboratory OTSS.	In PY4, MalariaCare will directly implement two rounds of laboratory OTSS.
A significant human resource constraint at the Clinical Laboratory Unit (CLU) has the potential of limiting the transition of activities to the CLU in the future.	MalariaCare will work with the CLU to identify a committed staff member to support the current head of CLU to oversee daily activities of the OTSS program, as well as provide templates and flow charts to guide the OTSS planning and implementation process. Given the longstanding capacity problem at the CLU,

	other options should also be considered, including the outsourcing (contracting-out) of this function by the GHS.
In some of districts, especially the newly-formed ones, the OTSS teams are not able to meet the criterion of ensuring that there is an experienced clinician on the supervision team.	In PY4, prior to OTSS visits, an assessment of district and regional teams will be conducted and an inventory/roster will be developed to ensure that the most qualified team members conduct OTSS visits. In situations where there are no clinicians available, clinicians from other districts will be enlisted to provide support.

Lessons Learned

- The tendency of some prescribers to treat patients with a malaria-negative test result with ACTs is still common (average adherence to a negative test result during OTSS Round Four was 73 percent), and poses a challenge to improving quality of care. In PY4, activities aimed at prescribers such as training for new GHS staff, medical school staff, and providers, and supervisor training and OTSS visits will include additional emphasis on management of negative test results.
- During the RDT and iCCM training provided to CHOs and CBAs in Ashanti and Brong Ahafo regions, it was observed that trained CBAs can deliver high-quality care for malaria using RDTs. However, there is a need to strengthen the referral system, including improving the availability of rectal artesunate at lower facilities. Rectal artesunate was reported as having an average 27 percent availability at health facilities visited during Round Four clinical/M&E OTSS.
- When done well, OTSS and targeted mentorship can deliver remarkable results. Over the past year, 75 percent of health workers observed during OTSS visits have demonstrated high clinical skills in managing febrile illnesses (see PMP Indicator 12).

Next steps

- In PY4, continue to support the NMCP and all regions to improve on the quality of managing malaria and other febrile illness through strengthening diagnostic and clinical capacity. Emphasis will continue to be on strengthening and improving the quality of OTSS support to health facilities, especially poorly performing ones.
- Provide technical support for laboratory OTSS in all ten regions. The OTSS visits will also include onsite proficiency testing using validated NAMS slide sets. Assistance to the CLU will expand its focus to help develop a long-term data management plan for laboratory OTSS, or explore other options as indicated.
- Work with the NMCP and regional health management teams to roll out EDS to project regions in order to facilitate complete and rapid data entry and analysis in PY4.

Guinea

Late in PY2, the Ebola virus outbreak required a diversion of the country's resources for health toward fighting the crisis and stretched an already overburdened health system even further beyond its capacity to provide even basic care. As a result, planned MalariaCare activities, centered on starting up laboratory supervision visits at the nine targeted national and regional hospitals across the country, continued to be on hold during the reporting period.

Next steps

Since the beginning of October 2015, there have been no new confirmed Ebola cases. During PY4, MalariaCare will reengage in activities to spend down the remaining pipeline from PY2. In coordination with StopPalu and the NMCP, the project will focus on strengthening the case management capacity of malaria through the development of PT panels, MDRT and OTSS. These activities aim to strengthen malaria diagnostic services in Guinea at the national and regional level while preparing for the transfer of these activities to StopPalu, to manage them at the district and peripheral levels.

Kenya

Introduction

MalariaCare works together with the NMCP in Kenya to provide high-quality diagnosis and clinical case management services for malaria and other febrile illnesses in the eight endemic counties on the shores of Lake Victoria in western Kenya. The primary goal is to obtain 100 percent compliance to national guidelines of case management of all suspected cases of malaria. These guidelines are in compliance with the WHO strategy of 100 percent testing and treatment of suspected malaria cases. The project focuses on strengthening both malaria and other febrile illness diagnostic and clinical capacity at the health facility level – with integration of on-site diagnostic and treatment focused QA interventions. The program is designed to be fully coordinated with the NMCP-led national malaria strategic plan. Implementation of the project relies on existing MOH structures both for service delivery and the quality improvement process. Technical training is provided to clinical and laboratory county- and sub-county level personnel to build a team of OTSS supervisors who will, in turn, supervise and mentor the clinical and laboratory service providers in level two through level five public health facilities in the eight targeted counties.

PY3 was the first year in which MalariaCare implemented activities in Kenya. An office was established in Kisumu, and a project team of five has been recruited. MalariaCare will use a phased approach to start-up – beginning activities in groups of two to three counties at a time. The first group includes Kisumu, Migori, and Vihiga counties, the second phase includes Kakamega and Homa Bay, and the last group includes Busia, Bungoma, and Siaya. In PY3, MalariaCare conducted a health facility assessment in all eight counties and began implementation in the first group of counties.

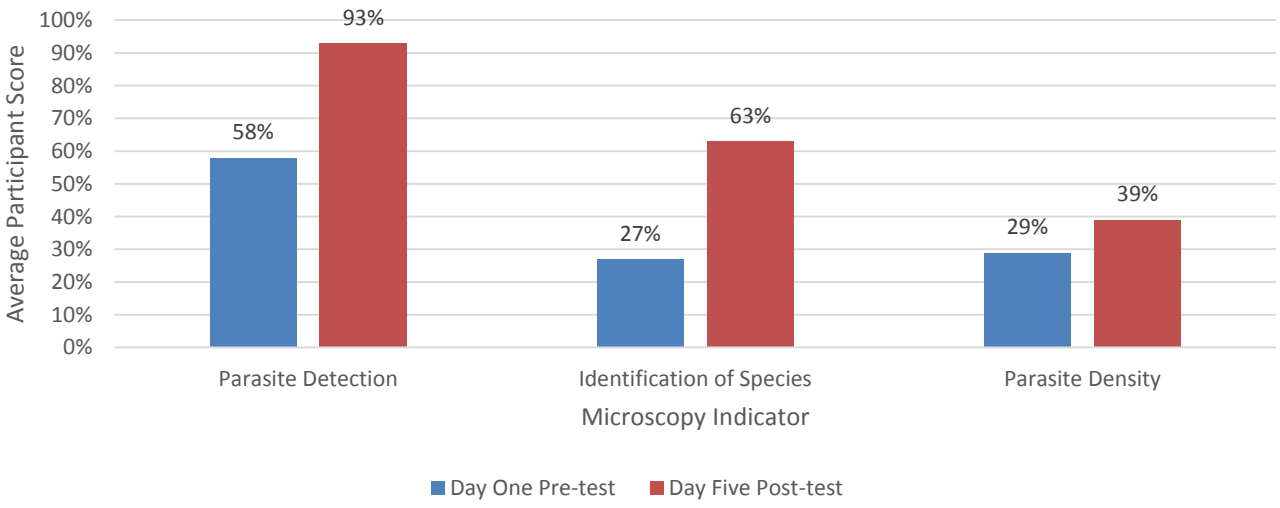
Key accomplishments

Objective 1: The accuracy of diagnostic testing for malaria is improved to greater than 90 percent.

- In consultation with the NMCP and the county health management teams (CHMT), MalariaCare developed criteria for identifying suitable, skilled laboratory and clinical staff from the counties and sub-counties to be trained as OTSS supervisors. These criteria were used to select 23 laboratory and 24 clinical OTSS supervisors for the three phase-one counties.

- Conducted aMDRT for the 23 laboratory OTSS supervisors, with post-test improvements shown below (see Figure 22). Attainment of WHO level-two equivalent in malaria microscopy for both parasite detection (>80 percent), species identification (>80 percent) and counting (>40 percent) is recommended for supervisors who will be supervising hospitals and reference level staff. The majority (82.6 percent) of participants met the competency criteria for parasite detection, yet only 3 participants (13.0 percent) scored at the recommended level for parasite counting and none met the standard for species identification. The class average for parasite counting was 31.9 percent; it is expected that with continued training and practice this cadre will eventually meet the established target of 40 percent. During the training, improvement in performing RDTs was minimal with a 2 percent increase from pre- to post-test. Further, none of the participants met the MalariaCare target of 90 percent, with an average score across participants of 69 percent at post-test. The greatest weaknesses in performing RDTs included not labeling the RDT cassettes with the date and time of reading, and blood splatter outside of the testing well. To increase competency, MalariaCare staff will conduct a refresher RDT session as part of the OTSS supervisor training in PY4.

Figure 22. Aggregate participant score on microscopy indicators as demonstrated in the MalariaCare Kenya aMDRT (n=23)



Objective 3: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illness--consistent with the result of the diagnostic test.

- Conducted a clinical case management training for the 24 clinical OTSS supervisors on the updated national and WHO case management guidelines – resulting in a post-test mean of 89 percent and 13 percent improvement over baseline mean scores. The training included a module on RDTs, but a competency test specific to RDTs was not administered. Therefore, MalariaCare plans to assess both clinical and laboratory RDT competency during the OTSS supervisor training in PY4.

Objective 4: Strengthened laboratory systems at the country level for detecting malaria and other infectious diseases.

- Conducted a rapid baseline health facility assessment (HFA) of 50 health facilities in the eight targeted counties to evaluate the supervisory capacity of county health management teams, to determine existing health facility capacity to provide quality case management services, and to prioritize counties to begin MalariaCare activities. A final report is under review by the Kenya Mission. See Table 5 for a summary of the major indicators evaluated as part of the assessment. In this table, red and yellow demonstrates areas where improvement is needed. Green demonstrates competency or standards met against that indicator.

Table 5. Aggregate health facility assessment scores, by county and indicator (MalariaCare, Kenya)

Assessment Indicator	Bungoma	Busia	Homa Bay	Kakamega	Kisumu	Migori	Siaya	Vihiga	Average by Indicator
Number of HFs	10	5	5	10	5	5	5	5	**6.25**
Health Facility Readiness									
Diagnostic Readiness	52.74%	53.94%	61.62%	46.36%	50.84%	43.83%	69.01%	57.60%	**54.49%**
Treatment Readiness	72.12%	78.16%	79.77%	83.84%	71.72%	84.00%	80.88%	77.01%	**78.44%**
Diagnostic Competence									
RDT Preparation & Reading	95.83%	94.44%	72.22%	53.87%	73.15%	78.24%	82.72%	73.15%	**77.95%**
Slide Preparation	89.16%	90.84%	80.56%	32.17%	62.96%	50.71%	83.35%	63.22%	**69.12%**
Slide Staining	79.80%	81.92%	86.91%	55.12%	59.65%	81.68%	83.64%	52.96%	**72.71%**
Slide Reading	86.41%	93.04%	95.41%	89.46%	96.89%	-	92.13%	98.96%	**93.19%**
Treatment Competence									
Pre-Test Clinical Evaluation	40.67%	37.70%	39.86%	32.11%	41.36%	39.04%	42.42%	42.68%	**39.48%**
Post-Test Diagnosis and Treatment	67.05%	73.93%	63.91%	67.86%	77.06%	68.23%	74.54%	75.56%	**71.02%**
Case Mgmt Knowledge Assessment	53.31%	63.12%	53.92%	56.62%	64.61%	60.00%	50.59%	54.95%	**57.14%**
Provider Adherence to Test Results									
Pharmacy/Clinical Register Adherence	77.48%	79.89%	50.61%	48.17%	43.74%	50.00%	66.11%	56.31%	**59.04%**
Laboratory Register Adherence	84.79%	92.70%	73.02%	91.89%	83.22%	-	62.49%	84.44%	**81.79%**
Average by County	**70.40%**	**73.72%**	**68.84%**	**58.12%**	**65.74%**	**63.09%**	**70.72%**	**64.40%**	**66.88%**

Note: Red indicates a score less than 50%, yellow a score between 50-80%, and green a score greater than 80%.

- Conducted a sensitization meeting for 10 county health management team members from Kisumu, Migori, and Vihiga counties to introduce the MalariaCare program and discuss planned activities.

- Participated in two national level case management technical working groups (TWGs) led by the NMCP.
- Supported the first Kisumu County malaria TWG. In this inaugural meeting the composition, structure, mandate, and future activities for the TWG were discussed, as well as the development of the first quarterly malaria bulletin for the sub-county.

Challenges

The project has experienced a delay in the dissemination of HFA findings due to complications in data analysis. However, MalariaCare discussed the delay with the NMCP and agreed that once the report is finalized based on the PMI review, the results will be disseminated at national level, then at county level. Also, due to competing priorities and a limited number of personnel at the case management unit of the NMCP, it appears difficult to get physical participation from national-level staff in project activities. Consequently, the project engages these officers as early as possible in the planning process for each activity in an effort to obtain concurrence on planned activity schedules when appropriate.

Lessons Learned

The HFA, as a baseline, was valuable in activity planning and providing rational in prioritizing county implementations. The assessment revealed that large county-level hospitals are not adhering fully to national case management guidelines. To address this, MalariaCare decided to involve the hospital medicines and therapeutic committees (HMTCs) in quality improvement processes to achieve adherence to guidelines. The CHMT interviews during the assessment provided an opportunity to get input on case management gaps at the county management level. Interviews with CHMTs indicated a need for better governance at county-level to manage malaria case management. Therefore, MalariaCare will be supporting the CHMT on facilitating county-specific TWGs where OTSS results and other issues related to malaria case management issues will be discussed. The HFA also provided MalariaCare the opportunity to involve the NMCP and the CHMT during MalariaCare activity planning, allowing for clear communications and expectations among parties.

At the county-level, the CHMTs were receptive to the criteria developed to select OTSS supervisors, which helped to streamline the selection process. Observation of supervisor competency in PY4 activities will provide greater insight into whether the use of these criteria was effective.

Lastly, training of supervisors will be conducted in locations away from work stations to minimize distractions and maximize participation.

Next steps

In PY4, activities in the phase-one counties (Kisumu, Migori, and Vihiga) will expand starting with training OTSS supervisors on performing OTSS in malaria diagnosis and appropriate use of test results. This training will be followed by the first round of OTSS. MalariaCare will begin the implementation of activities in the remaining five targeted counties, beginning with sensitization meetings with the CHMTs and selection of OTSS supervisors. The selected OTSS supervisors from the phase-two and phase-three counties will participate in the technical

refresher courses before being trained on the OTSS process. The phase-two counties will begin participating in OTSS during the second round while the phase-three countries will start participating in the fourth round.

Following each round of OTSS visits, MalariaCare will support the CHMT to facilitate a TWG at the county-level where OTSS data will be reviewed and action plans developed to address gaps in the OTSS data. Findings identified during the county-level TWG will be shared as part of a regional bi-annual lessons learned workshop which will include representation from the national and county-levels. Findings specific to county hospitals will be shared through the HMTCs that will organize continuing medical education at their facilities to strengthen the case management teams in areas that require improvement as identified during the OTSS visits. Following round one of OTSS, MalariaCare will also launch an electronic supervision tool to improve data collection and on-site mentoring.

MalariaCare will continue to collaborate with regional partners on activities – specifically working with APHIAplus Western Kenya to implement RDT refresher courses at the facility level. Staff will also continue to participate in TWGs at the national level.

Liberia

Introduction

Together with the Ministry of Health and Social Welfare (MOHSW), MalariaCare is relaunching activities in Liberia to reinvigorate malaria microscopy diagnostic capacity at the National Reference Laboratory and for county health team diagnostics focal points from each of the country's 15 counties.

Key accomplishments

Contracted with the UCAD in Dakar, Senegal, to develop 20 sets of standardized slides that can be used for proficiency training and external QA for malaria microscopy. The production of these slides is ongoing.

Challenges

No significant challenges to report.

Next steps

MalariaCare will work with the MOHSW to schedule a five-day on-site training program to refresh microscopy skills of key NRL staff in parasite detection, species identification, and quantification. A separate eight -day training will be held for 15 county level diagnostic focal persons that focuses on intensive microscopy refreshment paired with a competency assessment and three days working on improving supervisor skills. A malaria diagnostics master trainer from Ghana will lead both courses. The objective of the trainings are to improve malaria diagnostic and supervision skills at the central and country levels and equip them to conduct ongoing QA activities independently. Upon completion of these activities, MalariaCare will close out the project office in Monrovia.

Madagascar

Introduction

During PY3, MalariaCare conducted a country-wide assessment of facility-based case management capacity, and of the current national diagnostics framework. Using the preliminary results of these two activities, MalariaCare initiated interventions in Madagascar which aimed at building national-level capacity to train and mentor regional and district-level supervisors in diagnostic and clinical case management. The MalariaCare Madagascar team focused on strengthening malaria case management capacity by establishing a well-trained core cadre of clinicians and laboratory technicians able to provide decentralized case management and supervisory training for district-level supervisors. The training targeted five provinces (Antananarivo, Toliara, Fianarantsoa, Mahajanga, and Antsiranana) due to their designation as high malaria transmission zones that experience perennial transmission.

Key accomplishments

Health Facility Assessment

- MalariaCare conducted an HFA in PMI-supported facilities nationwide, covering each of the malaria transmission zones. Data collected from the surveys are designed to inform activities by both MalariaCare and other partners working in case management, and to help target technical support for overall febrile case management. A total of 65 health facilities were included in the survey. Information was gathered through direct observation, interviews, review of patient records, and assessment of the availability of drugs and equipment.

  While the HFA report provides further details, key findings include:

  - Less than half (45 percent, 5/11) of patients determined to have malaria by blood smear with results confirmed by Institute Pasteur (IPM) were found to have been treated with any antimalarial medication, and only 36 percent (4/11) were treated with an ACT.

  - Less than half (47.5 percent) of all patients presenting with fever or history of fever were suspected by health workers as possibly having malaria. Specifically in patients under 5 years of age, 49.8 percent of those with fever or history of fever were suspected of having malaria.

  - Nearly all health workers interviewed (88.3 percent) reported previously receiving either formal or informal training on ACT. Approximately, two-thirds (64.9 percent) reported having received formal, in-service training in malaria case management. Almost all (96.1 percent) used an RDT at some point.

Objective 1: The accuracy of diagnostic testing for malaria is improved to greater than 90 percent.

- In collaboration with the Direction de Lutte contre le Paludisme (DLP), MalariaCare trained 18 laboratory technicians from the central and regional levels during an MDRT of trainers. The training aimed to prepare the technicians to train, in turn, district-level technicians who eventually go on to conduct OTSS visits.

Analysis of pre- and post-test training scores was used to evaluate overall performance and to identify gaps in knowledge. Passing scores for each indicator (parasite detection, species identification, and quantitation) were determined based on WHO minimum grades for expert accreditation of malaria microscopists at the reference level. Fourteen out of eighteen participants (77.8 percent) met or surpassed the passing score (defined as WHO L1 or L2) at post-assessment (see Table 6). Significant improvements were observed between pre- and post-tests for parasite detection (average post-test 99.7 percent, a 14 percent point increase), species identification (average post-test 96 percent, a 49 percent point increase), and parasite counting (average post-test 50 percent, a 43 percent point increase) (see Table 7). In November 2015, the MOH will host an external competency assessment (ECA) in Madagascar with support from the WHO and AMREF. The MDRT results have been shared with ECA coordinators as a way to ensure that the most qualified candidates participate in the upcoming course. Since the November ECA will only accommodate 12 of the 14 identified experts, the two remaining candidates will attend an ECAMM scheduled for January 2016 in Dakar, Senegal.

Scores from the Madagascar central-level MDRT are the highest scores observed during any single training to date when compared across all MalariaCare supported countries. Assuming that all 14 participants will have the opportunity to attain WHO certification (L1 or L2) at the ECA, Madagascar will have established a core reference group of microscopists at the head of the hierarchical structure, which is a minimum recommendation by WHO to establishing a malaria microscopy QA program.

Table 6. Minimum MDRT grades for central level supervisors (MalariaCare, Madagascar)

Accreditation level	Parasite detection	Species ID	Counting	Number of participants achieving WHO level equivalents at post-test for all 3 skills combined
Level 1	90%	90%	50%	N=9 (50.0%)
Level 2	80%-<90%	80%-<90%	40%-<50%	N=5 (27.8%)
Level 3	70%-<80%	70%-<80%	30%-<40%	N=2 (11.1%)
Level 4	<70%	<70%	<30%	N=2 (11.1%)

Table 7. Improvements between average MDRT pre- and post-test scores (MalariaCare, Madagascar)

Accreditation level	Average pre-test score	Average post-test score	Change in score from pre- to post-test in percentage points
Parasite detection	85.4%	99.7%	14.3
Species ID	47.0%	96.0%	49.0
Parasite counting	7.0%	50.0%	43.0

- Trained 41 district-level laboratory technicians from each of the three targeted provinces, Toliara (n=11), Fianarantsoa (n=14), and Mahajanga (n=16) during a district-level MDRT for district-level supervisors. While the training addressed RDT and microscopy skills, attention focused on parasite detection. Since species identification and counting (parasites per microliter) is generally not routine practice at this level, minimum

competency is based only on parasite detection using the WHO criteria for L2 or greater. The majority (83.0 percent) of participants passed the minimum grading criteria by achieving L1 (44.0 percent) or L2 (39.0 percent), (see Table 8). Modest improvements were observed for all microscopy skills between pre- and post-tests for parasite detection (average post-test 87 percent, 13 percent point increase), species identification (average post-test 57 percent, 22 percent point increase), and counting (average post-test 11 percent, 5 percent point increase) (see Table 9). Continuous training and routine monitoring of parasite detection is recommended for this cadre as a way to ensure quality control over the district OTSS program.

Table 8. Minimum MDRT grades for district level supervisors (MalariaCare, Madagascar)

Accreditation level	Parasite detection	Number of participants achieving WHO level equivalents at post-test for parasite detection
Level 1	90%	N=18 (44.0%)
Level 2	80%-<90%	N=16 (39.0%)
Level 3	70%-<80%	N=3 (7.3%)
Level 4	<70%	N=4 (9.7%)

Table 9. Improvements between average MalariaCare Madagascar MDRT pre- and post-test scores for parasite detection for district level supervisors

Accreditation level	Average pre-test score	Average post-test score	Change in score from pre- to post-test
Parasite detection	74%	87%	13%
Species ID	35%	57%	22%
Parasite counting	6%	11%	5%

- Trained 37 of the 41 laboratory technicians mentioned above who achieved WHO L1, L2, and L3 during the district-level MDRT alongside the 45 clinicians from the district-level CCMRT during a joint OTSS supervisor training. Emphasis was placed on working as a team to conduct joint OTSS, including deliberate collaboration among clinical and laboratory supervisors to identify case management issues and working together to resolve them.

Objective 3: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illness--consistent with the result of the diagnostic test.

In response to gaps identified during the HFA of clinicians suspecting malaria and adhering to test results, MalariaCare supported the NMCP to organize a CCMRT focusing on building the capacity of clinicians to work as clinical mentors alongside their laboratory counterparts.

- Trained 20 clinicians from the central and provincial levels during a CCMRT. This training focused on improving the knowledge and adherence to MOH/DLP guidelines for clinical case management of malaria and other febrile illnesses. Analysis of pre- and post-test scores showed notable improvements, particularly in participants' understanding of correct diagnosis and management of complicated and severe malaria.

- 34 national and regional-level trainers participated in a TOT for joint laboratory and clinical OTSS supervisors. The group of 34 participants were made up of 16 of the 18 central-level laboratory supervisors

who achieved WHO L1, L2, and L3 equivalent, and 18 of the 20 clinicians trained in the central and provincial-level CCMRT mentioned above. During this training, participants from each province developed plans to train district-level supervisors. Using these plans, the staff would conduct cascade training for district-level OTSS supervisors in conjunction with other case management partners on in their respective provinces.

- Cascade training reached 45 district-level clinicians from Mahajanga, Toliara, and Fianarantsoa during CCMT. This training focused on improving the knowledge and adherence to the MOH/DLP guidelines for clinical case management of malaria and other febrile illnesses.

Objective 4: Strengthened laboratory systems at the country level for detecting malaria and other infectious diseases.

- In collaboration with IPM and the DLP, the project reviewed existing QA practices and capacity to implement malaria diagnostic QA systems. Key findings include:
    - Currently, no malaria QA system exists at the central level (MOH/IPM) for Madagascar's public health system; however, the DLP is developing a draft document on a QA framework, including QA systems, strategy and implementation plan.
    - No standard operating procedures (SOPs) or bench aids exist for malaria diagnostics.
    - The IPM has appropriate facilities for training groups of laboratory technicians, and both the IPM and DLP have qualified staff to facilitate training.

Challenges

Challenge	Solution
Ensuring that central and provincial/regional DLP staff is available to support the various decentralized training remains a challenge.	To help address this challenge, the project continues to work closely with the DLP to negotiate training schedules in advance and to ensure that the most qualified staff are available to provide support.
Difficulty aligning MalariaCare programming with DLP activities due to multiple partners in the field.	Better integration of MalariaCare PY4 activities in the 2016 DLP Annual Plan for Activities to ensure collaboration and prevent duplication of efforts.
Lack of sufficient microscopes for training at the regional level.	Advise the DLP to use funding from other sources to purchase microscopes and basic materials and supplies for the capacity building of laboratory technicians on diagnostic quality of malaria.

Next steps

In PY4, MalariaCare will continue to strengthen malaria case management capacity through additional training and by establishing an overall QA program supported by a well-trained and highly qualified team of clinicians and laboratory technicians for malaria diagnostics at national-level. This core team will be knowledgeable in on-site supportive supervision and contribute to sustainable QA of future training and supervision across the country.

MalariaCare will continue to support decentralized case management training in Menabe, a region not yet covered by the DLP's case management training plan. Additionally, in order to maintain the competencies of laboratory technicians who previously attended an MDRT, MalariaCare will support continuing education via multiple formative follow-up visits in malaria microscopy, in close collaboration with DLP and IPM.

MalariaCare will also provide in-country technical assistance to facilitate the development of a NAMS in collaboration with the DLP and IPM. MalariaCare will support the DLP through provision of guidance documentation, protocol development, and training of key staff meant to be directly involved in the development of the NAMS and QA of the actual development process. The resulting slide sets will be used by the DLP to provide microscopist training throughout the country, to prepare microscopists for future national and WHO level accreditation, and to develop proficiency testing (PT) panels which can be used for skills testing during on-site supervision visits. Both MalariaCare and IPM will provide technical assistance to and work with the DLP to lay the foundation for development of a NAMS.

Malawi

Introduction

MalariaCare has continued working closely with the NMCP and other implementing partners to build capacity in malaria case management at all levels of the health system in Malawi. To support the NMCP in its efforts to scale up nation-wide case management training, the project has focused efforts on conducting and strengthening the quality of case management training, including the use of injectable artesunate, across 14 districts. This year, MalariaCare also supported targeted diagnostic refresher training for laboratory supervisors and launched the EDS. All 58 OTSS supervisors were oriented to the EDS and were then supported to use this tablet-based system during an OTSS round. MalariaCare remains committed to working with the MOH and NMCP in the coming years to provide a comprehensive, treatment-seeking approach for identifying, testing, and treating suspected malaria cases in Malawi.

Key accomplishments

Objective 1: The accuracy of diagnostic testing for malaria is improved to greater than 90 percent.

MalariaCare has continued to build the competencies of laboratory trainers and to support them to mentor laboratory technicians though joint OTSS rounds together with their clinical counterparts.

- Conducted two advanced MDRTs for 37 laboratory supervisors. Pre- and post-tests were administered to assess both knowledge and the practical skills of participants. For practical skills (parasite detection, species identification and quantity determination) scores are shown in the Table 10 below. Species identification and parasite quantification continue to be a challenge.

Microscopists practicing during MDRT.
Photo credit: Petros Chirambo

Table 10. MalariaCare Malawi MDRT Practical Skills Testing (n=37)

MDRT results (N=40)	**Parasite detection (%)** Mean [median (range)]	**Species identification (%)** Mean [median (range)]	**Parasite counting (%)** Mean [median (range)]
Pre-test	75 [75 (42-92)]	29 [30 (0-60)]	18 [20 (0-60)]
Post-test	79 [81 (54-93)]	54 [52 (25-84)]	45 [43 (6-79)]

- From pre-test to post-test, averages scores increased across all three competency areas (parasite detection, species identification and parasite counting). In terms of meeting WHO Level 1 or Leve 2 standards, of the 37 participants, 19 (51 percent) scored above 80 percent on parasite detection, 25 (66 percent) scored above 40 percent on parasite counting and 2 (5%) scored above 40% on species identification. MalariaCare will continue to provide additional training and support for low performing supervisors in PY4.
- Completed the final visits of OTSS Round 11, which had started toward the end of PY2, in November 2014. Health facility coverage was nationwide. During Round 11, a total of 242 health facilities were visited by clinical and laboratory supervisors respectively. Round 12 OTSS was conducted in September 2015 following the roll out of EDS, and extended into early October 2015. A total of 248 health facilities were visited during this round. After implementing EDS, OTSS Round 12 data was available for analysis within 24 hours of each OTSS visit. The following graphs show the proportion of facilities who met the minimum and overall standards for malaria microscopy and RDT performance.

Figure 23a. Proportion of MalariaCare target health facilities in Malawi meeting *minimum* targets for diagnostic competency, OTSS Round 12

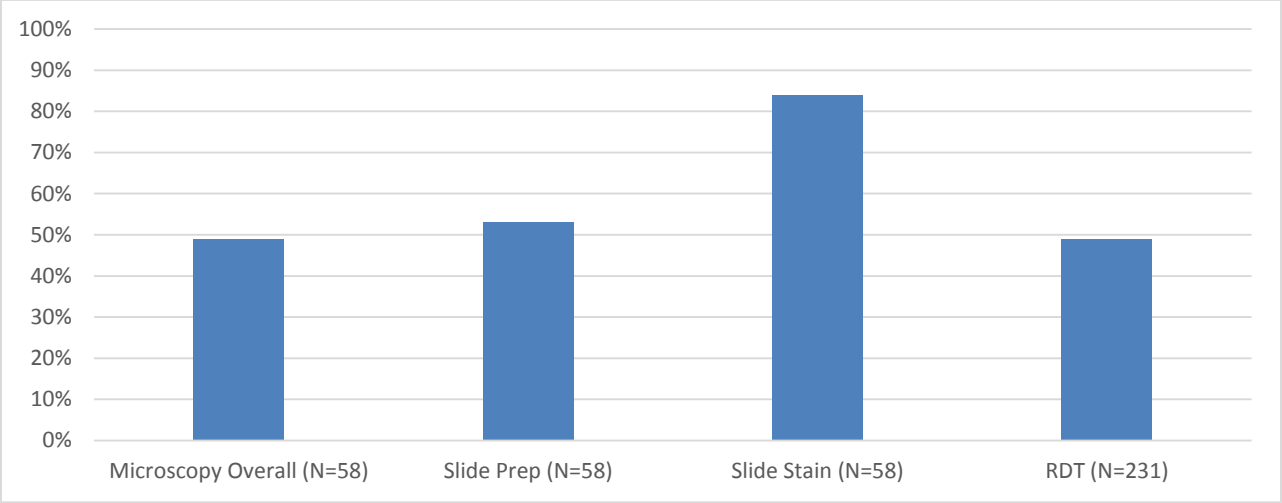
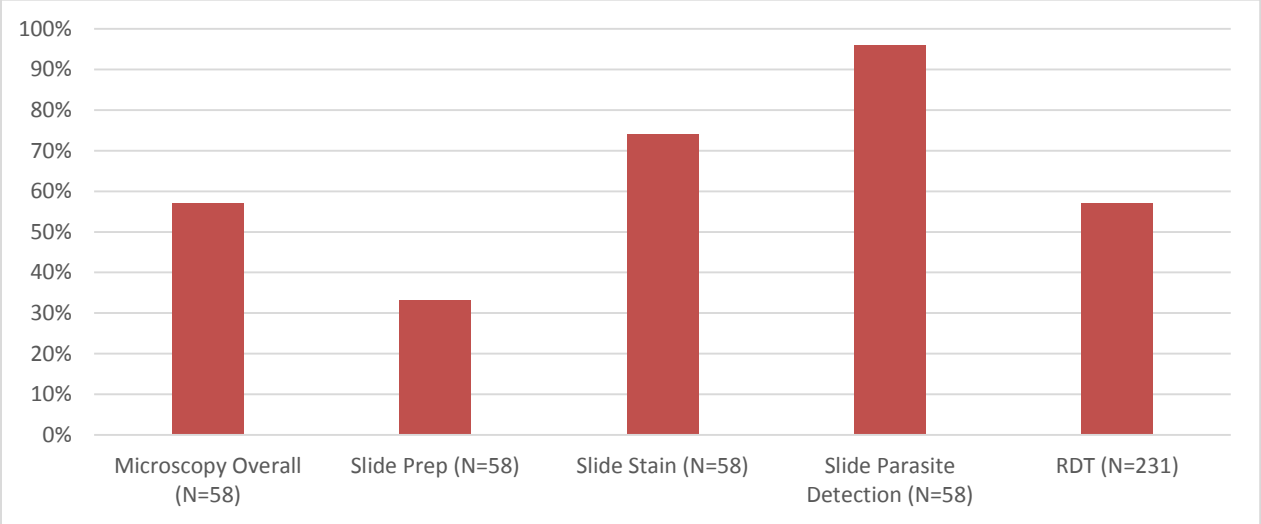


Figure 23b. Proportion of MalariaCare target health facilities in Malawi meeting *overall* targets for diagnostic competency, OTSS Round 12



*Parasite detection has only an overall score, and thus minimum scores are not presented for this indicator.

While laboratory staff in Malawi can effectively read slides (96 percent of facilities met 90 percent compliance with standards), their performance in preparing slides is very low (33 percent of facilities met 90 percent compliance with standards). RDT performance is also low – with only 57 percent of facilities reaching 90 percent compliance. This is likely due to high rates of untrained, non-clinical staff conducting RDTs. OTSS provides an excellent opportunity to provide on-site mentoring to these staff (see Figures 23a and 23b above).

- Conducted an MDRT workshop for 19 pre-service instructors, drawn from three training schools. The objective of the training was to ensure implementation of updated common standards for malaria microscopy training based on WHO standards, which would provide each school with clearly defined indicators of what students should know and be able to do once posted to a health facility. Pre- and post-tests were used to

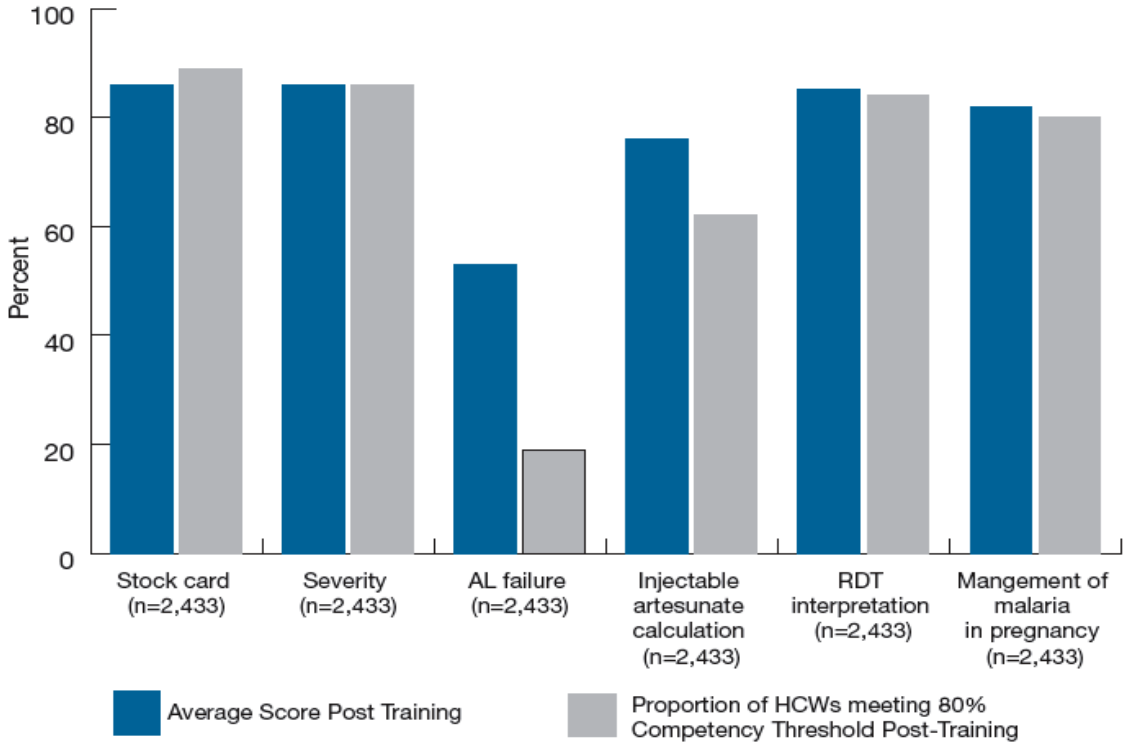
measure knowledge and practical skills. At post-test for competency test, a mean score of 79 percent was determined for parasite detection (52.7 percent point change), 85.9 percent for species identification (16.4 percent point change) and 35.1 percent for parasite counting (19.2 percent point change). On the last day of the workshop, participants outlined key areas in the malaria microscopy curriculum that they would review and assess in order to strengthen classroom practice.

- Supported 3 high-performing microscopists to attend the August 2015 ECAMM course in Kenya. All participants achieved WHO Level Two accreditation. MalariaCare aims to help develop a core group of Malawi based Level One master trainers. MalariaCare will continue to support these three candidates and other potential candidates to prepare for the ECAMM with the intention of achieving this goal.

Objective 3: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illnesses—consistent with the result of the diagnostic test

- Supported the national roll-out of revised case management guidelines. In 2012, Malawi's NMCP modified how health workers should manage cases of malaria, including providing updated guidance on the use of injectable artesunate for the management of severe malaria. To assist the NMCP with rapidly training health providers nationwide on the revised policy, MalariaCare supported training of 3,036 frontline health workers (primarily nurses and clinical officers) in case management, including use of injectable artesunate for management of severe malaria. The training was conducted across 14 districts over the course of one year.
    - Overall, 98 training courses were conducted, and 1,779 female, 1,255 male and two providers whose sex was not reported were trained. The training assessed changes in participants' knowledge as well as key case management competencies.
    - The average post-test score for knowledge indicators was 76.8, nearly double the pre-test score of 41. On average, participants met the 80 percent target threshold for all case management competencies, except for calculating the correct dose of injectable artesunate (average post-test score of 53 percent, 19 percent meeting threshold) and identification of the correct drug to treat patients with AL (artemether-lumefantrine) failure (average post-test score of 76 percent, 62 percent meeting threshold). As injectable artesunate is new in Malawi, providers will need more time and continued support to become familiar with the drug and its proper dosage. Lower scores on identification of the correct drug used to treat AL failure (only 19 percent met the competence threshold, average score was 53 percent) could be due to the second-line drug ASAQ (artesunate amodiaquine) being reserved for health facilities with microscopy services. The majority of health workers trained were from peripheral facilities and, therefore, likely not aware of this change in policy. Figure 24 outlines participant performance on key case management competency indicators.

Figure 24. Competency indicators: by average and proportion meeting threshold, MalariaCare Malawi, 2014-2015 (n=2,433)



Of the 215 health facilities with clinical observations data on all four minimum standards, the majority of facilities achieved 100 percent compliance on correctly determining whether a case was severe (74 percent), appropriately ordering a malaria test for fever cases (76 percent), and prescribing according to the diagnosis (75 percent). However, staff at few facilities routinely ask about or check for common signs of severe malaria. During future OTSS, and the upcoming follow-up of the case management training, supervisors will emphasize proper assessment for severe malaria (see Figure 25 below).

Figure 25. Proportion of health facilities meeting minimum standard targets for clinical case management, Round 12, Malawi (n=215)

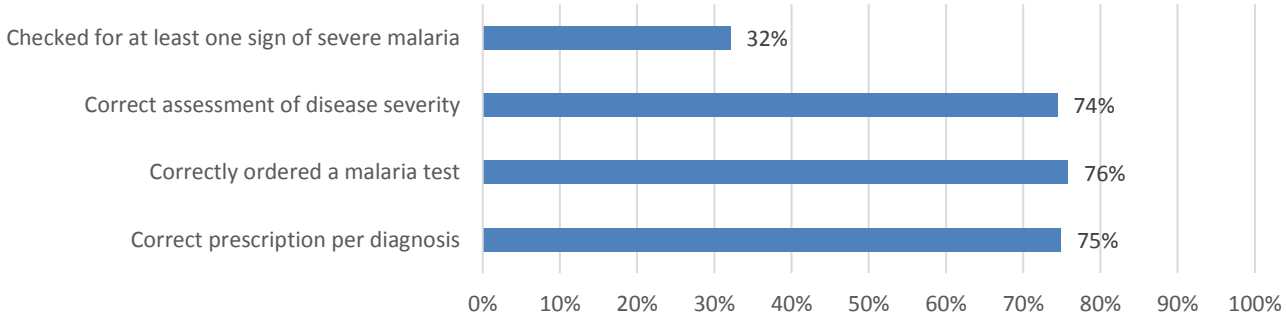
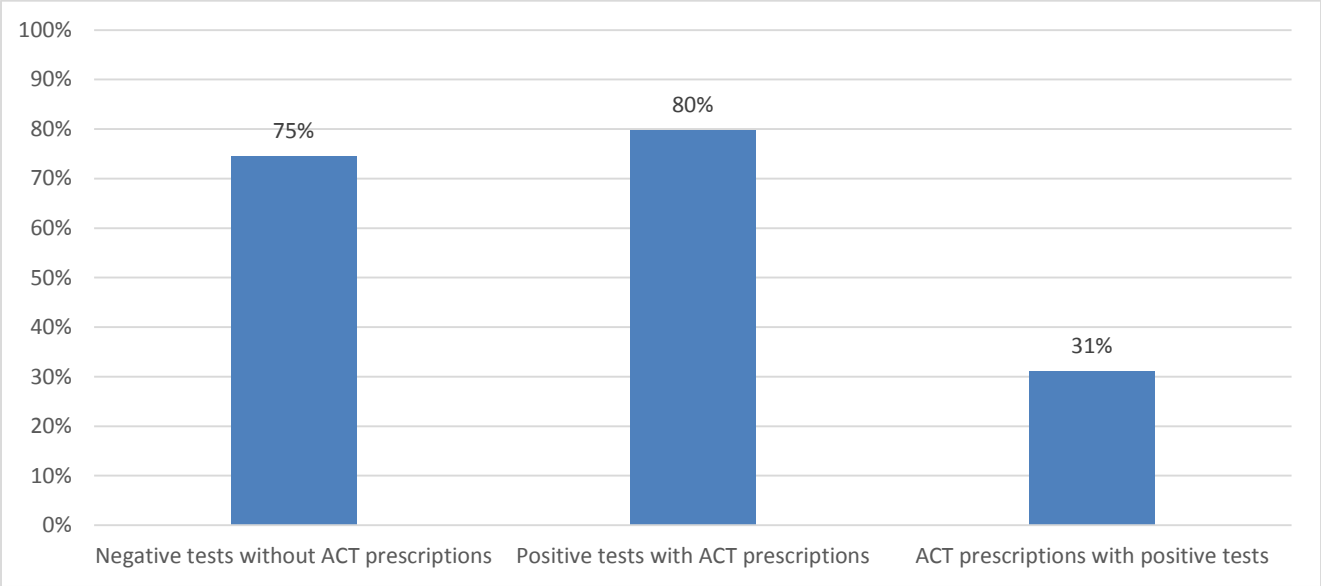


Figure 26. Proportion of health facilities reaching at least 90 percent adherence to test results, Round 12, Malawi (N=212)

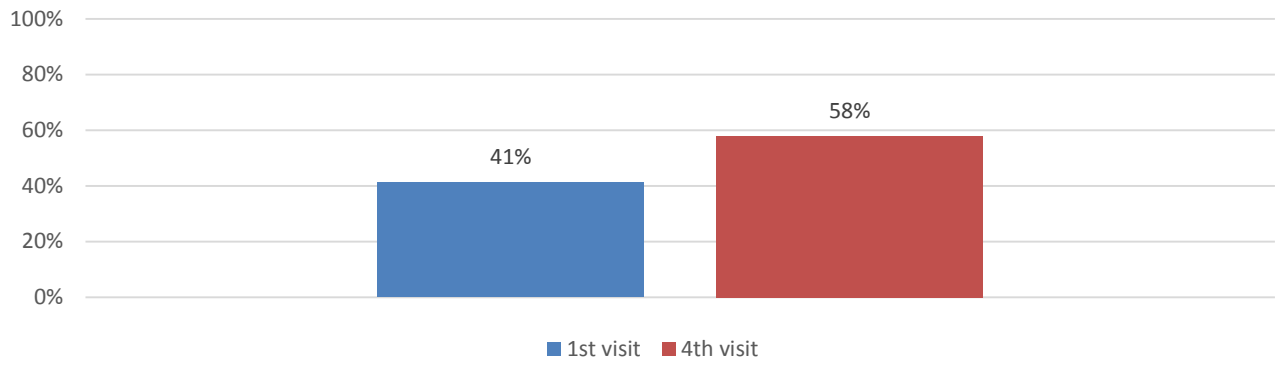


Note: The bar showing 31 percent refers to those given ACT who had a positive malaria test, while 39 percent of those given ACT did not have a positive malaria test and 61 percent were not tested for malaria.

In the revised OTSS checklist, adherence to test results is assessed through two measures: the proportion with positive and negative test results who received an ACT, and the proportion who received ACTs with evidence of a prior positive test result recorded. Eighty (80) percent of facilities had 90 percent or higher adherence for patients with positive test results being prescribed an ACT. For adherence to negative test results, only 75 percent of facilities met the adherence target of 90 percent. The proportion of facilities that met the 90 percent adherence standard for all those who were prescribed an ACT having a positive test result prior to their prescription, was much lower. Among the entries that did not have a positive test result recorded, 39 percent of these entries, on average, had a negative test result recorded, and 61 percent did not have a test result recorded.

Adherence to negative test results was included in the previous checklist, and thus, MalariaCare is able to analyze trends in this indicator over multiple OTSS visits. The team compared the results from the first and fourth visit – the visits to provide the greatest sample of facilities – for a consistent set of facilities. Adherence to negative test results has improved over OTSS visits – with 41 percent of facilities meeting the 90 percent adherence standard at the first visit and 58 percent meeting the standard by the fourth OTSS visit (see Figure 27 below).

Figure 27. Proportion of health facilities reaching at least 90 percent adherence to test results, comparison of first and fourth OTSS visit, Malawi (N=114)



Objective 4: Strengthened laboratory systems at the country level for detecting malaria and other infectious diseases

MalariaCare has continued to strengthen the readiness of health systems to provide quality malaria case management by building upon interventions supported by the project in previous year, including developing NAMS and transitioning to an EDS.

- Since the Malawi NAMS does not require institutional review board approval, it was agreed by the NMCP's task force that the protocol would be revised based on a number of improvements recommended by an institutional review board in Zambia. The protocol was finalized during a September technical assistance visit by MalariaCare. The NAMS task force agreed that the Malawi Community Health Service Unit (CHSU) would lead slide production in its role as the country's public health laboratory. It is anticipated that the Malaria Alert Center will provide training on PCR methods and QA to the CHSU and Malawi College of Medicine for donor species identification. NAMS supplies and reagents are due to arrive in Malawi in late November.
- Launched the EDS to enhance OTSS and improve data quality and use of data for decision-making. Following finalization of the revised OTSS checklist, MalariaCare conducted EDS end user training to orient central level staff and all 58 supervisors (from across the 29 districts) to the revised OTSS checklist and the tablets. End users refer to those who will use the EDS/tablets to collect data, mainly referring to OTSS supervisors. Supervisors were then supported to use the tablets (through a phased approach) during a subsequent round of OTSS (Round 12). Data was collected and analyzed using the EDS for the first time in Malawi during Round 12 OTSS. In addition to providing OTSS data electronically, the EDS helped identify key gaps in health facility performance. Supervisors documented what they determined to be the top three gaps for each health facility and worked with health facility staff to develop action plans

to address the gaps. A summary of these gaps is outlined in the table below. This information is being used to target OTSS support in PY4.

- General clinical issues (particularly conducting a history taking and physical exam), proper use of RDTs, data management and reporting issues, as well as supplies and infrastructure constraints were the primary gaps identified.
- To enhance operational capacity in-country, MalariaCare established a project office in Lilongwe and hired additional in-country staff to support activities. New staff include a finance and administration officer and a logistics coordinator. A program coordinator, technical advisor for clinical care, iCCM officer and receptionist are being hired early in PY4.

	No. gaps identified	Percentage
Any clinical	**170**	**31%**
General clinical	108	64%
Assessment of severe malaria	27	15%
Appropriate treatment	18	11%
Treatment adhearance	17	10%
Any diagnostic	**139**	**26%**
RDT	95	68%
Microscopy	32	23%
General Lab	12	9%
Any other	**234**	**43%**
Data management/reporting	86	37%
Supplies/infrastructure	71	30%
Patient communication	48	20%
HR/training	26	11%
Other issue	2	1%
Patient flow	1	1%

*Categories as labelled by supervisors, categories are not mutually exclusive

Summary of gaps identified by supervisors using EDS during OTSS Round 12, Malawi.

Challenges

Challenge	Solution
Ensuring adequate quality and appropriate follow up supervision of a large amount of case management training across 14 districts.	To address this, the team provided targeted technical assistance through multiple temporary duty assignments, finalization of a supplemental facilitator guide for future case management training, revision of the training evaluation form to better capture changes in competency, documentation of pre- and post-test scores, and lessons learned workshops to plan for follow up supervision. In PY4, MalariaCare plans to coordinate follow-up supervision with other implementing partners through OTSS visits.
Lengthy registration process.	To address this, the team worked with legal counterparts in Malawi to move the registration process forward as quickly as possible. Following completion of registration, a new project office was rapidly established in Lilongwe and new in-country staff could be hired.

Next steps

MalariaCare will work closely with the NMCP in training facilitators, OTSS supervisors and other implementing partners to provide follow up supervision of providers trained in case management and to provide on the job training for providers during upcoming joint and clinical-focus OTSS rounds.

In addition to OTSS, MalariaCare will also work to build the capacity of core groups of local trainers (in both diagnostic and clinical services) at different levels of the health system. To enhance diagnostic capacity, the

project will support development of a new core group of microscopy trainers (national level), while continuing support for development of Malawi's NAMS to enhance longer-term national microscopy training and capacity building efforts.

Following recent national policy discussions around the use of malaria RDTs at community level, MalariaCare will also support the NMCP in the roll-out of RDTs at community level though iCCM activities. Following the launch of the electronic data system in PY3, MalariaCare will continue to support supervisors as they use EDS/tablets during upcoming rounds of OTSS. The project will also hold a data user training to help ensure that key decision-makers, including NCMP, District Malaria Coordinators and in-country MalariaCare staff (data users) are able to access, analyze and use the incoming project data for decision making.

Mali

Introduction

The MalariaCare Mali PY3 work plan was approved in March 2015. Project activities began in May and targeted the four regions of Sikasso, Kayes, Koulikoro and the District of Bamako. These interventions focused on improving the case management of malaria through strengthening:

- the quality of malaria diagnosis using microscopy and RDTs;
- the quality of treatment of uncomplicated and severe malaria; and
- the quality of malaria indicator data collection and reporting.

MalariaCare has been working in partnership with the National Institute of Public Health Research (*Institut National de Recherche en Santé Publique* [INRSP]) to build and strengthen the capacity of a core group of technical staff, lab technicians and clinicians with known competencies to train, supervise, and mentor laboratory technicians and clinicians in malaria case management. This core group of experts will support the NMCP to train, supervise and mentor diagnostics experts and clinicians in the four intervention regions.

Key accomplishments

Rapid Situational Analysis:

- The project completed a rapid situational analysis in select facilities in the four intervention regions (Kayes, Koulikoro, Sikasso, and Bamako). A total of 16 health facilities were included. Information on provider practices, attitudes and performance challenges was gathered through direct observation, interviews, review of patient records, and assessment of the availability of drugs and equipment. Results from this analysis helped to refine MalariaCare interventions.

  While the final rapid situational analysis report will provide further details, key findings include:

  Only 50 percent of health facilities surveyed met the minimum diagnostic proficiency standards. Minimum standards were defined by MalariaCare technical advisors as critical to performing accurate malaria diagnosis.

This included slide preparation, staining, and reading by microscopy, and correct use of RDTs. See specific criteria in Table 2 in the executive summary.

Only 13 percent of the health facilities surveyed met the minimum treatment proficiency standards. Minimum standards were defined by MalariaCare technical advisors as critical to performing accurate malaria treatment. See specific criteria in Table 2 of the executive summary.

- When conducting the minimum standard analysis, several key deficit areas were identified. A key deficit is defined as less than 85 percent compliance to the minimum standard. The following key deficits were observed:

Microscopy

- 71 percent compliance to use of standard 10 percent Giemsa stain

RDTs

- 72 percent compliance to waiting appropriate length of time for RDT test reaction (per manufacture's instruction)
- 82 percent compliance to properly recording the test result

Treatment

- 52 percent compliance to identifying severe malaria signs
- 83 percent supervisors' agreement with clinicians assessment
- While 90 percent of cases diagnosed with malaria received an antimalarial, only 80 percent of uncomplicated malaria cases were treated with ACTs with the rest receiving treatment other than ACT; only 50 percent of severe malaria cases were treated with the appropriate drug (intravenous/rectal artesunate; intramuscular artemether; intravenous/intramuscular quinine)

Uncomplicated versus complicated malaria

- It was noted that 12 of the 31 cases with malaria (39 percent) observed in the survey were diagnosed with severe malaria.

Table 11. Summary of minimum standard performance of Mali rapid situational analysis

Region	Health Facility	Level of Health Facility	Minimum Standard	
			Diagnostics	Clinical
			90% N=19	79% N=19
Bamako	**Bamako Region**		**93%**	**71%**
	Centre de Sante de Reference Bamako commune IV	District Hospital/DDH	100%	67%
	ASACO SEK	Health Centre	100%	70%
	CS Ref Bamako commune VI	District Hospital/DDH	89%	85%
	ASACOYIR	Health Centre	88%	63%
Kayes	**Kayes Region**		**81%**	**92%**
	CS Ref Kayes	District Hospital/DDH	100%	74%
	Centre de Sante Communautaire de Segala	Health Centre	67%	100%
	CS Ref de Kita	District Hospital/DDH	83%	93%
	CS Com de Djidjan	Dispensary	83%	100%
Koulikoro	**Koulikoro Region**		**100%**	**77%**
	Centre de Sante de reference de Kati	District Hospital/DDH	100%	85%
	Centre de Sante Communautaire	Health Centre	100%	63%
	CS Ref de Kangaba	District Hospital/DDH	100%	85%
	Centre de sante communautaire	Health Centre	100%	78%
Sikasso	**Sikasso Region**		**85%**	**76%**
	Centre de sante de reference de Koutiala	District Hospital/DDH	81%	85%
	CS Com de Molobala	Health Centre	100%	85%
	CSREF de SELEGUE	District Hospital/DDH	83%	74%
	CSCOM de Tagon	Health Centre	94%	56%
	Met minimum standard			
	Did not meet minimum standard			

Objective 1: The accuracy of diagnostic testing for malaria is improved to greater than 90 percent.

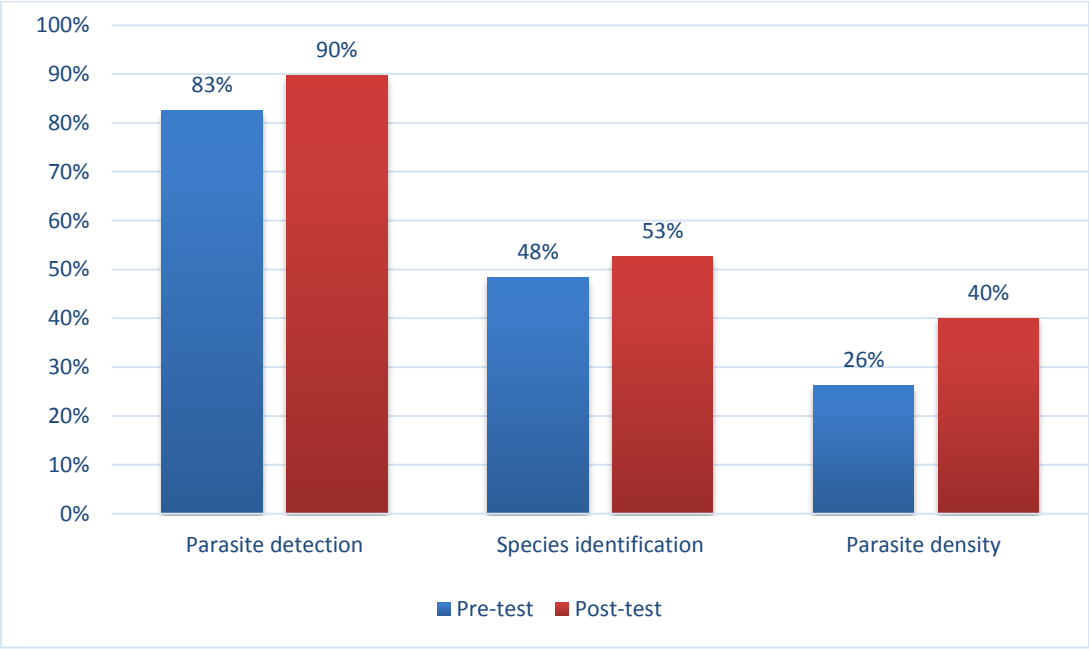
Timely and accurate diagnosis of malaria either through microscopy or rapid diagnostic testing remains a challenge in Mali mainly because of lack of training and poor adherence to standards and insufficient support to providers. MalariaCare's strategy to address the deficits in diagnostic competencies has been to train a core pool of national and regional trainers who will then support district level trainers to implement on-the-job training through OTSS.

- In collaboration with the INRSP, the project organized two five-day MDRT sessions focused on microscopy and RDT techniques for 38 lab technicians drawn from the four target regions (see Table 12). Significant improvements were observed between pre- and post-test scores relating to disease pathogenesis, laboratory knowledge and QA. During the first MDRT, the median score for the knowledge test increased from 33 percent at pre-test to 77 percent at post-test (44 percent point increase). During the second MDRT, the median score increased from 45 percent to 86 percent (a 41 percentage point increase).

Microsopists at an MDRT session. Photo credit: MalariaCare Mali

Of the total number of participants, only one of 38 (less than three percent) passed minimum competency standards for expert microscopists at a WHO L2 for parasite detection, species identification, and quantification. However, when supervisor competency is assessed for the most relevant skills such as parasite detection and parasite quantification, 42 percent of supervisors pass at WHO L1 equivalent (24 percent) and L2 equivalent (18 percent). Species identification has been identified as a challenge in all MalariaCare-supported countries. Species identification is generally not a part of routine practice and impossible to master during a one-week MDRT course. In Mali the mean score for species identification was 55 percent. The current WHO-recommended minimum standard for supervisors is 80 percent (WHO L2) for species identification. While mastery of species identification is a long-term goal in Mali, the focus will continue to be placed on clinically-relevant skills (parasite detection and quantification). Refer to Figure 28 for more information on pre- and post-test results.

Figure 28. Aggregate microscopy results for MDRT #1 (Bamako and Koulikoro)



- Of the 38 lab technicians, 29 joined their clinical counterparts in a three-day joint supervisors training in preparation for joint OTSS. Training covered supervision and mentoring techniques and the use of OTSS supervision checklists. In total, 55 people (29 lab technicians and 26 clinicians) were trained (see Table 12).
- During the first round of joint OTSS, the lab supervisors visited 40 health facilities.

Table 12. MalariaCare Mali PY3 training overview

Intervention Domain /Types of Training	Trained Personnel			Location/Region of Training	Participants
	Male	Female	Total		
1. Malaria Diagnosis Refresher Training (MDRT)	11	7	**18**	Koulikoro and Bamako District	• Bamako: 8 • Koulikoro: 10
2. Malaria Diagnosis Refresher Training (MDRT)	17	3	**20**	Sikasso and Kayes	• SIkasso: 11 • Kayes: 9
3. Clinical case management refresher training	30	13	**43**	Sikasso, Kayes, and Bamako	• Kayes: 11 • Sikasso: 13 • Bamako: 6 • Koulikoro: 13
4. Malaria clinical and diagnostics OTSS supervisors' training	39	16	**55**	Sikasso, Koulikoro, and Bamako	• Sikasso: 21 • Bamako : 10 • Koulikoro: 22 • National level: 2
TOTAL	**97**	**39**	**136**		

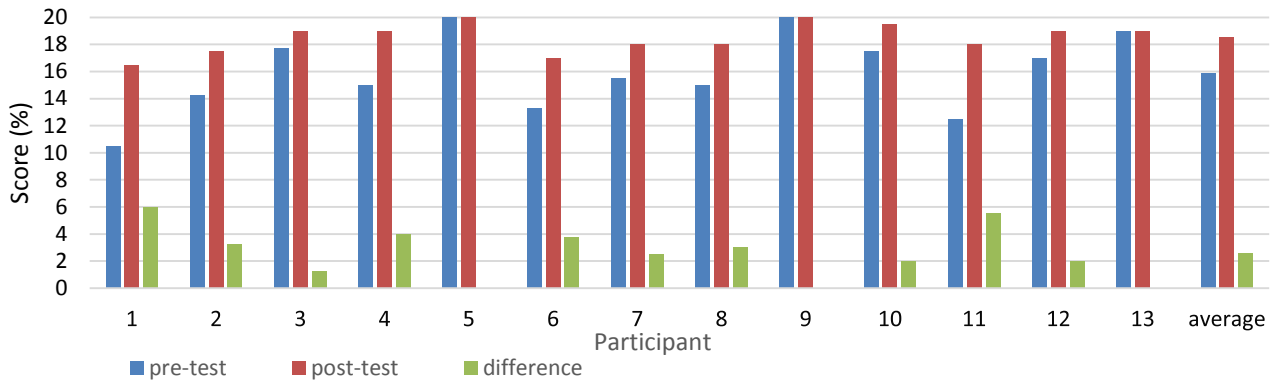
Objective 3: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illness--consistent with the result of the diagnostic test.

As presented in the rapid situational analysis, clinical case management performance remains a concern as several health facilities show key deficits in clinical competency. MalariaCare started addressing this through interventions that will continue in PY4. The strategy is the same as for diagnostics competence improvement, but will focus on clinical mentorship using case studies and evaluation, and discussion of management of individual cases observed during OTSS.


Healthcare workers entering RDT test results into the register. Photo credit: MalariaCare Mali

- In collaboration with the NMCP, the project organized three three-day CCMRT sessions on clinical management of severe and un-complicated malaria for clinicians drawn from 41 target facilities in the four regions. In total, 43 clinicians were trained (see Table 12). Significant improvements were observed between pre- and post-test score. The average score increased 12.7, 13, and 12.5 percentage points between pre- and post-tests during the training in Koulikoro, Sikasso, and Kayes respectively. Refer to Figure 29 for an illustration of the pre- and post-test results from the Sikasso training.

Figure 29. MalariaCare Sikasso clinical case management training aggregate pre- and post-test scores



Participants showed overall improvement between pre- and post-test with an average gain of 2.5 percentage points. Participants who started with low scores at pre-test showed the greatest improvement.

- Twenty-six (26) of the trained clinicians joined their laboratory counterparts in the joint clinical and laboratory training for OTSS supervisors and the first round of OTSS described above. Clinical OTSS reached 40 facilities.
- By the end of this project year, MalariaCare had completed the first round of joint clinical and laboratory OTSS in Sikasso region. The OTSS was scheduled in collaboration with the NMCP and INRSP, and targeted 40 facilities in the ten districts of Sikasso. Key findings of this round of OTSS aligned with the results of the rapid health facility assessment. The complete analysis of the first round of OTSS will be presented in subsequent reports.

Challenges

Challenge	Solution
Clinical and diagnostic OTSS supervisors training was delayed due to polio outbreak and national immunization activities. This led to delayed start of OTSS round 1, and failure to complete OTSS in some regions.	The timeline of programmed PY3 activities was adjusted and implementation of delayed activities will be completed in the beginning of PY4.
There was limited availability of malaria commodities including RDTs in health facilities.	This challenge could be overcome with improved information sharing including the use of the MalariaCare electronic data system that will be implemented in PY4.

Limited availability of health staff at the district level to support planned activities.	The project will coordinate closely with the district health team activities.

Lessons Learned

Clinical and laboratory staff need continued support to maintain acceptable competency level for quality malaria case management. Many implementing partners work on malaria control in Mali. Without adequate coordination, it is difficult to use health staff time efficiently for quality of care activities. In PY4, to ensure synergy between partner interventions, MalariaCare plans to implement a coordination mechanism and provide technical assistance in the use of tools and methodology of training and support supervision.

Next steps

MalariaCare interventions covered four regions in PY3: Kayes, Koulikoro, Sikasso and the city of Bamako. In PY4, these interventions will expand to include Mopti and Segou, while MalariaCare provides technical assistance to the High Impact Health Service (HIHS) project to expand interventions in the previous four regions. In PY4, MalariaCare will continue to strengthen the capacity of a cohort of the NMCP staff to train, supervise, and mentor laboratory technicians and clinicians in appropriate case management of malaria. The project will create synergies with the Global Fund and HIHS interventions to ensure quality support in the six intervention regions through technical assistance and direct program implementation.

MalariaCare will support NMCP to cascade clinical case management and diagnostic refresher training and mentorship to district health management teams and facility-level providers through joint OTSS and on-the-job mentoring, using the revised OTSS supervision checklist and associated mentoring curriculum. With the use of RDTs becoming more widespread in both health facilities and communities, MalariaCare will use the trained supervisors/mentors to train facility-level supervisors who oversee the work of community health workers administering RDTs in the communities. This should facilitate the implementation of QA strategies in support of current efforts by iCCM partners. In addition, MalariaCare will continue to support the NMCP to embed joint clinical and laboratory OTSS within the national system, to build the competence of providers in effective early diagnosis and treatment of malaria according to the revised national guidelines.

MalariaCare will roll out the use of an electronic data collection system in Mali. In anticipation of introduction of the DHIS2 system for the MOH, MalariaCare will collaborate with Measure Evaluation to ascertain interoperability between the OTSS electronic data collection and the DHIS2 platform. Harmonizing health management information system (HMIS) routine data collection through the DHIS2 with OTSS data would strengthen national data management systems and encourage data use for decision making at multiple levels.

Mozambique

Introduction

In PY3, MalariaCare provided technical assistance to two high-burden provinces, Nampula and Zambezia, to help strengthen QA systems as well as laboratory and clinical malaria case management capacity. Provincial laboratory staff were trained in malaria diagnostics – both in microscopy and performing RDTs. Clinical staff were trained in clinical case management and performing RDTs. These trainees then provided cascaded RDT refresher training and clinical mentoring to facility-level staff.

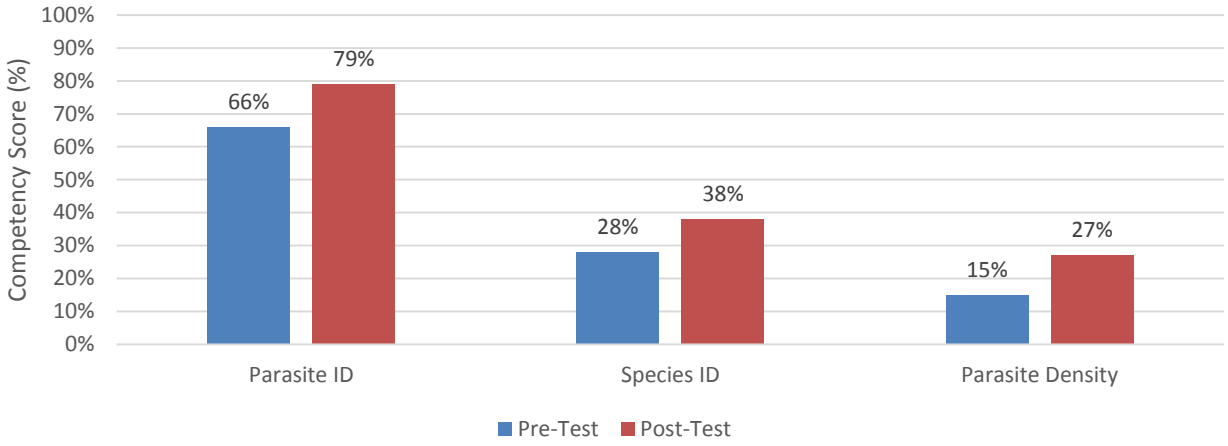
MalariaCare implemented supportive supervision activities in both provinces, including three rounds of supervision completed in each province followed by post-supervision LLWs at both the provincial and district levels. These LLWs proved valuable to the NMCP as a forum to review supportive supervision data, identify performance gaps based on this data, and map out action plans to improve quality. During the LLW, supportive supervision data was reviewed to identify low- and high-performing facilities. These facilities then participated in a peer-to-peer mentoring pilot in which providers from the low-performing facilities were mentored by providers from high-performing facilities. MalariaCare also began rolling out the electronic data system, piloting the electronic version of the supervision checklist in Zambezia. To enhance operational capacity, offices were established in central Maputo and Nampula. MalariaCare also hired a national coordinator and provincial coordinators for Nampula and Zambezia.

Objective 1: The accuracy of diagnostic testing for malaria is improved to greater than 90 percent.

- Facilitated two five-day MDRTs for 42 central and provincial laboratory staff (25 staff from Nampula and 17 from Zambezia). Pre- and post-tests were used to assess microscopy skills, such as agreement of sensitivity and specificity, species identification and parasite density. While several indicators improved, averages did not indicate significant gains. Staff with the highest competency scores were selected to receive continued mentorship to serve as laboratory supervisors.

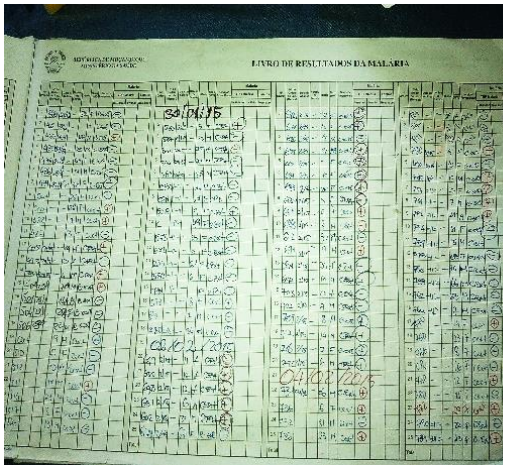
  The following graph shows average scores at post-test for the MDRT training participants in Zambezia and Nampula. On average, participant scores increased at post-test (Figure 30). However, none (47 percent) of the participants met the WHO Level 1 or 2 standards across all three areas (parasite detection, species id, and quantification). Species ID was the main barrier to meeting WHO Level 1 or 2 standards (80 percent or greater) – none of the participants reach proficiency in this area. For parasite detection, 24 participants (57 percent) met the WHO Level 1 or 2 standards (score of 80 percent or greater). For parasite density, 11 participants (65 percent) met the WHO Level 1 or 2 standards (score of 40 percent or greater).

Figure 30. Aggregate MDRT Results on Microscopy Indicators, Zambezia and Nampula (n=42)



- To provide support and mentorship to those trained, MalariaCare trained a cadre of 19 provincial laboratory supervisors during two combined clinical and laboratory TOTs in Nampula and Zambezia respectively (see Objective Three for description of this training pertaining to clinical supervisors). During the first two days of the training, the laboratory supervisors received additional microscopy training. Pre- and post-tests were used to measure microscopy skills and to evaluate knowledge of microscopy theory. On theory related pre- and post-tests, scores increased by an average of 13 percent in Nampula, and 15 percent in Zambezia. When evaluating microscopy skills, the largest increase was found in species identification, with a 35 percent increase between pre- and post-test. Change in scores related to quantification and parasite detection were not significant. For parasite detection, 13 of the 16 laboratory supervisors scored at L2 WHO accreditation for malaria microscopists (>80 percent). Comparison of MDRT post-test scores with TOT scores revealed that the most significant gain was in species identification, as the supervisor aggregate score increased 13 percent.
- Working closely with the NMCP, MalariaCare adapted the joint clinical and laboratory OTSS checklist to align with the Mozambican health system. The revised checklist was then used to conduct three rounds of OTSS.
- In collaboration with the NMCP and Provincial Health Authorities (PHAs), three rounds of OTSS were conducted in both Nampula and Zambezia. Across all rounds, 59 health facilities were visited in 37 districts.

  Figures 31a and 31b below shows the proportion of health facilities meeting MalariaCare's targets for diagnostic competency at the most recent visit for which data is available: 100 percent on minimum standard steps and an average score of 90 percent or better across all steps assessed in performing malaria diagnostics. Minimum standard steps are those steps assessed as part of slide preparation, slide staining, and RDT preparation/reading identified which have the greatest impact on



Clinical register reviewed during OTSS visit,

quality of malaria diagnostics. These results indicate that, on average, the majority of health facilities sampled are able to correctly perform all of the minimum standard steps. However, there is room for improvement, as only sixteen facilities (59 percent) met the minimum standard for RDTs and only four facilities (41 percent) achieved 90 percent compliance on overall standard for slide preparation procedures. With the introduction of the EDS in Mozambique, these indicators will be closely monitored in PY4 to assess improvement and provide feedback to supervisors.

Figure 31a. Proportion of facilities meeting the *minimum* standards for diagnostic competency at most recent MalariaCare Mozambique OTSS visit

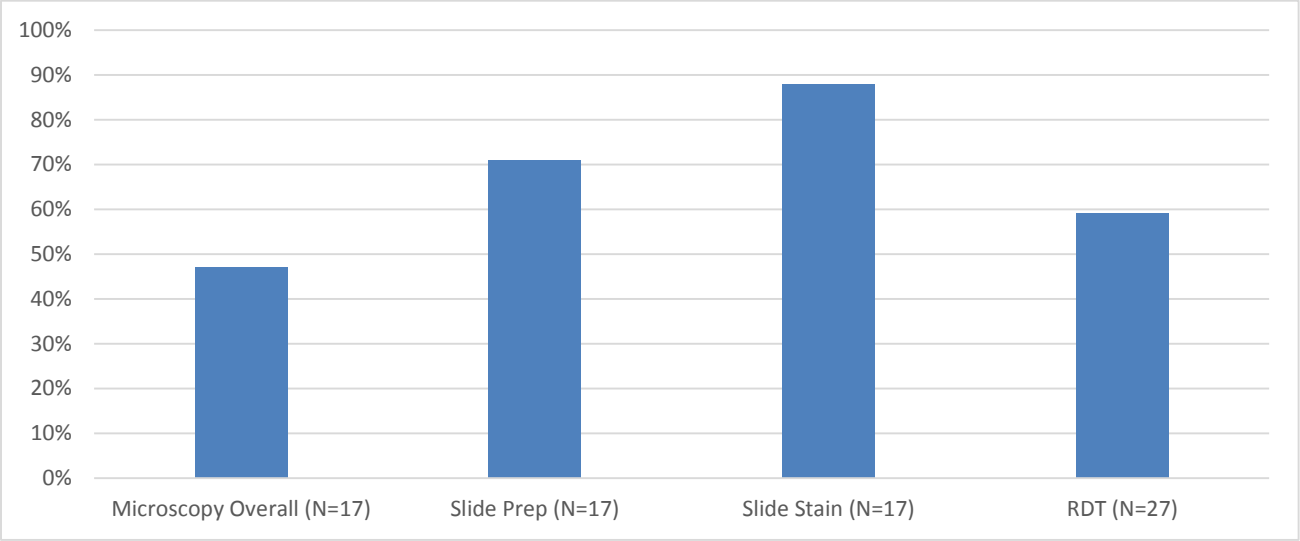
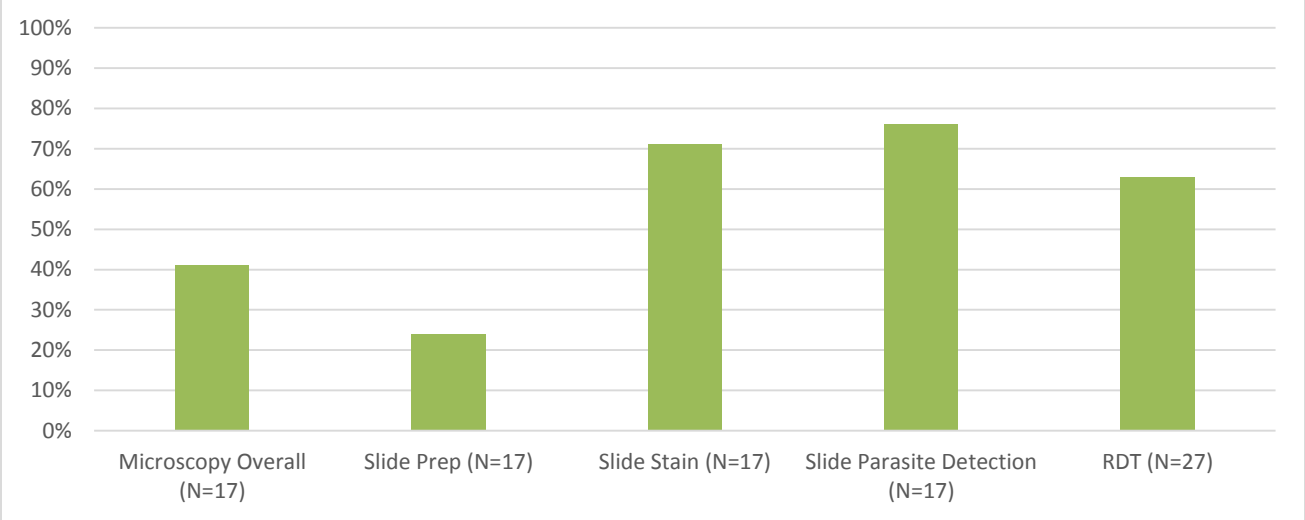


Figure 31b. Proportion of facilities meeting the *overall* standards for diagnostic competency at most recent MalariaCare Mozambique OTSS visit



*Slide parasite detection has only an overall score, and thus minimum scores are not presented for this indicator.

Objective 2: Increased percentage of patients suspected to have malaria or a febrile illness who receive a diagnostic test for malaria.

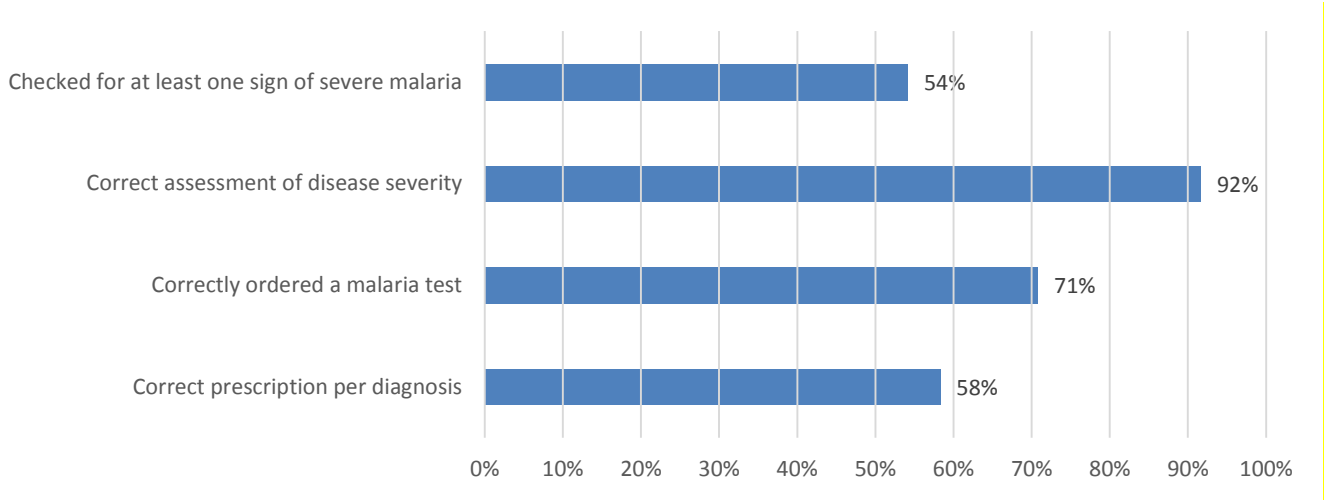
- Prior to starting the TOT, 24 clinicians received a two-day training on clinical case management guidelines and RDT QA. On the third day of the TOT, both clinical and laboratory supervisors were trained together on supervision and mentoring techniques for OTSS, including orientation to MalariaCare-specific OTSS checklists. Supervisors then completed onsite training, piloting the checklists in seven health facilities in Nampula City. Feedback and challenges from this exercise were discussed to conclude the training.
- Trained 28 OTSS laboratory supervisors (15 from Nampula and 13 from Zambezia) on RDT QA. The three-day training included on-site training in RDT use, discussion on lessons learned and supervisory training. Using a brief checklist, supervisors then visited health facilities to gain experience supervising health workers on use of RDT. Following the training, 47 percent of supervisors demonstrated competency in RDTs (scoring 90 percent or above), while the aggregate score improved by 12 percent from pre- to post-test. All supervisors, with the exception of one who scored 80 percent, scored 85 percent or above on the RDT competency post-test.

  The trained supervisors then provided on-site RDT refresher training for 1,149 health workers (633 health workers in Zambezia and 516 in Nampula) in 37 districts across the two intervention provinces. Of these, 241 health workers were trained during OTSS visits which includes staff from each of the 52 facilities visited. Another 269 health workers were trained during site visits as part of the district LLW where facilitators did presentations and facilitated practical RDT performance exercises in working groups. The remaining health workers were trained by supervisors who participated in the RDT QA and returned to their respective districts to conduct on-site training sessions.
- To continue developing providers' clinical case management skills, supervisors focused on observing clinical competencies as part of OTSS and on conducting targeted mentorship in the district health facility to address observed gaps. During a LLW, facilities demonstrating unsatisfactory performance during previous OTSS visits were also selected for targeted mentorship during the peer-to-peer mentoring in working groups in order to strengthen the quality of diagnosis and treatment.

Objective 3: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illness--consistent with the result of the diagnostic test.

- Trained 30 provincial clinical supervisors during the combined clinical and laboratory TOTs in Nampula and Zambezia. The training included two days of case management training for clinical supervisors, focused on new treatment guidelines for both uncomplicated and severe malaria, and role playing and practical application in local health facilities. Supervisors' test scores in malaria case management improved by 24 percent at post-test in Nampula and 23 percent at post-test in Zambezia.
- Using the OTSS clinical checklist for clinical case management, health facility staff were assessed on four minimum standards: checking for at least one sign of severe malaria, correctly assessing disease severity, correctly ordering a malaria test and prescribing according to the diagnosis. As demonstrated in Figure 32 below, facilities performed the weakest in checking for signs of severe malaria, with only 54 percent of facilities completing this task in all observations.

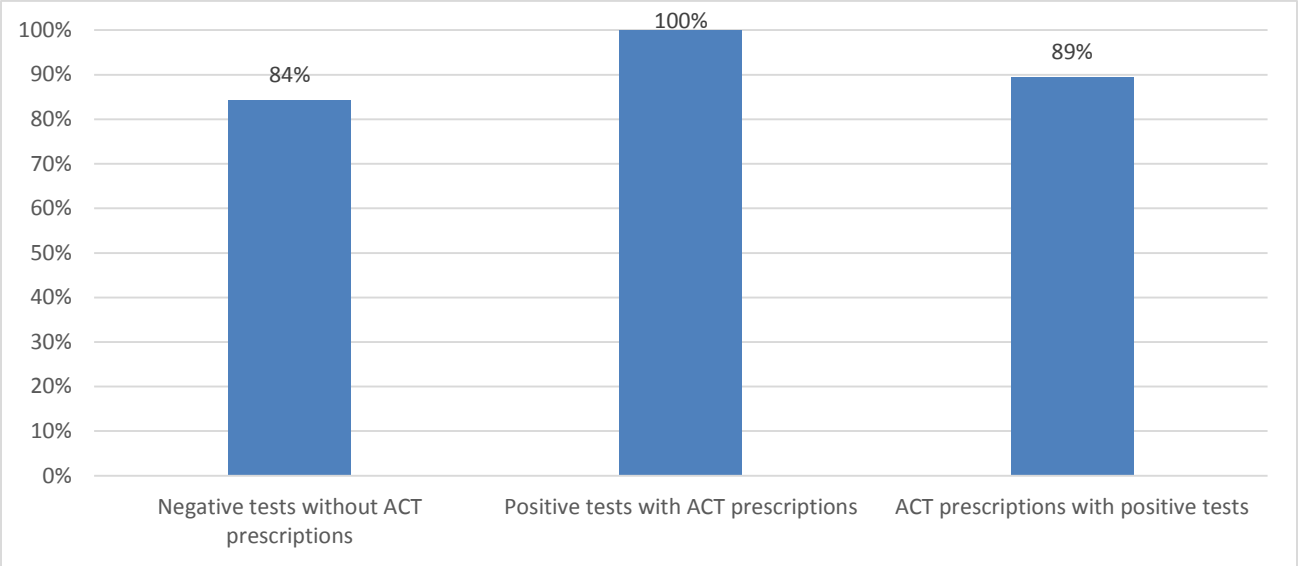
Figure 32. Proportion of health facilities meeting minimum standard targets for clinical case management during the most recent MalariaCare Mozambique OTSS (N=24)



In addition, only 58 percent of facilities had cases in which providers prescribed in accordance with the final diagnosis (i.e. no antimalarial prescribed if the patient was not diagnosed with malaria; an appropriate antimalarial prescribed for the patient according to severity and in accordance with national guidelines if the patient was diagnosed with malaria). These minimum standards will be monitored and emphasized in future OTSS visits.

In order to assess adherence to test results across the facility, OTSS supervisors were also asked to compare the clinical and pharmacy registers to the laboratory registers. Figure 33 displays results for the most recent visit, where available. Among the facilities with data, facilities ability to meet standards (reaching at least 90 percent adherence to test results) for adherence to malaria test results was high – 84 percent of facilities met standards for not providing an ACT prescription with negative diagnostic test results, 100 percent met standard for being provided an ACT prescription with a positive result and 89 percent of facilities met the standard for having a positive test recorded when an ACT prescription was provided. This is much higher than seen in other MalariaCare countries and the technical team is following up with the supervisors to better understand how these high rates have been achieved.

Figure 33. Proportion of health facilities reaching at least 90 percent adherence to test results during the most recent MalariaCare Mozambique OTSS (N=19)



- Completed a peer-to-peer mentoring pilot in five districts within each intervention province. MalariaCare supported two staff, one clinical and one laboratory, from a high-performing facility to spend three days at a low-performing facility to troubleshoot problems and to achieve optimal standards of diagnostic and clinical case management performance. Participating high- and low-performing facilities were identified during the provincial-level LLW based on findings from OTSS visits. Peer mentors used OTSS data as baseline and used the same tool on the last day of the visit to assess different aspects of case management. Results of this exercise are still being analyzed.
- Supported establishment of a malaria case management committee in four district-level hospitals. These multidisciplinary committees meet monthly at the facility level, especially the reference hospitals, to review case management data and discuss malaria case management trends (new malaria cases, severe malaria deaths, provider adherence to diagnostic results, case management practices and adherence to guidelines, and any data management issues). MalariaCare attended inaugural meetings and provided assistance to develop a terms of reference for each committee. The committees are intended to provide a forum for developing practical interventions to improve malaria case management in selected health facilities.

Objective 4: Strengthened laboratory systems at the country level for detecting malaria and other infectious diseases.

- Completed a rapid HFA to determine case management capabilities in each of the two provinces in which MalariaCare activities are to be expanded during PY4 – Cabo Delgado and Tete. Four facilities were evaluated in each province using a standardized health facility assessment checklist. Data is currently being analyzed and findings will be presented early in PY4.
- Facilitated a provincial-level LLW in Nampula. A total of 63 participants attended, one from the national level, 14 from the provincial level and 48 from the district level. In Zambezia, 117 provincial and district representatives participated across the four LLWs. During the workshop, participants reviewed findings from

OTSS visits to validate malaria case management records in select facilities. By the end of the workshop, participants identified key lessons learned from OTSS visits and defined actionable goals to strengthen low-performing facilities. Key recommendations identified during the workshop (and implemented almost immediately by the PHAs) include: all malaria focal points should be clinicians; introduce monthly malaria committee meetings at facility-level, especially the bigger reference hospitals in the periphery; and audits of data on severe malaria be conducted to assess accurate reporting of severe malaria outcomes. Some of these recommendations, mostly from Nampula, were also shared with Zambezia which started implementing them.

- Introduced the EDS. A total of 16 participants, OTSS supervisors, provincial-level representatives and MalariaCare staff attended the EDS end-user training in Zambezia. The training included an introduction to the tablet, a TOT session to prepare participants to facilitate similar training, and a practical session using the tablets in local health facilities. Following the end-user training, the electronic checklist was used during the third round of OTSS in Zambezia, collecting electronic data from 19 facilities in 19 districts. Supervisors were able to successfully utilize the EDS to guide their supervision activities and submit their completed OTSS checklists electronically. The EDS will be expanded to remaining project-supported provinces in PY4.

  In addition, MalariaCare recruited a data manager and laboratory supervision specialist (seconded to the NMCP in Maputo) to provide technical assistance to the NMCP for planning and implementation of diagnostic and data QA activities.

- In collaboration with the National Reference Laboratory (NRL), MalariaCare collected 3,500 specimens to prepare permanent slide sets for training and proficiency testing. A total of 15 slide sets (over 200 slides each) have been prepared. National experts have finished reading and confirming the slides. All slide sets will go through a rigorous validation process in PY4 and a WHO expert will validate the slides. The slide bank will also be a resource for the routine QA panels to be implemented at the regional level in PY4. In addition, the NRL has borrowed a set of these slides to support a therapeutic efficacy study which is being conducted by National Health Institute (supported by the US Centers for Disease Control and Prevention).

- Implemented a quality control system to review discordant slides identified during OTSS visits. During OTSS (Rounds One and Two in Nampula and Round One in Zambezia), supervisors collected 180 slides for which the OTSS supervisor and health facility provider reported discordant results. The slides were then sent to the provincial-level laboratory, where a WHO L2 accredited microscopist reviewed the results. During subsequent OTSS visits, supervisors provided direct feedback on the discordant slides to health facility staff.

OTSS visit, Nampula. Photo credit: PATH

Challenges

Challenge	Solution to address challenge
Major flooding at the end of December 2014, in both Nampula and Zambezia, caused implementation delays. Zambezia suffered greater damage than Nampula, and the flooding was followed by a cholera outbreak. Therefore, no MalariaCare activities could be implemented in Zambezia between January–March 2015.	To address this, the MalariaCare coordinator in-country worked closely with the PHAs in each province to quickly reschedule activities once conditions improved. Nampula activities restarted in February, while Zambezia activities started in April 2015.
Coordination and availability of various Ministry of Health departments prevented completion of the private health sector facility assessment.	To address this, MalariaCare sought guidance from the PMI/Mozambique team. It was agreed that, due to completing project priorities, MalariaCare would not move forward with the assessment.

Lessons learned

Conducting the TOT with both clinical and laboratory supervisors provided an opportunity to share both diagnostic and clinical perspectives. Until the joint TOT, clinical supervisors did not understand the importance of parasite density in classifying malaria. Because clinicians were not ordering parasite density as part of malaria microscopy tests, laboratory supervisors assumed that clinicians did not need that level of information in the diagnostic results. Following the TOT, those supervisors returned to their respective facilities and encouraged parasite density being recorded routinely as part of malaria microscopy results. These supervisors are now also able to advocate for the same during OTSS visits. MalariaCare plans to support expansion of the monthly malaria committee meetings to other facilities within the intervention provinces.

The monthly malaria committee meetings likely contributed to improvements in quality of care, parasite density as a routine metric of malaria microscopy, a reduction in clinical malaria diagnosis, and a reduction in the number of ACTs dispensed without a malaria diagnostic test or to patients with a negative test. The committees provide an opportunity for malaria case management stakeholders across the facility to review data related to malaria case management and identify discrepancies for immediate action.

Next steps

In PY4, MalariaCare will continue to strengthen central and provincial level managerial, diagnostic and clinical case management capacity to plan and coordinate implementation of QA interventions at all levels; and to supervise and mentor staff in project intervention provinces.

MalariaCare will strengthen current interventions underway in Zambezia and Nampula, and expand interventions to two other high-burden provinces, Cabo Delgado and Tete. In all four provinces, interventions will prioritize capacity building of key technical and managerial staff at provincial and district referral facilities.

OTSS rounds will continue in Zambezia and Nampula, and facilities in Cabo Delgado and Tete will be included in Round Four. LLWs will be held at the provincial-level to review OTSS data and set goals for improving challenges to facilities identified during OTSS visits. MalariaCare will continue the peer-to-peer mentoring in select districts in the intervention provinces, conducting operational research on whether the activity contributes to performance improvements. The electronic data system, designed to support mentoring during OTSS and OTSS data collection as well as to encourage data-driven decisions at the national and provincial level, will be scaled up in all four intervention provinces. As part of this activity, MalariaCare will train provincial-level health information officers and the malaria focal points on using data collected through the system.

To strengthen diagnostics QA at the national level, MalariaCare will support the NRL to reorganize the national malaria diagnostic QA system in the intervention provinces, starting with the establishment of four district regional reference laboratories per province. The project will also support the validation of slides collected for the reference slide bank during PY3. In addition, several bench aids and SOPs will be developed and disseminated to facilities which are visited during OTSS rounds. These include SOPs and bench aids on malaria microscopy and RDTs as well as job aids on the administration of injectable artesunate.

Nigeria

Introduction

In Nigeria, MalariaCare is partnering with the NMCP, the Expanded Social Marketing Project in Nigeria (ESMPIN) led by Society for Family Health (SFH) – an affiliate of PSI, and state health authorities to implement and evaluate a pilot to assess the ability of private-sector health providers (PPMVs) trained to manage cases of malaria and other febrile illnesses in accordance with national health standards. This intervention will determine whether, in a local government area (LGA), a saturation of points-of-service that provide correct case management of fever-related illnesses results in a measurable increase in household uptake of life-saving child illness interventions which in turn may have an impact on morbidity and mortality on a population basis.

MalariaCare is supporting the M&E of the pilot at baseline, during implementation, and at end-line. The project conducted baseline household surveys, outlet surveys and focus group discussions to provide preliminary data which will be used as a comparison to end-line data gathered through similar sources for an overall evaluation of the pilot's success. To monitor PPMV case management knowledge and practices throughout actual implementation of the nine-month pilot, MalariaCare has designed and is currently overseeing an electronic management and information system, which will be utilized by canvassers to collect data via electronic tablets. MalariaCare is also leading a cost analysis to provide the Federal Ministry of Health (FMOH) with information on the costs of the pilot implementation to guide national decision-makers about whether to expand the program to other target areas within Nigeria.

Key accomplishments

- Received approval from the Nigerian National Research Ethics Committee of the FMOH to conduct the pilot study, which included endorsement of all pilot materials and to conduct the baseline and end-line evaluations.
- Worked with ESMPIN to adapt the FMOH iCCM training materials for the PPMV pilot. The materials will be used by the FMOH to train the PPMVs in iCCM interventions. MalariaCare provided input into the design of job aids for canvassers to mentor PPMVs during monitoring visits. These materials are programmed in the tablet-based application for ease of accessibility while canvassers are collecting data.
- Developed, tested, and finalized information, education, and communication (IEC) materials to supplement the FMOH's iCCM training materials for providers and caregivers. To field test the materials, MalariaCare facilitated three focus groups in Eboyni State, including two groups of PPMVs and one group of caregivers.
- Completed a baseline household survey of care-seeking behavior for sick children under the age of five in all four LGAs to be included in the pilot—two intervention LGAs (Abakaliki and Afikpo North) and two control LGAs (Onicha and Ikwo). A baseline outlet provider survey and knowledge assessment were also completed in the two intervention LGAs. A total of 3,000 households were surveyed, and 400 PPMV shops participated in the outlet survey and knowledge assessment. In addition, eight focus groups were conducted with

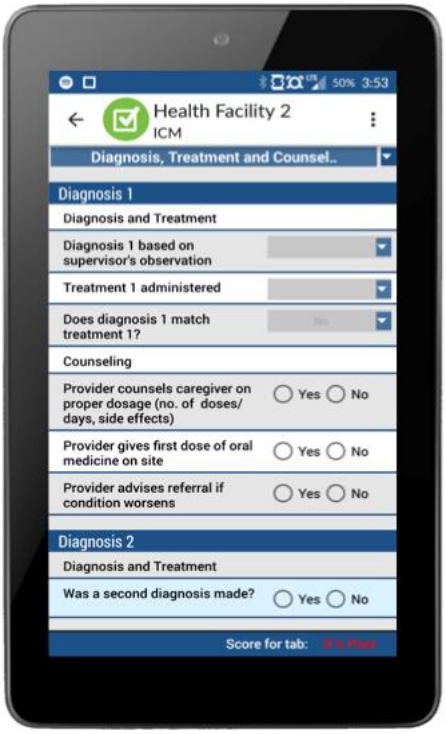
caregivers of children under five and PPMV shop owners, managers and employees to provide additional qualitative context to the survey data from the pilot.

- Conducted meetings with federal and state stakeholders to advocate for a federal and state partnership with national professional associations, including the Pharmacy Council of Nigeria (PCN) and the Nigeria Association of Patent and Proprietary Medicine Dealers (NAPPMED). NAPPMED agreed with PCN helping to supervise PPMVs and support the ESMPIN canvassers. In addition, they agreed to participate in PPMV training sessions, including a TOT led by ESMPIN, and an iCCM training also led by ESMPIN.

- Performed advocacy visits with PPMVs in the intervention LGAs to officially inform them of the iCCM pilot and identify eligible PPMVs to participate in the pilot. PPMVs were only eligible if registered with the PCN.

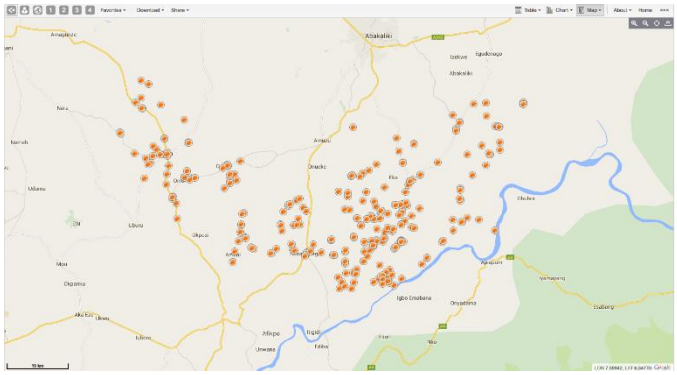
- Attended the Ebonyi State iCCM TOT led by ESMPIN. Of the 33 participants, 26 were selected as national iCCM facilitators. Trainees included 10 ESMPIN canvassers, staff from the state MOH, Federal Teaching Hospital Abakaliki, FMOH, and directors of health departments of the intervention LGAs.

- Adapted the HNQIS, an existing management information system to capture data in the field, to the needs of the implementation phase of the pilot. There are four modules of the HNQIS– *Assess, Improve, Monitor,* and *Plan*. Two (*Assess* and *Improve*) of the four modules will be used by the canvassers that serve the dual role of demand creation agents and supervisors of the PPMVs. The *Assess* module includes a checklist adapted from the Federal iCCM Sick Child Recording Form to assess the PPMVs knowledge of skills learned during the iCCM training. According to the observations entered by the canvasser into the HNQIS, the *Improve* module will create a monitoring platform that will guide the canvasser on how to provide positive feedback to reinforce the skills that were taught during the PPMV iCCM training. Canvassers will be equipped with tablets to capture data during every monitoring visit. All data collected via tablet will be integrated into DHIS2. The two back-end modules, *Monitor* and *Plan*, are currently being developed. *Monitor* will allow program managers to create charts and tables based on the information captured by canvassers, such as PPMV case load and skill assessment levels. *Plan* determines the frequency of canvasser visits to PPMV shops based on the knowledge level of the PPMV. It guides the canvasser on when the next visit to the PPMV should occur according to the canvasser's assessment.



Health Network Quality Improvement System platform.

- Supported ESMPIN in PPMV registration and mapping. The GPS coordinates of the PPMV shops captured during the registration process will be used for planning and management purposes. Additional algorithms have been designed by PSI to score and benchmark PPMVs and prioritize the frequency of support visits by canvassers and the type and level of support.



GPS mapping of the PPMVs participating in the pilot.

- Initiated a cost analysis on the PPMV pilot. The purpose of this analysis is to capture the costs associated with training, monitoring, and mentoring PPMVs; commodity demand creation; and all relevant activities associated with providing iCCM interventions to PPMVs. As part of this analysis, a MalariaCare consultant traveled to Nigeria to evaluate SFH cost data collection practices and align reporting systems between headquarters, the SFH field office and the intervention sites where field data is primarily collected. Once the pilot is completed and costs analyzed, results will be shared with FMOH to guide a scale-up scheme should they choose to provide PPMV iCCM interventions in other parts of the country.

Challenges

Challenge	Solution
Implementation of the baseline survey was delayed due to unexpected time needed by the Nigerian National Research Ethics Committee to review study documents. Further delays occurred due to election activity and setbacks in procuring commodities, which resulted in a global shift to the project timeline.	MalariaCare worked closely with stakeholders to reschedule these activities.
The submission of the baseline report is hindered due to delays in receiving deliverables from the local survey company.	To avoid similar delays in the end-line evaluation, MalariaCare will have an increased hands-on role in the evaluation, including developing the training materials, leading the training, and selecting interviewers and field operation managers.

Next steps

In PY4, MalariaCare will continue to partner with ESMPIN to complete the PPMV pilot. MalariaCare will lead the canvasser training on using the management information system – HNQIS - to assess PPMV case management practices throughout the pilot and to provide feedback to PPMVs based on the assessment. The training will also include a module on supervisory methods, including effectively communicating feedback to

PPMVs. Prior to the PPMVs being trained in iCCM, canvassers will collect benchmark data on PPMV case management skills and knowledge. Following the PPMV iCCM training to be facilitated by ESMPIN, MalariaCare will manage routine canvasser monitoring and supervision visits using the HNQIS over the course of the nine months during which PPMVs are implementing iCCM activities. Once this phase is completed, MalariaCare will lead an end-line household and outlet survey in the control and intervention LGAs. Findings from these surveys will be compared with the baseline survey results and monitoring data to develop a comprehensive evaluation report on the pilot. Findings from the cost study will also be integrated into the evaluation report to understand the potential for scale up.

Tanzania

Introduction

In Tanzania, MalariaCare works with the Tanzania MOHSW through the NMCP to improve the quality of malaria case management—both diagnosis using RDT and microscopy and clinical care. In its first year, MalariaCare began implementing its case management QA strategy in eight high-burden regions in the country: Geita, Mara, Mwanza, Shinyanga and Simiyu in the Lake Zone, and Dar es Salaam, Morogoro and Pwani in the Eastern Zone.

Key accomplishments

Objective 1: The accuracy of diagnostic testing for malaria is improved to greater than 90 percent.

- Conducted sensitization meetings for 54 regional leaders in each of the project's eight target regions to introduce the project and orient the regional health management teams to the malaria diagnostic test quality improvement plan. These meetings provided information on MalariaCare's goals, objectives, strategy and focus and provided an opportunity to reinforce the need for an RDT QA program to the regional management teams that provide supervision to health facilities.

- Collaborated with the NMCP and other malaria stakeholders, including PMI, to simplify RDT job aids and finalize the RDT QA training package. These documents were used to train 156 regional and district supervisors in the five Lake Zone regions. These individuals then cascaded the RDT QA training to individuals from each health facility in their district (for a total of 883 facilities) with the support of a national facilitator or MalariaCare staff.

- Conducted the project's first aMDRT for 40 laboratory technologists in the Lake Zone. The overall objective of the course is to identify and train regional and district level microscopists who will conduct supervision and onsite training for laboratory staff during OTSS visits. In the planning of this activity, it was anticipated that these participants, who were identified by the MOHSW with assistance from MalariaCare, had received recent microscopy refresher training, however it was later determined that this was not the case. In fact, the microscopists who attended the aMDRT had not received any microscopy refresher training for at least two years (and some reported none since entering the work force). Consequently, training pre- and post-tests of

practical skills used to assess microscopy skills, such as parasite identification, species identification and parasite counting were lower than expected. The results are shown in Table 13.

Table 13. Practical skills testing during Lake Zone MDRT (MalariaCare, Tanzania)

MDRT results (N=40)	**Parasite detection (%)** Mean [median (range)]	**Parasite speciation (%)** Mean [median (range)]	**Parasite counting (%)** Mean [median (range)]
Pre-test	58 [63 (0-94)]	22 [18 (0-73)]	39 [39 (0-100)]
Post-test	83 [84 (67-100)]	38 [37 (10-90)]	32 [33 (0-60)]

These findings illustrate the fact that baseline microscopy skills are not adequate and need on-going refreshment. Poor species identification is likely due to lack of practice identifying non-*falciparum* species. The cause of worsening parasite counting skills after the training is unclear, and is under current investigation. In future sessions (beginning with MDRT for microscopists from the Eastern Zone regions in early PY4), training will focus on the weaknesses identified during this session, namely species identification, and parasite quantification (see Table 13 above).

Objective 2: Increased percentage of patients suspected to have malaria or a febrile illness who receive a diagnostic test for malaria.

- As part of the NMCP update plan, the project supported training of more than 1,815 healthcare workers – at least one from each public health facility in the project's five Lake Zone target regions on RDT QA, including training on kit storage and testing procedure, common technical errors, and use of test results in clinical decision making. These workers, with the assistance of job aids provided by MalariaCare, then provided on-the-job training to their colleagues. This training will be carried out in the three Eastern Zone regions during PY4.

"As a clinician I did not believe in RDTs - that's why I used to treat each febrile patient as clinical malaria. The situation changed after coming back from a one-day RDT QA training organized by MalariaCare and the NMCP, which was conducted at Bunda district". Ndogo Vicenti Kiteja, Clinical Officer at Kangetutya dispensary, Bunda district, Mara region.

Objective 3: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illness--consistent with the result of the diagnostic test.

- Collaborated with the NMCP to train 62 medical doctors, assistant medical officers, clinical officers, assistant clinical officers and nurses from the five Lake Zone regions in malaria case management. The training provided technical updates on malaria testing procedures, use of ACTs to treat uncomplicated malaria, treatment of severe malaria, management of malaria in special situations, such as in pregnant women and newborns, monitoring of malaria activities and malaria recording and reporting tools. The mean pre-test score was 54 percent [median 55 percent (range 23-78 percent)] and mean post-test score was 77 percent [median 79 percent (range 50-92 percent)] – a 23 percentage mean improvement. The weakest points of performance on the post-test were topics related to management of malaria commodities and malaria surveillance/M&E. Clinicians are generally not responsible for these in the facility, however, they were included in the training at

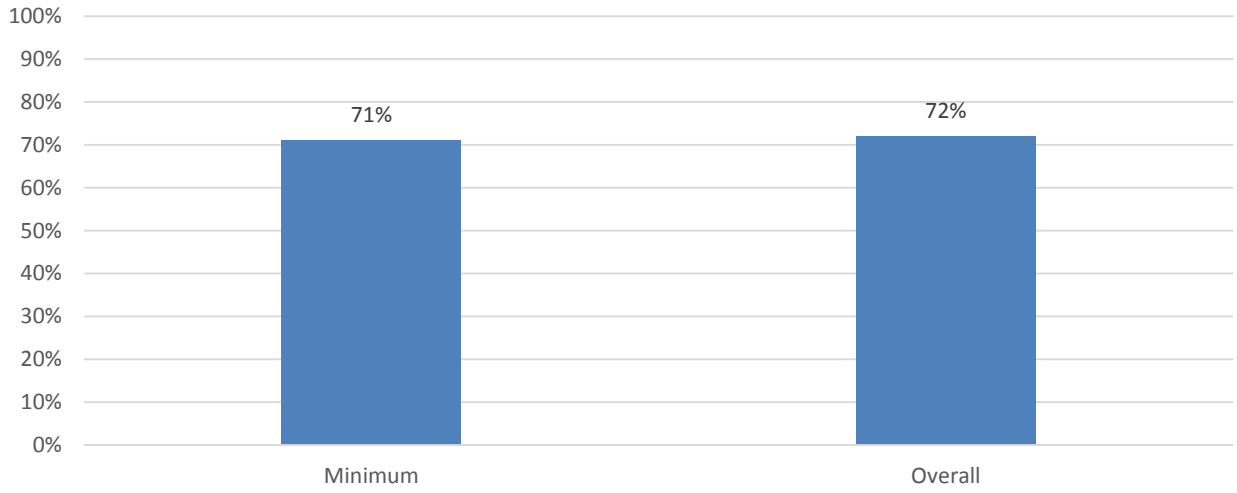
the ministry's request, as they orient clinicians to the proper use of new registers which were recently rolled out.

- Conducted the first two rounds of joint clinical and laboratory OTSS in the Lake Zone regions, which also provide for a baseline. OTSS visits were used to observe and refresh the skills of laboratory workers on microscopy, clinicians on patient examination and appropriate treatment in adherence to test results, and both cadres on RDT competency. It is estimated that 1,890 healthcare providers were provided with onsite mentoring during the two rounds of visits to 755 facilities in the Lake Zone.

Supervisors and facility staff reviewing RDT cassettes for errors during a supervision visit. Photo credit: PATH

- During OTSS Round One, 372 health facilities were visited. During these visits, supervisors recorded complete RDT observations at 82 facilities – with 71 percent meeting minimum competency standard and 72 percent meeting the overall RDT competency standard (see Figure 34). When analyzing these baseline minimum standard results, each of the six minimum competency steps was problematic and will need addressing in future supervision moving forward.

Figure 34. Proportion of health facilities meeting targets for RDT competency, MalariaCare Tanzania OTSS Round 1



The key indicators for a clinical evaluation of a suspected malaria patient are checking for signs of severe malaria, assessing the severity of disease, ordering a malaria test, and prescribing treatment to the patient consistent with the results of the malaria test (see Figure 35 below). Of the 134 health facilities with clinical observations data on all four minimum standards, facilities performed higher on checking for signs of severe malaria (74 percent) and correctly ordering a malaria test (63 percent). However, staff at facilities need to improve upon accurately assessing disease severity (54 percent) and prescribing according to the diagnosis (61 percent). During future OTSS, supervisors need to highlight these areas with lower scoring facilities.

Figure 35. Proportion of health facilities meeting minimum standard targets for clinical case management, MalariaCare OTSS Round 11, Tanzania (n=134)

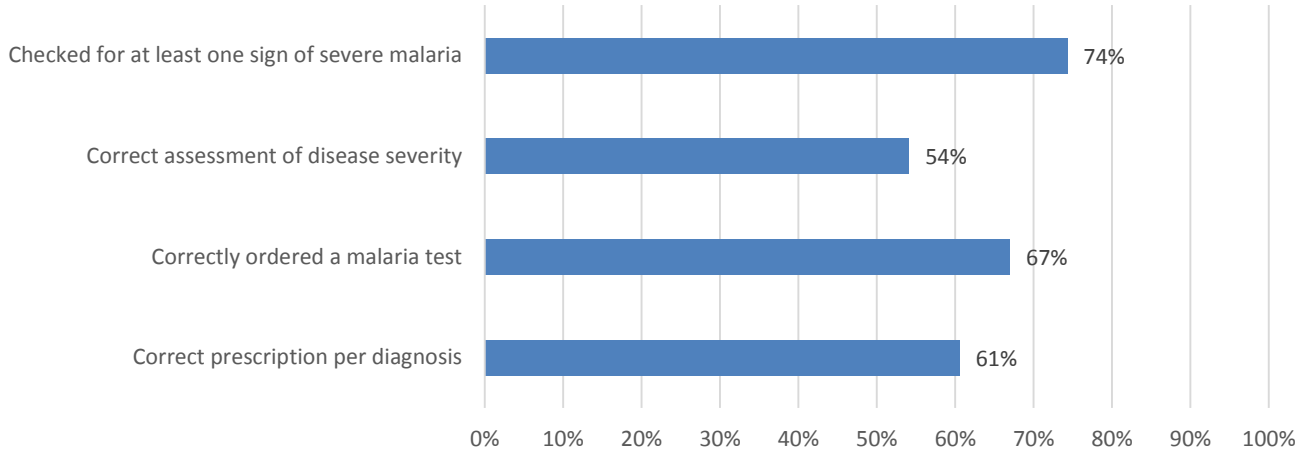
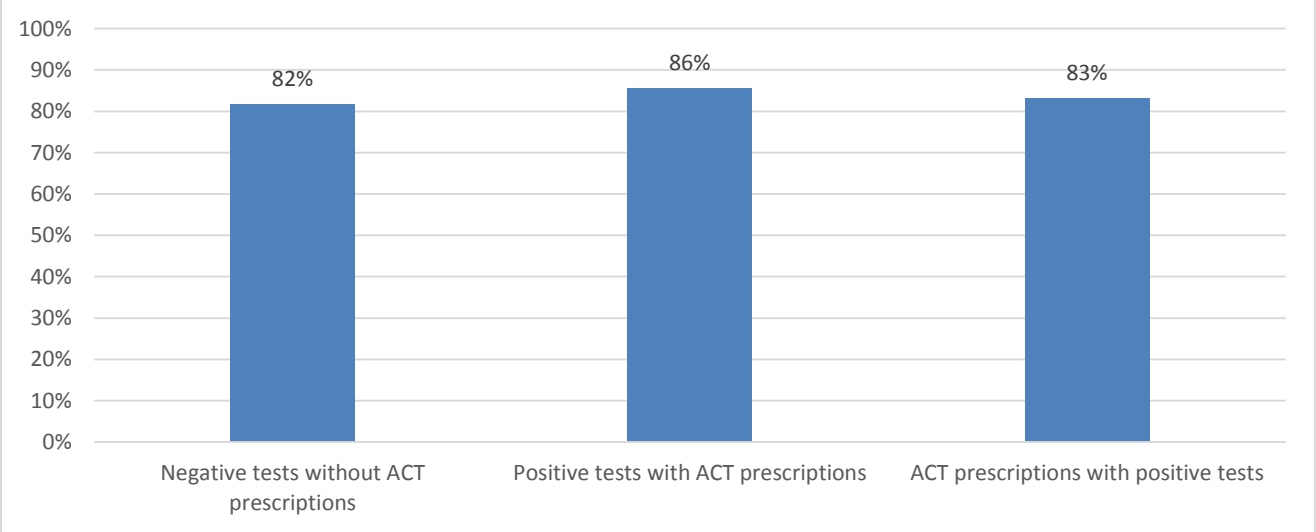


Figure 36 shows results for baseline adherence evaluation. Under records review, adherence to negative test results and adherence to positive test results appears to be quite good – 82 percent and 86 percent respectively – with results significantly higher than other countries at baseline.

Figure 36. Proportion of health facilities reaching at least 90 percent adherence to test results, MalariaCare OTSS Round 1, Tanzania (N=153)



- During OTSS Round Two, MalariaCare piloted EDS in 85 facilities in Mwanza region. Overall, supervisors were effectively able to utilize the tablets for data collection and provide feedback to healthcare workers. Results from the EDS will be presented with the rest of the data collected during OTSS Round Two. In PY4, the project plans to roll out the EDS to all eight regions to improve both data quality and use, and mentoring capacity.

Objective 4: Strengthened laboratory systems at the country level for detecting malaria and other infectious diseases.

- Rapid health facility assessments were done in each of the eight target regions. The report is currently under review for finalization. The findings are notable for generalized poor and variable record keeping and marked variability in microscopy and clinical performance from region to region – and within districts. In contrast, competence in RDT preparation and reading was fairly good and regular across the tested regions.

Challenges

Challenge	Solution
Insufficient and/or unsteady supply of RDTs and microscopy supplies threaten improved use of test-based diagnosis.	Contribute to improving supply chain problems through encouraging proper use of registers and reporting tools during OTSS visits to health facilities. Better use of registers could help to improve quantification and ordering at the health facility level (properly filling out requisition and reporting tools). Communicate with the Medical Stores Division zonal office in Mwanza to provide feedback to health facilities when the requisition and reporting tools are not properly filled out.
Maintaining quality microscopy skills is costly.	Develop a national system of regular training and accreditation for referral hospitals and focus on RDT testing at lower level facilities.
General low knowledge and skill level in laboratory and clinical supervisor candidates. Initial refresher training showed improvement, but did not result in achieving adequate knowledge and skill levels.	Monitor supervisor performance during OTSS visits and LLWs in order to provide feedback by technical staff. Carry out yearly refresher training on malaria diagnostics, clinical care, and supervision skills.
Improving clinician skill in differential diagnosis of fever and clinical management of malaria takes time and long-term commitment.	Develop a national system of regular update training and quality improvement through decentralization of supportive supervision.
High number of facilities and a limited number of supervisors in each district to be visited during OTSS compromises accuracy of data collected and entry to the database.	The use of the EDS and selecting a smaller number of facilities to be targeted (high volume facilities and those with gaps) will allow MalariaCare to concentrate resources where they have the most impact. After the baseline round of OTSS in the three Eastern Zone regions in PY4, MalariaCare will identify one third of all facilities to be targeted for OTSS visits.

Lessons Learned

- During follow-up OTSS visits to the health facilities in the Lake Zone, it was found that in facilities where participants in the RDT QA training provided training upon their return to other workers, had generally higher

RDT observation scores than in facilities where RDT QA participants did not provide any training to their colleagues. Based on this finding, with future training MalariaCare will emphasize the need for participants to share their newly acquired skills and knowledge with their colleagues. MalariaCare will develop a mechanism for verifying that this occurs.

- During the HFAs, most regional and district health management teams were very receptive to receiving feedback on HFA findings, and open to discussing how identified problems and weaknesses could be addressed. MalariaCare will prioritize providing feedback to regional and district health management teams to encourage using data for planning.

Next steps

- Work with the NMCP to complete initial activities in the three Eastern Zone regions (Dar es Salaam, Morogoro, and Pwani), including RDT QA/supervisor training; cascading RDT QA training to individuals from each public health facility; aMDRT for regional and district microscopists; and an initial round of OTSS to each facility that received RDT QA training. Data from this OTSS round will be used to select the facilities that will need continuing supervision visits.

- Complete EDS introduction and expand electronic data collection to other targeted regions – with the goal to significantly improve the ease and quality of data collection and analysis.

Zambia

MalariaCare has continued to work across all ten provinces in Zambia to strengthen malaria case management, with a focus on expanding the country's network of highly trained OTSS supervisors and trainers. In PY3, MalariaCare supported the National Malaria Control Center's (NMCC) efforts to strengthen case management capacity at provincial, district and local level. Key components of the QA framework have been implemented by training district teams to perform OTSS QA visits at sub-district level. MalariaCare has also continued to target OTSS support to poor-performing health facilities. In addition, groundwork has been laid to help transition project data collection to a more efficient EDS.

Key accomplishments

Objective 1: The accuracy of diagnostic testing for malaria is improved to greater than 90 percent.

- OTSS Round 13 began toward the end of PY2, and final visits were completed early in PY3 (November 2014) in 93 facilities. OTSS Round 14 began in March and finished in May 2015 covering 114 facilities. Within this timeframe, MalariaCare also conducted one round of sub-district OTSS and visited 160 facilities. The following graphs show average baseline performance in malaria microscopy, RDT performance, clinical case management, adherence to negative test results during combined OTSS Rounds 13 and 14. Sub-district results are presented in Figures 37 and 38.

Figure 37a. Proportion of facilities meeting *minimum* standards for diagnostic competency, at most recent MalariaCare Zambia OTSS visit

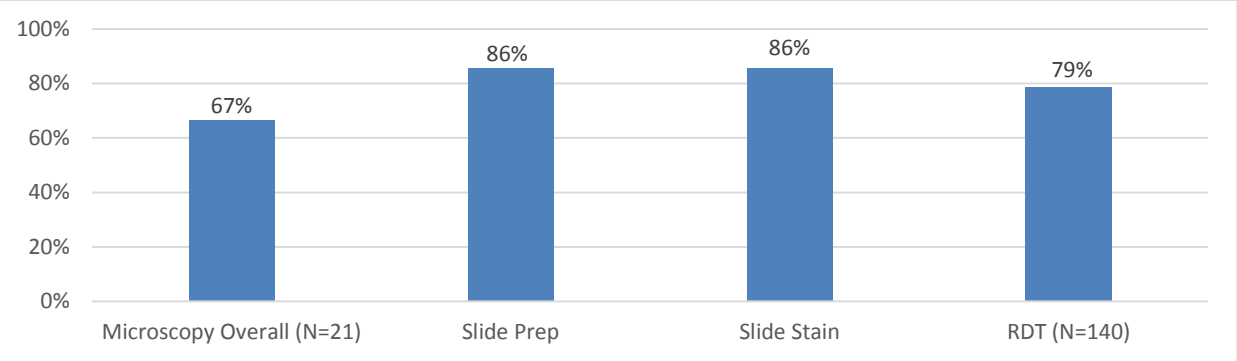
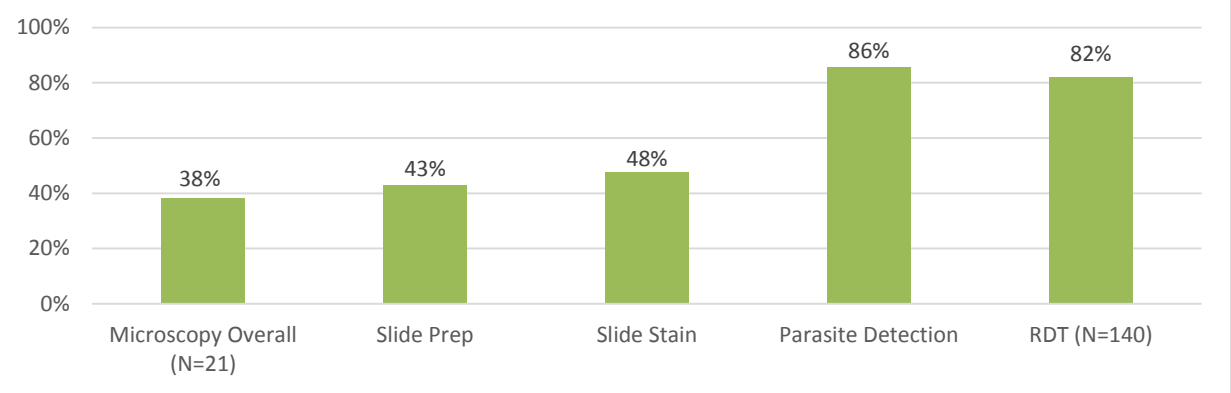


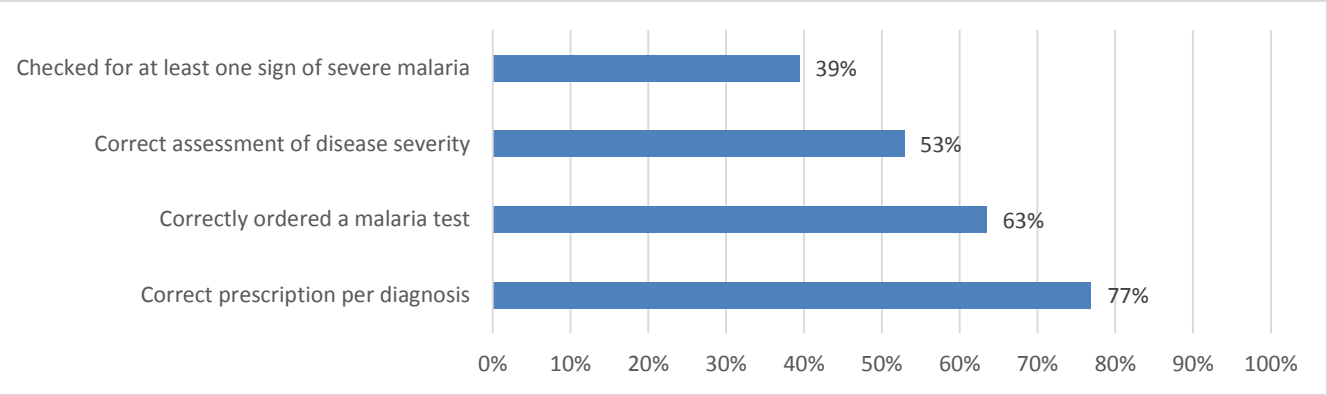
Figure 37b. Proportion of facilities meeting *overall* standards for diagnostic competency, at most recent MalariaCare Zambia OTSS visit



*Parasite detection has only an overall score, and thus minimum score is not presented for this indicator.

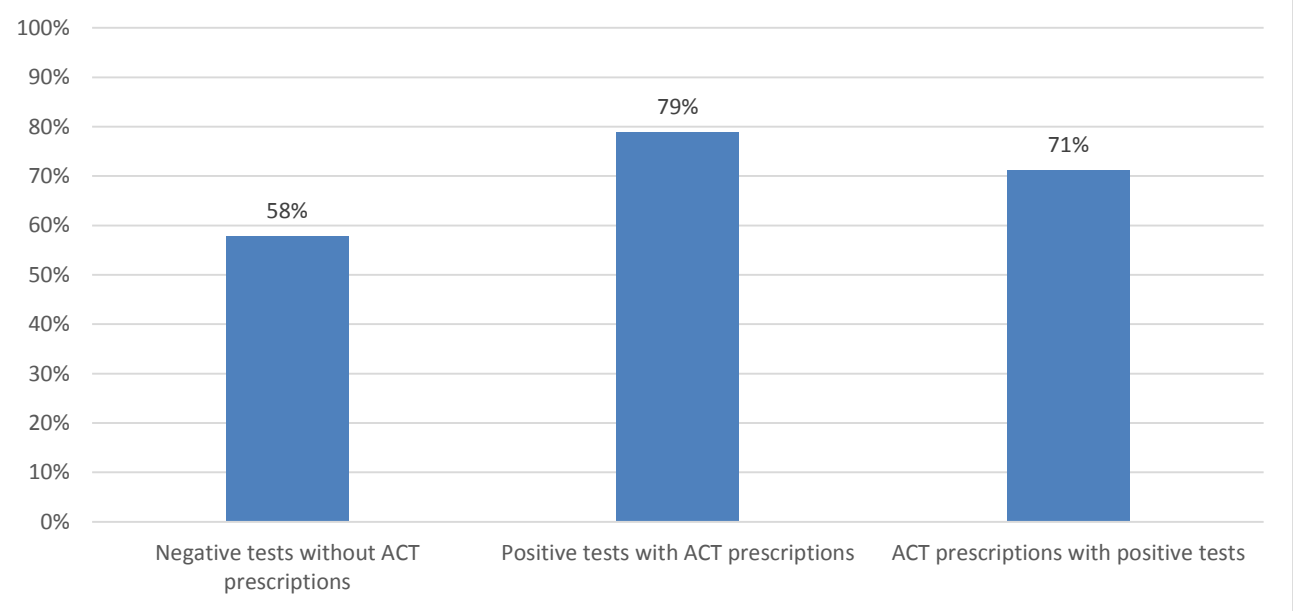
- Zambian health facilities with data for all microscopy indicators (N=21) scored mediocrely on minimum and overall standards for overall microscopy, but reported significantly higher scores for RDT (N=140). To highlight, however, the percentage of facilities scored higher on each microscopy and RDT item for the minimum standards, which indicates that they are performing the job *as required* and instructed to do.

Figure 38. Proportion of health facilities meeting minimum standard targets for clinical case management, MalariaCare Zambia Round 14, (N=104)



- Of the 104 health facilities with clinical observations data on all four minimum standards, facilities performed higher on correctly prescribing per diagnosis (77 percent) and correctly ordering a malaria test (63 percent). However, staff at facilities need to improve significantly on accurately assessing disease severity (53 percent) and routinely asking or checking for at least one sign of severe malaria (39 percent). During future OTSS, supervisors need to highlight these areas with facilities scoring lower (see Figure 39 below).

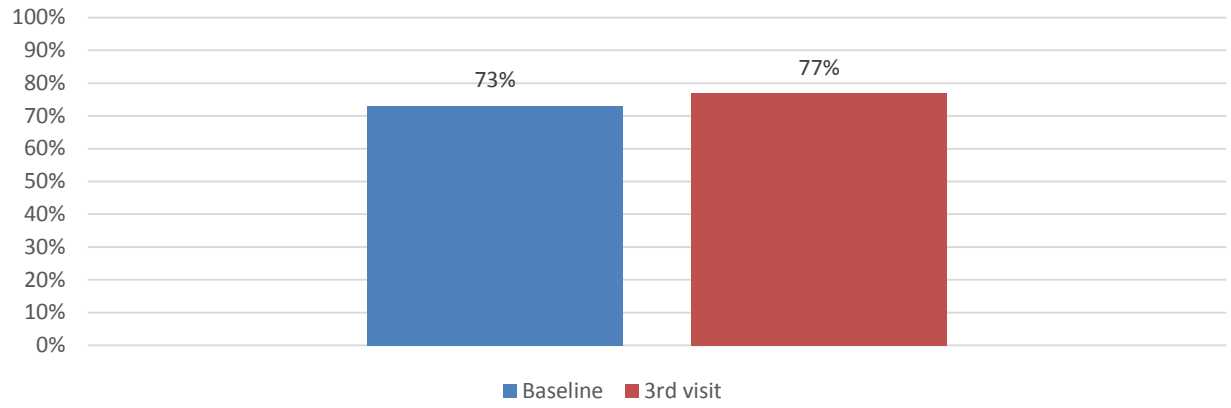
Figure 39. Proportion of health facilities reaching at least 90 percent adherence to test results, MalariaCare Zambia OTSS Round 14 (N=52)



- In Zambia's case, 58 percent of facilities met the target of 90 percent or higher adherence for patients with positive test results being prescribed an ACT and 79 percent met the adherence target for negative test results. The proportion of facilities that met the target for ACT prescriptions for patients provided only on the basis of a positive test result was 71 percent.

- As adherence to negative test results was included in the previous checklist, MalariaCare able to analyze trends for this indicator over more than one OTSS visit. The team compared the results from the first and third visit for the largest sample and consistent set of facilities. As seen in Figure 40, adherence to negative test results remained the same, with a slight improvement over the OTSS visits; for the baseline visit, 73 percent of facilities met the 90 percent adherence standard and 77 percent met the standard at the third OTSS visit. The project believes the high baseline reflects an early adoption and subsequent training of Zambian health care providers to a test-based approach (as opposed to clinical management). It also reflects a higher level of trust in malaria test results – likely gained over a longer period of time in using quality malaria testing (both microscopy and RDT).

Figure 40. Proportion of health facilities reaching at least 90 percent adherence to test results, comparison of first and third OTSS visits, (N=104)



- MalariaCare, in collaboration with the NMCC, has developed a protocol for a Zambian NAMS. Once approved by the institutional review board, sample collection will begin during peak malaria season late in 2015.
- In collaboration with the NMCC, two qualified microscopists received preparatory training for the WHO-AFRO microscopy accreditation course. In PY4, MalariaCare plans to support these staff to attend the next ECAMM course, scheduled for February 2016.

Objective 2: Increased percentage of patients suspected to have malaria or a febrile illness who receive a diagnostic test for malaria.

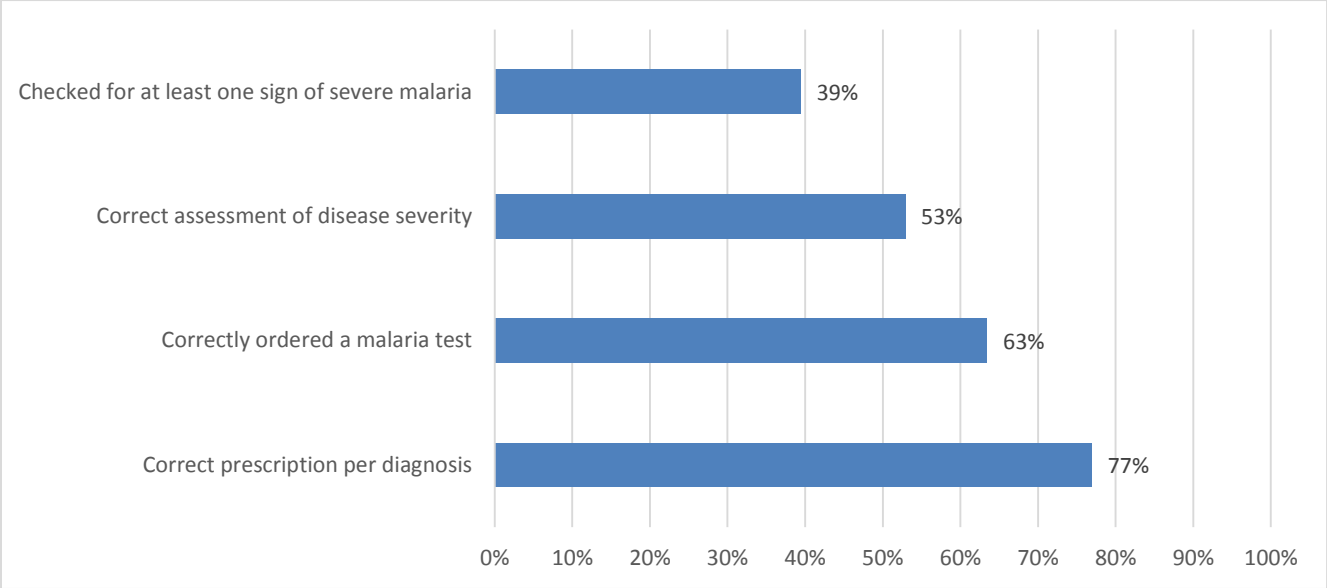
- To improve case management in lower level health facilities, MalariaCare trained 80 district health management team staff (diagnostic and clinical experts) in four provinces (Western, Central, North Western and Copperbelt) to provide QA mentoring on RDT for sub-district level health facilities. In general, participants improved both their theoretical and practical scores to near 90 percent or higher at post-test.

Table 14. Health workers trained by MalariaCare by province.

Province	Health workers trained
Western	20 trained (1 female, 19 male)
Central	20 trained (4 female, 16 male)
North Western	20 trained (6 female, 14 male)
Copperbelt	20 trained (8 female, 12 male)

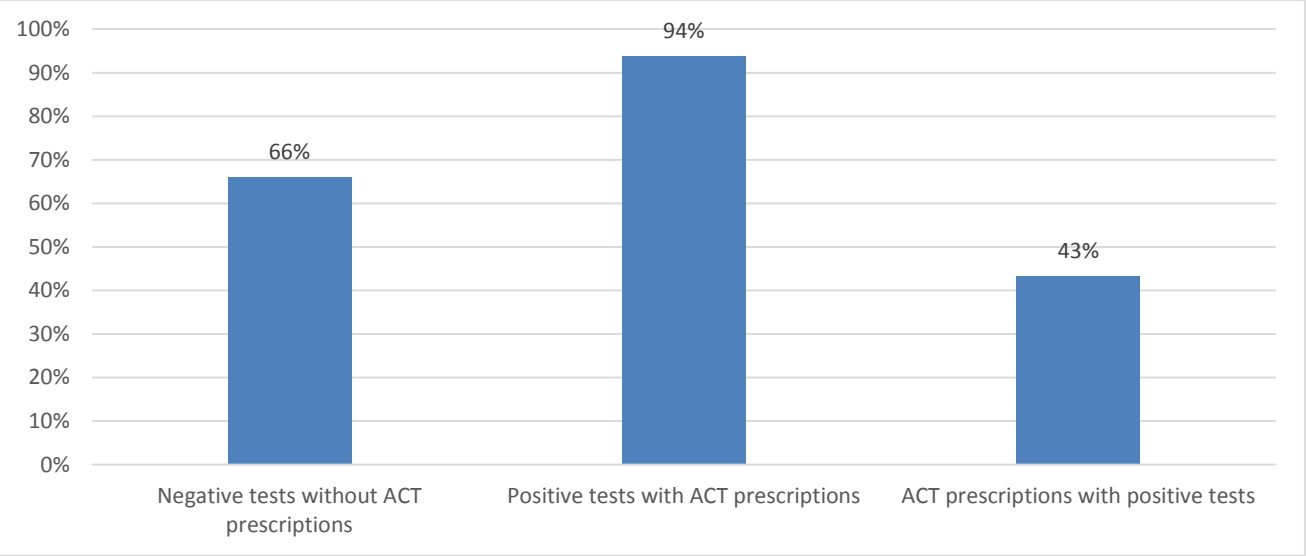
- Following the training, MalariaCare supported the trained supervisors to conduct OTSS visits to 160 sub-district level health facilities in the four respective provinces. Figures 41 and 42 below report baseline results for the facilities visited during these OTSS visits.

Figure 41: Clinical Observation Score: percent of sub-district facilities meeting minimum standard indicators, MalariaCare Zambia (N=104)



- Of the 104 sub-district health facilities with clinical observations data on all four minimum standards, facilities performed higher on correctly prescribing per diagnosis (77 percent) and correctly ordering a malaria test (75 percent) then accurately assessing disease severity (50 percent) and routinely asking or checking for at least one sign of severe malaria (41 percent). The cause of incorrect prescriptions and incorrect ordering of a malaria test are under investigation. It is unclear at this point if the low levels of assessment for disease severity and severe malaria are due to problems with checklist implementation or to poor clinical practice – this also is under investigation given that it is a new question section in the updated clinical portion of the checklist. Similar findings have been noted elsewhere (e.g. Tanzania) and the critical phenomena will likely pertain to more than Zambia.

Figure 42: Proportion of sub-district facilities with 90 percent adherence or higher, at most recent MalariaCare Zambia OTSS visit (N=97)



- To get a more complete picture of provider adherence, the new checklist evaluates this competency in three ways: 1) adherence to negative test results by not prescribing an ACT, 2) adherence to positive test results by prescribing an ACT, and 3) evaluating pharmacy and clinical records for a positive test result in patients prescribed an ACT. During the first round of OTSS in the sub-district health facilities, 94 percent of facilities met the 90 percent or higher adherence standard for patients with positive test results being prescribed an ACT. For adherence to negative test results, 66 percent of facilities met the adherence target. Finally, 43 percent of facilities that met the adherence standard for ACT prescriptions for patients provided only on the basis of a positive test result. This suggests that a significant amount of clinical diagnosis and treatment is still occurring in these facilities. An alternative hypothesis that test results were not recorded or readily identifiable in the record is also possible, and further analysis of the data quality is underway (see Figure 40 above).

District health management staff administering RDTs during training in Solwezi, North Western province.
Photo credit: Timothy Nzangwa

Objective 3: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illness consistent with the result of the diagnostic test.

- Updated the laboratory and clinical OTSS checklists to improve monitoring, facilitate quality improvements, and provide more time for onsite mentoring support.

- The team also conducted field testing of the new EDS tablet-based data collection platform. Following field testing, supervisors in Central Province (Kabwe) were trained on the EDS. MalariaCare will continue to work closely with NMCC and PMI to further roll out the system in PY4.

EDS end user pilot training in Kabwe, Central Province. Photo credit: Kelesia Lungu

- The therapeutic efficacy study protocol received institutional review board approval late in PY3; implementation will start early in PY4. The study will assess the safety and clinical effectiveness of three common ACTs for treatment of uncomplicated malaria.

Objective 4: Strengthened laboratory systems at the country level for detecting malaria and other infectious diseases.

- Conducted microscope inventory survey during OTSS. Among the 193 microscopes at 61 health facilities, 142 (73.6 percent) were functional and 51 (26.4 percent) were non-functional. Only 61.3 percent of the health facilities were able to effectively cover their microscopy diagnostic needs. Finally, regular maintenance on microscopes was performed in 61.3 percent of health facilities. A final report has been submitted to the NMCC to assist in planning needs.

Challenges

- Prolonged delays in effectively using OTSS data to make improvements continue – due primarily to missing data elements and slow input times. MalariaCare is moving forward to begin collection of all new data into an electronic format. The system is expected to facilitate and accelerate identification of problem areas and health facilities based on the minimum and overall standard criteria discussed above. MalariaCare will then work with the NMCC to target on-site interventions. The first step involves completing training of all OTSS supervisors on the use of the tablet based electronic data collection tool. This is scheduled for November 2015.
- Turn-over of OTSS supervisors is significant. MalariaCare will need to train a cadre of new laboratory and clinical specialists to allow for a complete team of provincial and district level supervisors.

Next steps

MalariaCare will continue to support improvements in health facility case management through the following major activities:

- The next round of joint OTSS (Round 15) is scheduled to occur early December 2015. Using data collected in PY3, MalariaCare will identify low performing health facilities in Western, Central, North Western and Copperbelt provinces that require targeted OTSS, including sub-district OTSS conducted by the district health management team staff trained in PY3.

- In collaboration with NMCC, MalariaCare will continue to roll out the EDS. All supervisors will be trained on the electronic checklist in November 2015, and use it to collect data in Round 15.

- Building on progress made in PY3, MalariaCare will begin mass slide production for Zambia's NAMS.

- MalariaCare will support the NMCC to implement a therapeutic efficacy study to assess clinical effectiveness and safety of three common treatments for uncomplicated malaria – to be implemented in clinical sites in Katete, Gwembe, and Isoka in early PY4.

Appendix A: Performance Monitoring Plan

Analysis note: The target is provided for all indicators that are based on supervisory checklist scores, which is the proportion of health facilities/providers meeting a pre-defined score (usually 85 percent to 90 percent), as well as the mean and median scores on the checklist, as applicable. The mean and median scores can help gauge whether the majority of health facilities/providers are approaching the threshold score.

DRC Performance Monitoring Plan

GOAL: Contribute to PMI's overall goal 50% reduction in the burden of malaria in 70% of the at-risk population in PMI focus countries

Objective 1: The accuracy of diagnostic testing for malaria is improved to greater than 90%.

Objective 2: Increased percentage of patients suspected to have malaria or febrile illness who receive a diagnostic test.

Objective 3: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illnesses-consistent with the diagnostic test**.**

Objective 4: Strengthened laboratory systems at the country level for detecting malaria and other infectious diseases.

Objective 1: The accuracy of diagnostic testing for malaria is improved to greater than 90%.

Description: The accuracy of diagnostic testing for malaria is improved to greater than 90 percent. The activities described in this section relate to addressing the laboratory technician and health care provider competency related to providing quality diagnostic services.

Intermediate Objectives

Clear and functioning quality assurance procedures for regulation of diagnostics for malaria and other febrile illnesses

Providers demonstrate competence in RDTs and/or microscopy

Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness

Country has supervisory structure for laboratory case management of malaria

Outcomes

#	Indicator	Definition	Act. #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean score	Median score	
1	Percentage of targeted laboratory technicians demonstrating competence in malaria microscopy	Number of targeted laboratory technicians who score 90% or greater on the supervisory checklist measuring slide preparation and parasite detection/total number of laboratory technicians who received a supervisory visit during the reporting period.	3.1	Providers demonstrate competence in RDTs and/or microscopy	Team supervision reports	40% threshold target (85% mean score target)	75%	70	93	90%	97%	Target met. 70 out of 93 scored higher than 90% Prep Mean: 94% Stain Mean: 89% Read Mean: 92%

Outputs													
#	Indicator	Definition	Act. #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean score	Med score	
2	Percentage of targeted facilities with at least one service provider (re)trained in malaria microscopy in the past 2 years	Number of targeted facilities with one or more service providers, who were present at the time of the supervisory visit, found to be (re)trained in malaria microscopy via government-sanctioned training institutions or courses in the past 2 years/Total number of targeted facilities	3.1	Providers demonstrate competence in RDTs and/or microscopy	Team supervision reports	80%	43%	16	37			Target not met. Less than half of the targeted facilities has at least one service provider (re)trained in malaria microscopy in the past 2 years that were present during the OTSS visit.
Objective 2: Scale up and improve access and availability to quality malaria treatment with focus on the lower health facility level.													
Description: Increased percentage of patients suspected to have malaria or febrile illnesses who receive a diagnostic test for malaria. These activities relate to addressing health care provider performance in the use of diagnostic tools after appropriate training. Emphasis is on supervision and use of performance monitoring tools.													
Intermediate Objectives													
Providers demonstrate competence in detecting suspected malaria cases													
Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases													
Providers demonstrate competence in malaria treatment													
Intermediate Outcomes													
3	Percentage of targeted facilities that meet standards for quality diagnosis of malaria via RDTs at the time of the most recent supervisory visit within the reporting period	Number of targeted facilities that meet all standards for quality diagnosis of malaria via RDTs at the time of the most recent supervisory within the reporting period/Total number targeted facilities at the time of the most recent supervisory visit within the reporting period.	3.1 3.2	Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases	Team supervision reports	80%	42%	8	19			Target not met. During subsequent rounds of OTSS, the team will focus on mentoring on RDT diagnosis.

#	Indicator	Definition	Act. #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	%	Num	Den	Mean score	Median score	Comment
4	Percentage of targeted service providers demonstrating competence in RDTs at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who score ≥ 90% or greater on supervisory checklists measuring the proper use of malaria RDTs and correct interpretation of their results at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers evaluated on RDT use and interpretation of their results at the time of the most recent supervisory visit within the reporting period	3.1; 3.2	Providers demonstrate competence in RDTs and/or microscopy	Team supervision reports	50% threshold target (80% mean target)	50%	62	123	84%	93%	Target met.
5	Percentage of targeted service providers who demonstrate competence in the clinical evaluation of febrile cases at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who appropriately complete ≥ 85% of recommended steps for the clinical evaluation of febrile cases at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers observed for clinical evaluation of febrile cases	3.1; 3.2	Providers demonstrate competence in detecting suspected malaria cases	Team supervision reports	40% threshold target (70% mean target)	15%	6	40	3975%	77%	Mean target met. Threshold target not met. Target not met. This indicator is based on the following minimum standards: 1) At least one of the severe disease signs asked, assessed, or apparent. 2) Supervisor agrees with whether a malaria test should be ordered 3) Correct prescription based on final diagnosis 4) Supervisor agrees with clinician's assessment of disease severity While the mean (and median) performance at 75% (77%) are approaching the targeted 85%, the threshold percentage was not met due to an underestimation in the clinical readiness at newly enrolled facilities.

#	Indicator	Definition	Act. #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	%	Num	Den	Mean score	Median score	Comment
6	Percentage of targeted service providers who received training by supervisors on documented diagnostic errors at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who received training by supervisors on documented diagnostic errors at the time of the most recent supervisory visit within the reporting period/Total number of targeted providers with documented diagnostic errors at the time of the most recent supervisory visit within the reporting period	3.1; 3.2	Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness	Team supervision reports	90%	100%	218	218			The goal is to reach at least one HCW per health facility with microscopy. 218 lab observations were conducted during OTSS. Data was not collected on diagnostic errors in the latest version of the checklist. However, on-site diagnostic mentoring was provided during 218 observations.
7	Percentage of supervisors demonstrating competence in RDTs	Number of targeted supervisors who scored greater than 90% on competence in RDT administration on as post-test during supervisor training/Total number of targeted supervisors attending supervisor training in RDTs	2.2; 2.3	Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases	Activity Reports	90%						The project will report on this target during the next reporting period. Activity 2.3 was not completed within the reporting period. MalariaCare will complete activity 2.3 in the first quarter of PY4.
Outputs												
8	Percentage of targeted service providers (re)trained in RDTs	Number of targeted service providers (re)trained in RDTs via courses directly supported by the project/Total number of targeted service providers	2.2; 2.3	Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases	Team supervision reports	95%	78.2%	471	602			Target not met. Activity 2.3 was not completed within the reporting period. There are 10 (out of 43) target health zones remaining that are receiving RDT QA training in the beginning of PY4.
9	Percentage of targeted facilities with at least one service provider (re)trained in RDTs in the past 2 years	Number of targeted facilities with one or more service providers, who were present at the time of the supervisory visit, found to be (re)trained in RDTs via government-sanctioned training institutions or courses in the past 2 years/Total number of targeted facilities	3.1; 3.2	Providers demonstrate competence in RDTs and/or microscopy	Team supervision reports	90%	49%	18	37			Target not met. Less than half of the targeted facilities has at least one service provider (re)trained in RDTs in the past 2 years that were present during the OTSS visit.

Objective 3: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illnesses-consistent with the diagnostic test.												
Description: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illnesses—consistent with the result of the diagnostic test. The activities described in this section relate to addressing health care provider performance in delivering appropriate treatment after training has occurred. Emphasis is on supervision and ongoing use of performance monitoring tools.												
Intermediate Objectives												
Health care providers demonstrate competence in malaria treatment												
Country has supervisory structures and implementation of supervision of malaria case management practices												
Intermediate Outcomes												
#	**Indicator**	**Definition**	**Act. #**	**Contributes to the following intermediate objective of MalariaCare**	**Data Source**	**Targets**	**Results**					**Comment**
							%	**Num**	**Den**	**Mean score**	**Median score**	
10	Percentage of targeted service providers demonstrating competence in malaria case management	Number of targeted service providers achieving 90% or greater on post-tests for malaria case management/Total number of targeted service providers trained in malaria case management during the reporting period. This indicator collects data on both health facility level and community-based health care providers – with relative cohorts disaggregated in final report.	2.2, 3.5	Health care providers demonstrate competence in malaria treatment	Activity Reports	75%						Activity 3.5 was not completed during PY3. This activity will be completed within the first quarter of PY4.
11	Percentage of targeted service providers demonstrating compliance to treatment for cases with positive malaria test results at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers demonstrating compliance to treatment for cases with positive malaria test results at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers evaluated on compliance to treatment for cases with positive malaria test results at the time of the most recent supervisory visit within the reporting period	3.1; 3.2	Health care providers demonstrate competence in malaria treatment	Team supervision reports	85%	77%	189	246			Target not met. During subsequent rounds of OTSS, the team will focus on mentoring on treatment according to diagnostic test results.

#	Indicator	Definition	Act. #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	%	Num	Den	Mean score	Median score	Comment
12	Percentage of targeted service providers demonstrating compliance to treatment for cases with negative malaria test results at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers demonstrating compliance to treatment for cases with negative malaria test results at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers evaluated on compliance to treatment for cases with negative malaria test results at the time of the most recent supervisory visit within the reporting period	3.1; 3.2	Health care providers demonstrate competence in malaria treatment	Team supervision reports	70%	36%	82	229			Target not met. Team is investigating why this indicator is low. Anecdotally, the project team has noted that HCWs over-prescribe quinine without adherence to test results in order to charge the patient for an antimalarial.
13	Percentage of instances where service providers demonstrate adherence to malaria test results with respect to treatment practices based on pharmacy or clinic record review at the time of the most recent supervisory visit within the reporting period	Number of instances where service providers demonstrate adherence to malaria test results with respect to treatment practices based on record review at the time of the most recent supervisory visit within the reporting period/Total number of instances investigated for service providers demonstrate adherence to malaria test results with respect to treatment practices based on record review at the time of the most recent supervisory visit within the reporting period	3.1; 3.2	Health care providers demonstrate competence in malaria treatment	Team supervision reports	80%	57%	271	475			Target not met. Team is investigating why this indicator is low. Anecdotally, the project team has noted that HCWs over-prescribe quinine without adherence to test results in order to charge the patient for an antimalarial.
14	Percentage of targeted facilities that meet standards for high quality treatment of malaria	Number of targeted facilities that meet all standards for high quality treatment of malaria (including trained personnel, guidelines, SOPs, job aids, equipment and supplies)/Total number of targeted facilities	3.1; 3.2	Health care providers demonstrate competence in malaria treatment	Team supervision reports	70%	54%	7	13			Of the 13 facilities that reported on all five tracer elements: 1) RDT in stock: 12/13 2) Case Mgmt. Guidelines: 9/13 3) At least on person trained in Case Mgmt.: 13/13 4) No 1st line ACT Stock outs: 12/13 5) No paracetamol stock outs: 12/13

#	Indicator	Definition	Act #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean score	Median score	
15	Percentage of targeted providers who received onsite training in malaria treatment during the reporting period	Number of providers who received onsite training in malaria treatment during the reporting period/Total number of targeted providers	3.1; 3.2	Health care providers demonstrate competence in malaria treatment	Team supervision reports	90%	100%	40	40			The project targeted at least one provider per health facility visited. There were 40 providers who received on-site training during the OTSS.
Outputs												
16	Percentage of scheduled joint laboratory/clinical supervisory visits to targeted facilities that occurred within the reporting period	Number of scheduled joint laboratory/clinical supervisory visits to targeted facilities that occurred within the reporting period/Total number of scheduled joint laboratory/clinical supervisory visits to targeted facilities	3.1; 3.2	Country has supervisory structures and implementation of supervision of malaria case management practices	Team supervision reports	90%	7.8%	40	512			Because of delays in work plan approval, the project only completed one of two scheduled rounds of the joint OTSS at larger facilities (activity 3.1) visiting 40 health facilities. Because of delays in the RDT QA training for individual health facilities (activity 2.3), the project did not complete scheduled OTSS visits to the 430 smaller health facilities in the 43 target HZs (activity 3.2). Activity 3.1 and 3.2 will be complete within the first quarter of PY4.

Ghana Performance Monitoring Plan

GOAL: Contribute to PMI's overall goal 50% reduction in the burden of malaria in 70% of the at-risk population in PMI focus countries.

Objective 1: Scale up and improve access to and availability of quality malaria diagnostic services, with a focus on the lower health facility level

Objective 2: Scale up and improve access to and availability of high-quality malaria treatment, with a focus on the lower health facility level.

Objective 3: Improve the accuracy, reliability, and availability of health information management systems

Objective 4: Strengthen technical management ability at the regional level for implementing programs and activities.

Objective 5: Program management

Objective 1: Scale up and improve access to and availability of quality malaria diagnostic services, with a focus on the lower health facility level

Description: Scale up and improve access to and availability of quality malaria diagnostic services, with a focus on the lower health facility level
The activities described in this section relate to addressing the laboratory technician and health care provider competency related to providing quality diagnostic services.

Intermediate Objectives

Clear and disseminated laboratory guidelines, procurement policies, supervision structures
Clear and functioning quality assurance procedures for regulation of diagnostics for malaria and other febrile illnesses
Reporting on malaria indicators is complete and accurate
Country has complete national guidelines for the diagnosis of malaria
Providers demonstrate competence in RDTs and/or microscopy
Country has supervisory structure for laboratory case management of malaria

Intermediate Outcomes

#	Indicator	Definition	Relevant Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	Results					Comment
							%	Num	Den	Mean score	Med score	
1	Percentage of targeted service providers demonstrating competence in malaria microscopy at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who score ≥ 90% or greater on supervisory checklists measuring slide preparation, staining and reading at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers evaluated on malaria microscopy at the time of the most recent supervisory visit within the reporting period	1.5, 1.6	Providers demonstrate competence in RDTs and/or microscopy	Team supervision reports	80%						Target not reached. This activity was not conducted in PY3. [5]

[5] MalariaCare's role was intended to provide technical assistance to the CLU to carry laboratory OTSS out. Laboratory OTSS was not conducted in Ghana in PY3 due to delay in finalizing the funding mechanism between PMI and the GHS for the CLU to carry the activity out.

#	Indicator	Definition	Relevant Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	Results					Comment
							%	Num	Den	Mean score	Median score	
2	Percentage of service providers participating in basic MDRT courses who demonstrate competence in malaria microscopy	Number of service providers participating in basic MDRT courses who meet minimum competency levels for peripheral level microscopists in malaria microscopy/Total number of service providers participating in basic MDRT courses	1.4	Providers demonstrate competence in RDTs and/or microscopy	Training reports	85%	58%	80	137			Target not reached. This year's MDRT prioritized new lab staff coupled with the fact that there had also not been any lab OTSS visits for 2 years, which would have provided further support and coaching to the low-performing personnel.
3	Percentage of national level microscopy trainers and laboratory supervisors participating in advanced MDRT courses who demonstrate competence in malaria microscopy	Number of national level microscopy trainers and laboratory supervisors who achieve competency in parasite detection, species identification and quantification during the advanced MDRT post-test/Total number of national level microscopy trainers and laboratory supervisors participating in advanced MDRT courses	1.1	Country has supervisory structure for laboratory case management of malaria	Training reports	80%	22%	9	41	PD: 87% Species ID: 70% Counting: 64%	PD: 87% Species ID: 75% Counting: 67%	Target not reached. 22% of supervisors scored at WHO level 2 equivalent (combined score-detection, species ID, & density). However 83% scored at WHO level 1 or 2 equivalent for parasite detection.
4	Percentage of service providers participating in any MDRT courses who demonstrate competence in RDTs	Number of service providers who score 90% or greater in reading and interpretation of RDTs during any MDRT post-test/Total number of service providers participating in any MDRT courses	1.1, 1.4, 1.8, 1.9	Providers demonstrate competence in RDTs and/or microscopy	Activity reports	85%	66%	70	106			Target not reached. This year's MDRT prioritized new lab staff coupled with the fact that there had also not been any lab OTSS visits for 2 years, which would have provided further support and coaching to the low-performing personnel. Data was collected for this indicator during the second half of PY3. As such, data was collected for only four regions.

#	Indicator	Definition	Relevant Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Median score	Comment
5	Percentage of targeted facilities with at least one service provider (re)trained in malaria microscopy in the past 2 years	Number of targeted facilities with one or more service providers, who were present at the time of the supervisory visit, found to be (re)trained in malaria microscopy via government-sanctioned training institutions or courses in the past 2 years/Total number of targeted facilities	1.4	Providers demonstrate competence in RDTs and/or microscopy	Team supervision reports	90%						Target not reached. This activity was not conducted in PY3[1.]
6	Percentage of targeted facilities that meet standards for quality diagnosis of malaria via microscopy at the time of the most recent supervisory visit within the reporting period	Number of targeted facilities that meet all standards for quality diagnosis of malaria via microscopy at the time of the most recent supervisory within the reporting period/Total number targeted facilities at the time of the most recent supervisory visit within the reporting period	1.4	Country has supervisory structure for laboratory case management of malaria	Team supervision reports	50%						Target not reached. This activity was not conducted in PY3[1.]
7	Percentage of targeted laboratories demonstrating competence in malaria microscopy at the time of the most recent supervisory visit within the reporting period	Number of targeted laboratories that meet minimum competency levels for peripheral level microscopists in malaria microscopy via PT panels at the time of the most recent supervisory visit within the reporting period/Total number of targeted laboratories evaluated for minimum competency levels for peripheral level microscopists in malaria microscopy via PT panels at the time of the most recent supervisory visit within the reporting period	1.5, 1.6	Reference laboratories and facilities able to provide high quality diagnostics for malaria and other febrile illnesses	Training reports	80%						Target not reached. This activity was not conducted in PY3[1.]
8	Percentage of targeted laboratories with instituted IQA measures for malaria microscopy at the time of the most recent supervisory visit within the reporting period	Number of targeted laboratories practicing at least 75% of recommended IQA measures for malaria microscopy at the time of the most recent supervisory visit within the reporting period/Total number targeted laboratories at the time of the most recent supervisory visit within the reporting period	1.5, 1.6	Clear and functioning quality assurance procedures for regulation of diagnostics for malaria and other febrile illnesses	Training reports	70%						Target not reached. This activity was not conducted in PY3[1.].

Outputs												
#	Indicator	Definition	Relevant Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
9	Percentage of targeted service providers participating in basic MDRT courses	Number of targeted service providers participating in basic MDRT courses/Total number of targeted service providers	1.4	Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illnesses	Training/ Activity reports	90%	81%	243	300			Target not reached. The total number of lab staff released for training by regions and health facilities was 243.
10	Percentage of scheduled laboratory only supervisory visits to targeted facilities that occurred within the reporting period	Number of scheduled laboratory only supervisory visits to targeted facilities that occurred within the reporting period/Total number of scheduled laboratory only supervisory visits to targeted facilities	1.5, 1.6	Country has supervisory structure for laboratory case management of malaria	Team supervision reports	90%	0%	0	4			Target not reached. This activity was not conducted in PY3[1.]

Objective 2: Scale up and improve access to and availability of high-quality malaria treatment, with a focus on the lower health facility level.

Description: Scale up and improve access to and availability of high-quality malaria treatment, with a focus on the lower health facility level. These activities relate to addressing health care provider performance in the use of diagnostic tools and case management after appropriate training. Emphasis is on supervision and use of performance monitoring tools.

Intermediate Objectives

Providers demonstrate competence in detecting suspected malaria cases

Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases

Providers demonstrate competence in malaria treatment

Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness

Private facilities are linked with the public sector

Intermediate Outcomes

#	Indicator	Definition	Relevant Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
11	Percentage of targeted service providers demonstrating competence in RDTs at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who score ≥ 90% or greater on supervisory checklists measuring the proper use of malaria RDTs and correct interpretation of their results at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers evaluated on RDT use and interpretation of their results at the time of the most recent supervisory visit within the reporting period	2.3	Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases	Team supervision reports	85%	68%	1163	1721	92%	94%	Target not reached. OTSS teams at district level will continue to target low performing providers during subsequent rounds of OTSS and in targeted mentorships. Median and mean performance is encouraging and also shows an improvement over mid-year results.
12	Percentage of targeted service providers who demonstrate competence in the clinical evaluation of febrile cases at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who correctly complete ≥ 85% of recommended steps for the clinical evaluation of febrile cases at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers observed for clinical evaluation of febrile cases	2.3	Providers demonstrate competence in detecting suspected malaria cases	Team supervision reports	80%	75%	1245	1650	92%	100%	Target not reached. OTSS teams at district level will target low performing providers during subsequent rounds of OTSS and in targeted mentorships. Median and mean performance is encouraging.

#	Indicator	Definition	Relevant Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
13	Percentage of targeted service providers who demonstrate competence in ordering malaria tests for suspected malaria cases at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who order malaria tests for suspected malaria cases at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers who evaluated suspected malaria cases at the time of the most recent supervisory visit within the reporting period	2.3	Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases	Team supervision reports	90%	96%	1567	1628			Target exceeded.
14	Percentage of targeted facilities that meet standards for malaria service readiness/treatment	Number of targeted facilities that meet standards for malaria service readiness/treatment at the time of the most recent supervisory visit within the reporting period/Total number of targeted facilities that received a supervisory visit during the reporting period	2.3, 2.5, 2.16, 2.17	Facilities are able to provide high quality case management services for malaria and other febrile illness	Team supervision reports	50%	41%	559	1359			Target not reached. Multiple criteria required. Availability of revised case management guidelines was the lowest, but should improve in subsequent rounds as teams have distributed the newly printed flowcharts and guidelines.
15	Percentage of targeted service providers demonstrating compliance to treatment for cases with positive malaria test results at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers demonstrating compliance to treatment for cases with positive malaria test results at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers evaluated on compliance to treatment for cases with positive malaria test results at the time of the most recent supervisory visit within the reporting period	2.3,2.5, 2.16, 2.17	Service providers demonstrate competence in malaria treatment	Team supervision reports	95%	95%	1074	1125			Target reached.

#	Indicator	Definition	Relevant Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
16	Percentage of targeted service providers demonstrating compliance to treatment for cases with negative malaria test results at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers demonstrating compliance to treatment for cases with negative malaria test results at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers evaluated on compliance to treatment for cases with negative malaria test results at the time of the most recent supervisory visit within the reporting period	2.3, 2.5, 2.16, 2.17	Service providers demonstrate competence in malaria treatment	Team supervision reports	70%	77%	214	279			Target exceeded.
17	Percentage of instances where service providers demonstrate adherence to malaria test results with respect to treatment practices based on record review at the time of the most recent supervisory visit within the reporting period	Number of instances where service providers demonstrate adherence to malaria test results with respect to treatment practices based on record review at the time of the most recent supervisory visit within the reporting period/Total number of instances investigated for service providers demonstrate adherence to malaria test results with respect to treatment practices based on record review at the time of the most recent supervisory visit within the reporting period	2.3, 2.5, 2.16, 2.17	Service providers demonstrate competence in malaria treatment	Team supervision reports	80%	88%	7528	8507			Target exceeded.
18	Percentage of targeted service providers who received training by supervisors on documented diagnostic errors at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who received training by supervisors on documented diagnostic errors at the time of the most recent supervisory visit within the reporting period/Total number of targeted providers with documented diagnostic errors at the time of the most recent supervisory visit within the reporting period	1.5, 1.6	Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness	Team supervision reports	90%	99%	1178	1194			Target exceeded.

#	Indicator	Definition	Relevant Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
19	Percentage of service providers who received training from supervisors on documented clinical case management errors at the time of the most recent supervisory visit within the reporting period	Number of service providers who received training from supervisors on documented clinical case management errors at the time of the most recent supervisory visit within the reporting period/Total number of service providers with documented clinical case management errors at the time of the most recent supervisory visit within the reporting period	2.3, 2.5	Providers demonstrate competence in malaria treatment	Team supervision reports	90%	99%	1178	1194			Target exceeded.
Outputs												
19	Percentage of targeted service providers (re)trained in RDTs	Number of targeted service providers (re)trained in RDTs via stand-alone courses directly supported by the project/Total number of targeted service providers	1.8, 1.9	Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases	Training reports	90%	91%	3108	3400			Target reached. Some RDT training was carried out alongside the case management training.
20	Percentage of targeted service providers (re)trained in clinical case management of febrile illnesses	Number of targeted service providers (re)trained in clinical case management of febrile illnesses/Total number of targeted service providers	2.3, 2.6, 2.14, 2.16	Service providers demonstrate competence in malaria treatment	Training/Activity reports	90%	84%	2142	2560			Target not reached. NMCP conducted similar training in some of the target districts, therefore there was no need to repeat the training.
21	Percentage of targeted service providers trained in clinical supervision of case management of febrile illnesses	Number of targeted service providers trained in clinical supervision of case management of febrile illnesses/Total number of targeted service providers	2.2	Country has supervisory structures and implementation of supervision of malaria case management practices	Training/Activity reports	90%	85%	651	770			Target not reached. Total number of supervisors available from the regions and districts at the time of the training was 651. This did not affect the conduct of OTSS as all districts had a minimum of four supervisors trained.

Objective 3: Improve the accuracy, reliability, and availability of health information management systems												
Description: Improve the accuracy, reliability, and availability of health information management systems. The activities described in this section relate to addressing district and regional staff performance in monitoring and evaluating malaria activities.												
Intermediate Objectives												
Reporting and monitoring information for malaria is integrated, complete and accurate												
Outputs												
#	**Indicator**	**Definition**	**Relevant Activity #**	**Contributes to MalariaCare intermediate objective(s)**	**Data Source**	**Targets**	**%**	**Num**	**Den**	**Mean score**	**Med score**	**Comment**
23	Percentage of targeted service providers (re)trained in M&E and/or data management practices	Number of targeted service providers (re)trained in M&E and/or data management practices/Total number of targeted service providers	3.4, 3.7	Reporting and monitoring information for malaria is integrated, complete and accurate	Training/ Activity reports	90%	151%	106	70			Target exceeded.
24	Percentage of scheduled M&E/data management supervisory visits to targeted facilities that occurred within the reporting period	Number of scheduled M&E/data management supervisory visits to targeted facilities that occurred within the reporting period/Total number of scheduled M&E/data management supervisory visits to targeted facilities	3.3	Reporting and monitoring information for malaria is integrated, complete and accurate	Team supervision reports	90%	100%	3	3			Target exceeded.
25	Percentage of targeted service providers who received training by supervisors on documented M&E and/or data management errors within the reporting period at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers that received training by supervisors at the time of the most recent supervisory visit on documented M&E and/or data management errors within the reporting period/Total number of targeted providers with documented M&E and/or data management errors at the time of the most recent supervisory visit within the reporting period	3.3	Reporting and monitoring information for malaria is integrated, complete and accurate	Team supervision reports	90%	99%	1178	1194			Target exceeded.

Objective 4: Strengthen technical management ability at the regional level for implementing programs and activities.												
Description: Strengthen technical management ability at the regional level for implementing programs and activities. These activities relate to addressing the health systems management issues that are a barrier to achieving universal access to malaria diagnostics and appropriate case management practices such as program management, use of data for decision-making, human and financial resources, and support systems required to deliver quality diagnosis and treatment services.												
Intermediate Objectives												
Regional and district directors use DHIMS2 and OTSS data to guide programmatic decision making												
Regional and District Health Management Teams demonstrate good governance and accountability practices												
Outputs												
#	**Indicator**	**Definition**	**Relevant Activity #**	**Contributes to MalariaCare intermediate objective(s)**	**Data Source**	**Targets**	**%**	**Num**	**Den**	**Mean score**	**Med score**	**Comment**
26	Percentage of targeted regional and district health management team staff (re)trained in program management skills	Number of targeted regional and district health management team staff (re)trained in program management skills/Total number of regional and district health management team staff	4.1, 4.2	Regional and district directors use DHIMS2 and OTSS data to guide programmatic decision making; Regional and District Health Management Teams demonstrate good governance and accountability practices	Training/ Activity reports	90%	100%	10	10			Target exceeded.
27	Number of regions successfully handed over to Systems for Health for continued implementation				Training/ Activity reports	5	100%	5	5			Target reached.

Project Management: Assure the visibility and support the mission of PMI through strong partner relationships.												
Description: Through a strong partnership, MalariaCare will support the mission of PMI and assure the visibility of PMI programs in targeted countries. These activities relate to project management, communications and leadership.												
Intermediate Objectives												
All key MalariaCare partners contribute to and are represented in the annual country work plans.												
In-country coordinators are hired/retained in MalariaCare focus countries.												
PMI and focus countries are aware of MalariaCare's objectives and buy into the MalariaCare program.												
Outputs												
#	**Indicator**	**Definition**	**Relevant Activity #**	**Contributes to MalariaCare intermediate objective(s)**	**Data Source**	**Targets**	**%**	**Num**	**Den**	**Mean score**	**Med score**	**Comment**
28	Number of senior technical committee meetings held during the reporting period.	Number of senior technical committee meetings held during the reporting period.		All key MalariaCare partners contribute to and are represented in the annual country work plans.	Activity reports	0	6					No target set. Six meetings held.
29	Number of program activity reports or evaluations disseminated to the global health community through publication, conference papers/posters, listservs or other communication methods.	Number of program activity reports or evaluations disseminated to the global health community through publication, conference papers/posters, listservs or other communication methods.		All key MalariaCare partners contribute to and are represented in the annual country work plans.	Activity reports	0	3					No target set.

Kenya Performance Monitoring Plan
GOAL: Contribute to PMI's overall goal 50% reduction in the burden of malaria in 70% of the at-risk population in PMI focus countries.
Objective 1: The accuracy of diagnostic testing for malaria is improved to greater than 90%.
Objective 2: Increased percentage of patients suspected to have malaria or febrile illness who receive a diagnostic test.
Objective 3: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illnesses-consistent with the diagnostic test**.**
Objective 4: Strengthened laboratory systems at the country level for detecting malaria and other infectious diseases.
Objective 1: The accuracy of diagnostic testing for malaria is improved to greater than 90%.
Description: The accuracy of diagnostic testing for malaria is improved to greater than 90 percent. The activities described in this section relate to addressing the laboratory technician and health care provider competency related to providing quality diagnostic services.
Intermediate Objectives
Clear and disseminated laboratory guidelines, procurement policies, supervision structures
Clear and functioning quality assurance procedures for regulation of diagnostics for malaria and other febrile illnesses
Reporting on malaria indicators is complete and accurate
Country has complete national guidelines for the diagnosis of malaria
Providers demonstrate competence in RDTs and/or microscopy
Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness
Country has supervisory structure for laboratory diagnosis of malaria

Intermediate Outcomes													
#	Indicator	Definition	Relevant Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	Results					Comment
							%	Num	Den	Mean score	Med score	
1	Percentage of targeted service providers demonstrating competence in malaria microscopy at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who score ≥ 90% or greater on supervisory checklists measuring slide preparation, staining and reading at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers evaluated on malaria microscopy at the time of the most recent supervisory visit within the reporting period	3.2	Providers demonstrate competence in RDTs and/or microscopy	Team supervision reports	50%						Target not yet reached, this activity is scheduled to take place in PY4. [6]

[6] The Kenya PMP covers an 18 month period from January 2015 to September 2016 (MalariaCare PY3 – PY4). This indicator is reporting on an activity that was scheduled to take place within the MalariaCare PY4.

#	Indicator	Definition	Relevant Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	Results					
							%	Num	Den	Mean score	Med score	Comment
2	Percentage of national level microscopy trainers and laboratory supervisors participating in advanced MDRT courses who demonstrate competence in malaria microscopy	Number of national level microscopy trainers and laboratory supervisors who achieve an equivalent score to a WHO ECAMM Level 1 or 2 designation for parasite detection and quantification during the advanced MDRT post-test/Total number of national level microscopy trainers and laboratory supervisors participating in advanced MDRT courses	1.1,4.4	Providers demonstrate competence in RDTs and/or microscopy	Training reports	50%	0%	0	23	PD: 85% Species ID: 50% Counting: 31%	PD: 83% Species ID: 52% Counting: 33%	Target not reached. No baseline competency data available at the time target set. Counting scores responsible for not meeting target. However 82.6% of participants passed the WHO L2 criteria for parasite detection (>80%).
3	Percentage of service providers participating in basic MDRT courses who demonstrate competence in malaria microscopy	Number of service providers participating in basic MDRT courses who meet minimum competency levels for peripheral level microscopists in malaria microscopy/Total number of service providers participating in basic MDRT courses	1.3	Providers demonstrate competence in RDTs and/or microscopy	Training reports	70%	0%					Target not yet reached. Please refer to footnote 3.
4	Percentage of service providers participating in any MDRT courses who demonstrate competence in RDTs	Number of service providers who score 90% or greater in reading and interpretation of RDTs during any MDRT post-test/Total number of service providers participating in any MDRT courses	1.1,1.3,4.4	Providers demonstrate competence in RDTs and/or microscopy	Activity Reports	70%	0%	0	22	69%	72%	Target not reached. No service providers scored higher than 90% on RDT competency. Only 22 of 23 MDRT participants had a score recorded.

#	Indicator	Definition	Relevant Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
5	Percentage of targeted facilities with at least one service provider (re)trained in malaria microscopy in the past 2 years	Number of targeted facilities with one or more service providers, who were present at the time of the supervisory visit, found to be (re)trained in malaria microscopy via government-sanctioned training institutions or courses in the past 2 years/Total number of targeted facilities	3.2	Providers demonstrate competence in RDTs and/or microscopy	Team supervision reports	75%						Target not reached. Please refer to footnote 3.
Outputs												
6	Percentage of targeted service providers participating in basic MDRT courses	Number of targeted service providers participating in advanced MDRT courses/Total number of targeted service providers	1.1	Providers demonstrate competence in RDTs and/or microscopy	Activity/ Training Reports	100%						Target not reached. Please refer to footnote 3.
7	Percentage of targeted service providers participating in advanced MDRT courses	Number of targeted service providers participating in advanced MDRT courses/Total number of targeted service providers	1.1	Providers demonstrate competence in RDTs and/or microscopy	Activity/ Training Reports	100%	95%	23	24			Target not reached. One of the selected supervisors was promoted, which does not allow him time to serve as an OTSS supervisor and therefore, did not attend the MDRT. A replacement will be selected and trained as part of the PY4 MDRTs.

Objective 2: Increased percentage of patients suspected to have malaria or febrile illness who receive a diagnostic test.												
Description: Increased percentage of patients suspected to have malaria or febrile illnesses who receive a diagnostic test for malaria. These activities relate to addressing health care provider performance in the use of diagnostic tools after appropriate training. Emphasis is on supervision and use of performance monitoring tools.												
Intermediate Objectives												
Providers demonstrate competence in detecting suspected malaria cases												
Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases												
Providers demonstrate competence in malaria treatment												
Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness												
Private facilities are linked with the public sector												
Intermediate Outcomes												
#	**Indicator**	**Definition**	**Relevant Activity #**	**Contributes to MalariaCare intermediate objective(s)**	**Data Source**	**Targets**	**%**	**Num**	**Den**	**Mean score**	**Med score**	**Comment**
8	Percentage of targeted service providers demonstrating competence in RDTs at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who received training by supervisors on documented diagnostic errors at the time of the most recent supervisory visit within the reporting period/Total number of targeted providers with documented diagnostic errors at the time of the most recent supervisory visit within the reporting period	3.2	Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases	Team supervision reports	70%						Target not reached. Please refer to footnote 3.
9	Percentage of targeted facilities with at least one service provider (re)trained in RDTs in the past 2 years	Number of targeted service providers who score ≥ 90% or greater on supervisory checklists measuring the proper use of malaria RDTs and correct interpretation of their results at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers evaluated on RDT use and interpretation of their results at the time of the most recent supervisory visit within the reporting period	2.1	Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases	Team supervision reports	85%						Target not reached. Please refer to footnote 3.

#	Indicator	Definition	Relevant Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
10	Percentage of targeted service providers who demonstrate competence in the clinical evaluation of febrile cases at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who appropriately complete ≥ 85% of recommended steps for the clinical evaluation of febrile cases at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers observed for clinical evaluation of febrile cases	3.1	Providers demonstrate competence in detecting suspected malaria cases	Team supervision reports	60%						Target not reached. Please refer to footnote 3.
11	Percentage of targeted service providers who demonstrate competence in ordering malaria tests for suspected malaria cases at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who order malaria tests for suspected malaria cases at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers who evaluated suspected malaria cases at the time of the most recent supervisory visit within the reporting period	3.2	Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases	Team supervision reports	95%						Target not reached. Please refer to footnote 3.
Outputs												
12	Percentage of targeted service providers (re)trained in RDTs	Number of targeted service providers (re)trained in RDTs via stand-alone courses directly supported by the project/Total number of targeted service providers	2.1	Providers demonstrate competence in RDTs and/or microscopy	Training Reports	100%						Target not reached. Please refer to footnote 3.

Objective 3: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illnesses-consistent with the diagnostic test.

Description: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illnesses—consistent with the result of the diagnostic test. The activities described in this section relate to addressing health care provider performance in delivering appropriate treatment after training has occurred. Emphasis is on supervision and ongoing use of performance monitoring tools.

Intermediate Objectives

Country has full national policies for malaria treatment

Service providers demonstrate competence in malaria treatment

Facilities are able to provide high quality case management services for malaria and other febrile illness

Country has supervisory structures and implementation of supervision of malaria case management practices

Intermediate Outcomes

#	Indicator	Definition	Relevant Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
13	Percentage of targeted service providers demonstrating compliance to treatment for cases with positive malaria test results at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers demonstrating compliance to treatment for cases with positive malaria test results at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers evaluated on compliance to treatment for cases with positive malaria test results at the time of the most recent supervisory visit within the reporting period	3.2	Service providers demonstrate competence in malaria treatment	Team supervision reports	95%						Target not reached. Please refer to footnote 3.
14	Percentage of targeted service providers demonstrating compliance to treatment for cases with negative malaria test results at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers demonstrating compliance to treatment for cases with negative malaria test results at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers evaluated on compliance to treatment for cases with negative malaria test results at the time of the most recent supervisory visit within the reporting period	3.2	Service providers demonstrate competence in malaria treatment	Team supervision reports	90%						Target not reached. Please refer to footnote 3.

#	Indicator	Definition	Relevant Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
15	Percentage of instances where service providers demonstrate adherence to malaria test results with respect to treatment practices based on record review at the time of the most recent supervisory visit within the reporting period	Number of instances where service providers demonstrate adherence to malaria test results with respect to treatment practices based on record review at the time of the most recent supervisory visit within the reporting period/Total number of instances investigated for service providers demonstrate adherence to malaria test results with respect to treatment practices based on record review at the time of the most recent supervisory visit within the reporting period	3.2	Service providers demonstrate competence in malaria treatment	Team supervision reports	95%						Target not reached. Please refer to footnote 3.
Outputs												
16	Percentage of targeted service providers (re)trained in clinical case management of febrile illnesses	Number of targeted service providers (re)trained in clinical case management of febrile illnesses/Total number of targeted service providers	3.1	Facilities are able to provide high quality case management services for malaria and other febrile illness	Training/ Activity reports	100%	100%	24	24			Target reached.
17	Percentage of scheduled joint laboratory/clinical supervisory visits to targeted facilities that occurred within the reporting period	Number of scheduled joint laboratory/clinical supervisory visits to targeted facilities that occurred within the reporting period/Total number of scheduled joint laboratory/clinical supervisory visits to targeted facilities	3.2	Facilities are able to provide high quality case management services for malaria and other febrile illness	Team supervision reports	100%						Target not reached. Please refer to footnote 3.

Liberia Performance Monitoring Plan

GOAL: Contribute to PMI's overall goal 50% reduction in the burden of malaria in 70% of the at-risk population in PMI focus countries.

Objective 1: The accuracy of diagnostic testing for malaria is improved to greater than 90%.

Objective 2: Increased percentage of patients suspected to have malaria or febrile illness who receive a diagnostic test.

Objective 3: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illnesses-consistent with the diagnostic test**.**

Objective 4: Strengthened laboratory systems at the country level for detecting malaria and other infectious diseases.

Objective 1: The accuracy of diagnostic testing for malaria is improved to greater than 90%.

Description: The accuracy of diagnostic testing for malaria is improved to greater than 90 percent. The activities described in this section relate to addressing the laboratory technician and health care provider competency related to providing quality diagnostic services.

Intermediate Objectives

Clear and disseminated laboratory guidelines, procurement policies, supervision structures

Clear and functioning quality assurance procedures for regulation of diagnostics for malaria and other febrile illnesses

Reporting on malaria indicators is complete and accurate

Country has complete national guidelines for the diagnosis of malaria

Providers demonstrate competence in RDTs and/or microscopy

Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness

Country has supervisory structure for laboratory case management of malaria

Intermediate Outcomes												
#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data source	Target	Results					Comment
							%	Num	Den	Mean score	Med score	
1	Percentage of national level microscopy trainers and laboratory supervisors participating in advanced MDRT courses who demonstrate competence in malaria microscopy	Number of national level microscopy trainers and laboratory supervisors who achieve an equivalent score to a WHO ECAMM Level 1 or 2 designation for parasite detection, species identification and quantification during the advanced MDRT post-test/Total number of national level microscopy trainers and laboratory supervisors participating in advanced MDRT courses	1.1	Country has supervisory structure for laboratory case management of malaria	Training reports	60%						Target not reached. Activity has not yet occurred.[7]
2	Percentage of service providers participating in basic MDRT courses who demonstrate competence in malaria microscopy	Number of service providers participating in basic MDRT courses who meet minimum competency levels for peripheral level microscopists in malaria microscopy/Total number of service providers participating in basic MDRT courses	1.2	Providers demonstrate competence in RDTs and/or microscopy	Training reports	45%						Target not reached. Activity has not yet occurred. Refer to footnote 4.
Outputs												
3	Percentage of targeted service providers participating in basic MDRT courses	Number of targeted service providers participating in basic MDRT courses/Total number of targeted service providers	1.2	Providers demonstrate competence in RDTs and/or microscopy	Training/ Activity reports	95%						Target not reached. Activity has not yet occurred. Refer to footnote 4.
4	Percentage of targeted service providers trained in laboratory supervision of malaria case management	Number of targeted service providers trained in laboratory supervision of malaria case management/Total number of targeted service providers	1.1, 1.2	Country has supervisory structure for laboratory diagnosis of malaria	Training reports	95%						Target not reached. Activity has not yet occurred. Refer to footnote 4.

[7] The current work plan for activities in Liberia – an annex to the PY2 work plan – covers the period from June 2015 – December 2015. Activities will be implemented in the first quarter of PY4.

Madagascar Performance Monitoring Plan
GOAL: Contribute to PMI's overall goal 50% reduction in the burden of malaria in 70% of the at-risk population in PMI focus countries.
Objective 1: The accuracy of diagnostic testing for malaria is improved to greater than 90%.
Objective 2: Increased percentage of patients suspected to have malaria or febrile illness who receive a diagnostic test.
Objective 3: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illnesses-consistent with the diagnostic test**.**
Objective 4: Strengthened laboratory systems at the country level for detecting malaria and other infectious diseases.
Objective 1: The accuracy of diagnostic testing for malaria is improved to greater than 90%.
Description: The accuracy of diagnostic testing for malaria is improved to greater than 90 percent. The activities described in this section relate to addressing the laboratory technician and health care provider competency related to providing quality diagnostic services.
Intermediate Objectives
Clear and disseminated laboratory guidelines, procurement policies, supervision structures
Clear and functioning quality assurance procedures for regulation of diagnostics for malaria and other febrile illnesses
Reporting on malaria indicators is complete and accurate
Country has complete national guidelines for the diagnosis of malaria
Providers demonstrate competence in RDTs and/or microscopy
Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness
Country has supervisory structure for laboratory diagnosis of malaria

Intermediate Outcomes												
#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean score	Med score	
1	Percentage of targeted service providers demonstrating competence in malaria microscopy at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who score ≥ 90% or greater on supervisory checklists measuring slide preparation, staining and reading at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers evaluated on malaria microscopy at the time of the most recent supervisory visit within the reporting period	3.5	Providers demonstrate competence in RDTs and/or microscopy	Team supervision reports	65%						Target not reached.[8]
2	Percentage of service providers participating in basic MDRT courses who demonstrate competence in malaria parasitemia detection.	Number of service providers participating in basic MDRT courses who meet minimum competency levels for malaria parasetemia detection/Total number of service providers participating in basic MDRT courses	1.2	Providers demonstrate competence in RDTs and/or microscopy	Activity/Training Reports	80%	88%	52	59	94%	95%	Target exceeded. The mean post-test score in parasitemia detection for those technicians reaching the threshold (n=52) was 94%.
3	Percentage of service providers participating in any MDRT courses who demonstrate competence in RDTs	Number of service providers who score 90% or greater in reading and interpretation of RDTs during any MDRT post-test/Total number of service providers participating in any MDRT courses	1.1; 1.2	Providers demonstrate competence in RDTs and/or microscopy	Activity/ Training Reports	95%	100%	59	59			Target exceeded. RDT performance is based on a pass/fail system. All MDRT participants passed. No data on mean/median available as all recorded as pass/fail.

[8] The USAID/PMI Mission requested MalariaCare to reprogram funds and activities before the scheduled PY3 OTSS started. Thus, OTSS was not conducted in PY3. Central-level OTSS will be conducted in PY4.

#	Indicator	Definition	Relevant Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
4	Percentage of targeted facilities with at least one service provider (re)trained in malaria microscopy in the past 2 years	Number of targeted facilities with one or more service providers, who were present at the time of the supervisory visit, found to be (re)trained in malaria microscopy via government-sanctioned training institutions or courses in the past 2 years/Total number of targeted facilities	1.1, 1,2, 3.5	Providers demonstrate competence in RDTs and/or microscopy	Team supervision reports	45%						Target not reached. Please refer to footnote 5.
5	Percentage of targeted laboratories that meet standards for quality diagnosis of malaria including RDTs and microscopy at the time of the most recent supervisory visit within the reporting period	Number of targeted laboratories that meet all standards for quality diagnosis of malaria via RDTs and/or microscopy at the time of the most recent supervisory within the reporting period/Total number of targeted laboratories at the time of the most recent supervisory visit within the reporting period	3.5	Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness	Team supervision reports	45%						Target not reached. Please refer to footnote 5.

Outputs												
#	Indicator	Definition	Relevant Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
6	Percentage of targeted service providers participating in basic MDRT courses	Number of targeted service providers participating in basic MDRT courses/Total number of targeted service providers	1.2	Providers demonstrate competence in RDTs and/or microscopy	Activity/ Training Reports	95%	84%	59	70			Target not reached. In some instances, the project was unable to identify candidates for MDRT courses to form a full course. MalariaCare selected candidates from potential OTSS districts but candidate pools were smaller than previously anticipated.
7	Percentage of targeted service providers trained in laboratory supervision of malaria case management	Number of targeted service providers trained in laboratory supervision of malaria case management/Total number of targeted service providers	3.3; 3.4	Country has supervisory structure for laboratory diagnosis of malaria	Activity/ Training Reports	95%	76%	53	70			Target not reached. Please see the explanation above that pertains to this indicator as well. Also, some participants were dismissed from this training course due to poor performance noted during the MDRT.

Objective 2: Increased percentage of patients suspected to have malaria or febrile illness who receive a diagnostic test.												
Description: Increased percentage of patients suspected to have malaria or febrile illnesses who receive a diagnostic test for malaria. These activities relate to addressing health care provider performance in the use of diagnostic tools after appropriate training. Emphasis is on supervision and use of performance monitoring tools.												
Intermediate Objectives												
Providers demonstrate competence in detecting suspected malaria cases												
Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases												
Providers demonstrate competence in malaria treatment												
Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness												
Private facilities are linked with the public sector												
Intermediate Outcomes												
#	**Indicator**	**Definition**	**Relevant Activity #**	**Contributes to MalariaCare intermediate objective(s)**	**Data Source**	**Targets**	**%**	**Num**	**Den**	**Mean score**	**Med score**	**Comment**
8	Percentage of targeted service providers who received training by supervisors on documented diagnostic errors at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who received training by supervisors on documented diagnostic errors at the time of the most recent supervisory visit within the reporting period/Total number of targeted providers with documented diagnostic errors at the time of the most recent supervisory visit within the reporting period	3.5	Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases	Team supervision reports	90%						Target not reached. Refer to footnote 5.
9	Percentage of targeted service providers demonstrating competence in RDTs at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who score ≥ 90% or greater on supervisory checklists measuring the proper use of malaria RDTs and correct interpretation of their results at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers evaluated on RDT use and interpretation of their results at the time of the most recent supervisory visit within the reporting period	3.5	Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases	Team supervision reports	80%						Target not reached. Refer to footnote 5.

#	Indicator	Definition	Relevant Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
10	Percentage of targeted service providers who demonstrate competence in the clinical evaluation of febrile cases at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who appropriately complete ≥ 85% of recommended steps for the clinical evaluation of febrile cases at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers observed for clinical evaluation of febrile cases	3.5	Providers demonstrate competence in detecting suspected malaria cases	Team supervision reports	70%						Target not reached. Refer to footnote 5.
11	Percentage of targeted service providers who demonstrate competence in ordering malaria tests for suspected malaria cases at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who order malaria tests for suspected malaria cases at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers who evaluated suspected malaria cases at the time of the most recent supervisory visit within the reporting period	3.5	Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases	Team supervision reports	70%						Target not reached. Refer to footnote 5.
12	Percentage of targeted facilities that meet standards for quality diagnosis of malaria via RDTs at the time of the most recent supervisory visit within the reporting period	Number of targeted facilities that meet all standards for quality diagnosis of malaria via RDTs at the time of the most recent supervisory within the reporting period/Total number targeted facilities at the time of the most recent supervisory visit within the reporting period	3.5	Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness	Team supervision reports	45%						Target not reached. Refer to footnote 5.
13	Percentage of targeted facilities with at least one service provider (re)trained in RDTs in the past 2 years	Number of targeted facilities with one or more service providers, who were present at the time of the supervisory visit, found to be (re)trained in RDTs via government-sanctioned training institutions or courses in the past 2 years/Total number of targeted facilities	3.5	Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases	Team supervision reports	45%						Target not reached. Refer to footnote 5.

Objective 3: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illnesses-consistent with the diagnostic test.

Description: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illnesses—consistent with the result of the diagnostic test. The activities described in this section relate to addressing health care provider performance in delivering appropriate treatment after training has occurred. Emphasis is on supervision and ongoing use of performance monitoring tools.

Intermediate Objectives

Country has full national policies for malaria treatment

Service providers demonstrate competence in malaria treatment

Facilities are able to provide high quality case management services for malaria and other febrile illness

Country has supervisory structures and implementation of supervision of malaria case management practices

Intermediate Outcomes

#	Indicator	Definition	Relevant Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
14	Percentage of targeted facilities that meet standards for malaria service readiness/treatment	Number of targeted facilities that meet standards for malaria service readiness/treatment at the time of the most recent supervisory visit within the reporting period/Total number of targeted facilities that received a supervisory visit during the reporting period	3.5	Facilities are able to provide high quality case management services for malaria and other febrile illness	Team supervision reports	45%						Target not reached.. Refer to footnote 5.
15	Percentage of targeted service providers demonstrating compliance to ACT treatment for cases with positive malaria test results at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers demonstrating compliance to ACT treatment for cases with positive malaria test results at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers evaluated on compliance to ACT treatment for cases with positive malaria test results at the time of the most recent supervisory visit within the reporting period	3.5	Service providers demonstrate competence in malaria treatment	Team supervision reports	90%						Target not reached. Refer to footnote 5.

#	Indicator	Definition	Relevant Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
16	Percentage of targeted service providers demonstrating compliance to treatment standards for cases with negative malaria test results at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers demonstrating compliance to treatment standards for cases with negative malaria test results at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers evaluated on compliance to treatment for cases with negative malaria test results at the time of the most recent supervisory visit within the reporting period	3.5	Service providers demonstrate competence in malaria treatment	Team supervision reports	65%						Target not reached. Refer to footnote 5.
17	Percentage of records reviewed that demonstrate treatment adherence based on malaria test results through record review at the time of the most recent supervisory visit within the reporting period	Number of instances where service providers demonstrate treatment adherence based on malaria test results through record review at the time of the most recent supervisory visit within the reporting period/Total number of instances investigated for adherence to malaria test results with respect to treatment practices based on record review at the time of the most recent supervisory visit within the reporting period	3.5	Service providers demonstrate competence in malaria treatment	Team supervision reports	65%						Target not reached. Refer to footnote 5.
18	Percentage of service providers who received training from supervisors on documented clinical case management errors at the time of the most recent supervisory visit within the reporting period	Number of service providers who received training from supervisors on documented clinical case management errors at the time of the most recent supervisory visit within the reporting period at the time of the most recent supervisory visit within the reporting period/Total number of service providers with documented clinical case management errors at the time of the most recent supervisory visit within the reporting period at the time of the most recent supervisory visit within the reporting period	3.5	Providers demonstrate competence in detecting suspected malaria cases; Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases; Providers demonstrate competence in malaria treatment	Team supervision reports	90%						Target not reached. Refer to footnote 5.

Outputs												
#	Indicator	Definition	Relevant Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
19	Percentage of targeted service providers (re)trained in clinical case management of febrile illnesses	Number of targeted service providers (re)trained in clinical case management of febrile illnesses/Total number of targeted service providers	3.1; 3.2	Country has supervisory structures and implementation of supervision of malaria case management practices	Training/ Activity reports	90%	93%	65	70			Target reached. The initial budget included up to 70 clinicians to be trained, but only 65 were identified who met the expected criteria to attend this training course.
20	Percentage of targeted service providers trained in clinical supervision of case management of febrile illnesses	Number of targeted service providers trained in clinical supervision of case management of febrile illnesses/Total number of targeted service providers	3.3; 3.4	Country has supervisory structures and implementation of supervision of malaria case management practices	Training/ Activity reports	90%	90%	63	70			Target reached. 2 participants from the clinical case management training did not move forward to the clinical supervisor training course.
21	Percentage of scheduled joint laboratory/clinical supervisory visits to targeted facilities that occurred within the reporting period	Number of scheduled joint laboratory/clinical supervisory visits to targeted facilities that occurred within the reporting period/Total number of scheduled joint laboratory/clinical supervisory visits to targeted facilities	3.5	Country has supervisory structures and implementation of supervision of malaria case management practices	Team supervision reports	90%						Target not reached. Refer to footnote 5.

Objective 4: Strengthened laboratory systems at the country level for detecting malaria and other infectious diseases.

Description: Strengthened laboratory systems at the country level for detecting malaria and other infectious diseases. These activities relate to addressing the health systems issues that are a barrier to achieving universal access to malaria diagnostics and appropriate case management practices such as physical health facilities, human and financial resources, and support systems required to deliver quality diagnosis and treatment services.

Intermediate Objectives

Reference laboratories and facilities able to provide high quality diagnostics for malaria and other febrile illnesses

Service providers are able to provide high quality case management services for malaria and other febrile illnesses

Private sector laboratories are integrated into national QA/QC and supervision strategies

QA/QC strategies are robust and evidence-based

Reporting and monitoring information for malaria is integrated, complete and accurate

Outputs

#	Indicator	Definition	Relevant Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
22	Action items specified at lessons learned workshops	Number of action items identified during lessons learned or quality improvement workshops that are incorporated into action plans for subsequent rounds of supervision.	4.3; 4.4	QA/QC strategies are robust and evidence-based	Activity Reports	6						Target not reached.. Refer to footnote 5.
Intermediate Outcomes												
23	Percentage of targeted laboratories with instituted IQA measures for malaria microscopy at the time of the most recent supervisory visit within the reporting period	Number of targeted laboratories practicing at least 75% of recommended IQA measures for malaria microscopy at the time of the most recent supervisory visit within the reporting period/Total number targeted laboratories at the time of the most recent supervisory visit within the reporting period	3.5	Reference laboratories and facilities able to provide high quality diagnostics for malaria and other febrile illnesses	Team supervision reports	60%						Target not reached. Refer to footnote 5.

Malawi Performance Monitoring Plan

GOAL: Contribute to PMI's overall goal 50% reduction in the burden of malaria in 70% of the at-risk population in PMI focus countries.

Objective 1: The accuracy of diagnostic testing for malaria is improved to greater than 90%.

Objective 2: Increased percentage of patients suspected to have malaria or febrile illness who receive a diagnostic test.

Objective 3: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illnesses-consistent with the diagnostic test**.**

Objective 4: Strengthened laboratory systems at the country level for detecting malaria and other infectious diseases.

Objective 1: The accuracy of diagnostic testing for malaria is improved to greater than 90%.

Description: The accuracy of diagnostic testing for malaria is improved to greater than 90 percent. The activities described in this section relate to addressing the laboratory technician and health care provider competency related to providing quality diagnostic services.

Intermediate Outcomes

#	Indicator	Definition	Relevant Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	Results 2015 (Oct14-Sep15)					Comment
							%	Num	Den	Mean score	Median Score	
1	Percentage of service providers participating in basic MDRT courses who demonstrate competence in malaria microscopy	Number of service providers participating in basic MDRT courses who meet minimum competency levels for peripheral level microscopists in malaria microscopy/Total number of service providers participating in basic MDRT courses	1.2	Providers demonstrate competence in RDTs and/or microscopy	Activity reports	90%	37%	7	19	86%	85%	The 19 participants are pre-service trainers.
2	Percentage of national level microscopy trainers participating in advanced MDRT courses who demonstrate competence in malaria microscopy	Number of national level microscopy trainers and laboratory supervisors who achieve an equivalent score to a WHO ECAMM Level 1 or 2 designation for parasite detection, species identification and quantitation during the advanced MDRT posttest/Total number of national level microscopy trainers and laboratory supervisors participating in advanced MDRT courses	1.1	Providers demonstrate competence in RDTs and/or microscopy	Activity reports	90%	5.4%	2	37	PD: 79% Species ID: 54% Counting: 45%	PD: 81% Species ID: 52% Counting: 43%	Among the 37 OTSS lab supervisors, 19 (51%) achieved the cut-off (or above) for parasite detection, 25(68%) achieved the cut-off (or above) for parasite counting, and 2 (5%) achieved the cut-off (or above) for species id. . Scores are well below target (which was set too high) considering Malawi has stopped doing routine microscopy since the introduction of RDTs. We have seen a steady decline in Malawi MDRT scores.

#	Indicator	Definition	Relevant Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Median score	Comment
3	Percentage of national level microscopy trainers participating in advanced MDRT courses who demonstrate competence in RDTs	Number of service providers who score 90% or greater in reading and interpretation of RDTs during advanced MDRT posttest/Total number of service providers participating in advanced MDRT courses	1.1 & 1.2	Providers demonstrate competence in RDTs and/or microscopy	Activity reports	90%	100%	37	37			37 are OTSS lab supervisors. Mean/Median do not exist as only pass/fail was recorded.

#	Indicator	Definition	Relevant activity #	Contributes to MalariaCare intermediate objective(s)	Data source	Targets	%	Num	Den	Mean score	Median score	Comment
4	Percentage of targeted facilities with at least one service provider (re)trained in malaria microscopy in the past 2 years	Number of targeted facilities with one or more service providers, who were present at the time of the supervisory visit, found to be (re)trained in malaria microscopy via government-sanctioned training institutions or courses in the past 2 years/Total number of targeted facilities	1.4	Providers demonstrate competence in RDTs and/or microscopy	Supervi-sion reports	90%	54%	58	107			107 of the OTSS facilities visited were reported to have microscopy. Of these 58 had a microscopy observation. Using the new checklist we will be further analyzing the reasons for the low percentage of microscopy observations done.
5	Percentage of targeted facilities that meet standards for quality diagnosis of malaria via microscopy at the time of the most recent supervisory visit within the reporting period	Number of targeted facilities that meet all standards for quality diagnosis of malaria via microscopy at the time of the most recent supervisory within the reporting period/Total number targeted facilities at the time of the most recent supervisory visit within the reporting period	1.4	Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness	Supervi-sion reports	90%	57%	33	58	87%	91%	Of the 58 with a microscopy observation 57% received a score of 90% or higher. The mean score was 87% showing that many are just under the cut-off.
Outputs												
6	Percentage of scheduled laboratory only supervisory visits to targeted facilities that occurred within the reporting period	Number of scheduled laboratory only supervisory visits to targeted facilities that occurred within the reporting period/Total number of scheduled laboratory only supervisory visits to targeted facilities	1.4	Country has supervisory structure for laboratory case management of malaria	Supervi-sion reports	90%	107%	107	100			All supervisory visits this year were combined joint lab and clinical. We expected to reach 100 facilities with labs and during the one round of OTSS we reached 107.

Objective 2: Increased percentage of patients suspected to have malaria or febrile illness who receive a diagnostic test.												
Description: Increased percentage of patients suspected to have malaria or febrile illnesses who receive a diagnostic test for malaria. These activities relate to addressing health care provider performance in the use of diagnostic tools after appropriate training. Emphasis is on supervision and use of performance monitoring tools.												
Intermediate Outcomes												
#	**Indicator**	**Definition**	**Relevant activity #**	**Contributes to MalariaCare intermediate objective(s)**	**Data source**	**Targets**	**%**	**Num**	**Den**	**Mean score**	**Median score**	**Comment**
7	Percentage of targeted service providers demonstrating competence in RDTs at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who score ≥ 90% or greater on supervisory checklists measuring the proper use of malaria RDTs and correct interpretation of their results at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers evaluated on RDT use and interpretation of their results at the time of the most recent supervisory visit within the reporting period	1.4	Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases	Supervis-ion reports	90%	60%	392	652	88%	93%	Of the 652 providers observed doing RDTs, 60% met the 90% cut-off. The mean score was 88%, illustrating that many are likely just under the cut-off.
8	Percentage of targeted facilities with at least one service provider (re)trained in RDTs in the past 2 years	Number of targeted facilities with one or more service providers, who were present at the time of the supervisory visit, found to be (re)trained in RDTs via government-sanctioned training institutions or courses in the past 2 years/Total number of targeted facilities	1.4	Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases	Supervis-ion reports	100%	94%	229	243			As all facilities in Malawi offer microscopy, supervisors were able to observe and retrain at most facilities. Using the new checklist MalariaCare will further analyze the reasons for the low percentage of microscopy observations done.
9	Percentage of targeted service providers who demonstrate competence in the clinical evaluation of febrile cases at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who appropriately complete ≥ 85% of recommended steps for the clinical evaluation of febrile cases at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers observed for clinical evaluation of febrile cases	1.4	Providers demonstrate competence in detecting suspected malaria cases	Supervis-ion reports	90%	34%	190	552	80%	78%	Target not reached. This is the first time that clinicians have been evaluated with the new clinical observation checklist. The project expects to see an increase in scores in the next round of OTSS.

#	Indicator	Definition	Relevant Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Median score	Comment
10	Percentage of targeted facilities that meet standards for quality diagnosis of malaria via RDTs at the time of the most recent supervisory visit within the reporting period	Number of targeted facilities that meet all standards for quality diagnosis of malaria via RDTs at the time of the most recent supervisory within the reporting period/Total number targeted facilities at the time of the most recent supervisory visit within the reporting period	1.4	Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness	Supervis -ion reports	90%	91%	172	188			Target Re\ached.

Outputs												
#	Indicator	Definition	Relevant activity #	Contributes to MalariaCare intermediate objective(s)	Data source	Targets	%	Num	Den	Mean score	Med score	Comment
11	Percentage of targeted service providers trained in RDTs	Number of targeted service providers (re)trained in RDTs via stand-alone courses directly supported by the project/Total number of targeted service providers		Providers demonstrate competence in detecting suspected malaria cases	Training reports							This activity was not included in the PY3 work plan - no available data to support this indicator.
12	Percentage of targeted service providers who received training by supervisors on documented microscopy diagnostic errors at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who received training by supervisors on documented diagnostic errors at the time of the most recent supervisory visit within the reporting period/Total number of targeted providers with documented diagnostic errors at the time of the most recent supervisory visit within the reporting period	1.4	Providers demonstrate competence in detecting suspected malaria cases	Supervis-ion Reports	90%	100%	184	184			The goal is to reach at least one HCW per health facility with microscopy. 185 lab personnel were observed and provided feedback during OTSS.
13	Percentage of targeted service providers who received training by supervisors on documented RDT diagnostic errors at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who received training by supervisors on documented diagnostic errors at the time of the most recent supervisory visit within the reporting period/Total number of targeted providers with documented diagnostic errors at the time of the most recent supervisory visit within the reporting period	1.4	Providers demonstrate competence in detecting suspected malaria cases	Supervis-ion reports	90%	100%	564	564			The goal is to mentor at least one HCW per health facility on the use of RDTs. 564 observations had diagnostic errors. On average, 2.3 observations were done per facility.
14	Percentage of service providers who received training from supervisors on documented clinical case management errors at the time of the most recent supervisory visit within the reporting period	Number of service providers who received training from supervisors on documented clinical case management errors at the time of the most recent supervisory visit within the reporting period/Total number of service providers with documented clinical case management errors at the time of the most recent supervisory visit within the reporting period	1.4	Providers demonstrate competence in detecting suspected malaria cases	Supervis-ion reports	90%	100%	552	552			The goal is to mentor at least one HCW per health facility on clinical case management. In the current data, 552 observations of HCWs were done

Objective 3: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illnesses-consistent with the diagnostic test.												
Description: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illnesses—consistent with the result of the diagnostic test. The activities described in this section relate to addressing health care provider performance in delivering appropriate treatment after training has occurred. Emphasis is on supervision and ongoing use of performance monitoring tools.												
Intermediate Outcomes												
#	**Indicator**	**Definition**	**Relevant Activity #**	**Contributes to MalariaCare intermediate objective(s)**	**Data Source**	**Targets**	**%**	**Num**	**Den**	**Mean**	**Med**	**Comment**
15	Percentage of targeted service providers demonstrating compliance to treatment for cases with positive malaria test results at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers demonstrating compliance to treatment for cases with positive malaria test results at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers evaluated on compliance to treatment for cases with positive malaria test results at the time of the most recent supervisory visit within the reporting period	1.4	Service providers demonstrate competence in malaria treatment	Supervi-sion reports	90%	91%	1290	1412			Notably, adherence was higher among RDT positive tests (93%) and lower for microscopy positive tests (85%).
16	Percentage of targeted service providers demonstrating compliance to treatment for cases with negative malaria test results at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers demonstrating compliance to treatment for cases with negative malaria test results at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers evaluated on compliance to treatment for cases with negative malaria test results at the time of the most recent supervisory visit within the reporting period	1.4	Service providers demonstrate competence in malaria treatment	Supervi-sion reports	85%	89%	1318	1479			Notably, adherence was higher for RDT negative tests (93%) and lower among microscopy negative tests (78%).
17	Percentage of instances where service providers demonstrate adherence to malaria test results with respect to treatment practices based on record review at the time of the most recent supervisory visit within the reporting period	Number of instances where service providers demonstrate adherence to malaria test results with respect to treatment practices based on record review at the time of the most recent supervisory visit within the reporting period/Total number of instances investigated for service providers demonstrate adherence to malaria test results with respect to treatment practices based on record review at the time of the most recent supervisory visit within the reporting period	1.4	Service providers demonstrate competence in malaria treatment	Supervi-sion reports	90%	90%	2608	2891			Target reached.

Outputs												
#	Indicator	Definition	Relevant Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean	Med	Comment
18	Percentage of targeted service providers (re)trained in clinical case management of febrile illnesses	Number of targeted service providers (re)trained in clinical case management of febrile illnesses/Total number of targeted service providers	3.2	Service providers demonstrate competence in malaria treatment	Training/ activity reports	90%	100%	3036	3000			Target based off the PY3 Semi-Annual Report was 3000. Exceeded this target.
19	Percentage of scheduled clinical supervisory visits to targeted facilities that occurred within the reporting period	Number of scheduled clinical supervisory visits to targeted facilities that occurred within the reporting period/Total number of scheduled clinical supervisory visits to targeted facilities	1.4 & 3.1	Country has supervisory structures and implementation of supervision of malaria case management practices	Activity reports	80%	51%	243	473			One round of joint clinical and lab OTSS was done reaching 243 facilities. The case management follow-up, which accounted for the 373 facilities, was postponed until PY4 pending partner coordination discussions.
20	Percentage of scheduled community supervisory visits to targeted communities that occurred within the reporting period	Number of scheduled community supervisory visits to targeted facilities that occurred within the reporting period/Total number of scheduled community supervisory visits to targeted facilities		Country has supervisory structures and implementation of supervision of malaria case management practices	Activity reports	90%						This activity was postponed until PY4 at the request of PMI.

Mali Performance Monitoring Plan
GOAL: Contribute to PMI's overall goal 50% reduction in the burden of malaria in 70% of the at-risk population in PMI focus countries.
Objective 1: The accuracy of diagnostic testing for malaria is improved to greater than 90%. **Objective 2:** Increased percentage of patients suspected to have malaria or febrile illness who receive a diagnostic test. **Objective 3:** Increased percentage of patients who receive appropriate treatment for malaria or other febrile illnesses-consistent with the diagnostic test. **Objective 4:** Strengthened laboratory systems at the country level for detecting malaria and other infectious diseases.
Objective 1: The accuracy of diagnostic testing for malaria is improved to greater than 90%.
Description: The accuracy of diagnostic testing for malaria is improved to greater than 90 percent. The activities described in this section relate to addressing the laboratory technician and health care provider competency related to providing quality diagnostic services.
Intermediate Objectives
Clear and disseminated laboratory guidelines, procurement policies, supervision structures
Clear and functioning quality assurance procedures for regulation of diagnostics for malaria and other febrile illnesses
Reporting on malaria indicators is complete and accurate
Country has complete national guidelines for the diagnosis of malaria
Providers demonstrate competence in RDTs and/or microscopy and clinical case management of febrile illness
Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness
Country has supervisory structure for laboratory diagnosis and clinical case management of malaria

Intermediate Outcomes												
#	Indicator	Definition	Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	Results					Comment
							%	Num	Den	Mean score	Med score	
1	Percentage of targeted service providers demonstrating competence in malaria microscopy at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who score ≥ 90% or greater on supervisory checklists measuring slide preparation, staining and reading at the time of the most recent supervisory visit within the reporting period Total number of targeted service providers evaluated on malaria microscopy at the time of the most recent supervisory visit within the reporting period	3.4	Providers demonstrate competence in RDTs and/or microscopy	Team supervision reports	60%						OTSS visits were not completed within this reporting period.[9]
2	Percentage of service providers participating in basic MDRT courses who demonstrate competence in malaria microscopy	Number of service providers participating in basic MDRT courses who meet minimum competency levels for peripheral level microscopists in malaria microscopy Total number of service providers participating in basic MDRT courses	1.2	Providers demonstrate competence in RDTs and/or microscopy	Training reports	60%	82%	31	38	N/A	N/A	Target met. Minimum competency levels for peripheral microscopists are defined as achieving WHO level 2 in parasite detection (>80%).
3	Percentage of national level microscopy trainers and laboratory supervisors participating in advanced MDRT courses who demonstrate competence in malaria microscopy	Number of national level microscopy trainers and laboratory supervisors who achieve an equivalent score to a WHO ECAMM Level 1 or 2 designation for parasite detection, species identification and quantitation during the advanced MDRT post-test Total number of national level microscopy trainers and laboratory supervisors participating in advanced MDRT courses	1.3,1.4	Country has supervisory structure for laboratory case management of malaria	Training reports	60%	0%	0	2	N/A	N/A	Target not met. Both of the two national-level microscopy trainers achieved WHO level 1 in parasite detection but both achieved level 4 in species ID and levels 2 and 3 in quantification.

[9] There were delays in implementing OTSS due to the availability of regional supervisors who redirected their attention and other health recourses to vaccination efforts after new cases of polio were detected. This pushed the scheduled OTSS back to late PY3 and to finish in PY4. OTSS results will be reported on in the next reporting period.

#	Indicator	Unit of Measure	Baseline (estimated)	Target	Result 2014	Activity	%	Num	Den	Mean score	Med score	Comment
4	Percentage of targeted microscopy centers with at least one service provider (re)trained in malaria microscopy in the past 2 years	Number of targeted microscopy centers with one or more service providers, who were present at the time of the supervisory visit, found to be (re)trained in malaria microscopy via government-sanctioned training institutions or courses in the past 2 years Total number of targeted facilities with microscopy centers	3.3	Providers demonstrate competence in RDTs and/or microscopy	Team supervision reports	30%						OTSS visits were not complete within this reporting period. Please refer to footnote 5.
Outputs												
5	Percentage of scheduled joint laboratory and clinical supervisory visits to targeted facilities that occurred within the reporting period	Number of scheduled laboratory only supervisory visits to targeted facilities that occurred within the reporting period Total number of scheduled laboratory only supervisory visits to targeted facilities	3.3	Country has supervisory structure for laboratory case management of malaria	Team supervision reports	90%						OTSS visits were not complete within this reporting period. Please refer to footnote 7.

Objective 2: Increased percentage of patients suspected to have malaria or febrile illness who receive a diagnostic test.

Description: Increased percentage of patients suspected to have malaria or febrile illnesses who receive a diagnostic test for malaria. These activities relate to addressing health care provider performance in the use of diagnostic tools after appropriate training. Emphasis is on supervision and use of performance monitoring tools.

Intermediate Objectives

Providers demonstrate competence in detecting suspected malaria cases

Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases

Providers demonstrate competence in malaria treatment

Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness

Private facilities are linked with the public sector

Intermediate Outcomes

#	Indicator	Definition	Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
6	Percentage of targeted service providers demonstrating competence in RDTs at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who score ≥ 90% or greater on supervisory checklists measuring the proper use of malaria RDTs and correct interpretation of their results at the time of the most recent supervisory visit within the reporting period Total number of targeted service providers evaluated on RDT use and interpretation of their results at the time of the most recent supervisory visit within the reporting period	3.4	Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases	Team supervision reports	60%						OTSS visits were not complete within this reporting period. Please refer to footnote 7.
7	Percentage of targeted service providers who demonstrate competence in the clinical evaluation of febrile cases at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who appropriately complete ≥ 85% of recommended steps for the clinical evaluation of febrile cases at the time of the most recent supervisory visit within the reporting period Total number of targeted service providers observed for clinical evaluation of febrile cases	3.4	Providers demonstrate competence in detecting suspected malaria cases	Team supervision reports	60%						OTSS visits were not complete within this reporting period. Please refer to footnote 7.

#	Indicator	Definition	Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
8	Percentage of targeted service providers who demonstrate competence in ordering malaria tests for suspected malaria cases at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who order malaria tests for suspected malaria cases at the time of the most recent supervisory visit within the reporting period Total number of targeted service providers who evaluated suspected malaria cases at the time of the most recent supervisory visit within the reporting period	3.4	Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases	Team supervision reports	70%						OTSS visits were not complete within this reporting period. Please refer to footnote 7.
Outputs												
9	Percentage of targeted service providers who received training by supervisors on documented diagnostic errors at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who received training by supervisors on documented diagnostic errors at the time of the most recent supervisory visit within the reporting period Total number of targeted providers with documented diagnostic errors at the time of the most recent supervisory visit within the reporting period	3.4	Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness	Team supervision reports	90%						OTSS visits were not complete within this reporting period. Please refer to footnote 7.
10	Percentage of service providers who received training from supervisors on documented clinical case management errors at the time of the most recent supervisory visit within the reporting period	Number of service providers who received training from supervisors on documented clinical case management errors at the time of the most recent supervisory visit within the reporting period Total number of service providers with documented clinical case management errors at the time of the most recent supervisory visit within the reporting period	3.4	Providers demonstrate competence in malaria treatment	Team supervision reports	90%						OTSS visits were not complete within this reporting period. Please refer to footnote 7.

Objective 3: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illnesses-consistent with the diagnostic test.												
Description: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illnesses—consistent with the result of the diagnostic test. The activities described in this section relate to addressing health care provider performance in delivering appropriate treatment after training has occurred. Emphasis is on supervision and ongoing use of performance monitoring tools.												
Intermediate Objectives												
Country has full national policies for malaria treatment												
Service providers demonstrate competence in malaria treatment												
Facilities are able to provide high quality case management services for malaria and other febrile illness												
Country has supervisory structures and implementation of supervision of malaria case management practices												
Intermediate Outcomes												
#	**Indicator**	**Definition**	**Activity #**	**Contributes to MalariaCare intermediate objective(s)**	**Data Source**	**Targets**	**%**	**Num**	**Den**	**Mean score**	**Med score**	**Comment**
11	Percentage of targeted service providers demonstrating compliance to treatment for cases with positive malaria test results at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers demonstrating compliance to treatment for cases with positive malaria test results at the time of the most recent supervisory visit within the reporting period / Total number of targeted service providers evaluated on compliance to treatment for cases with positive malaria test results at the time of the most recent supervisory visit within the reporting period	3.4	Service providers demonstrate competence in malaria treatment	Team supervision reports	85%						OTSS visits were not complete within this reporting period. Please refer to footnote 7.
12	Percentage of targeted service providers demonstrating compliance to treatment for cases with negative malaria test results at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers demonstrating compliance to treatment for cases with negative malaria test results at the time of the most recent supervisory visit within the reporting period / Total number of targeted service providers evaluated on compliance to treatment for cases with negative malaria test results at the time of the most recent supervisory visit within the reporting period	3.4	Service providers demonstrate competence in malaria treatment	Team supervision reports	70%						OTSS visits were not complete within this reporting period. Please refer to footnote 7.

#	Indicator	Definition	Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
13	Percentage of instances where service providers demonstrate adherence to malaria test results with respect to treatment practices based on record review at the time of the most recent supervisory visit within the reporting period	Number of instances where service providers demonstrate adherence to malaria test results with respect to treatment practices based on record review at the time of the most recent supervisory visit within the reporting period Total number of instances investigated for service providers demonstrate adherence to malaria test results with respect to treatment practices based on record review at the time of the most recent supervisory visit within the reporting period	3.4	Service providers demonstrate competence in malaria treatment	Team supervision reports	75%						OTSS visits were not complete within this reporting period. Please refer to footnote 7.

Mozambique Performance Monitoring Plan

GOAL: Contribute to PMI's overall goal 50% reduction in the burden of malaria in 70% of the at-risk population in PMI focus countries.

Objective 1: The accuracy of diagnostic testing for malaria is improved to greater than 90%.

Objective 2: Increased percentage of patients suspected to have malaria or febrile illness who receive a diagnostic test.

Objective 3: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illnesses-consistent with the diagnostic test**.**

Objective 4: Strengthened laboratory systems at the country level for detecting malaria and other infectious diseases.

Objective 1: The accuracy of diagnostic testing for malaria is improved to greater than 90%.

Description: The accuracy of diagnostic testing for malaria is improved to greater than 90 percent. The activities described in this section relate to addressing the laboratory technician and health care provider competency related to providing quality diagnostic services.

Intermediate Objectives

Clear and disseminated laboratory guidelines, procurement policies, supervision structures

Clear and functioning quality assurance procedures for regulation of diagnostics for malaria and other febrile illnesses

Reporting on malaria indicators is complete and accurate

Country has complete national guidelines for the diagnosis of malaria

Providers demonstrate competence in RDTs and/or microscopy

Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness

Country has supervisory structure for laboratory diagnosis of malaria

Intermediate Outcomes

#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean score	Med score	
1	Percentage of targeted service providers demonstrating competence in malaria microscopy at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who score ≥ 90% or greater on supervisory checklists measuring slide preparation, staining and reading at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers evaluated on malaria microscopy at the time of the most recent supervisory visit within the reporting period	3.2, 3.3	Providers demonstrate competence in RDTs and/or microscopy	Team supervision reports	85%	47%	16	34	85%	89%	Target not reached. As shown in the MDRT results below, microscopy capacity in Mozambique was low at baseline. Further visits will likely be needed to reach the target.

#	Indicator	Definition	Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
2	Percentage of national and provincial level microscopy trainers and laboratory supervisors participating in advanced MDRT courses who demonstrate competence in malaria microscopy	Number of national level microscopy trainers and laboratory supervisors who demonstrate competence for parasite detection and quantitation during the advanced MDRT post-test/Total number of national level microscopy trainers and laboratory supervisors participating in advanced MDRT courses	1.1	Country has supervisory structure for laboratory diagnosis of malaria; Clear and functioning quality assurance procedures for regulation of diagnostics for malaria and other febrile illnesses	Activity reports	85%	0%	0	42	PD: 79% Species ID: 38% Count: 27%	PD: 81% Species ID: 37% Count: 27%	Target not reached. None met the standard for all three areas. However, 9 out of 42 (21%) participants meet the competence criteria for aMDRT (PD=>80% and counting=>40%). No competency based data for malaria microscopy available prior to this course. Target was based off recommendations from the MOH. Target set too high and should be adjusted for PY4 (~70%) Class avg. for PD was 79.0% with 57.1% passing using PD L2 criteria.
3	Percentage of service providers participating in any MDRT courses who demonstrate competence in RDTs	Number of service providers who score 90% or greater in reading and interpretation of RDTs during any MDRT post-test/Total number of service providers participating in any MDRT courses	2.1	Providers demonstrate competence in RDTs and/or microscopy	Activity reports	90%	47%	7	15	88%	88.0%	Target not reached. RDT use among lab staff in Mozambique is low. Since this training MalariaCare has been conducting on-site RDT refresher trainings to address this low performance.

#	Indicator	Definition	Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
4	Percentage of targeted laboratories that meet standards for quality diagnosis of malaria including microscopy at the time of the most recent supervisory visit within the reporting period	Number of targeted laboratories that meet all standards for quality diagnosis of malaria via RDTs and/or microscopy at the time of the most recent supervisory within the reporting period/Total number of targeted laboratories at the time of the most recent supervisory visit within the reporting period	3.2, 3.3	Clear and functioning quality assurance procedures for regulation of diagnostics for malaria and other febrile illnesses	Team supervision reports	50%	27%	8	30			Target not reached. MalariaCare continues to scale-up RDT outreach trainings, which should help to improve performance on this indicator in PY4.
Outputs												
5	Percentage of targeted service providers trained in laboratory supervision of malaria diagnostics	Number of targeted service providers trained in laboratory supervision of malaria diagnostics/Total number of targeted service providers	2.1, 3.1	Country has supervisory structure for laboratory diagnosis of malaria; Clear and functioning quality assurance procedures for regulation of diagnostics for malaria and other febrile illnesses	Training reports	95%	Overall 100%: Male 95%: Female 5%:	40	40			Target met. 25 supervisors trained in Nampula and 15 trained in Zambezia.
Objective 2: Increased percentage of patients suspected to have malaria or febrile illness who receive a diagnostic test.												
Description: Increased percentage of patients suspected to have malaria or febrile illnesses who receive a diagnostic test for malaria. These activities relate to addressing health care provider performance in the use of diagnostic tools after appropriate training. Emphasis is on supervision and use of performance monitoring tools.												
Intermediate Objectives												
Providers demonstrate competence in detecting suspected malaria cases												
Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases												
Providers demonstrate competence in malaria febrile case assessment												
Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness												

Intermediate Outcomes												
#	Indicator	Definition	Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
6	Percentage of targeted service providers demonstrating competence in RDTs at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who score ≥ 90% or greater on supervisory checklists measuring the proper use of malaria RDTs and correct interpretation of their results at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers evaluated on RDT use and interpretation of their results at the time of the most recent supervisory visit within the reporting period	3.1, 3.2	Providers demonstrate competence in detecting suspected malaria cases	Team supervision reports	90%	80%	33	41	92%	95%	Target not reached. Performance was better among higher level facilities than lower level. In PY4 project will focus on lower level facilities to improve quality of RDTs.
7	Percentage of targeted facilities with at least one service provider (re)trained in RDTs in the past 2 years	Number of targeted facilities with one or more service providers, who were present at the time of the supervisory visit, found to be (re)trained in RDTs via government-sanctioned training institutions or courses in the past 2 years/Total number of targeted facilities	3.2, 3.3	Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness	Team supervision reports	90%	62%	31	50			Target not reached. MalariaCare will continue to expand the outreach RDT competency training in PY4 to increase the proportion of facilities covered.
8	Percentage of targeted service providers who demonstrate competence in the clinical evaluation of febrile cases at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who appropriately complete ≥ 85% of recommended steps for the clinical evaluation of febrile cases at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers observed for clinical evaluation of febrile cases	3.2, 3.3	Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases	Team supervision reports	65%	46%	11	24	80%	77%	Target not reached. The main barriers to meeting this standard are checking for signs of severe malaria and correct prescription per diagnosis. This will be a focus in future OTSS.

#	Indicator	Definition	Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
9	Percentage of targeted service providers who demonstrate competence in ordering malaria tests for suspected malaria cases at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who order malaria tests for suspected malaria cases at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers who evaluated suspected malaria cases at the time of the most recent supervisory visit within the reporting period	3.2, 3.3	Providers demonstrate competence in malaria treatment	Team supervision reports	85%	87%	48	55			Target reached.
10	Percentage of targeted facilities that meet standards for quality diagnosis of malaria via RDTs at the time of the most recent supervisory visit within the reporting period	Number of targeted facilities that meet all standards for quality diagnosis of malaria via RDTs at the time of the most recent supervisory within the reporting period/Total number targeted facilities at the time of the most recent supervisory visit within the reporting period	3.2, 3.3	Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness	Team supervision reports	70%	76%	19	26			Target reached. Project will continue to scale-up RDT outreach training, which should also help to improve performance on this indicator in PY4.
Outputs												
11	Percentage of targeted service providers (re)trained in RDTs	Number of targeted service providers (re)trained in RDTs via stand-alone courses directly supported by the project/Total number of targeted service providers	1.1, 2.1	Providers demonstrate competence in RDTs and/or microscopy	Training reports	95%	100%	1,149	840			Target exceeded.
12	Percentage of targeted service providers who received training by supervisors on documented diagnostic errors at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who received training by supervisors on documented diagnostic errors at the time of the most recent supervisory visit within the reporting period/Total number of targeted providers with documented diagnostic errors at the time of the most recent supervisory visit within the reporting period	3.2, 3.3	Providers demonstrate competence in malaria treatment	Team supervision reports	90%	100%	26	26			Target exceeded.

Objective 3: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illnesses-consistent with the diagnostic test.												
Description: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illnesses—consistent with the result of the diagnostic test. The activities described in this section relate to addressing health care provider performance in delivering appropriate treatment after training has occurred. Emphasis is on supervision and ongoing use of performance monitoring tools.												
Intermediate Objectives												
Country has updated national policies and guidelines for malaria treatment												
Health care providers demonstrate competence in malaria treatment												
Country has supervisory structures and implementation of supervision of malaria case management practices												
Intermediate Outcomes												
#	**Indicator**	**Definition**	**Activity #**	**Contributes to MalariaCare intermediate objective(s)**	**Data Source**	**Targets**	**%**	**Num**	**Den**	**Mean score**	**Med score**	**Comment**
13	Percentage of service providers who received training from supervisors on documented clinical case management errors at the time of the most recent supervisory visit within the reporting period	Number of service providers who received training from supervisors on documented clinical case management errors at the time of the most recent supervisory visit within the reporting period at the time of the most recent supervisory visit within the reporting period/Total number of service providers with documented clinical case management errors at the time of the most recent supervisory visit within the reporting period at the time of the most recent supervisory visit within the reporting period	3.2, 3.3	Providers demonstrate competence in malaria treatment	Team supervision reports	85%	100%	13	13			Target exceeded. 13 out of 13 clinical observations completed had errors.
14	Percentage of targeted service providers demonstrating compliance to treatment guidelines for cases with positive malaria test results at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers demonstrating compliance to treatment guidelines for cases with positive malaria test results at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers evaluated on compliance to treatment guidelines for cases with positive malaria test results at the time of the most recent supervisory visit within the reporting period	3.2, 3.3	Providers demonstrate competence in malaria treatment	Team supervision reports	85%	100%	113	113			Target exceeded.

#	Indicator	Definition	Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
15	Percentage of targeted service providers demonstrating compliance to treatment guidelines for cases with negative malaria test results at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers demonstrating compliance to treatment guidelines for cases with negative malaria test results at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers evaluated on compliance to treatment guidelines for cases with negative malaria test results at the time of the most recent supervisory visit within the reporting period	3.2, 3.3	Providers demonstrate competence in malaria treatment	Team supervision reports	70%	91%	88	97			Target exceeded.
16	Percentage of instances where service providers demonstrate adherence to malaria test results with respect to treatment practices based on record review at the time of the most recent supervisory visit within the reporting period	Number of instances where service providers demonstrate adherence to malaria test results with respect to treatment practices based on record review at the time of the most recent supervisory visit within the reporting period/Total number of instances investigated for service providers demonstrate adherence to malaria test results with respect to treatment practices based on record review at the time of the most recent supervisory visit within the reporting period	3.2, 3.3	Providers demonstrate competence in malaria treatment	Team supervision reports	75%	96%	201	210			Target exceeded.
Outputs												
17	Percentage of scheduled joint laboratory/clinical supervisory visits to targeted facilities that occurred within the reporting period	Number of scheduled joint laboratory/clinical supervisory visits to targeted facilities that occurred within the reporting period/Total number of scheduled joint laboratory/clinical supervisory visits to targeted facilities	3.2	Country has supervisory structures and implementation of supervision of malaria case management practices	Team supervision reports	95%	67%	59	88			Target not reached. Some facility visits were cancelled due to flooding in Zambezia. The health facilities missed during earlier rounds have been incorporated in the later rounds.

Objective 4: Strengthened laboratory systems at the country level for detecting malaria and other infectious diseases.

Description: Strengthened laboratory systems at the country level for detecting malaria and other infectious diseases. These activities relate to addressing the health systems issues that are a barrier to achieving universal access to malaria diagnostics and appropriate case management practices such as physical health facilities, human and financial resources, and support systems required to deliver quality diagnosis and treatment services.

Intermediate Objectives

Reference laboratories and facilities able to provide high quality diagnostics for malaria and other febrile illnesses

Private sector laboratories are integrated into national QA/QC and supervision strategies

Reporting and monitoring information for malaria is integrated, complete and accurate

Intermediate Outcomes

#	Indicator	Definition	Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
18	Percentage of targeted laboratories with instituted IQA measures for malaria microscopy at the time of the most recent supervisory visit within the reporting period	Number of targeted laboratories practicing at least 75% of recommended IQA measures for malaria microscopy at the time of the most recent supervisory visit within the reporting period/Total number targeted laboratories at the time of the most recent supervisory visit within the reporting period	3.2, 3.3	Reference laboratories and facilities able to provide high quality diagnostics for malaria and other febrile illnesses	Team supervision reports	70%	0%	0	13			Target not reached. National IQA guidelines are not being followed. This will be emphasized in the coming OTSS.

Tanzania Performance Monitoring Plan

GOAL: Contribute to PMI's overall goal 50% reduction in the burden of malaria in 70% of the at-risk population in PMI focus countries.

Objective 1: The accuracy of diagnostic testing for malaria is improved to greater than 90%.

Objective 2: Increased percentage of patients suspected to have malaria or febrile illness who receive a diagnostic test.

Objective 3: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illnesses-consistent with the diagnostic test**.**

Objective 4: Strengthened laboratory systems at the country level for detecting malaria and other infectious diseases.

Objective 1: The accuracy of diagnostic testing for malaria is improved to greater than 90%.

Description: The accuracy of diagnostic testing for malaria is improved to greater than 90 percent. The activities described in this section relate to addressing the laboratory technician and health care provider competency related to providing quality diagnostic services.

Intermediate Objectives

Clear and disseminated laboratory guidelines, procurement policies, supervision structures

Clear and functioning quality assurance procedures for regulation of diagnostics for malaria and other febrile illnesses

Reporting on malaria indicators is complete and accurate

Country has complete national guidelines for the diagnosis of malaria

Providers demonstrate competence in RDTs and/or microscopy

Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness

Country has supervisory structure for laboratory case management of malaria

Intermediate Outcomes

#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean score	Median score	
1	Percentage of targeted service providers demonstrating competence in malaria microscopy at the time of the most recent supervisory visit within the reporting period.	Number of targeted service providers who score ≥ 90% or greater on supervisory checklists measuring slide preparation, staining and reading at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers evaluated on malaria microscopy at the time of the most recent supervisory visit within the reporting period.	3.2	Providers demonstrate competence in RDTs and/or microscopy	Team supervision reports	70%	100%	10	10	99%	100%	Target exceeded. As few health facilities in Tanzania do microscopy, very few microscopy observations were conducted.

#	Indicator	Definition	Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Median score	Comment
2	Percentage of national level microscopy trainers and laboratory supervisors participating in advanced MDRT courses who demonstrate competence in malaria microscopy.	Number of national level microscopy trainers and laboratory supervisors who achieve an equivalent score to a WHO ECAMM Level 1 or 2 designation for parasite detection, species identification and quantitation during the advanced MDRT post-test/Total number of national level microscopy trainers and laboratory supervisors participating in advanced MDRT.	1.3	Providers demonstrate competence in RDTs and/or microscopy	Training reports	50%	3%	1	40	PD: 83% Counting: 32% Species ID: 37%	PD: 84% Counting: 33% Species ID: 37%	Target not reached. 3% of supervisors scored at the WHO level 2 equivalent (combined score-detection, species ID, & density). However 33% scored at the WHO level 1 or 2 equivalent for parasite detection and counting. Given the high rates of Pf in Tanzania this maybe a more appropriate measure of microscopy competence.
3	Percentage of service providers participating in any MDRT courses who demonstrate competence in RDTs	Number of service providers who score 90% or greater in reading and interpretation of RDTs during any MDRT post-test/Total number of service providers participating in any MDRT courses	1.2, 1.3	Providers demonstrate competence in RDTs and/or microscopy	Activity reports	85%	9%			71%		Target not reached. Only 23% of those targeted scored 85% and above on RDT, when the team applies the 90% cut-off point, only 7% scored 90% and above. The average score overall was 71%

Outputs												
#	Indicator	Definition	Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
4	Percentage of targeted service providers participating in basic MDRT courses	Number of targeted service providers participating in basic MDRT courses/Total number of targeted service providers	1.2, 2.1	Providers demonstrate competence in RDTs and/or microscopy	Training/Activity reports	90%						Target not reached. This activity did not occur in PY3, as this was not an activity that was planned for PY3.
5	Percentage of targeted service providers trained in laboratory supervision of malaria case management	Number of targeted service providers trained in laboratory supervision of malaria case management/Total number of targeted service providers	1.2	Country has supervisory structure for laboratory case management of malaria	Training reports	90%	100%					Target exceeded.
Objective 2: Increased percentage of patients suspected to have malaria or febrile illness who receive a diagnostic test.												
Description: Increased percentage of patients suspected to have malaria or febrile illnesses who receive a diagnostic test for malaria. These activities relate to addressing health care provider performance in the use of diagnostic tools after appropriate training. Emphasis is on supervision and use of performance monitoring tools.												
Intermediate Objectives												
Providers demonstrate competence in detecting suspected malaria cases												
Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases												
Providers demonstrate competence in malaria treatment												
Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness												
Private facilities are linked with the public sector												
Intermediate Outcomes												
6	Percentage of targeted service providers demonstrating competence in RDTs at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who score ≥ 90% or greater on supervisory checklists measuring the proper use of malaria RDTs and correct interpretation of their results at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers evaluated on RDT use and interpretation of their results at the time of the most recent supervisory visit within the reporting period	3.2	Providers demonstrate competence in RDTs and/or microscopy	Team supervision reports	80%	74%	79	107	92%	99%	Target not reached. This is the first round of OTSS. Since observations happen prior to mentoring the team does not expect to reach the target during the first round of OTSS.

#	Indicator	Definition	Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
7	Percentage of targeted facilities with at least one service provider (re)trained in RDTs in the past 2 years	Number of targeted facilities with one or more service providers, who were present at the time of the supervisory visit, found to be (re)trained in RDTs via government-sanctioned training institutions or courses in the past 2 years/Total number of targeted facilities	3.2	Providers demonstrate competence in RDTs and/or microscopy	Team supervision reports	90%	43%	159	372			Target not reached. Goal to reach one HCW per facility with an observation. Of the 373 facilities visited, 159 observations were started. Another 50 facilities had RDT stockouts on the day of the visit, and thus were unable to conduct RDT tests and related observations.
8	Percentage of targeted service providers who demonstrate competence in the clinical evaluation of febrile cases at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who appropriately complete ≥ 85% of recommended steps for the clinical evaluation of febrile cases at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers observed for clinical evaluation of febrile cases	3.2	Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases; Providers demonstrate competence in detecting suspected malaria cases	Team supervision reports	80%	34%	45	134	74%	77%	Target not reached. This is the first round of OTSS. Since observations happen prior to mentoring the team does not expect to reach the target during the first round of OTSS.

#	Indicator	Definition	Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
9	Percentage of targeted service providers who demonstrate competence in ordering malaria tests for suspected malaria cases at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who order malaria tests for suspected malaria cases at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers who evaluated suspected malaria cases at the time of the most recent supervisory visit within the reporting period	3.2	Providers demonstrate competence in malaria treatment	Team supervision reports	75%	71%	95	134			Target not reached. The scores reflect the first OTSS visit, no significant mentoring done yet.
10	Percentage of targeted facilities that meet standards for quality diagnosis of malaria via RDTs at the time of the most recent supervisory visit within the reporting period	Number of targeted facilities that meet all standards for quality diagnosis of malaria via RDTs at the time of the most recent supervisory within the reporting period/Total number targeted facilities at the time of the most recent supervisory visit within the reporting period	3.2	Providers demonstrate competence in RDTs and/or microscopy	Team supervision reports	85%	62%	16	26			Target not reached. This is the first round of OTSS. Since observations happen prior to mentoring the team does not expect to reach the target during the first round of OTSS.
Outputs												
11	Percentage of targeted service providers (re)trained in RDTs	Number of targeted service providers (re)trained in RDTs via stand-alone courses directly supported by the project/Total number of targeted service providers	2.1	Providers demonstrate competence in RDTs and/or microscopy	Training reports	90%	102%					Target exceeded.
12	Percentage of targeted service providers who received training by supervisors on documented diagnostic errors at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who received training by supervisors on documented diagnostic errors at the time of the most recent supervisory visit within the reporting period/Total number of targeted providers with documented diagnostic errors at the time of the most recent supervisory visit within the reporting period	1.2, 3.2	Country has supervisory structure for laboratory case management of malaria	Team supervision reports	85%	100%	10	10			During OTSS, mentoring follows laboratory observations. 10 laboratory observations were conducted.

#	Indicator	Definition	Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
13	Percentage of service providers who received training from supervisors on documented clinical case management errors at the time of the most recent supervisory visit within the reporting period	Number of service providers who received training from supervisors on documented clinical case management errors at the time of the most recent supervisory visit within the reporting period/Total number of service providers with documented clinical case management errors at the time of the most recent supervisory visit within the reporting period	3.2	Providers demonstrate competence in RDTs and/or microscopy	Team supervision reports	85%	100%	134	134			During OTSS, mentoring follows clinical observations. 10 laboratory observations were conducted..

Objective 3: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illnesses-consistent with the diagnostic test.

Description: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illnesses—consistent with the result of the diagnostic test. The activities described in this section relate to addressing health care provider performance in delivering appropriate treatment after training has occurred. Emphasis is on supervision and ongoing use of performance monitoring tools.

Intermediate Objectives

Country has full national policies for malaria treatment

Health care providers demonstrate competence in malaria treatment

Country has supervisory structures and implementation of supervision of malaria case management practices

Intermediate Outcomes

#	Indicator	Definition	Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
14	Percentage of targeted service providers demonstrating compliance to treatment for cases with positive malaria test results at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers demonstrating compliance to treatment for cases with positive malaria test results at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers evaluated on compliance to treatment for cases with positive malaria test results at the time of the most recent supervisory visit within the reporting period	3.2	Country has supervisory structure for laboratory case management of malaria	Team supervision reports	85%	94%	938	995			Target exceeded.
15	Percentage of targeted service providers demonstrating compliance to treatment for cases with negative malaria test results at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers demonstrating compliance to treatment for cases with negative malaria test results at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers evaluated on compliance to treatment for cases with negative malaria test results at the time of the most recent supervisory visit within the reporting period	3.2	Country has supervisory structure for laboratory case management of malaria	Team supervision reports	70%	90%	836	925			Target exceeded.

#	Indicator	Definition	Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
16	Percentage of instances where service providers demonstrate adherence to malaria test results with respect to treatment practices based on record review at the time of the most recent supervisory visit within the reporting period	Number of instances where service providers demonstrate adherence to malaria test results with respect to treatment practices based on record review at the time of the most recent supervisory visit within the reporting period/Total number of instances investigated for service providers demonstrate adherence to malaria test results with respect to treatment practices based on record review at the time of the most recent supervisory visit within the reporting period	3.2	Country has supervisory structure for laboratory case management of malaria	Team supervision reports	75%	92%	1774	1920			Target exceeded.
Outputs												
17	Percentage of scheduled joint laboratory/clinical supervisory visits to targeted facilities that occurred within the reporting period	Number of scheduled joint laboratory/clinical supervisory visits to targeted facilities that occurred within the reporting period/Total number of scheduled joint laboratory/clinical supervisory visits to targeted facilities	1.2, 3.2	Country has supervisory structure for laboratory case management of malaria	Team supervision reports	90%	86%	755	875			This indicator includes Round 2 OTSS visits, all other indicators include only Round 1 OTSS, as data is still being analyzed from Round 2. Target not reached. The number of facilities was scaled back to allow for a greater focus on testing the new EDS in Mwanza during Round 2 OTSS.

Objective 4: Strengthened laboratory systems at the country level for detecting malaria and other infectious diseases.

Description: Strengthened laboratory systems at the country level for detecting malaria and other infectious diseases. These activities relate to addressing the health systems issues that are a barrier to achieving universal access to malaria diagnostics and appropriate case management practices such as physical health facilities, human and financial resources, and support systems required to deliver quality diagnosis and treatment services.

Intermediate Objectives

Reference laboratories and facilities able to provide high quality diagnostics for malaria and other febrile illnesses

Service providers are able to provide high quality case management services for malaria and other febrile illnesses

Private sector laboratories are integrated into national QA/QC and supervision strategies

Reporting and monitoring information for malaria is integrated, complete and accurate

QA/QC strategies are robust and evidence-based

Intermediate Outcomes

#	Indicator	Definition	Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
18	Percentage of targeted laboratories demonstrating competence in malaria microscopy at the time of the most recent supervisory visit within the reporting period	Number of targeted laboratories that meet minimum competency levels for peripheral level microscopists in malaria microscopy via PT panels at the time of the most recent supervisory visit within the reporting period/Total number of targeted laboratories evaluated for minimum competency levels for peripheral level microscopists in malaria microscopy via PT panels at the time of the most recent supervisory visit within the reporting period	3.2	Country has supervisory structure for laboratory case management of malaria	Training reports	70%	67%	4	6	89%	100%	Target not reached. Currently, the team is using slide rechecking, rather than PT panels to assess microscopy competence. Of the six facilities that conducted slide rechecking, 4 scored 90% or higher on correctly identifying slide positivity.
19	Specific action items specified at Quality Improvement review meetings	Action items developed during lessons learned or quality improvement review meetings that are incorporated into plans for subsequent round of supervision	4.3	QA/QC strategies are robust and evidence-based	Activity Reports	6	0					Target not reached. This activity did not occur during PY3.Will occur in PY4, after all facilities have had at least one OTSS visit.

Zambia Performance Monitoring Plan

GOAL: Contribute to PMI's overall goal 50% reduction in the burden of malaria in 70% of the at-risk population in PMI focus countries.

Objective 1: The accuracy of diagnostic testing for malaria is improved to greater than 90%.

Objective 2: Increased percentage of patients suspected to have malaria or febrile illness who receive a diagnostic test.

Objective 3: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illnesses-consistent with the diagnostic test**.**

Objective 4: Strengthened laboratory systems at the country level for detecting malaria and other infectious diseases.

Objective 1: The accuracy of diagnostic testing for malaria is improved to greater than 90%.

Description: The accuracy of diagnostic testing for malaria is improved to greater than 90 percent. The activities described in this section relate to addressing the laboratory technician and health care provider competency related to providing quality diagnostic services.

Intermediate Objectives

Clear and disseminated laboratory guidelines, procurement policies, supervision structures

Clear and functioning quality assurance procedures for regulation of diagnostics for malaria and other febrile illnesses

Country has complete national guidelines for the diagnosis of malaria

Providers demonstrate competence in RDTs and/or microscopy

Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness

Country has supervisory structure for laboratory case management of malaria

Intermediate Outcomes

#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean score	Med score	
1	Percentage of targeted service providers demonstrating competence in malaria microscopy at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who score ≥ 90% or greater on supervisory checklists measuring slide preparation, staining and reading at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers evaluated on malaria microscopy at the time of the most recent supervisory visit within the reporting period	3.2	Providers demonstrate competence in RDTs and/or microscopy	Team supervision reports	85%	30.2%	13	43	87%	87%	Target not reached. Some facilities are not able to conduct microscopy because two of the primary reagents are often out of stock. In addition, more frequent supervision visits are required to help ensure that

												microscopy skills are kept up to date.
#	**Indicator**	**Definition**	**Activity #**	**Contributes to MalariaCare intermediate objective(s)**	**Data Source**	**Targets**	**%**	**Num**	**Den**	**Mean score**	**Med score**	**Comment**
2	Percentage of participants in the WHO national accreditation course who receive a level II score or higher.	Number of national level microscopy trainers and laboratory supervisors who receive WHO level I or II certification for parasite detection, species identification and quantitation /Total number of national level microscopists participating in the WHO accreditation course	1.3	Clear and functioning quality assurance procedures for regulation of diagnostics for malaria and other febrile illnesses	Activity reports	75%						Target not reached. This activity has been delayed until PY4.
Objective 2: Increased percentage of patients suspected to have malaria or febrile illness who receive a diagnostic test.												
Description: Increased percentage of patients suspected to have malaria or febrile illnesses who receive a diagnostic test for malaria. These activities relate to addressing health care provider performance in the use of diagnostic tools after appropriate training. Emphasis is on supervision and use of performance monitoring tools.												
Intermediate Objectives												
Clear and functioning quality assurance procedures for regulation of diagnostics for malaria and other febrile illnesses												
Providers demonstrate competence in detecting suspected malaria cases												
Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases												
Providers demonstrate competence in malaria treatment												
Intermediate Outcomes												
#	**Indicator**	**Definition**	**Activity #**	**Contributes to MalariaCare intermediate objective(s)**	**Data Source**	**Targets**	**%**	**Num**	**Den**	**Mean score**	**Med**	**Comment**
3	Percentage of targeted service providers demonstrating competence in RDTs at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who score ≥ 90% or greater on supervisory checklists measuring the proper use of malaria RDTs and correct interpretation of their results at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers evaluated on RDT use and interpretation of their results at the time of the most recent supervisory visit within the reporting period	3.2	Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases	Team supervision reports	85%	53%	390	742	85.0%	91.0%	Target not reached. This could be due in part to the need for more frequent and routine training and supervision for staff conducting RDTs.

#	Indicator	Definition	Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
4	Percentage of targeted service providers who demonstrate competence in ordering malaria tests for suspected malaria cases at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who order malaria tests for suspected malaria cases at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers who evaluated suspected malaria cases at the time of the most recent supervisory visit within the reporting period	3.2	Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases	Team supervision reports	80%	86%	415	482			Target exceeded.
5	Percentage of targeted facilities that meet standards for quality diagnosis of malaria via RDTs at the time of the most recent supervisory visit within the reporting period	Number of targeted facilities that meet all standards for quality diagnosis of malaria via RDTs at the time of the most recent supervisory within the reporting period/Total number targeted facilities at the time of the most recent supervisory visit within the reporting period	3.2	Clear and functioning quality assurance procedures for regulation of diagnostics for malaria and other febrile illnesses	Team supervision reports	70%	88%	49	56			Target exceeded.
6	Percentage of targeted service providers trained in clinical supervision of RDT administration	Number of targeted service providers trained in clinical supervision of RDT administration/Total number of targeted service providers	2.1	Clear and functioning quality assurance procedures for regulation of diagnostics for malaria and other febrile illnesses	Team supervision reports	90%	25%	20	80			Target not reached. Trainings are ongoing and will continue through the PY3 activity period.

Outputs												
#	Indicator	Definition	Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
7	Percentage of targeted service providers who received training by supervisors on documented diagnostic errors at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who received training by supervisors on documented diagnostic errors at the time of the most recent supervisory visit within the reporting period/Total number of targeted providers with documented diagnostic errors at the time of the most recent supervisory visit within the reporting period	3.2	Clear and functioning quality assurance procedures for regulation of diagnostics for malaria and other febrile illnesses	Team supervision reports	85%	100%	382	382			Target exceeded.
8	Percentage of service providers who received training from supervisors on documented clinical case management errors at the time of the most recent supervisory visit within the reporting period	Number of service providers who received training from supervisors on documented clinical case management errors at the time of the most recent supervisory visit within the reporting period/Total number of service providers with documented clinical case management errors at the time of the most recent supervisory visit within the reporting period	3.2	Clear and functioning quality assurance procedures for regulation of diagnostics for malaria and other febrile illnesses	Team supervision reports	85%	100%	170	170			Target exceeded.

Objective 3: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illnesses-consistent with the diagnostic test.

Description: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illnesses—consistent with the result of the diagnostic test. The activities described in this section relate to addressing health care provider performance in delivering appropriate treatment after training has occurred. Emphasis is on supervision and ongoing use of performance monitoring tools.

Intermediate Objectives

Country has full national policies for malaria treatment

Providers demonstrate competence in malaria treatment

Country has supervisory structures and implementation of supervision of malaria case management practices

Intermediate Outcomes												
#	Indicator	Definition	Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
9	Percentage of targeted facilities that meet standards for malaria service readiness/treatment	Number of targeted facilities that meet standards for malaria service readiness/treatment at the time of the most recent supervisory visit within the reporting period/Total number of targeted facilities that received a supervisory visit during the reporting period	3.2	Country has supervisory structures and implementation of supervision of malaria case management practices	Team supervision reports	60%	50.0%	35	70			Target not reached. MalariaCare will continue to analyze supervision data to identify potential explanations as to why some facilities are not meeting this target.
10	Percentage of targeted service providers demonstrating compliance to treatment for cases with positive malaria test results at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers demonstrating compliance to treatment for cases with positive malaria test results at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers evaluated on compliance to treatment for cases with positive malaria test results at the time of the most recent supervisory visit within the reporting period	3.2	Health care providers demonstrate competence in malaria treatment	Team supervision reports	90%	98%	491	500			Target exceeded.
11	Percentage of targeted service providers demonstrating compliance to treatment for cases with negative malaria test results at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers demonstrating compliance to treatment for cases with negative malaria test results at the time of the most recent supervisory visit within the reporting period/Total number of targeted service providers evaluated on compliance to treatment for cases with negative malaria test results at the time of the most recent supervisory visit within the reporting period	3.2	Health care providers demonstrate competence in malaria treatment	Team supervision reports	75%	81%	395	487			Target exceeded.

#	Indicator	Definition	Activity #	Contributes to MalariaCare intermediate objective(s)	Data Source	Targets	%	Num	Den	Mean score	Med score	Comment
12	Percentage of instances where service providers demonstrate adherence to malaria test results with respect to treatment practices based on record review at the time of the most recent supervisory visit within the reporting period	Number of instances where service providers demonstrate adherence to malaria test results with respect to treatment practices based on record review at the time of the most recent supervisory visit within the reporting period/Total number of instances investigated for service providers demonstrate adherence to malaria test results with respect to treatment practices based on record review at the time of the most recent supervisory visit within the reporting period	3.2	Health care providers demonstrate competence in malaria treatment	Team supervision reports	80%	81%	803	986			Target exceeded.
Outputs												
13	Percentage of scheduled joint laboratory/clinical supervisory visits to targeted facilities that occurred within the reporting period	Number of scheduled joint laboratory/clinical supervisory visits to targeted facilities that occurred within the reporting period/Total number of scheduled joint laboratory/clinical supervisory visits to targeted facilities	3.2	Country has supervisory structures and implementation of supervision of malaria case management practices	Team supervision reports	90%	55%	367	566 from PY3 +107 from PY2 673 total			Target not reached. Not all planned visits were conducted due to budgetary limitations, which also delayed Rounds 15 & 16.
Objective 4: Strengthened laboratory systems at the country level for detecting malaria and other infectious diseases.												
Description: Strengthened laboratory systems at the country level for detecting malaria and other infectious diseases. These activities relate to addressing the health systems issues that are a barrier to achieving universal access to malaria diagnostics and appropriate case management practices such as physical health facilities, human and financial resources, and support systems required to deliver quality diagnosis and treatment services.												
Intermediate Objectives												
Reference laboratories and facilities able to provide high quality diagnostics for malaria and other febrile illnesses												
Intermediate Outcomes												
14	Percentage of targeted facilities that meet standards for quality diagnosis of malaria at the time of the most recent supervisory visit within the reporting period.	Number of targeted facilities that meet all standards for quality diagnosis of malaria at the time of the most recent supervisory within the reporting period/Total number targeted facilities at the time of the most recent supervisory visit within the reporting period.	3.2	Reference laboratories and facilities able to provide high quality diagnostics for malaria and other febrile illnesses	Team supervision reports	50%	12%	12	100			Target not reached. Not all planned visits were conducted due to budgetary limitations, which also delayed Rounds 15 & 16.

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