

Universal Diagnosis and Treatment to Improve Maternal and Child Health

Project Year 4 Semi-Annual Report
Approved August 9, 2016



The US Agency for International Development (USAID) funded MalariaCare under the terms of Cooperative Agreement No. AID-OAA-A-12-00057. The information provided in this document does not necessarily reflect the views or positions of USAID or the US Government.

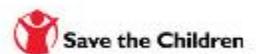
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MalariaCare remembers Timothy Nzangwa



MalariaCare recently lost a long-time friend and colleague dedicated to the fight against malaria, Mr. Timothy Nzangwa, an employee of MalariaCare partner MCDI. A malaria diagnostic expert based in Lusaka, Tim led our work in Zambia. He will always be remembered for his technical ability, along with his warmth, enthusiasm and kindness. Tim will be greatly missed.

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Acronyms

ACT	artemisinin-based combination therapy
ASTMH	American Society of Tropical Medicine and Hygiene
CCMRT	clinical case management refresher training
CHAI	Clinton Health Access Initiative
CHSP	community health service provider (Burma)
CHSU	community health service unit (Malawi)
CHT	county health team (Liberia)
CLU	clinical laboratory unit (Ghana)
CNM	Cambodia's National Malaria Control Program
DHIS2	district health information software version 2
DHMT	district health management team
DLP	Direction de la Lutte contre le Paludisme (National Malaria Program- Madagascar)
DQA	data quality assurance
DRC	Democratic Republic of Congo
ECAMM	external competency assessment for malaria microscopists (WHO)
EDS	electronic data system
EPHI	Ethiopian Public Health Institute
ESMPIN	Expanded Social Marketing Project in Nigeria
FMOH	Federal Ministry of Health (Ethiopia, Nigeria)
HIHS	High Impact Health Service project (Mali)
HMIS	health management information system
HNQIS	health network quality information system
HSO	health service officer (Burma)
HSS	health service supervisor (Burma)
iCCM	integrated community case management
INRB	Institut National de Recherches Biomédicales – DRC (<i>National Biomedical Research Institute</i>)
INRSP	Institut National de Recherche en Santé Publique – Mali (<i>National Institute of Public Health Research</i>)
IPM	Institut Pasteur Madagascar
IPTp	intermittent preventive treatment of malaria in pregnancy
LGA	local government area (Nigeria)
LLW	lessons learned workshop
M&E	monitoring and evaluation
MDRT	malaria diagnostics refresher training
MERG	M&E Reference Group (WHO)
MIS	malaria information system
MOH	Ministry of Health
NAMS	national archive of malaria slides

NMCC	National Malaria Control Centre (Zambia)
NMCP	National Malaria Control Program
NPCDD	National Program for the Control of Diarrheal Diseases (DRC)
OTSS	outreach training and supportive supervision
PAMO	Program for Advancement of Malaria Outcomes (Zambia)
PCR	polymerase chain reaction
PMI	President's Malaria Initiative (United States)
PMP	performance monitoring plan
PPM	public private mix
PPMV	patent proprietary medicine vendor (Nigeria)
pre-ECA	preparatory external competency assessment
PSI	Population Services International
PSK	Population Services Khmer (Cambodia)
PT	proficiency testing
PY	project year
QA	quality assurance
RAI	Global Fund Regional Artemisinin Resistance Initiative (Greater Mekong Subregion)
RDT	rapid diagnostic test
RHMT	regional health management team
RITM	Research Institute of Tropical Medicine (Philippines)
SFH	Society for Family Health (Nigeria)
SLMTA	strengthening laboratory management toward accreditation
SQH	Sun Quality Health (Burma)
TES	therapeutic efficacy study
UCAD	Université Cheikh Anta Diop
USAID	United States Agency for International Development
WHO	World Health Organization
WHO AFRO	WHO Africa Regional Office
ZAMEP	Zanzibar Malaria Elimination Program

Executive summary

MalariaCare 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.

During the first half of project year four (PY4), MalariaCare continued work in 14 countries where it had activities in PY3 (no activities have occurred in Guinea since PY2 due to the recent Ebola outbreak, but implementation will continue there in the second half of PY4). The project will be scaling up to add Burundi and Senegal to its global portfolio—for a total of 17 countries.

MalariaCare’s strategy is built around three key malaria case management quality assurance (QA) 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.

The project builds the QA axes 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 (see Figure 1 below). 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.

Highlights of achievements against project objectives

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

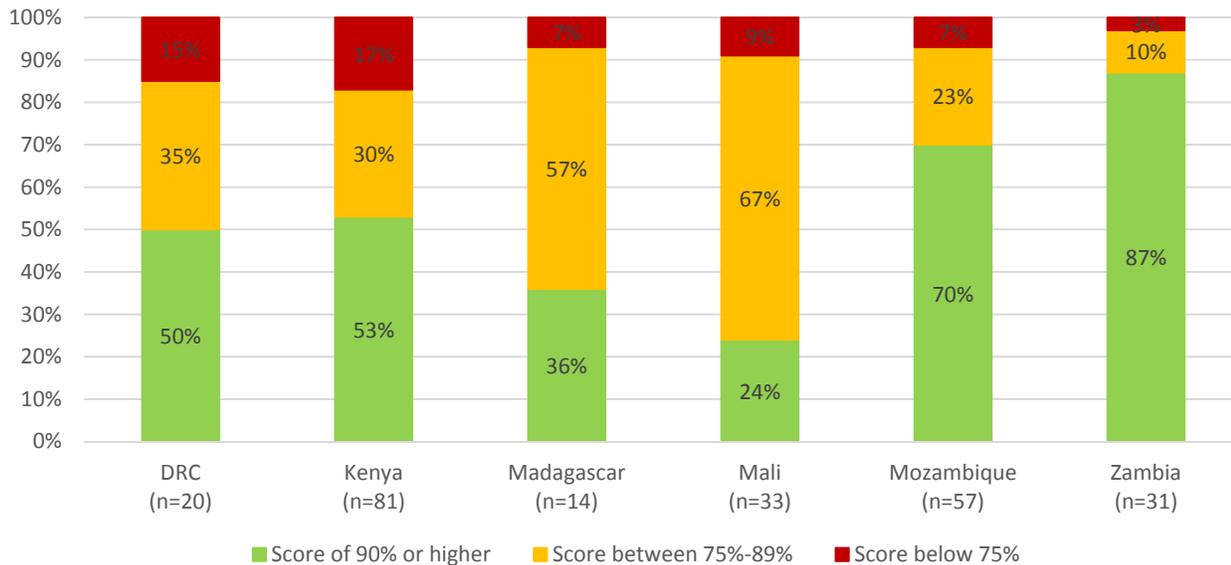
In PY4, MalariaCare has continued to strengthen microscopy skills through a combination of advanced malaria diagnostics refresher training (MDRT) followed by supportive supervision, the focus of which is mentoring, and feedback to develop and maintain a cadre of well-trained microscopists serving as OTSS supervisors. MalariaCare established minimum passing standards for OTSS supervisors during MDRT 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 in the first half of PY4, 182 supervisors (69 percent of participants) across 6 countries achieved an L1 or L2 equivalent for parasite detection. Parasite detection scores across MalariaCare countries have been consistently high, while speciation (5 percent) and parasite counting (23 percent), 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 more difficult as they are seldom seen. Furthermore, parasite counting, when done at all, has historically been with the ‘plus’ system—and this standard is slow to change. MalariaCare has tested additional acceptance criteria for participants joining the WHO External Competency Assessment for Malaria Microscopy (ECAMM) that has resulted in a higher proportion reaching L1 and L2 accreditation. Results will be published after additional upcoming ECAMM sessions have been completed and analyzed using the new criteria.

Table 1: Number of supervisors achieving Level 1 or Level 2 equivalent scores in microscopy for parasite detection, species identification, and parasite counting during malaria diagnostic refresher training (basic and advanced).

Country	N	Parasite detection WHO Level 1 or Level 2	Species ID WHO Level 1 or Level 2	Parasite counting WHO Level 1 or Level 2
DRC	39	28 (72%)	14 (36%)	20 (51%)
Kenya	128	78 (60%)	0 (0%)	33 (26%)
Malawi	19	14 (74%)	0 (0%)	8 (42%)
Mali	20	12 (60%)	0 (0%)	1 (5%)
Mozambique	37	46 (74%)	0 (0%)	30 (48%)
Tanzania	22	4 (18%)	0 (0%)	8 (36%)
Total	265	182 (69%)	14 (5%)	100 (23%)

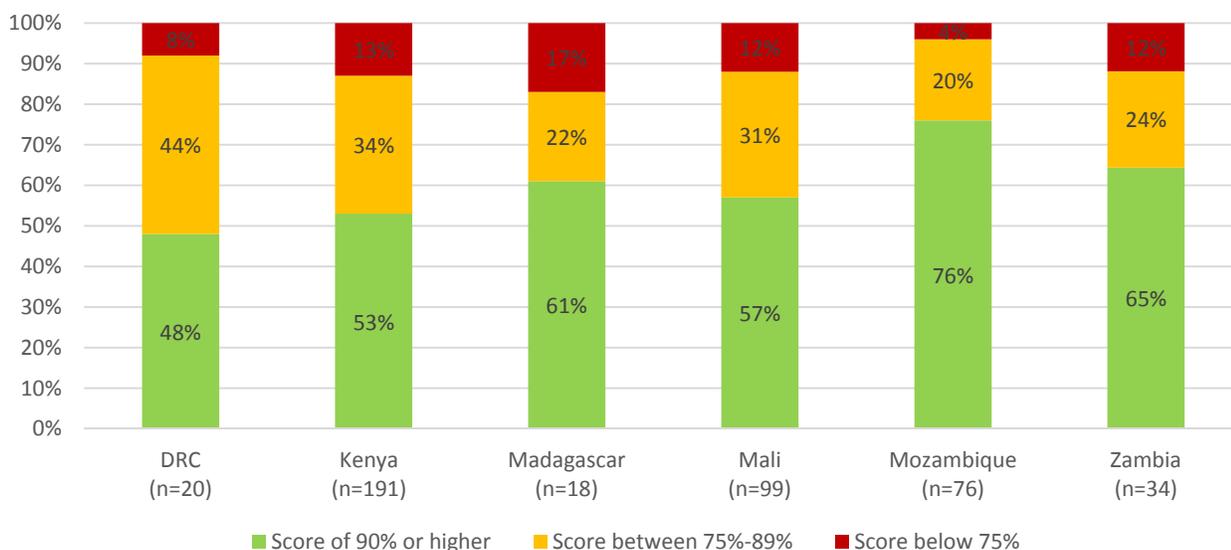
Microscopy skills are generally improving over OTSS visits across project countries. Using the original MalariaCare checklist, the proportion of facilities meeting the minimum standard competency of 75 percent across 6 countries ranged from 83 percent to 97 percent. Minimum score for competency during OTSS is based on parasite detection, while supervisors are scored during MDRTs on parasite detection, species identification, and parasite counting.

Figure 2: Proportion of health facilities meeting minimum standard of competency (75 percent) in microscopy.



MalariaCare has worked to improve the performance of providers on RDT testing. Using the revised checklist, the project evaluated health facility performance on six key indicators that represent the necessary steps to correctly perform an RDT. At the most recent visits this year, across the 6 countries shown in Figure 3 below, between 83 percent and 96 percent of facilities met the minimum competency score of 75 percent. MalariaCare is working with its country teams to publish results that highlight the successes and also present the challenges to achieving and maintaining high RDT performance scores.

Figure 3: Proportion of health facilities meeting minimum standard of competency (75 percent) in rapid diagnostic test (RDT) performance.



2. Improve the percentage of patients with suspected malaria or febrile illness who receive a diagnostic test

In the first half of PY4, the project conducted three-day clinical case management refresher training (CCMRT) in seven countries; updating a total of 216 providers on current national guidelines and febrile case management skills. The CCMRTs were followed directly with on-the-job mentoring during OTSS using the revised clinical checklist, which was developed in PY3 to ensure clinician performance.

In the latest rounds of OTSS, correctly ordering a malaria test was performed 87 percent to 96 percent of the time in 5 of 6 countries, the outlier being in Mali at 69 percent (see Table 2). Mali is the latest country in MalariaCare’s portfolio to have begun activities to strengthen case management. Findings from the most recent rounds of OTSS demonstrate highly variable scores across countries, with only 30 percent of facilities in Democratic Republic of Congo (DRC) meeting the minimum competency score of 75 percent, versus 94 percent of facilities in Madagascar (see Figure 4).

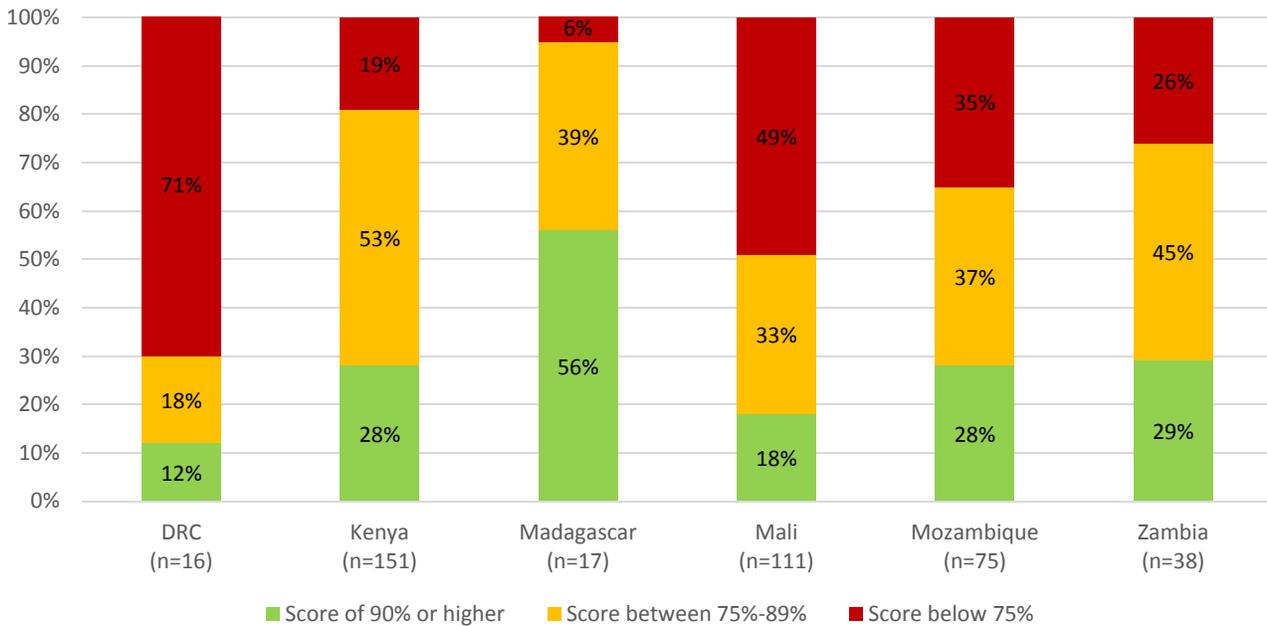
Table 2: Average country OTSS performance on key febrile clinical management indicators, by health facility.

Standard	DRC (n=17)	Kenya (n=151)	Madagascar (n=17)	Mali (n=111)	Mozambique (n=75)	Zambia (n=38)
Checks for at least one sign of severe disease	53%	90%	37%	80%	78%	81%
Correctly ordered a malaria test	84%	96%	89%	69%	87%	96%
Correctly diagnosed patient (including severity)	73%	97%	94%	N/A	97%	95%
Correctly prescribed per test result and/or diagnosis	49%	84%	69%	79%	93%	97%

3. Improve the percentage of patients to receive appropriate treatment for malaria or other related illnesses - consistent with the result of the diagnostic test

MalariaCare has continued working to improve clinicians’ ability to diagnose malaria and other febrile illnesses in patients presenting with fever. In addition to improving their ability to recognize the need for a test, we work to improve their ability to adhere to the results of the test, initiate early treatment, and conduct appropriate follow up of both uncomplicated and severe malaria. While clinicians are able to recognize the need for a diagnostic test, are able to properly diagnose malaria, and treat malaria appropriately (Table 2), review of the data from clinical OTSS visits reveal that they are scoring poorly in certain tasks that may improve their ability to diagnose other febrile conditions, such as conducting a physical exam or performing a focused history. Data from the latest round of clinical OTSS in 6 countries is shown in Figure 4, is highly variable, and in some countries scores are poor. MalariaCare will continue to emphasize our key indicators and improve them in countries like DRC, while building more complete clinical skills by focusing on deficient areas identified in the clinical encounter through OTSS observation that will help clinicians better diagnose other febrile conditions.

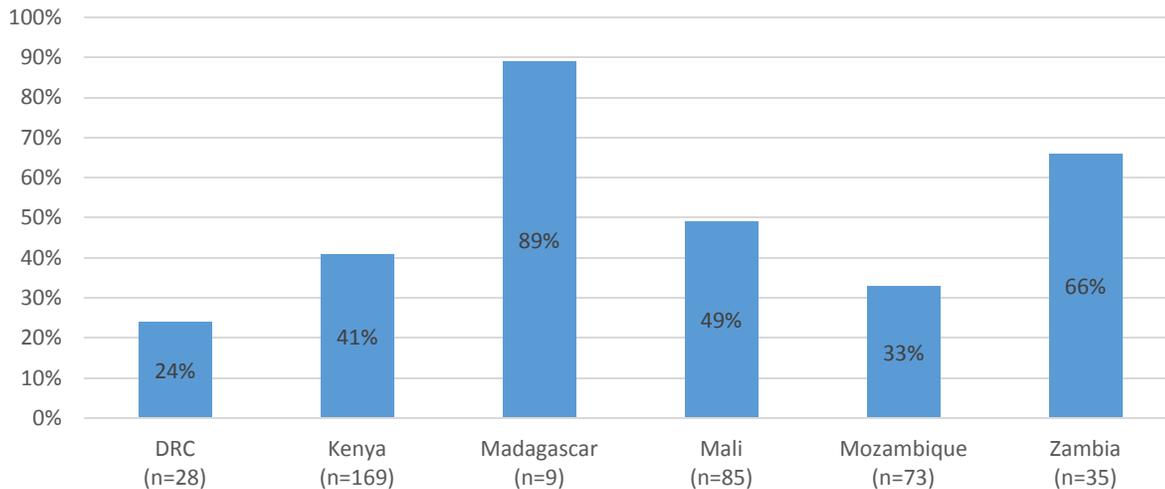
Figure 4: Proportion of health facilities meeting minimum standard of competency (75 percent) in clinical care.



MalariaCare focused on building clinicians’ capacity to adhere to test results and national guidelines for treatment of uncomplicated and severe malaria. MalariaCare evaluates adherence from both a diagnostic and treatment standpoint: adherence to negative test results by not treating with an artemisinin-based combination therapy (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.

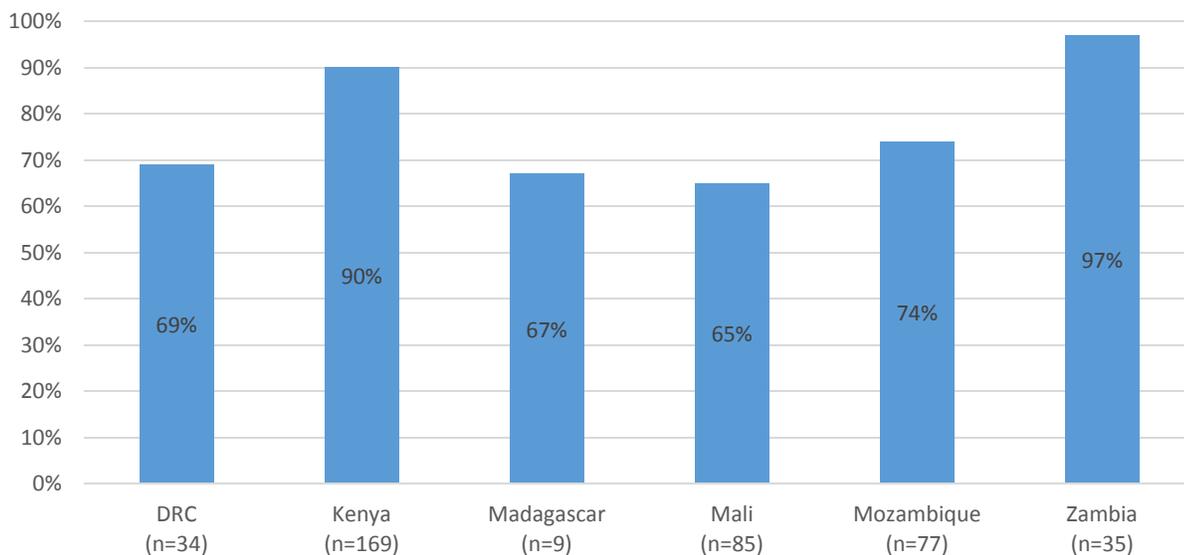
Lack of adherence to negative malaria test results continues to be problematic, and highly variable across countries. In some countries, clinicians still use antimalarial drugs other than ACTs in spite of clear national guidelines. Analysis of the latest round of OTSS results in the first half of PY4 demonstrates the variability of the problem across countries with adherence to negative test results ranging from 24 percent in DRC to 89 percent in Madagascar (see Figure 5). In addition to training and collaborative review of registers during OTSS to improve confidence and adherence to RDT testing and increasing use of ACTs, and improving provider skill in differential diagnosis and prescribing appropriate alternate treatment in cases of a negative malaria test, MalariaCare has improved supervisor capacity to address other reasons for lack of adherence (such as client expectation and financial incentives) through improved mentoring and coaching. This is being done through an increased emphasis during supervisor training on techniques to teach, coach and mentor on these other factors that may influence providers’ behavior.

Figure 5: Proportion of health facilities meeting minimum standard of competency (90 percent) in adherence to negative malaria test results.



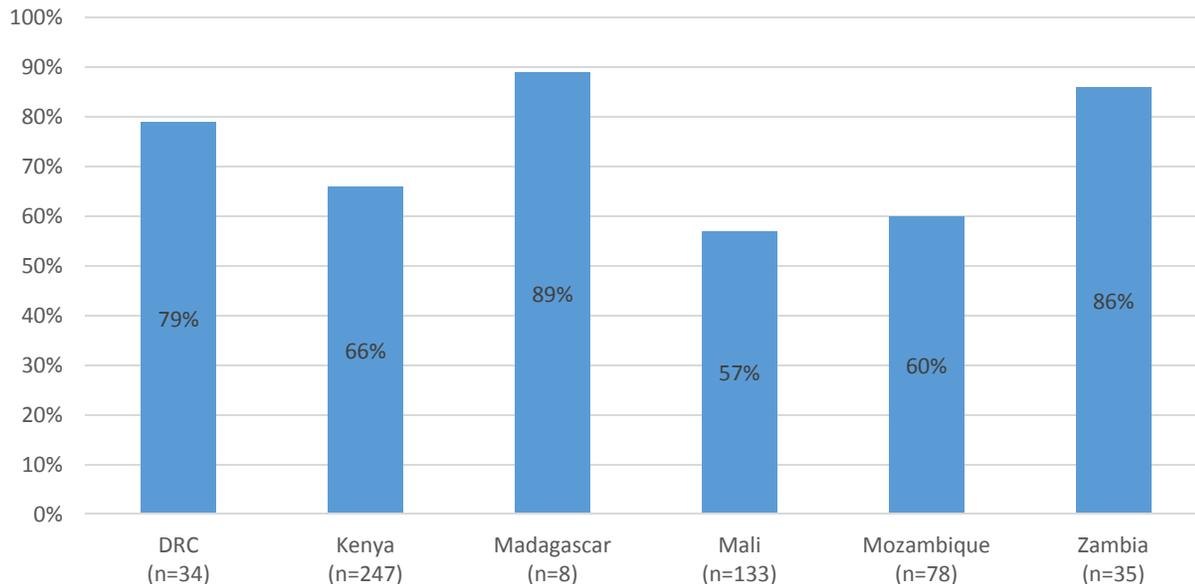
Provider adherence to a positive test by administering an ACT was better and somewhat less variable across countries, but still with considerable room for improvement as shown in Figure 6, below.

Figure 6: Proportion of health facilities meeting minimum standard of competency (90 percent) in adherence to positive malaria test results.



A third approach to evaluating adherence uses the treatment register as starting point, and evaluates whether a patient who received an ACT, did so based on a positive test result, received it despite a negative test result, or got the ACT prescription without evidence of any test being performed. As with adherence to positive testing, results are better than adherence to negative test results and less variable, but with room for improvement, particularly in Mali (57 percent) and Mozambique (60 percent)—(Figure 7).

Figure 7: Proportion of health facilities meeting minimum standard of competency (90 percent) in performing a malaria test prior to treatment with an ACT.



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

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 national malaria control programs (NMCPs) to strengthen key components of case management systems. In addition to examples throughout country chapters, a few activities with cross-cutting potential are listed here:

- MalariaCare, in addition to continuing to work closely with the WHO and Amref Health Africa to scale up ECAMM across Africa, has tested additional criteria developed to improve the proportion of participants who achieve L1 and L2 accreditation. The additional criteria, tested in three countries to date, have shown improved passing rates and will help countries better target human and financial resources when building a cadre of expert microscopists. After upcoming ECAMM sessions using the criteria are complete, MalariaCare will publish the results.
- MalariaCare has continued to move forward national archive of malaria slides (NAMS) development in DRC, Malawi, Zambia, and Madagascar to develop well-characterized and high-quality reference slides needed to conduct malaria microscopy training that includes an assessment of competency, and continuous training and monitoring activities to support QA systems. In Madagascar, Malawi, and Zambia, a development training was conducted, and in DRC NAMS equipment and supplies were procured, with development training expected in the second half of this year. We will continue to work with countries to identify donors and produce slides.
- MalariaCare is improving the electronic data system that was piloted in six countries (Mozambique, Ghana, Tanzania, Zambia, Mali, and Malawi) in PY3 that will make improve ease of checklist use in the field and data compilation and analysis. It is expected that the new version will be rolled out first in Kenya in June

2016. Data end-user training has occurred in three countries to empower national staff to be able to organize, analyze, and use data for decision making.

- Collaborated with the NMCP and Queen Elizabeth Hospital in Malawi to conduct training and strengthen a curriculum for severe malaria management, as well as including evaluation of severe malaria case management in OTSS training. This follows the rapid training and roll-out in PY3 of injectable artesunate for treatment of severe malaria. This experience will help inform the development of severe malaria management tools for other MalariaCare countries.
- In Kenya and Mozambique, ‘malaria case management committees’ and ‘therapeutics committees’, respectively, were established at peripheral hospitals and facilities to strengthen local, sub-national ownership, accountability and management of malaria case management activities.

Background

MalariaCare works to achieve the following objectives:

- To improve the accuracy of diagnostic testing for malaria to greater than 90 percent.
- To improve the percentage of patients with suspected malaria or febrile illness who receive a diagnostic.
- To improve the percentage of patients to receive appropriate treatment for malaria or other related illness consistent with results of a diagnostic test.
- To strengthen laboratory systems at the country level for malaria and other infectious diseases as applicable.

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 semi-annual progress report describes accomplishments toward achieving MalariaCare’s objectives, intermediate results, and milestones during the first half of PY4, covering the period from October 1, 2015, through March 31, 2016. 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 (PMPs), which present progress toward reaching specific targets.

The global achievements section describes progress toward reaching the project’s PY4 core work plan activities. 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 17 countries listed below and depicted in Figure 8. Accomplishments are described by each project objective.

- Burma
- Burundi
- Cambodia
- Democratic Republic of Congo
- Ethiopia
- Ghana
- Guinea
- Kenya
- Liberia
- Madagascar
- Malawi
- Mali
- Mozambique
- Nigeria
- Senegal
- Tanzania
- Zambia

Figure 8: Project year four MalariaCare countries.



Global achievements

Project operations

The MalariaCare operations team—made up of the finance and administration and field operations teams—facilitates country-based planning and implementation, budget development and financial tracking, partner communications, and the sharing of lessons learned through operations and technical advisory group meetings.

Key accomplishments

- Updated the internal accounting system to better support implementation of an \$18,616,773 approved annual budget.
- Supported efficient implementation of project activities in 14 active project countries through frequent communication; troubleshooting on budget, human resources, and administrative issues; and effective use of project data for decision-making. During the second half of PY4, implementation will resume in Guinea, and is planned to begin in two new project countries, Burundi and Senegal.
- Convened two technical advisory group meetings to review and improve the QA strategy and OTSS checklist, discuss and develop publications, plan for continued rollout of the electronic data system, and discuss project close-out strategies. Specifically, to support the appropriate treatment of severe malaria and reduce mortality, the advisory group developed a severe malaria checklist targeting inpatient care at higher-level hospitals. The advisory group discussed and developed ideas for abstracts to be presented at the American Society of Tropical Medicine and Hygiene (ASTMH) conference. Currently 12 ASTMH abstracts are being finalized for submission. The advisory group includes members from all four MalariaCare partner organizations.
- Convened two operations advisory group meetings with representation from all partners. The group met to review country-level operations and helped streamline subcontract development, 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.

Challenges

Delays in approval and receipt of PY4 obligations led to an additional burden on project finance and administration. Also, with less core funding available during PY4, the use of core funds to compensate for delayed country obligations also had to be limited. Implementation for some countries, such as Ghana and Zambia, may need to slow down to avoid running out of funds prior to the end of the PY.

Next steps

MalariaCare will continue to provide oversight and coordination support to in-country teams with a steadily increasing emphasis on transition and project close-out during the last 18 months of the project. 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 staff. The project team will continue focusing on the effective management of project operations across all supported countries, on communications to keep PMI and all project partners informed of progress and challenges, and on responding in a timely manner to those challenges.

Monitoring and evaluation

M&E work supports the design and implementation of project strategies and activities that champion PMI objectives. M&E also ensures that project performance indicators align with PMI and the Roll Back Malaria Partnership indicators. M&E allows project management to continually review project performance and contribute to global scale-up of innovations that improve case management of malaria and other febrile illnesses.

Key accomplishments

Electronic Data System

Halfway through PY4, MalariaCare is operating at scale in the five countries (Ghana, Malawi, Mozambique, Tanzania, and Zambia) that piloted the Electronic Data System (EDS) in PY3, with all OTSS supervision being conducted using the EDS. With the paper-based system, project staff would have a two-to-three month wait for data entry and analysis to make any operational adjustment, long after OTSS was completed. With EDS, data are available for review on the EDS District Health Information Software version 2 (DHIS2) dashboard as soon as supervisors submit their electronic forms. For example, in Zambia, MalariaCare staff called supervisors daily if their data were missing or incorrect for on-the-spot reconciliation. The EDS appears to increase turnaround of results and feedback for our post-OTSS LLWs and for pre-OTSS activity meetings for future rounds.

In expanding use of EDS, MalariaCare conducted end-user and data-user training for national-, regional- and district-level staff, government officials, and stakeholders in four and three countries, respectively. Nine hundred and sixty-four (964) supervisors were trained as EDS end users—those who conduct supervision visits and use the tablet to record supervision information in the EDS. Twenty-four (24) managers were trained as EDS data users—those who use the EDS DHIS2 dashboards to monitor OTSS operations and assess program performance following OTSS rounds. Because EDS utilizes the DHIS2 platform, three MalariaCare M&E staff members attended a two-and-a-half-day training led by Akros in Washington, DC, in February 2016. The training engendered a better understanding of the system and its dashboard features for appropriate facilitation of in-country training and support to local teams.

Data quality improvement

MalariaCare also scaled up data quality assurance (DQA) by creating DQA dashboards in the EDS DHIS2 for each country currently performing OTSS. Part of this measure included assigning a headquarters and in-country person to monitor the data coming in on a daily or every-other-day basis. MalariaCare also simplified the OTSS checklist for data collection to reduce the likelihood of “form fatigue.” This included removing data points that the team rarely used for analysis and refining the scoring system to focus on the six primary OTSS indicators.

Reporting

To improve the process of providing feedback on OTSS to supervisors, MalariaCare developed district reports that outlined the results of the six primary OTSS indicators (microscopy, RDTs, clinical management, testing prior to treatment, adherence to negative test results, and adherence to positive test results), using Malawi as a test case. In addition to overall district scores, the report also describes performance by individual health facilities, main problems encountered, and feedback and action plans for the next round of OTSS. Supervisors review the results with senior-level district staff and tailor the needs of OTSS for the next round based on the results in this report. MalariaCare conceptualized and generated these reports as an interim solution to provide feedback to supervisors and until a comparable report can be developed in the EDS DHIS2 platform. With the ongoing developments in EDS, automated dashboards similar to these reports should be available by the end of PY4.

M&E staffing

A new regional senior M&E officer was hired and operates from the PATH Kisumu office in Kenya. He supports M&E activities in Kenya, Tanzania, Malawi, Mozambique, and Zambia. In addition, MalariaCare hired a part-time M&E consultant in Zambia. Both new staff members have previous experience working with DHIS2 and mHealth systems and have been trained on MalariaCare's EDS DQA process. These positions will be instrumental in further cascading DQA data review to the national, regional, and district levels within each of these countries, with the goal of improving data quality and project results.

Conferences

MalariaCare sent a headquarters senior M&E officer/team co-lead and sponsored an epidemiologist from Zambia's National Malaria Control Centre (NMCC) to attend the WHO M&E Reference Group (MERG) semi-annual meeting in Istanbul, Turkey, in October 2015. The focus on M&E systems in pre-elimination settings offered an opportunity to think through the challenges as some MalariaCare countries, such as Zambia, move toward elimination. The NMCC epidemiologist presented Zambia's progress in improving surveillance and increasingly in using these routine data sources to track and treat cases in low-prevalence areas. This conference also allowed MalariaCare to reconnect with the global discussions on integrating data systems and standardizing data collection tools and systems.

Challenges

During the initial EDS data-user training activities, where key NMCP staff are trained to use the DHIS2 interface to interpret and analyze OTSS data, MalariaCare identified differences in capacity across countries; these differences are primarily due to existing familiarity with DHIS2 and with MalariaCare's OTSS process. As we learn more about existing capacity within each country, MalariaCare will adapt future training to each country's context and capability as we continue to roll out data use to lower levels. MalariaCare also has had difficulty effectively sharing detailed OTSS results that include specific district- and health facility-level information with supervisors. This information is critical in supporting supervisors to identify common issues and track progress within their area of oversight. As a result, we created the Malawi district reports, as mentioned above, and will continue to do so for each OTSS-performing country. Finally, in some cases, programming bugs and internet connectivity caused delays in submitting EDS data. With real-time data review, MalariaCare has been able to

identify these cases and is working to ensure all data is submitted and sent according to protocol. Other implementation adjustments may be made where such challenges remain beyond the control of the project.

Next steps

MalariaCare plans to implement the EDS and DHIS2 platform in two additional countries and is exploring the possibility of another country by the end of PY4.

In the second half of PY4, MalariaCare will continue to focus on data use at lower levels. This includes ensuring that supervisors receive detailed OTSS results during LLWs and before subsequent rounds of OTSS, which is expected to improve both results of supervision and data quality. MalariaCare continues to work with developers to roll out improvements in EDS. Each version will provide enhanced functionalities and data quality measures, such as simple interfaces to edit content (which reduces the need to rely on programmers), improved skip logic, enhanced feedback functionality, and prefilled action plan sections to allow easy follow-up on previous issues identified.

MalariaCare will draft migration plans and begin preparations for the transition of the EDS from the project to NMCPs and ministries of health, with the potential of syncing our EDS DHIS2 platform with national health management information system (HMIS) DHIS2 systems. During PY5, MalariaCare plans to implement the migration plans and provide technical assistance to government staff to ensure smoother operations and utilization of EDS.

Advocacy and communications

MalariaCare's advocacy and communications activities seek to increase access to technical and programmatic information and to support USAID communication with missions and governments. During this reporting period, 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

- Developed three symposium concepts and 12 individual abstracts on MalariaCare’s work to submit to ASTMH.
- Organized a global webinar entitled *Quality assurance approaches to improve malaria outcomes at health facility level*. More than 70 participants, representing countries in Africa and Asia in addition to the United States and Europe, joined the webinar. Participants asked thoughtful questions and several contacted MalariaCare after the webinar to request further information. The webinar has been archived for continuing access at <http://malariacare.org/resources>.
- Visits to the MalariaCare website increased 36 percent over the previous year, with 42 percent more visitors. In 2015 the site garnered 11,500 views by 4,700 unique visitors, compared to 8,400 views and 3,300 unique visitors in 2014.
- Maintained, routinely updated, and expanded the MalariaCare website. We added new country fact sheets, case studies, photos, and technical resources.
- Promoted the webinars, program briefs, and fact sheets through our MalariaCare e-bulletins.



MalariaCare webinars have proven to be very popular. The recent session on quality assurance approaches had the highest attendance rate of any of our webinars so far!

Challenges

No significant challenges to report.

Next steps

For the rest of PY4 and PY5, MalariaCare will maintain a focus on 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, maintain and expand the website, and continue to broadcast e-bulletins.

Technical leadership

MalariaCare’s technical leadership activities aim to continue 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. In the first half of PY4, more emphasis was placed on clinical care of patients with severe disease, in addition to the work on uncomplicated febrile illness, and on expanding in-country capacity to mentor. Together with our work to improve the ability to develop local data-driven action plans to address identified gaps, this continues to emphasize a systems approach that includes all levels of the health care system and multiple team members and departments within a facility. Our work may also lead to new global recommendations in case management as we

conduct and evaluate innovative strategies related to diagnostic accreditation and our quality assurance system that encourages low-cost and local solutions to common problems.

Key accomplishments

- Strengthened the training of supervisors to be effective mentors. In both supervisor and clinical case management training in six countries, we have expanded our training techniques for both clinicians and laboratorians to include role-playing and simulation to demonstrate and evaluate techniques supervisors can use to constructively provide feedback, demonstrate proper skills, and work with mentees and facility leadership staff to develop action plans for sustainable improvement in their work.
- Building on the two-part mentoring curriculum for severe malaria, we have developed training tools to improve management of patients with severe malaria. This includes clinical management, focusing on the complications of severe malaria, as well as the importance of microscopy in identifying and following response to treatment. While the electronic tablet used for data collection during OTSS was not able to accommodate the originally developed severe malaria mentoring curriculum, we have built upon the latter and incorporated severe malaria management into clinical training. In Malawi we have included the use of the NMCP severe malaria checklist during OTSS following the rollout of injectable artesunate, and in Mozambique we have formed Malaria Committees at five facilities to focus on the inpatient care of severe malaria.
- In 2015 the MalariaCare project introduced an additional selection criterion to determine the best-qualified candidates among those who met course entry requirements for ECAMM accreditation. This additional criterion led to improved performance in the course and improved certification of L1 and L2 expert microscopists.
- Developed a framework for intensive mentoring at low-performing facilities that will be implemented and evaluated against control facilities in Mozambique. Underperforming facilities identified through OTSS data will receive additional mentoring visits between OTSS rounds to hasten improvement in key malaria case management indicators. MalariaCare will examine both intervention and control facilities involved in the process to identify if benefits are observed using this strategy that might then be applicable to other focus countries.
- The technical team has worked closely with the M&E team and in-country staff to disseminate lessons learned from our work. During the first half of PY4, that dissemination has included five manuscripts for publication that are currently under development, one of which has been cleared by PMI for submission; submission of 12 abstracts/posters to ASTMH focusing on country-level progress; three symposia submitted to ASTMH highlighting our efforts at improving diagnosis, building quality assurance systems, and improving health worker performance; and a webinar on quality assurance of case management.

Challenges

As in previous years, responding in a timely and adequate way to technical needs across MalariaCare's portfolio is challenging. Although we have improved our ability to validate improvements we see in focus countries

through both EDS and internal task-shifting, we continue to adjust and modify the latter to improve our ability to focus on technical activities.

Next steps

In the second half of PY4, the technical team will continue to work with the M&E and operational teams to consolidate previous accomplishments with two primary goals: 1) to strengthen the links between activities in our QA system with the goal of continuing to improve the quality of case management and transition technical capacity to the in-country NMCPs; and 2) to develop further publication of peer-reviewed articles to share lessons from the project's multi-country experience.

The expansion of training in the first half of PY4 (to include improving mentoring skills and improving the ability to manage severe disease) has been well received and is expected to lead to improved skills of supervisors, clinicians, and laboratorians. We will continue to improve on these efforts and expand this to additional focus countries. EDS allows us to more rapidly identify gaps, which has led to improvements working with supervisors and health management teams to use data to address these deficiencies through targeted action plans to more effectively use resources. We will continue to build this capacity during training, OTSS visits and LLWs, and we will evaluate additional inexpensive local solutions such as intensive mentoring to address weaknesses. By building capacity in areas that have been neglected, and by focusing on locally derived data-based decisions, we hope to be able to better transition MalariaCare technical innovations as the project comes to an end.

MalariaCare will include findings from three additional focus countries on the expanded criteria for ECAMM accreditation and will continue to collaborate and share findings with the WHO case management team, Amref Health Africa, and other relevant partners to use results to adjust and revise criteria for participant selection in an effort to improve outcomes through efficient use of resources.

Finally, participation in key global dialogues such as the WHO technical working groups for case management, malaria diagnostics QA, artemisinin resistance technical expert group, and the CORE Group working group meeting, as well as conferences such as ASTMH, will help us disseminate our key findings and lessons learned on a global scale. The five peer-reviewed publications under development will be shared with PMI for submission prior to the end of PY4, and we will continue to develop ideas for further publications in PY5.

Country achievements

Burma

Since May 2015, MalariaCare has supported PSI's Sun Network—a franchised network of rural community health service providers (CHSPs) and Sun Quality Health (SQH) private physicians—which provides basic health services in both urban and rural townships. MalariaCare's support focuses on malaria case management, as an addition to the integrated package of services provided by the Sun franchises. The Sun Network malaria program currently includes 2,343 community health workers, 871 private doctors, 39 diagnostic professionals, and four counselors/social workers. The other components—including family planning, diarrhea, and pneumonia services—are supported by the Global Fund and the Millennium Development Goal Fund. MalariaCare has supported training of 296 CHSPs and 18 SQH providers on improved malaria diagnosis and treatment in 17 high-burden, malaria-endemic townships.

Key accomplishments

- Supported RDT testing of 15,770 suspected malaria cases by Sun Network providers in this reporting period, with 184 malaria cases identified and treated according to national guidelines.
- Conducted on-site malaria case management and supply chain refresher training for five SQH doctors in three townships: Terchileik, Nyaung Shwe, and Hsiseng.
- Conducted 16 CHSP training sessions in 14 townships for a total of 166 providers: 48 were trained as new CHSP providers and 118 received refresher training. With this training, the recruitment and training targets for new CHSPs are nearly met, with 296 CHSPs trained across 16 of the 17 MalariaCare-supported townships. No recruitment or training was completed in Tangyang Township, due to insecure conditions and difficulty in recruiting health service supervisors (HSS); however, the situation has stabilized and training of CHSPs is planned for June 2016.
- Conducted approximately 85 mobile surveillance trips—each with two CHSPs and one HSS—for active case detection in areas of intervention townships with limited access to formal health services. During the monitoring trips, the team performed RDT testing for all people in a selected area/village who had fever within a week prior to the visit, and for any others who requested testing. For positive cases, the team provided the full course of treatment according to national guidelines.
- Procured information, education, and communication materials for clients and providers. Malaria treatment guideline charts were disseminated, and a waste management flowchart for CHSPs is being procured and will be disseminated to the field in June 2016.
- Disseminated job aid materials to CHSPs and SQH providers to facilitate quality case management, including solar lamps, to improve RDT testing at night and sharps boxes for safe waste disposal. To facilitate home visits, the CHSPs were given disposable gloves, plastic drug boxes, and raincoats.

- Conducted monitoring and supportive supervision for CHSPs and SQH providers through monthly visits by senior health service officers (HSOs), junior HSOs, and HSSs. The visits focused on technical corrective actions and improving adherence to treatment guidelines. The supervisors used a monitoring checklist that includes a knowledge assessment, observation of RDT testing and treatment procedures, and a client assessment. HSSs also collected data regarding on-time reporting to the field office and ensured that providers had access to a consistent supply of commodities.
- Conducted the Sun Network Annual Review Meeting at Kalaw Township, Southern Shan State in December 2015 for area managers, junior HSOs, and HSSs. The PSI headquarters malaria program team presented updated targets and future work for 2016 as well as achievements and lessons learned from 2015.

Challenges

Challenge	Solution
The project had planned to recruit 20 to 25 SQH doctors; however, only 18 have been recruited to date.	In several townships, no private physicians could be recruited—either because all private physicians were working for other organizations or there are no practicing private physicians. Despite the delays, MalariaCare anticipates meeting the CHSP recruitment target once Tangyang Township training begins in June.

Next steps

In the next reporting period, the project will continue to support malaria case management activities in the 17 high-malaria-burden townships and will continue to expand active case detection through mobile trips, focusing on townships with migrant populations. During these trips, the mobile team will facilitate health education sessions with the community, focusing on key areas of malaria prevention and treatment. In the next quarter, MalariaCare will procure 17 motorbikes (one for each township) for use in monitoring visits. Also, the team will hold additional new CHSP training and provide refresher training to both CHSP and SQH providers already enrolled in the program.

Burundi

Since the start of PY4, MalariaCare has been in discussions with USAID Burundi and PMI on a role for MalariaCare to assist with the implementation of case management QA activities in Burundi. A draft scope of work was developed and shared with PMI; it will be discussed and elaborated during an introductory trip in April 2016. The scope of work describes proposed activities on building and strengthening capacity for quality-assured case management by updating current policies, implementing RDT and ACT training, and implementing OTSS.

Next steps

Following the introductory visit, MalariaCare will submit a work plan and budget to PMI for further implementation.

Cambodia

In Cambodia, since PY2, MalariaCare is serving as a funding pass-through mechanism enabling partner PSI/ Population Services Khmer (PSK) to improve QA systems for malaria case management and associated information systems in the private sector. During the last six months, the project has focused on: 1) promoting more effective data sharing and strategy harmonization with Cambodia's National Malaria Control Program (CNM), supporting the adoption and use of DHIS2 (or a similar platform), and encouraging use of public- and private-sector data for decision-making; 2) extending training, supervision, and surveillance to new private-sector providers; and 3) strengthening the quality of care offered by the



PSK Network, Memot Plantation, Cambodia.
Photo credit: Malaria No More

private sector and improving reporting of private-sector data. Building on the first two years of implementation, the project drew on lessons learned and focused activities and monitoring on the specific needs of the Emergency Response to Artemisinin Resistance, and more recently, on the Malaria Elimination Action Framework strategy (2015–2020) in Cambodia. During the last six months, the project has continued to build on the successful QA platform to respond to national and regional data needs and, increasingly, to support malaria surveillance activities, which have been identified as essential to elimination.

Key accomplishments

The results below demonstrate constant improvement of QA scores across the network and improved reporting of critical malaria testing and treatment data that is essential to national-level surveillance and monitoring.

Objective 1: Improved harmonization of data systems and strengthened management within the national malaria response and across donors.

- Joined the Cambodia Malaria Elimination Task Force, with special focus on surveillance and engagement of private-sector health providers.
- Working with CNM and the Clinton Health Access Initiative (CHAI), developed a package of standard operating manuals for various activities, including the public-private mix program, the malaria plantation program, quality assurance assessments, and project-supported surveillance efforts. The standard operating procedures for the public-private mix and malaria plantation programs have already been endorsed by the CNM. The team will continue to work with CNM, CHAI, and WHO to finalize a national surveillance manual, including supporting training curricula. This manual will guide surveillance activities for the next five years, in line with the Malaria Elimination Action Framework, and will further solidify the role of the private sector in surveillance for malaria elimination.

- Continued efforts to formally integrate public, private, and community data. As part of the core Malaria Elimination Task Force, PSI/PSK has provided support to the development of an updated, web-based National Malaria Information System (MIS). While full integration of data cannot happen until the new MIS has been installed and programmed, the project has continued to collaborate with CNM and technical partners to develop a transition plan designed to help operational district staff conduct integrated data entry quickly and in a quality manner.

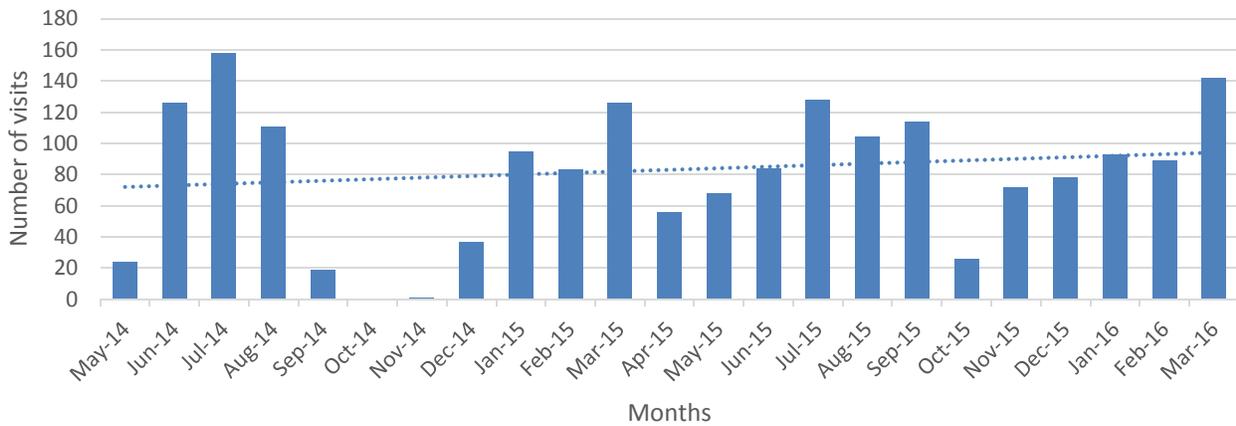


Private-sector health provider in a project-supported health facility, Cambodia.
Photo credit: PSK Cambodia

Objective 2: Improved quality of malaria case management in the private sector (private-sector outlets and worksites).

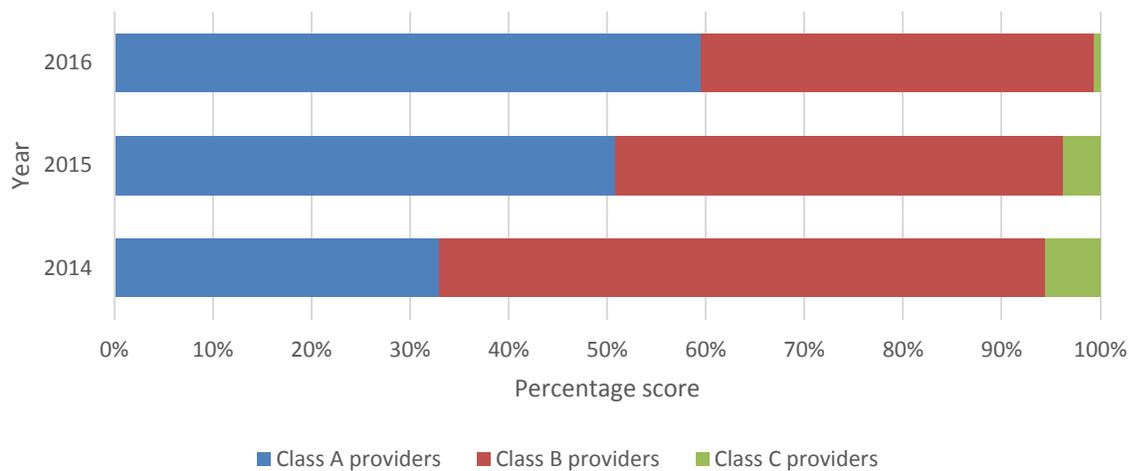
- During the reporting period, the project conducted over 500 QA visits to 385 providers in the public-private mix network and 183 plantation malaria workers. The following figure summarizes the number of visits per month.

Figure 9: Quality assurance (QA) assessment visits conducted per month, May 2015 to March 2016, Cambodia.



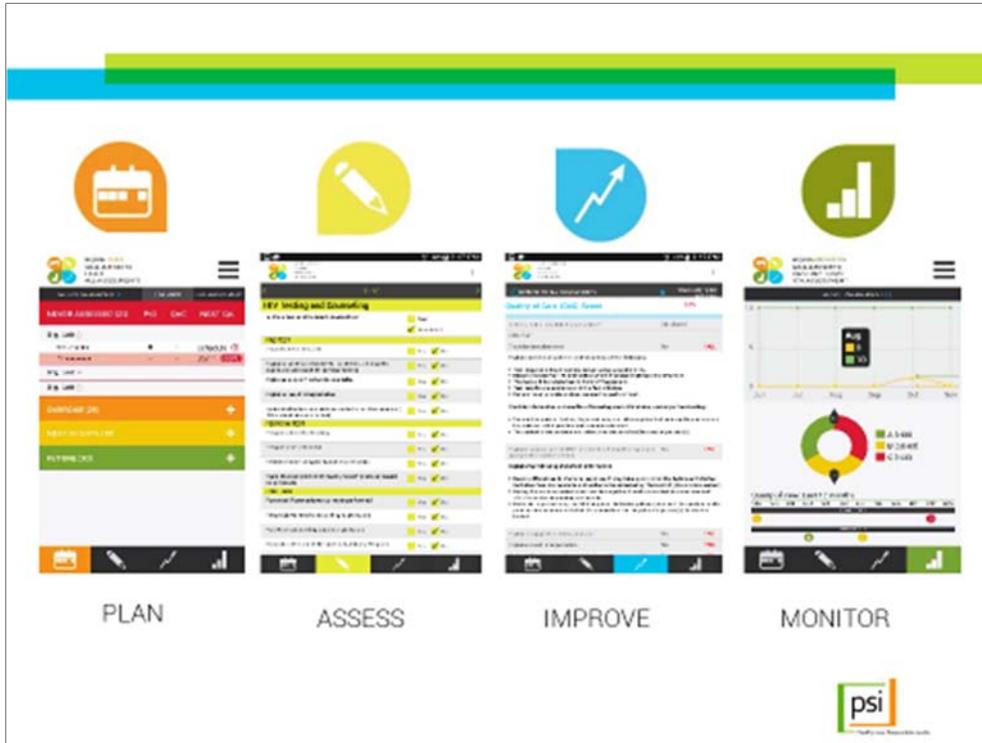
- Increased the proportion of Class A providers in the project-supported network. Providers are assigned to one of three classes, depending on their level and needs: Class A to receive a visit every six months, Class B to receive a visit every three months, and Class C to receive a visit every 30 days (see Figure 10). This demonstrates a trend in quality of care improvement that the project anticipates will continue as the provider network matures. With the addition of new providers this year and the scores of some of the new providers in the short term, the project will target support to new providers accordingly.

Figure 10: Provider achievement during quality assurance visits, 2014 to 2016, Cambodia (n=618).



- Further developed the Health Network Quality Improvement System (HNQIS)—an electronic, tablet-based tool designed to improve the quality of health service provision within private health facilities. The tool aims to help QA officers: 1) effectively prioritize where support is required; 2) undertake assessments with comparable scoring and benchmarking mechanisms; 3) consistently and effectively provide feedback and coaching following assessments; and 4) monitor performance of providers over time to understand the return on their support efforts and to conduct mid-course corrections (such as refresher training). HNQIS is fully functional without internet connectivity and operates off an android application linked with the information management system (DHIS2). The system consists of four modules designed to support the focus areas outlined above and is applicable to a range of health provider networks. Rollout of the HNQIS is planned for June 2016.

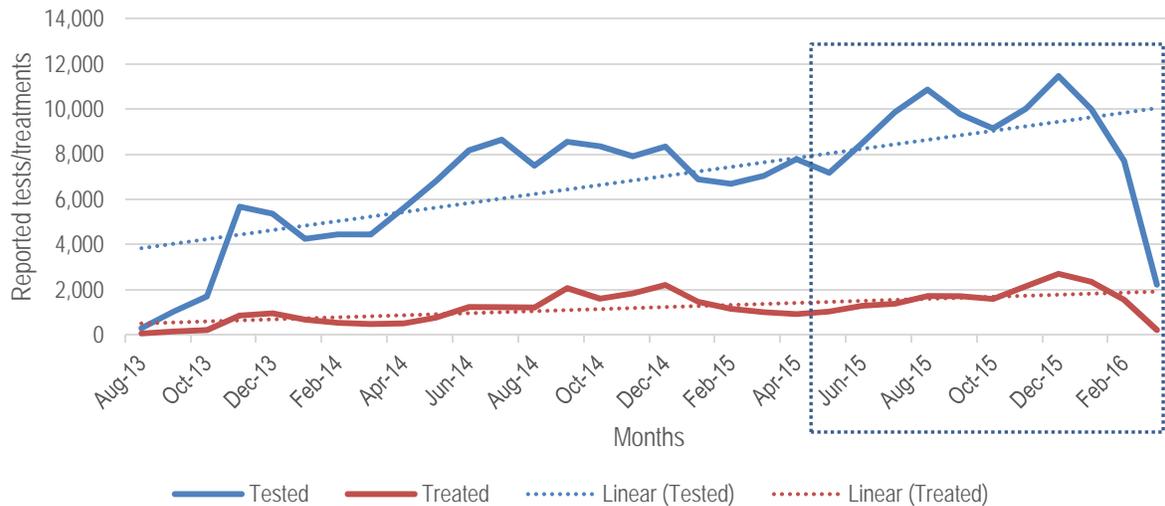
Figure 11: Health Network Quality Improvement System (HNQIS) module screen shots, Cambodia.



Objective 3: Improved malaria surveillance.

- Between August 2013 and February 2016, a total of 221,617 suspected malaria cases were tested by providers in the project network. Of these, 38,902 (18 percent) tested positive for malaria and were treated with appropriate first-line ACTs. Recent analysis reveals that, in 2015, providers in the project-supported network (across eight provinces) have contributed to roughly 32 percent of confirmed malaria cases reported to the CNM. With planned expansion to all eleven provinces in Tier 2 areas, PSK anticipates that the project will contribute to increased reporting of testing and treatment administered by private-sector providers by July 2016. The following figure outlines testing and treatment rates reported by project-supported providers between August 2013 and February 2016.

Figure 12: Testing and treatment rates among cases received by providers in the project network, August 2013 to February 2016, Cambodia.



- After being elected to serve on the CNM’s Malaria Surveillance Technical Working Group, the project team supported CNM and partners to develop a national malaria surveillance manual. This is an exciting step forward, and initial meetings have resulted in the development of updated data collection tools for public, private and community sectors.
- Finalized the project’s malaria case surveillance application and conducted initial field testing of the tool, to better collect surveillance data electronically. The application is now a well-designed product that has been well-received by providers and that is able to collect critical caseload data in real time. The CNM team is pleased with the inclusion as it will lead to improved foci investigation and classification of imported versus locally occurring cases.
- Established a dedicated surveillance team to oversee field activities. The team serves as the principal liaison with the development group in Washington, DC, the local CNM information technology team, the Malaria Consortium team developing the upgraded MIS, and the local providers who have served as the testing grounds for the tool. One additional surveillance officer will be recruited for this team under the Global Fund Regional Artemisinin Resistance Initiative (RAI) project, and the unit will be responsible for ensuring the functionality of the malaria case surveillance application, reviewing the data as it comes in and determining appropriate thresholds for action, creating the links with the operational districts, and then investigating areas of high caseload as the information is received and deemed anomalous. The team will liaise with the provincial health department malaria unit and can provide support with case classification and investigation.

Challenges

Challenge	Solution
Program management and coordination challenges related to different partners covering Tier 2 providers.	This challenge led to broader coverage of project-supported QA assessments than in previous project years, stretching resources quite thin. Despite the ambiguity of public private mix (PPM) program coverage, the QA team has done a tremendous job ensuring that all providers are assessed, monitored, supported, and provided with standard performance-based feedback.
No finalized, operational, web-based national MIS established in Cambodia.	Integration of public-, private-, and community-sector data will only happen when CNM is able to finalize the new web-based MIS. The server was meant to be procured over a year and a half ago, but delays in the process have meant that the current MIS is still in the form of an ACCESS database, inaccessible to subnational levels, partners, and donors, and maintained by a single data entry person. This should be resolved over the coming months. To prepare for a smooth transition to the new MIS, PSK and other partners have been working to ensure that all data entry forms are up to date and are prepared to feed data directly into this new system. The next step is to work toward a culture of data use at central and subnational levels.
Collaboration with CNM, CHAI, WHO, and other partners has led to multiple iterations of the malaria case surveillance application.	The various iterations are testimony to the collaborative development process for the malaria case surveillance application. The application has been circulated, reviewed, adjusted, pretested, and revised with feedback from all stakeholders, with the intention for the application to be adopted by the public sector. The application has now been finalized.

Next steps

- Continue to monitor provider performance data in real time, as it comes in, and to establish strong feedback channels with CNM. Using project data to target support, the team will also continue to support QA assessments in the field.
- Finalize and formally implement the malaria case surveillance application. The planning and preparation that have gone into advocacy, design, review, and pre-testing of this important new data collection tool will mean a smooth transition to electronic reporting. Phase 1 will include 100 providers (funded by PMI – May/June), Phase 2 will include 100 providers (funded by RAI – June/July), and Phase 3 will include the remaining 500 providers (funded by Global Fund/Bill & Melinda Gates Foundation – August/September). The application will continue to be developed and improved, with the latest additions coming from recommendations by WHO and CNM to add questions about employment and recent travel (last two weeks), and even taking the

first steps to identify the potential point of transmission at the village level. This is a problem that has faced surveillance teams globally, so it will be exciting to take a stab at better pinpointing risk foci.

- Continue to conduct QA assessments in line with rollout of HNQIS (algorithm drawing from caseload and quality assurance scores). In the remaining six months of PY4, the project plans to conduct approximately 480 visits to malaria service providers across the network, guided by the planning algorithm (targeting high-caseload, mid- and low-performing providers first).
- Continue to improve provider QA scores, particularly among providers new to the PPM network or the plantation program, with an ongoing focus on accurate identification of danger signs.
- Finalize and implement the HNQIS. We are at the final stage of development: checklists have been reviewed and global best practices have been consulted and incorporated, and we are currently finalizing the feedback scripts that will offer immediate guidance for providers on key steps of the test/treat/track process. HNQIS will take the existing QA system, developed and expanded from the beginning with funding from PMI, to the next level.
- Continued advocacy for private-sector contribution. A big part of our role in country is to strengthen the links between the public, private, and community sectors. PSI/PSK will continue to represent the private sector and emphasize the contribution that it makes to diagnosis and treating malaria, while stressing and demonstrating ongoing improvements to the quality of case management.
- Support CNM in developing and rolling out a QA system, using the PSI/PSK model. The CNM is interested in the system.
- Work with PMI and CNM to ensure a smooth transition to the next stage in the project. PSK will continue to provide guidance and technical support on both the importance and rollout of QA assessment intervention, sharing, provide review and training on all available tools and standards of practice, and offer as much support as is required to ensure that CNM is able to access and benefit from the lessons learned over the life of the project.

Democratic Republic of Congo

In the Democratic Republic of Congo (DRC), since PY1 and building upon the work of the IMaD project, MalariaCare supports the NMCP and other malaria-linked entities of the MOH to implement the malaria case management QA strategy, which aims to achieve that every febrile patient is tested for malaria and treated based in accordance with the test results. During PY4, MalariaCare continues to work on improving the quality of malaria diagnosis and clinical care at national and provincial referral levels through training and on-site supportive supervision visits, and at community level through supporting the NMCP, the Haut Katanga Health Provincial Division, and the National Program for the Control of Diarrheal Diseases (NPCDD, which oversees integrated community case management [iCCM] of childhood illness) to establish community health sites in remote, hard-to-reach villages in Haut Katanga Province.

Key accomplishments

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

- Collaborated with the NMCP and the National Biomedical Research Institute (*Institut National de Recherches Biomédicales* [INRB]) to identify 20 participants from central and provincial health facilities and institutions to participate in an advanced MDRT, which aimed to refresh the diagnostic skills of staff who act as laboratory supervisors during OTSS. Pre- and post-test training scores were used to identify gaps in knowledge and to evaluate performance improvement.

Course participants were trained on and evaluated for practical microscopy skills (microscopy parasite infection detection, identification of Plasmodium species, and counting of whole blood parasite load) and for basic malaria knowledge critical for patient care (theory evaluation). At post-test, significant improvements were noted in all test categories, with average scores improving by 12 to 45 percentage points (See Table 3 below). Participants demonstrated particular competence in parasite detection (average 91 percent; median 93 percent) and understanding malaria management theory (average 94 percent; median 96 percent). While the results for practical skills for species identification and parasite counting showed room for improvement, participants did improve significantly in both categories (by 29 percentage points and 36 percentage points, respectively) from a relatively low baseline. MalariaCare believes that the lab OTSS supervisors will be able to mentor their colleagues effectively—particularly in using microscopy to identify infected patients and working closely with their clinical colleagues on appropriate use of the test results.

Table 3: Malaria diagnostics refresher training (MDRT) microscopy practical pre- and post-test results, DRC (n=20).

Competency area	Average pre-test score (median [range])	Average post-test score (median [range])	% point change in score
Parasite detection	79% (82% [55%–100%])	91% (93% [80%–100%])	12
Species identification	47% (43% [14%–71%])	76% (75% [54%–96%])	29
Parasite counting	14% (0% [0%–50%])	49% (50% [19%–88%])	36
Theory evaluation	49% (50% [26%–74%])	94% (96% [57%–100%])	45

These participants are now expected to take a lead in establishing relevant laboratory procedures within their facilities and to share their knowledge with colleagues, as well as continue to work as laboratory OTSS supervisors in order to implement the malaria case management QA system in their province. Four of the best performers from this course will be selected for testing in international accreditation standards through the WHO ECAMM, which will take place at Cheikh Anta Diop University in Dakar, Senegal.

- Performed a basic MDRT in Lubumbashi. This course refreshed diagnostic skills (microscopy and RDT testing) and clinical knowledge for 22 laboratory OTSS supervisors from provincial and peripheral-level laboratories in Haut Katanga, Haut Lomami, Lualaba, and Tanganyika provinces.

During this course, which targets participants with lower microscopy skill levels and is graded less stringently than the advanced MDRT (see PMP indicator definitions), trainees were evaluated for practical microscopy skills (microscopy parasite infection detection, identification of Plasmodium species, and counting of whole blood parasite load) and on basic malaria knowledge critical for patient care (theory evaluation)—see Table 4 below. The best overall performances were in parasite detection (average 75 percent; median 73 percent), species identification (average 65 percent; median 71 percent), and theoretical knowledge (average 60 percent; median 59 percent). While final performance for parasite counting was on average only 43 percent, the participants improved significantly from their baseline by 41 percentage points. These findings indicate a marked improvement in capacity, with some room for improvement in key areas.

Table 4: Improvements between average basic malaria diagnostics refresher training (MDRT) pre- and post-test scores (n=19), DRC.

Competency area	Average pre-test score (median [range])	Average post-test score (median [range])	% point change in score
Parasite detection	66% (73% [36%–91%])	75% (73% [18%–100%])	9
Species identification	31% (29% [0%–71%])	65% (71% [0%–100%])	34
Parasite counting	3% (0% [0%–25%])	43% (25% [0%–100%])	41
Theory evaluation	20% (22% [0%–48%])	60% (59% [30%–91%])	40

Note: Three participants were removed from analysis due to lack of pre-test scores due to late arrival on the first day of the MDRT.

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

- Completed the RDT QA cascade training for individual health care workers from health facilities in the remaining 14 health zones in five provinces not reached during PY3. This one-day training, which was led by the clinical and laboratory supervisors, and two health zone management team members trained in PY3, included training on kit storage and testing procedure, common technical errors, and use of test results in clinical decision-making. The sessions conducted in PY4 reached 175 head nurses, who are expected to return to their facilities and provide on-the-job training to those responsible for conducting RDTs. Performance in these 14 health zones improved by 29 percentage points from an average pre-test score of 48 percent (range 26 to 73 percent) to 77 percent at post-test with a range of scores from 45 to 94 percent. While the training sessions were successful and participants improved their knowledge, health zone management teams are currently conducting follow-up supervision visits to assess ongoing RDT capacity in facilities in these health zones, using a checklist that includes the MalariaCare RDT observation form. Supervision reports from those facilities supported by RDT QA training will be reviewed to determine if further support is needed from MalariaCare.

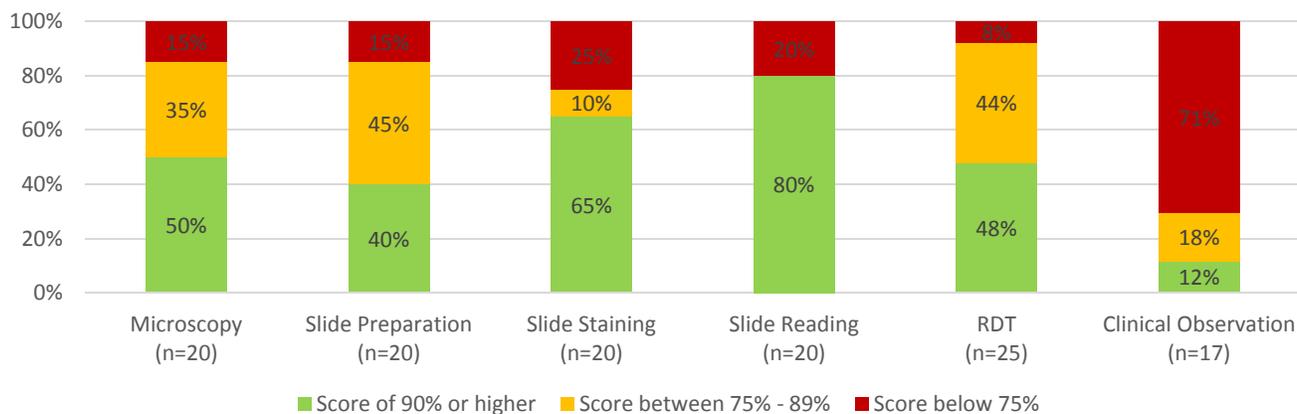
Objective 3: Increased percentage of patients who receive appropriate treatment for malaria or other febrile illness—consistent with the result of the diagnostic test.

- Conducted the year’s first round of joint clinical/laboratory OTSS (Round 7) during which national and provincial supervisors visited the same 41 facilities that received OTSS support during PY3. Data collection was through use of a paper checklist and the findings for diagnostics, clinical performance, and adherence are shared below.

Figure 13 shows average health facility performance in diagnostics and clinical care. Of the 41 facilities visited, 20 facilities (49 percent) had at least one complete microscopy observation, 25 facilities (61 percent) had an RDT observation, and 17 facilities (41 percent) had at least one complete febrile case observation. Ensuring data quality and conducting complete observations will be emphasized in any future trainings and LLWs. Among facilities with data, DRC generally shows strong performance in microscopy and RDT testing, with 85 percent meeting overall microscopy and 92 percent meeting RDT testing minimum competency performance levels (75 percent) or higher. Indeed, 50 percent of labs are meeting the 90 percent overall competency threshold in microscopy. While slide preparation and staining need improvement, slide reading skills appear to be nearly at target of 90 percent or higher in all facilities.

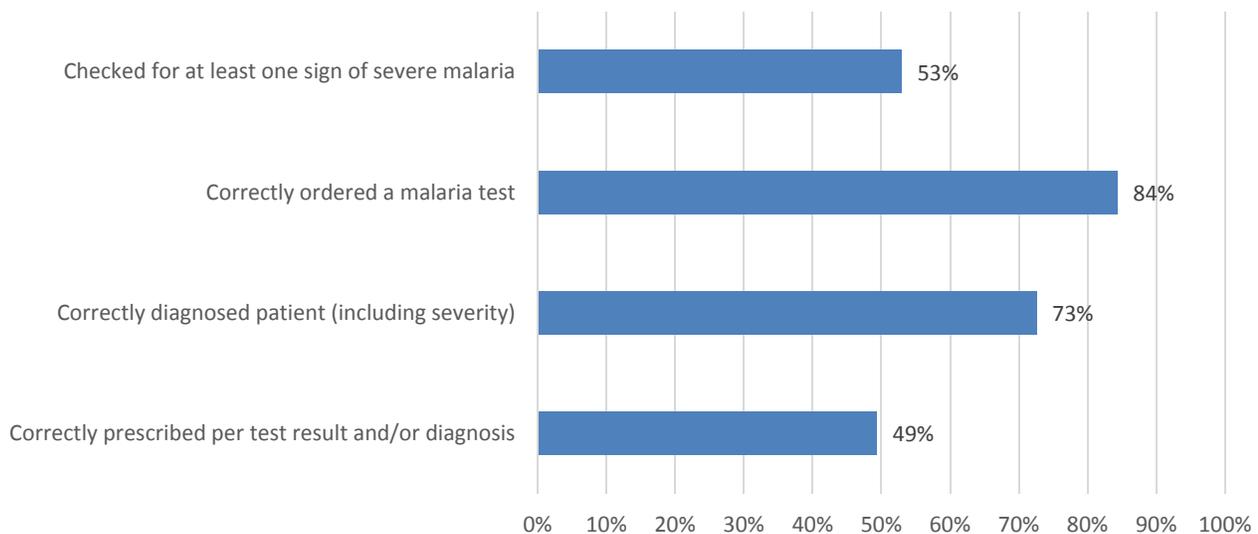
Overall clinical performance during observations was lower: 30 percent of facilities with at least one complete observation met the minimum standard for febrile case management competency; among these facilities, 12 percent reached the 90 percent target. The DRC has suffered from a long period of neglect of malaria clinical skills training in its workforce. The national guidelines have not been updated since 2010 and no national case management refresher training has been conducted, as is commonly done in other countries. In addition, MalariaCare only recently added a clinical component (supervisor training and clinical OTSS), whereas laboratory strengthening had been implemented in a number of facilities under the Improving Malaria Diagnostics (IMaD) project. The findings also highlight the need for intensifying training on clinical performance skills at facility level, and for working with the NMCP to make clinical treatment a priority intervention area.

Figure 13: Proportion of facilities meeting MalariaCare’s minimum standard (75 percent) and overall competency (90 percent) targets at most recent outreach training and supportive supervision (OTSS) visit for diagnostics and febrile case management, DRC.



Data elements collected for evaluation of clinical competency during the most recent round of OTSS are described below in Figure 14. As in other countries, the clinicians are correctly ordering a malaria test (on average 84 percent of the time across health facilities) but are less competent in checking for evidence of severe malaria and correctly prescribing according to the test result or diagnosis (done correctly only 53 percent and 49 percent of the time, respectively). On average, they correctly assess the severity of malaria infection 73 percent of the time. One common mistake is the use of oral quinine—instead of an ACT—for uncomplicated malaria: on average, only 56 percent of facilities prescribed an ACT for patients diagnosed with uncomplicated malaria. Moreover, prescribing antimalarials *despite* a negative test was also common: on average, antimalarials were prescribed for patients with negative test results 71 percent of the time. However, patients presenting with fever are being tested and clinicians are accurately assessing disease severity for referral and diagnostic purposes more than was noted during previous reporting periods.

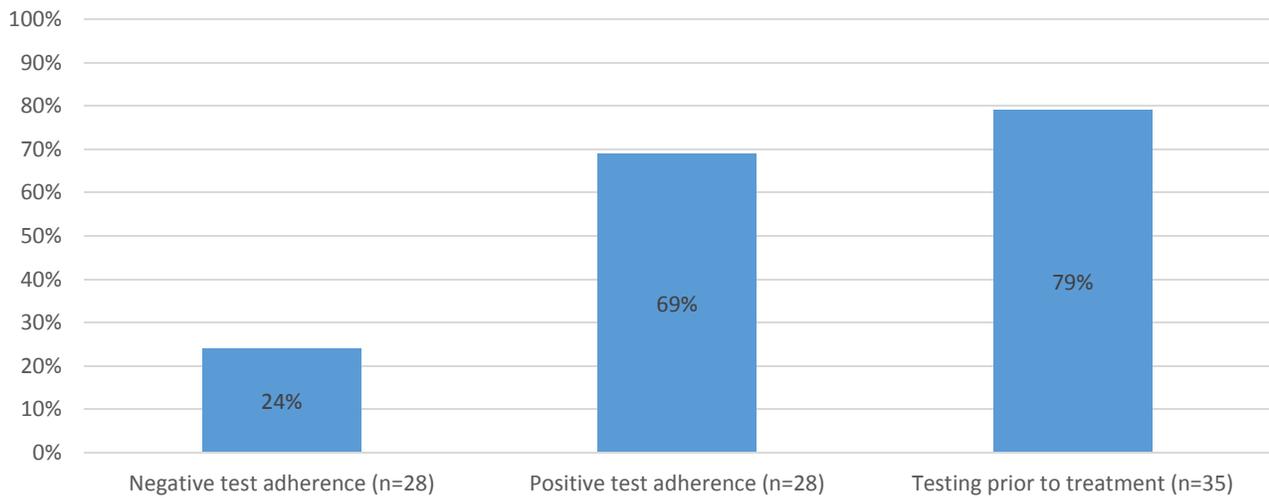
Figure 14: Average health facility performance on key febrile clinical management indicators, DRC (n=17).



One of the key requirements for 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 15 below illustrates the proportion of facilities that met the targeted 90 percent or higher adherence to test results during the most recent OTSS visit.

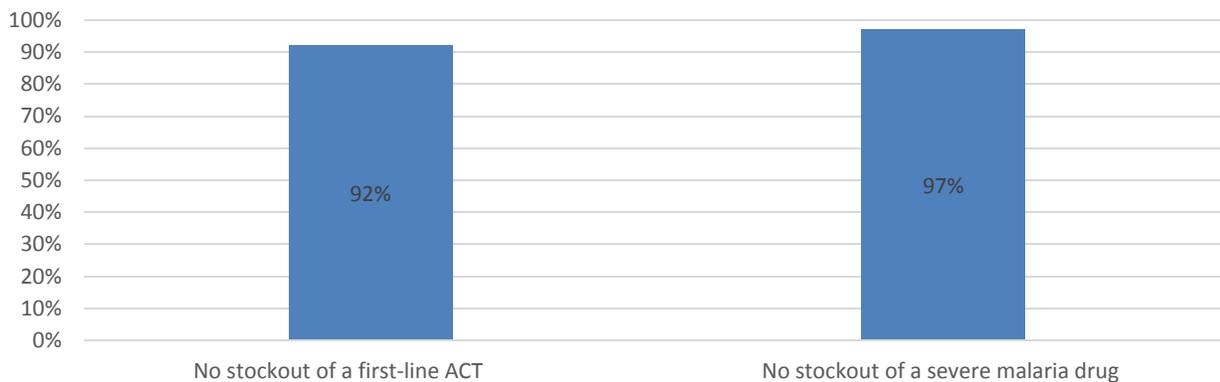
Of the 41 facilities visited for OTSS, 28 facilities (71 percent) had sufficient data to calculate treatment adherence to test results, and 35 facilities (85 percent) had sufficient data for testing prior to treatment. When evaluating adherence to a negative test result, only 24 percent of facilities reached the 90 percent target, meaning 76 percent of the sampled facilities were inappropriately prescribing a malaria medication despite negative test results. Conversely, when evaluating adherence to positive test results, 69 percent of facilities appropriately prescribed ACTs with a positive test result. The third measure of adherence—percentage of ACT prescriptions with evidence of any test record found—estimates whether patients who get antimalarial treatment receive a diagnostic test beforehand. Seventy-nine (79) percent of facilities tested patients prior to treatment based on register reviews by supervisors. In other words, when reviewing the records of those prescribed an ACT, 21 percent of patients were treated without evidence of any malaria test. There are multiple potential reasons for this target not being met, which include low clinician confidence in RDT accuracy, reliance on clinical malaria diagnosis, and low quality of records kept at the facility. Additional rounds of OTSS training and implementation will focus on improving adherence to testing performance and scores.

Figure 15: Proportion of facilities meeting MalariaCare’s 90 percent target for testing prior to treatment and adherence to test results at most recent outreach training and supportive supervision (OTSS) visit, DRC.



The ready availability of ACTs and injectable medications at facilities is necessary to improve treatment outcomes and provider adherence to test results. Figure 16 illustrates the proportion of facilities with no stockouts (either of first-line ACTs or of a first-line severe malaria drug) for more than seven days in the past three months. Remarkably, only 8 percent of surveyed facilities had significant ACT stockouts and only 3 percent had stockouts of parenteral therapy.

Figure 16: Proportion of facilities with at least one key drug in stock more than seven days in the past three months at most recent visit (n=36), DRC.



- The results of Round 7 will be used in preparation for the remaining two rounds (Rounds 8 and 9) planned for PY4, which will include expansion to an additional 12 facilities: the seven new general reference hospitals in Kasai, Lomami, Sankuru, Haut Lomami, Lualaba, Tanganyika, and Bas-Uele provinces, as well as five high-volume facilities in Haut Katanga and Kinshasa at the request of PMI, for a total of 53 health facilities enrolled in OTSS. New provincial teams will be trained as supervisors in the seven new provinces.

- Participated in three technical collaborative meetings with the SIAPS project, which supports malaria case management to health zone–level facilities in the 44 PMI-assigned health zones in which MalariaCare also has limited work. In PY4, MalariaCare is providing technical assistance to SIAPS to implement its activities at this level through reviewing the SIAPS checklist for integration of indicators with the MalariaCare checklist, participating in supervisor training, and observing facility-level OTSS visits. These technical meetings led to the determination of common strategies and approaches in OTSS for these overlapping areas and an integrated supervision checklist for health zone–level supervisors. In coming months, OTSS findings will be shared between the two implementing partners and common actions developed to improve identified weaknesses.
- Supported the NMCP, the Haut Katanga Health Provincial Division, and the NPCDD to perform training-of-trainer iCCM workshops in nine health zones. Eighteen members of the health zone management teams and three provincial supervisors were trained on the national standards for assessment of malaria, diarrhea, and respiratory disease; iCCM management tools; and training techniques.

Following the training-of-trainers, 42 head nurses from health facilities and a community leader from each of the nine health zones participated in community health worker (*relais*) supervisor training. This training focused on reviewing national iCCM guidelines and site management tools, management and mentorship skills, and the role of community health site supervisors. A pre- and post-test was conducted to assess participant understanding. Performance improved from an average score of 5 percent (range 0 to 38 percent) at pre-test to an average score of 56 percent (range 38 to 85 percent) at post-test. According to the post-test results, 88 percent of the 51 participants met the minimum score (50 percent) at the end of training.

Following their training, the health zone management teams conducted an iCCM training for 100 *relais* from the 53 identified health sites. Over the course of six days, participants were trained on identifying danger signs in patients; assessment, management, and treatment of malaria, diarrhea, and respiratory diseases; assessing ill children; proper RDT use; and referral of severe cases and pre-referral treatment. A 13-question pre- and post-test was administered to measure participant knowledge. Average performance increased from 8 to 56 percent (median 56 percent and range of 8 to 92 percent), with 65 percent receiving a passing score of 50 percent or higher. The most common weakness noted in all nine health zone sessions was the inability to use respiratory counting to help distinguish pneumonia from other causes of cough. Opportunities to revisit and reinforce *relais* skills will be identified, beginning with the post-training follow-up that begins in April 2016.

To build effective community support for the iCCM activities, the health zone management teams also provided a one-day training to 53 community health care site management committee members. This training introduced the national



A community health worker practices giving a rapid diagnostic test (RDT) during integrated community case management (iCCM) training in Sakania Health Zone.

Photo credit: Dr. André Bopé

iCCM management strategy and oriented committee members to the reporting and supervision structure led by health center head nurses.

- Supported the official launch of iCCM activities in Haut Katanga Province by procuring and distributing iCCM kits (containing iCCM materials and data collection/reporting tools) to the trained *relais* at the 53 community health sites. Bicycles were also procured for use by the *relais* to support their work.

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

- Procured parasitological diagnostic supplies for five old province reference laboratories, with expected delivery in April 2016. During the next round of OTSS (Round 8), MalariaCare staff will also travel to the seven newly established general reference hospitals in Kasai, Lomami, Sankuru, Haut Lomami, Lualaba, Tanganyika, and Bas-Uele provinces to conduct an assessment of diagnostics capacity; MalariaCare anticipates procurement of key supplies for these facilities in PY5.

Challenges

Challenge	Solution
Delays in the rollout of the second iteration of EDS at global level led to delay in shifting OTSS in DRC to electronic data collection.	To maintain the implementation timeline, supervisor training, the LLWs, and OTSS Round 8 will go forward without the EDS component.
Delays in procurement and delivery of the NAMS supplies led to a shifted timeline for NAMS training and consequently a delay in sample collection.	The NAMS training has been rescheduled for April 2016. Sample collection will proceed following the training, upon receipt of all supplies.

Next steps

In the remaining half of PY4, MalariaCare will move forward with implementing case management refresher training for clinical OTSS supervisors and reference facility staff, holding a dissemination meeting for the “National Guidelines for Quality Assurance of Malaria Diagnostics,” and supporting the first meeting of the case management working group in April. Procurement will be finalized for the laboratory supplies for five provincial laboratories, and a training microscope will be procured for the INRB. Supervisor training for all clinical and laboratory supervisors and LLWs will occur in May, followed by OTSS Round 8. MalariaCare will also move forward with supporting the INRB and Katanga reference laboratory toward accreditation through the Strengthening Laboratory Management toward Accreditation (SLMTA) structured laboratory quality improvement program and plan for the assessment of iCCM implementation in nine health zones, the results of which will inform the expansion to create new health sites in an additional three Haut Katanga health zones.

Ethiopia

MalariaCare started its interventions in Ethiopia in PY1, continuing the work that had started earlier under the IMaD project. During PY4, 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 for central and regional-level reference laboratories. In support of this objective, MalariaCare supports EPHI through two major activities:

1. Accreditation of an expert group of microscopists from the national and regional reference laboratories to serve in training and QA activities.
2. Completing WHO validation of donor slides for the NAMS.

Key accomplishments

Objectives 1, 2, and 3:

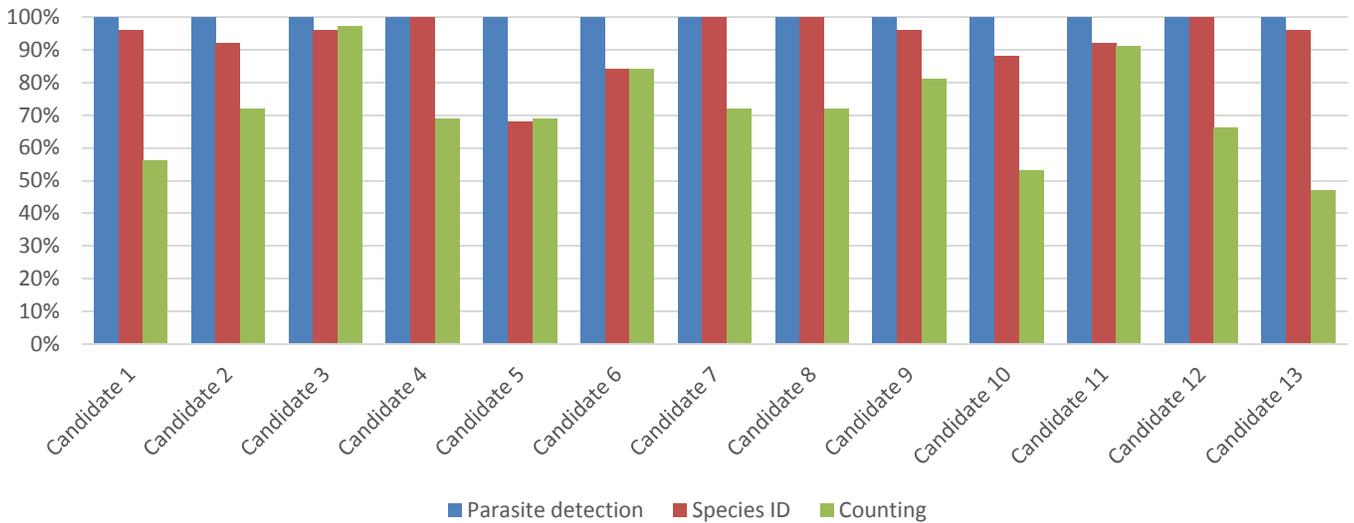
No activities carried out.

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

- To ensure quality health system diagnostic outputs, in PY4 the Ethiopian Federal Ministry of Health (FMOH) initiated a plan to accredit reference-level staff by international standards in malaria microscopy. The national and regional levels program included preparatory external competency assessment (pre-ECA) and WHO ECAMM courses. Previous attempts in international ECAMM between 2010 and 2012 resulted in only 6 of 27 (22.2 percent) laboratory staff passing at L1 (3.7 percent) or L2 (18.5 percent) and an average class accreditation score of L3. To improve outcomes, MalariaCare worked with EPHI and PMI partner ICAP to develop an ECAMM preparatory training program that included WHO reference materials for malaria microscopy, access to the WHO slide bank for one month prior to the actual ECAMM course, and a five-day pre-ECA refresher training and competency assessment using WHO slide sets. Twelve (12) of 13 participants in the pre-ECA course who passed the three components that make up the assessment (parasite detection,

species identification, and parasite counting) scored the equivalent of WHO L1 (n=10) or L2 (n=3), suggesting quality preparation for the ECAMM.

Figure 17: Preparatory external competency assessment (pre-ECA) post-test scores, Ethiopia (n=13).



- In December, Amref Health Africa facilitated an ECAMM course for national (EPHI) and regional (Adama, Bahir Dar, Tigray, Nekemte, and Dessie) reference laboratory staff in Ethiopia. All participants passed the ECAMM with L1 (61.5 percent) or L2 (38.5 percent) accreditation, an accomplishment that was called a “historic performance” by the WHO.



Participants from the Malaria Microscopy Refresher Training and World Health Organization (WHO) External Competency Assessment of Malaria Microscopy courses in Adama, Ethiopia (Oromia State).

Photo credit: ICAP

Challenges

Challenge	Solution
<p>After the ECAMM, the FMOH identified eight L1 microscopists it believed were capable of conducting in-house validation of NAMS donor slides and wanted to use this cadre to complete the validation for use in international ECAMM. WHO, however, will not accredit the slide set unless microscopist validation is done through the standardized process for international accreditation at the Research Institute of Tropical Medicine (RITM) in the Philippines.</p>	<p>After a discussion with all key parties—including PMI, WHO-Global Malaria Program, and the WHO Africa Regional Office (WHO AFRO)—in order to compare the results, the EPHI has decided to pursue parallel WHO and national validation processes by six WHO/RITM L1 microscopists and six Ethiopian L1 microscopists.</p>

Next steps

Due to the success of the WHO Ethiopian ECAMM—resulting in eight WHO-accredited L1 microscopists—EPHI will now work with WHO/RITM to conduct a parallel validation of NAMS donor slides. Twelve L1 microscopists (six from RITM and six from Ethiopia) will participate in the validation using WHO protocols. This will be the first “joint” slide bank validation effort by the WHO. It is anticipated that this work will be submitted for publication so that lessons can be shared with the global malaria community. Once completed, the Ethiopia NAMS will be fully validated in accordance to the most recent WHO protocols and can be implemented for training and quality assurance activities.

Ghana

MalariaCare started its activities in Ghana in PY1, following a 5-year bilateral project called ProMPT. In PY4, MalariaCare has continued to implement diagnostic capacity-strengthening activities in all 10 regions and worked in the Upper East, Upper West, Brong Ahafo, Ashanti, and Eastern regions to improve the quality of malaria clinical care and M&E. Activities in this first half of PY4 were focused on promoting sustainability of the project’s interventions by further strengthening the partnerships with key stakeholders to determine specific support needed to that end. MalariaCare continues to create an implementation environment that includes the appropriate allocation and utilization of requisite inputs, capacity development at all levels, sustaining commitment, and measuring progress.

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.

- Provided supervisor refresher training for 41 laboratory OTSS supervisors from all 10 regions. The two-day training focused on supervisors’ mentoring skills, providing guideline updates on diagnosis and treatment of

malaria, and reviewing the laboratory OTSS checklist. The aggregate score on supervisor competency in skills and knowledge on supportive supervision increased from a mean score of 71.8 percent (median 70 percent; range 40 to 93 percent) at pre-test to a mean score of 91.7 percent (median 95 percent; range 75 to 100 percent) at post-test. The training ended with supervisors planning their itinerary for conducting supervision visits.

- Supported the Clinical Laboratory Unit (CLU) of the Institutional Care Division to conduct the first of two laboratory OTSS visits, the first round to take place since November 2013 due to delays in a government-to-government funding agreement between USAID and the NMCP, under which the CLU would directly implement laboratory OTSS. In December 2015, 186 health facilities with the ability to conduct microscopy across all 10 regions were visited, with on-site mentoring provided to 1,257 health workers. The visits were used to train and mentor staff on microscopy and RDT skills, assess adherence to case management through patient record reviews, and provide feedback on identified issues and challenges within facilities. MalariaCare technical advisors, in collaboration with national supervisors from the Ghana Health Service, conducted 10 days of monitoring and oversight visits to assess and ensure the quality of the OTSS visits. The following figures show key laboratory OTSS results. Findings from laboratory OTSS will highlight skill and knowledge areas to focus on during the next round of OTSS, which is scheduled for May 2016.

Summary results on overall RDT performance scores show an increase from 85.6 percent at the last OTSS visit (in 2013) to 91.5 percent during the most recent round of the OTSS. In the next round, more attention will be given to improving skills in slide preparation, staining, and reading (where only 57.5 percent of facilities reached the 90 percent score target). Notably, the average facility score for each indicator is quite close to the target: the lowest-scoring competency area, slide staining and reading, has an average facility score of 86.4 percent, only four percentage points from reaching the target.



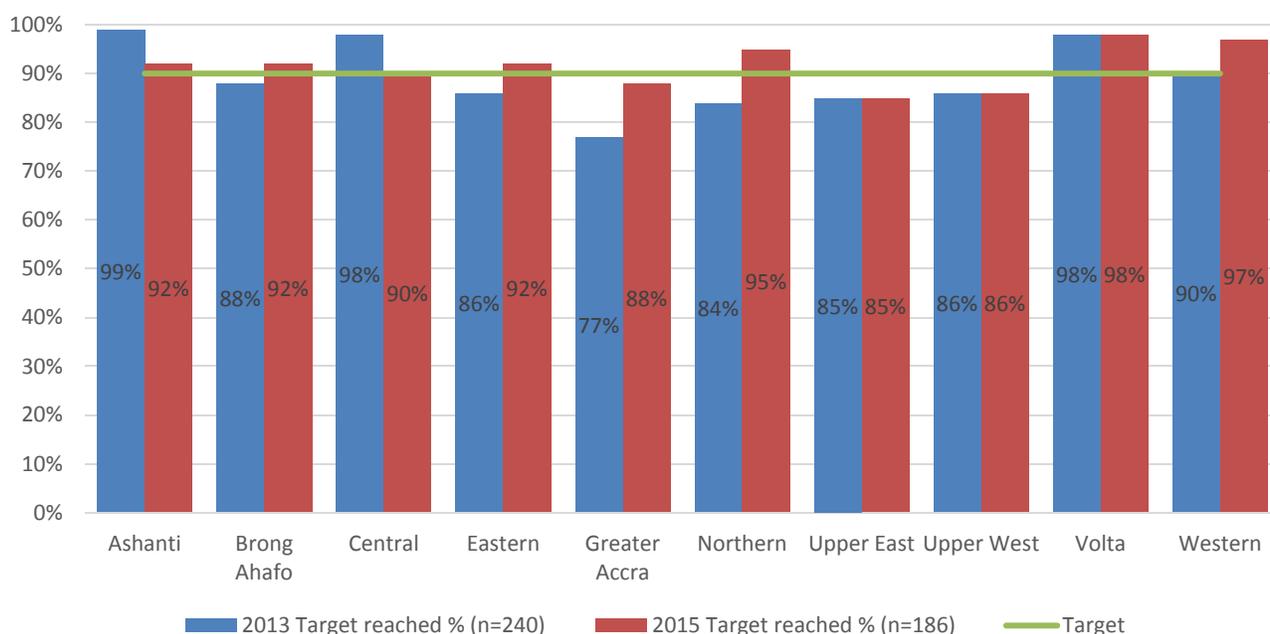
Laboratory outreach training and supportive supervision (OTSS) supervisor observing staff at Nkwanta Hospital, Volta Region.
Photo credit: MalariaCare Ghana

Table 5: Average overall performance scores, Round 11 of laboratory outreach training and supportive supervision (OTSS), Ghana.

Competency area	Overall average health facility (HF) score	Total # of HF	Target threshold	% of HF scoring at or above target	# of HF at or above target
Slide preparation	89.02%	186	90%	58%	107
Staining and reading	86.40%	186	90%	57%	106
Rapid diagnostic test (RDT) performance observation	91.54%	186	90%	64%	119
Adherence to negative test results	87.09%	186	85%	53%	99

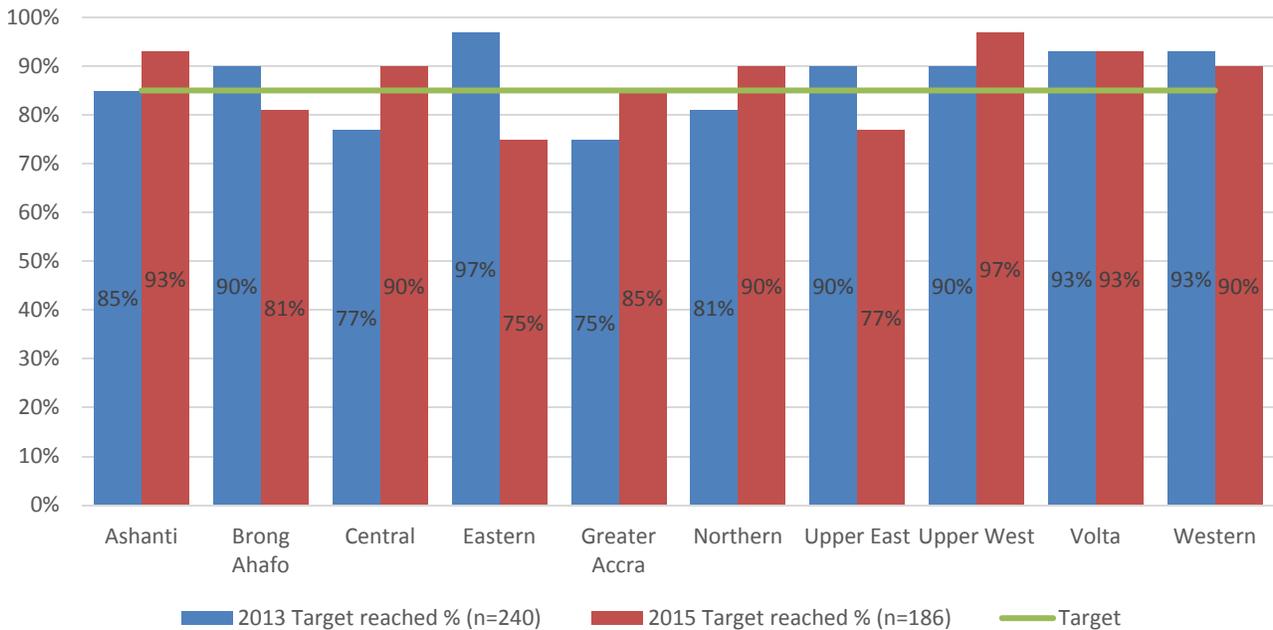
Regional comparisons of the past two rounds of laboratory OTSS data shows that the number of regions reaching the 90 percent target for overall RDT preparation and reading scores has increased from three regions in 2013 to seven in 2015 (see Figure 18 below).

Figure 18: Comparison of average overall scores for rapid diagnostic test (RDT) preparation and reading by region over the last two rounds of outreach training and supportive supervision (OTSS, Rounds 10 and 11), Ghana.



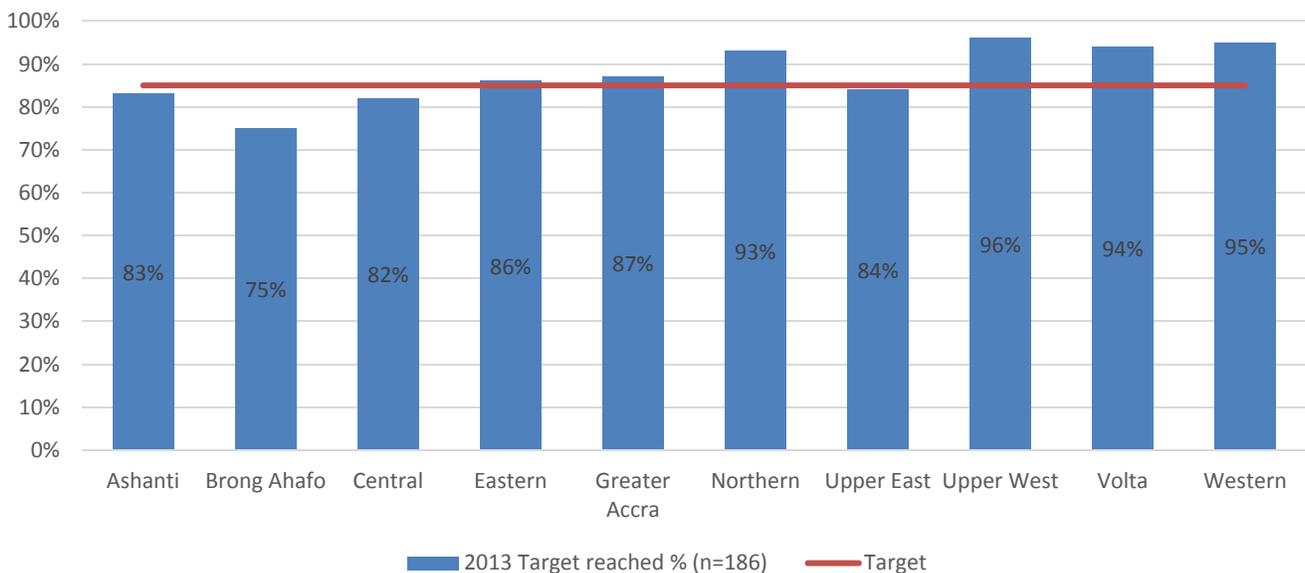
Between OTSS Rounds 10 and 11, performance in microscopy slide staining and reading declined in six of ten regions (see Figure 19 below), suggesting that targeted mentorship or more frequent supportive supervision visits may be necessary to maintain the skills of laboratory staff in malaria microscopy. Further potential causes for the decline in scores will be investigated during Round 12.

Figure 19: Average scores for malaria microscopy slide staining and reading by region over the last two rounds of outreach training and supportive supervision (OTSS, Rounds 10 and 11), Ghana.



Six of the ten regions reached the 85 percent target in the 2015 laboratory OTSS as shown in Figure 20. In future rounds of OTSS, MalariaCare supervisors will provide targeted mentorship with a focus on adherence to test results to improve provider performance on this indicator. In addition, MalariaCare will emphasize the importance of test-based treatment in future supervisor and case management training.

Figure 20: Overall adherence to negative test results by region by register review for most recent round of laboratory outreach training and supportive supervision (OTSS, Round 11), Ghana.



- Supported the NMCP in developing a draft manual for microscopy and RDT quality assurance. The manual is currently undergoing technical review by MalariaCare global staff; it is expected to be finalized in June 2016.
- Initiated the final stage of validation for the NAMS by sending slides to the Research Institute for Tropical Medicine in the Philippines for WHO validation. The results of the validation are expected early in the second half of PY4.

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

- Supported the training of 54 medical school lecturers at the University of Cape Coast (n=22) and the University of Development Studies (n=32) on malaria case management. The two-day training updated the knowledge and skills of the lecturers with modules on uncomplicated and severe malaria, malaria in pregnancy, RDT use, biosafety/waste disposal, and epidemiology. MalariaCare plans to support the formation of a Malaria Working Group to review and update the malaria curriculum at these schools in the next academic year.
- Conducted refresher training for 685 clinical and M&E OTSS supervisors, who make up 118 district and five regional supervision teams. The two-day refresher training included practical sessions on RDT use and appropriate waste disposal, supervision and mentoring skills, clinical management of malaria, data management, and end-user training on EDS. Knowledge and skills in all four areas of the training—case management, RDT use, supervision skills, and data management—were assessed to have improved post-training. In general, supervisor knowledge on case management was satisfactory prior to the training, with a mean pre-test score of 72 percent and median score of 76 percent. This increased to post-test mean and median scores of 81 percent and 83 percent, respectively. The greatest change in average score from pre- to post-test was in supervision skills, which increased from 63 percent (mean 67 percent; range zero to 100 percent) to 77 percent (median 79 percent; range 16 to 100 percent).¹



Refresher training for clinical outreach training and supportive supervision (OTSS) supervisors using the electronic data system (EDS).
Photo credit: MalariaCare Ghana

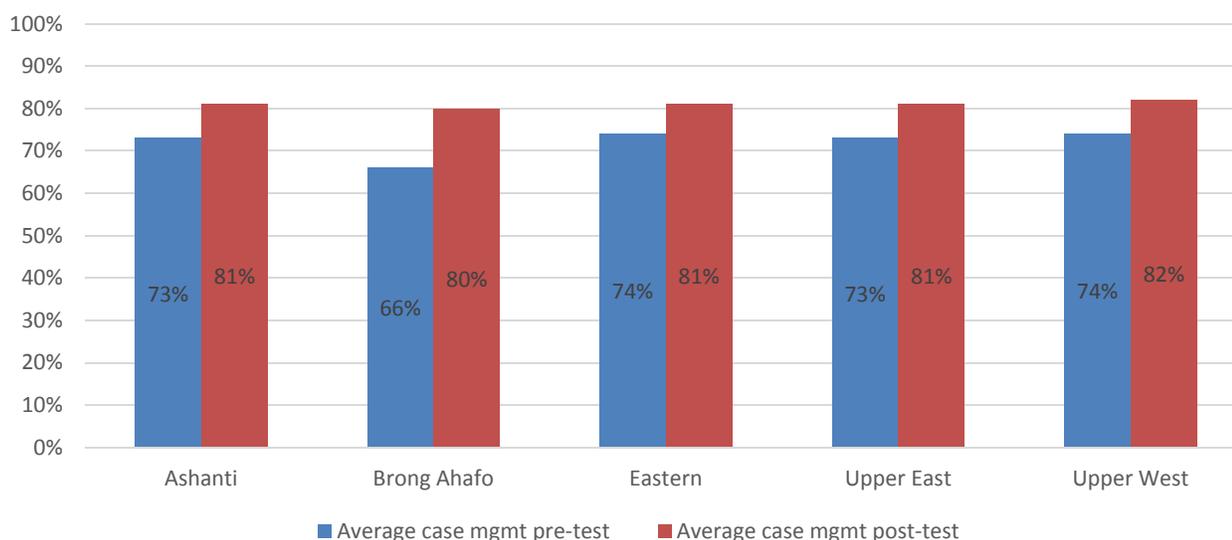
¹ Some participants returned pre-tests with blank or incomplete sections, leading to some zero scores.

Table 6: Average performance scores by area, clinical/monitoring and evaluation (M&E) supervisor training, Ghana (n=685).

Indicator	Pre-test mean (median [range])	Post-test mean (median [range])	Mean (median) improvement by percentage point
Case management	72% (76% [0%–98%])	81% (83% [2%–100%])	9% (7%)
Rapid diagnostic test (RDT) use	82% (83% [0%–100%])	91% (94% [28%–100%])	9% (11%)
Supervision skills	63% (67% [0%–100%])	77% (79% [16%–100%])	14% (12%)
Data management	60% (63% [0%–100%])	70% (74% [5%–100%])	10% (11%)

Supervisor performance across regions tended to be uniform, with pre-test scores of 73 or 74 percent in all regions except Brong Ahafo, which had a slightly lower overall pre-test score of 66 percent. In all regions, post-test performance improved to at least 80 percent (Brong Ahafo) and, most commonly, 81 percent (Ashanti, Eastern, and Upper East). Upper West improved to a post-test average score of 82 percent. See Figure 21 below for a breakdown of average pre- and post-test scores on case management by region. Following this training, supervisors continued to conduct the year’s first round of joint clinical/M&E OTSS in the five regions.

Figure 21: Average case management pre- and post-test scores for clinical supervisors, Ghana (n=685).



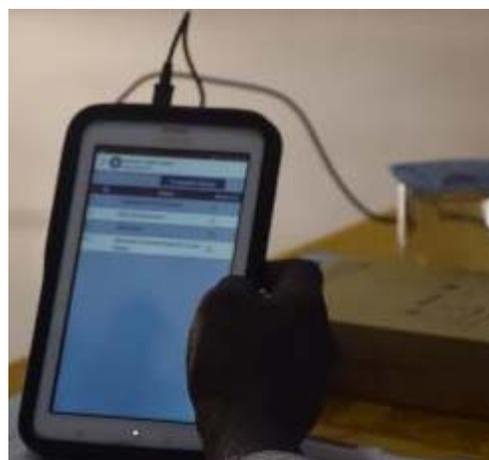
Supported five regions to conduct the year’s first round of OTSS, which reached over 1,900 health facilities. District supervision teams were made up of four individuals, with a health information officer and clinician as permanent team members. Supervisors provided on-site support to facility staff in malaria data capture and reporting, clinical case management, RDT use, and general facility management. Regional teams provided backstopping support to the districts in supervising large facilities within the districts. A team of MalariaCare technical advisors provided support to each regional team and select district teams within the regions. Over

the course of this round, internal server errors precluded some checklists from being submitted to the EDS database. These issues are currently being investigated; the data from Round 5 of OTSS remains to be fully uploaded and analyzed while these issues are being resolved. Data from this round is expected to be available in early May 2016.

- Supported the rollout of standardized clinical notes forms during the OTSS visits. A total of 2,300 laminated copies were distributed to guide clinicians in lower-level facilities in properly and fully completing clinical notes for each patient. In addition, 2,000 flow charts to assist in the diagnosis and proper treatment of malaria were distributed to facilities during clinical OTSS visits.
- Conducted an assessment of the participants of the community health officer internship program that was implemented in PY3, with the objective of measuring the quality of health care delivered. This assessment included management of febrile illnesses and a record review on adherence to malaria test results. The data is currently being entered for analysis, and results will be shared with the NMCP and regional directors when they are finalized.

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

- Trained a total of 685 supervisors on accurate completion of the consulting room register and use of EDS during joint clinical/M&E supervisor training. Knowledge and skills gained in the data management training module (consulting room register completion and EDS) increased the average pre-test score from 60 percent (median score 63 percent) to 70 percent (median 74 percent) at post-test. See Table 6 above for the performance scores of supervisors during the joint clinical/M&E supervisor training. The supervisors also received refresher training on data quality management and improvement at the facility level, which they used during the years first round of joint clinical/M&E OTSS.
- Following the supervisor refresher training, M&E supervisors provided coaching to data managers at more than 1,900 health facilities during Round 5 of OTSS. In addition to coaching data managers and other consulting room health care workers on malaria and M&E issues, supervisors also conducted data verification on select malaria indicators captured routinely in the health management information system, DHIMS2. The data from Round 5 of OTSS remains to be fully uploaded and analyzed while the internal server issues are being resolved. Data from this round is expected to be available in May 2016.



A MalariaCare supervisor reviewing the checklist during Electronic Data System (EDS) end-user training in Upper West Region.
Photo credit: MalariaCare Ghana

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

- Conducted one-day joint work planning sessions with the regional health management team (RHMT) from each of the five MalariaCare-supported regions between October and November 2015. These joint work planning sessions are used to receive buy-in from each RHMT for MalariaCare activities and are used to develop joint activity implementation plans to ensure that the RHMTs are aware of and available for MalariaCare activities. Increasingly, these meetings have been used to work with RHMTs on their activity planning and implementation skills, for eventual transition of activity support from implementing partners to the regional government. MalariaCare also participated in 2015 annual performance review meetings in each region, where the team worked with stakeholders and established relationships with other implementing partners of the same area.

Challenges

Challenge	Solution
Resource constraints limited supervisor/EDS training for clinical/M&E supervisors to two days per session. MalariaCare suggests a moderate increase in training days to thoroughly cover the material.	Training sessions focused on key areas using a compact, two-day agenda. To accommodate the short time, participants were given assignments to complete overnight to get a better understanding of the EDS system before implementation.
The erratic supply of RDT kits affects the ability of facilities to sustain momentum in systemization of test-based treatment for malaria.	MalariaCare will provide stockout data collected during OTSS to the NMCP to enable them to work with relevant partners to ensure regular availability of RDT kits in facilities across regions and districts.
Withdrawal of support for iCCM activities has limited ability to create a link between community care and facility care.	Advocate for a continuum-of-care approach in the management of malaria cases.
Reduced staff strength limits the level of on-site support and oversight the MalariaCare team can provide to lower-level OTSS supervisors during OTSS visits.	Utilized new social media tools, such as chat groups for all supervisors, to enable MalariaCare staff to respond quickly to challenges and questions. This also facilitated rapid dissemination of resolutions to problems to other teams.

Next steps

In the second half of PY4, MalariaCare will:

- Continue to collaborate with the NMCP and CLU to conduct a second round (Round 12) of laboratory OTSS.
- Support the regional health directorates in performing a second round (Round 6) of clinical/M&E OTSS using EDS.
- Facilitate a training for national, regional and district OTSS supervisors on the use and analysis of EDS and DHIS2 data.
- Work with the CLU and NMCP to establish a national malaria diagnostics competency assessment program with a national competency scoring system.
- Conduct LLWs on clinical/M&E OTSS findings in each of the five focus regions and work with regional teams to develop and prioritize action plans based on identified areas of weakness.
- Complete malaria case management update training for lecturers at the three remaining medical schools (Korle Bu Teaching Hospital, Kwame Nkrumah University of Science and Technology, and University of Health and Allied Sciences).
- Support integrating two days of training on malaria case management and updated RDT guidelines for newly hired health care workers as part of their orientation.

Guinea

MalariaCare has been active in Guinea since PY1, and continued operations until late in PY2, when the Ebola virus outbreak required a diversion of the country's resources for health toward fighting the epidemic. In addition, due to transmission risk by blood exposure, national policy during this period specified use of clinical criteria alone for diagnosis of malaria—which is expected to have resulted in a loss of some diagnostic capacity due to lack of practice. In May and June 2016, MalariaCare will work with the NMCP and the PMI partner StopPalu to bring diagnostic services at the national and regional level back to former standards, or better, before closing out operations in the country.

Next steps

- Perform MDRT and supervisor skills training for national-level laboratory supervisors.
- Support the development of high-quality, standardized malaria slide sets that can be used for training and quality assurance. MalariaCare will also provide an implementation manual, slide database, and standard operating procedures to support effective use and management of the slide sets. A one-day training will be provided to the NMCP on use, long-term care, and slide set management.

- The project anticipates close-out of operations in June 2016, following refresher training and the one-day slide set utilization training.

Kenya

Since PY3, 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 (total population approximately 45 million people²). The primary goal is to reduce the burden of malaria in the at-risk populations through compliance with national case management guidelines. These guidelines are based on the WHO strategy of testing and treatment of all suspected malaria cases. The project focuses on strengthening diagnostic and clinical capacity for both malaria and other febrile illness at the health facility level – with integration of on-site diagnostic and treatment-focused QA interventions. It 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 quality improvement. Technical training is provided to clinical and laboratory county- and sub-county level personnel to build a team of OTSS supervisors who, in turn, will supervise and mentor the clinical and laboratory service providers in level two (dispensaries) through level five (county hospitals) public health facilities in the eight targeted counties.

As MalariaCare Kenya is following a phased-in approach to activity implementation, activities were implemented in five out of the eight target counties – Kakamega, Migori, Kisumu, Vihiga, and Homabay. To support these activities, three regional coordinators were hired. The three coordinators are sharing space in the APHIAplus field offices to encourage collaboration and coordination between the two projects. In all five counties, county health authorities were engaged to identify teams of clinicians and laboratory staff to serve as OTSS supervisors. In phase one counties – Migori, Vihiga, and Kisumu – MalariaCare provided technical training to clinical and laboratory county- and sub-county level personnel, as well as supervisor training to build a team of OTSS supervisors. This team of supervisors conducted one round of OTSS visits. MalariaCare began implementing activities in phase two counties – Homabay and Kakamega, which included conducting technical training for supervisors. Supervisor training for phase two supervisors is planned for the second half of PY4.

Key accomplishments

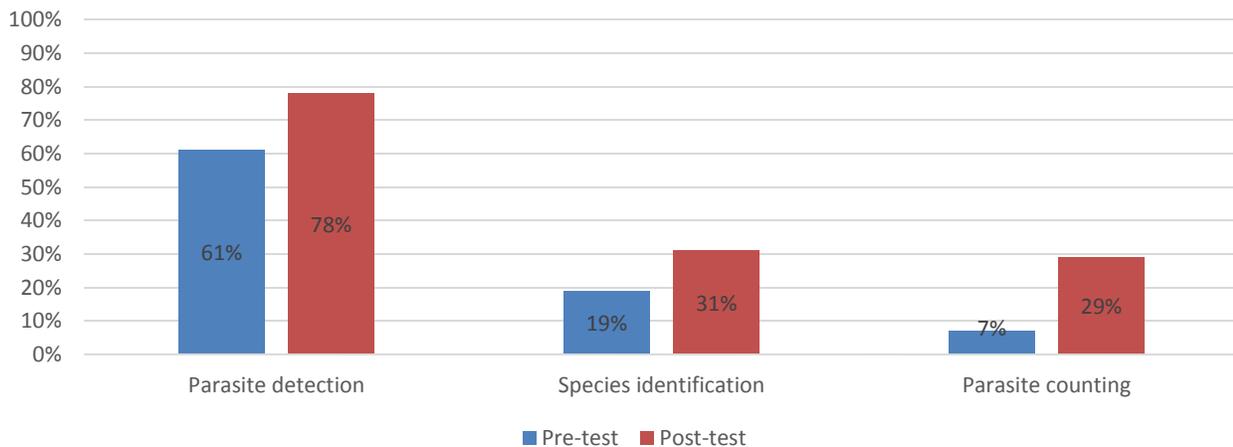
Objective 1: The accuracy of diagnostic testing for malaria is improved to greater than 90 percent.

- Conducted basic MDRT for health facility laboratory personnel. In order to improve the accuracy of diagnostic testing for malaria, MalariaCare conducted basic MDRT sessions for 80 health facility laboratory personnel. A total of four five-day training sessions were held – two for phase-one counties and two for phase-two counties. Trainees were identified based on the following criteria: staff were to be based in high volume health facilities where no laboratory staff had been trained on microscopy in the last two years. Overall scores improved across all three competency areas (parasite detection, species identification and

² Source: World Bank, Kenya

parasite counting) from pre-test to post-test (see Figure 22 below). Of the 80 trainees, none met the WHO L1 or L2 standards for all three competency areas. Species identification was the biggest barrier, with no participant meeting that standard (80 percent or above). For the other two competencies, 42 of the 80 participants (53 percent) met the L1 or L2 standard for parasite detection (80 percent or above) and 24 trainees (30 percent) met the L1 or L2 standard for parasite counting (40 percent). The participants who excelled in this training were staff who had extensive experience working on the bench. Many of the remaining participants who demonstrated the greatest need for additional training had recently completed national in-service training. This demonstrates a need for greater capacity building in national diagnostic training institutions.

Figure 22: Average basic MDRT scores for microscopy competency areas, Kenya (n=80).



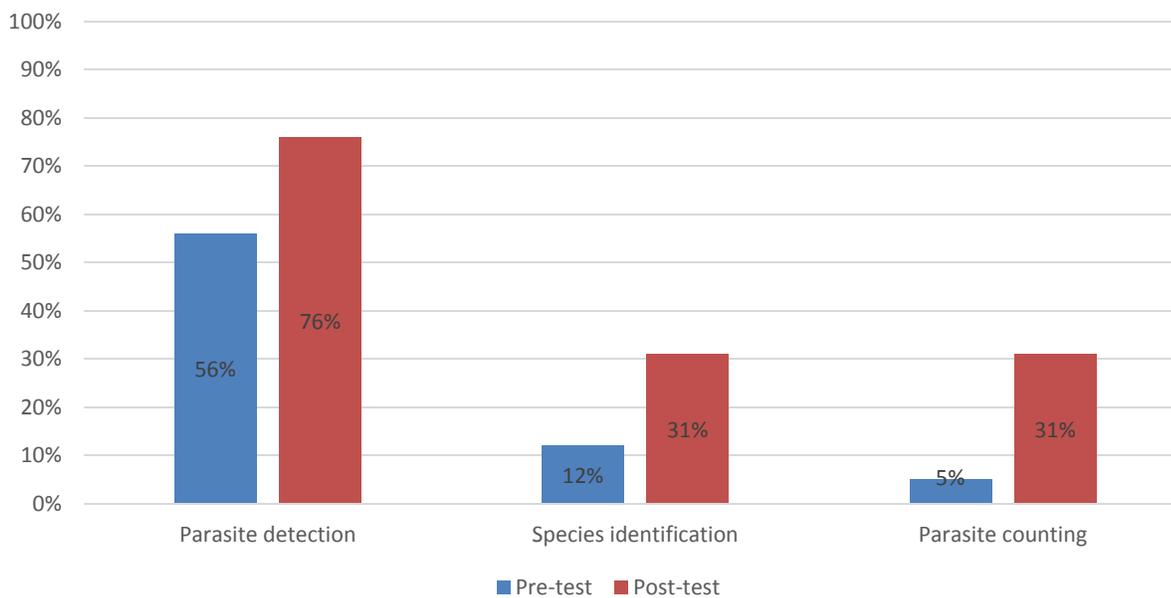
- Conducted advanced MDRT for 25 OTSS laboratory supervisors from phase two counties, held in two five-day sessions. Overall scores improved across all three competency areas (parasite detection, species identification and parasite counting) from pre-test to post-test (see Figure 23 below). Of the 25 trainees, none met the WHO L1 or L2 standards for all three competency areas. Species identification was the biggest barrier as no participant met that standard (80 percent or above). When not considering species identification, eight participants met L1 or L2 standards for both parasite detection (80 percent or above) and parasite counting (40 percent).



OTSS supervisors being trained on RDTs during advanced MDRT.

Photo credit: MalariaCare Kenya.

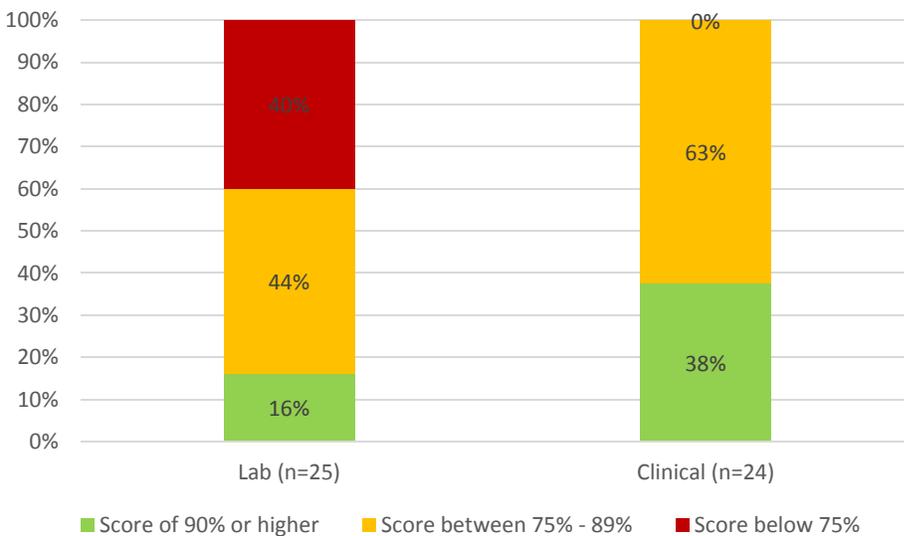
Figure 23: Average advanced MDRT scores for microscopy competency areas, Kenya (n=25).



Objective 2: All patients suspected to have malaria or a febrile illness receive a diagnostic test for malaria.

- Supported the NMCP to develop and finalize the National Quality Assurance Guidelines on Parasitological Diagnosis of Malaria. MalariaCare attended two technical working groups focused on finalizing the national guidelines. In the first meeting, MalariaCare staff worked with a total of 16 experts from the NMCP, the National Malaria Reference Laboratory and other implementing partners to develop draft guidelines. The second meeting was supported by MalariaCare and focused on finalizing the document. A total of 18 experts attended this final meeting. The document will be launched by the NMCP in the next reporting period and will be used by MalariaCare when implementing RDT QA training for health facility staff in the second half of PY4.
- Trained clinical and laboratory OTSS supervisors on using RDTs. Phase two laboratory supervisors were trained on RDTs during MDRT. Following the training, supervisors were assessed on reading and interpretation of RDTs, averaging a score of 76 percent across all participants. Four of the 25 supervisors trained scored 90 percent on the assessment. The main weakness in RDT performance was the labeling of invalid test devices (those with no visible control line) as such. In addition, a total of 25 clinical OTSS supervisors from phase two counties were trained on using RDTs during clinical case management refresher training. Clinical supervisors scored an average of 90 percent on the RDT competency assessment, with the labeling of the test kit being the greatest weakness. Of the 24 who took the competency assessment (one supervisor was not present for the assessment), nine scored above 90 percent. Scores of these 24 clinical supervisors and 25 lab supervisors are summarized Figure 24 below. Both clinical and laboratory supervisors from phase one counties were also trained on using RDTs as part of OTSS supervisor training (see description under objective 3 below).

Figure 24: OTSS clinical and lab supervisor scores on RDT competency, Kenya.



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 clinical case management refresher training for OTSS clinical supervisors. MalariaCare trained 25 OTSS clinical supervisors from phase two counties – Kakamega and Homabay – on the updated national and WHO case management guidelines. During this training, participants reviewed DHIS2 data on the number of malaria cases diagnosed clinically versus diagnosed using a diagnostic test, as reported by sub-counties of those counties represented in the training. This exercise demonstrated to clinicians the challenge they will be facing as supervisors. Clinical supervisors were assessed on clinical theory as part of a pre- and post-test as well as on their competency to conduct RDT tests (see above). Overall, participant scores on clinical case management theory increased from 80 percent at pre-test to 87 percent at post-test.
- Conducted joint OTSS supervisor training for OTSS supervisors. MalariaCare led a joint supervisor training for both clinical and laboratory supervisors from phase one counties. For part of this training, clinical and laboratory staff were split into separate groups to review important topics specific to their areas of expertise. During this time, both groups were administered a pre- and post-test specific to clinical case management or laboratory diagnostics. Clinical supervisor scores increased from 64 percent to 73 percent and laboratory



Phase two counties case management training.
Photo credit: MalariaCare Kenya.

supervisors increased from 61 percent to 74 percent. Clinical and laboratory supervisors also attended joint sessions which covered using RDTs, supervision and mentoring skills, sources of error in patient diagnosis, and using the OTSS checklist.

- Conducted the first round of OTSS in phase one counties. The first round of OTSS was conducted using paper checklists in 280 level two through level five health facilities in phase one counties – Vihiga, Kisumu and Migori. Figure 25 describes the current status of key diagnostic competencies during the first round of OTSS: comparative facility competency in overall microscopy performance (a combined score of all three sub-competencies), slide preparation, slide staining, parasite detection, and overall RDT use.

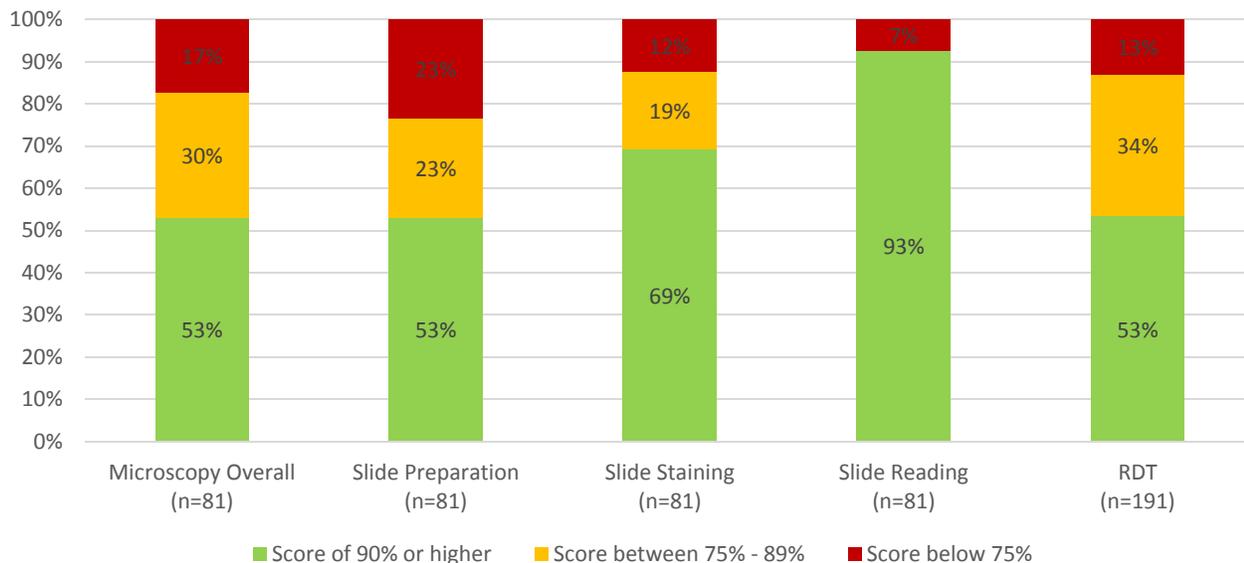
Of the 280 facilities visited, 191 (68 percent) had a complete RDT observation and of the 136 facilities with microscopy, 81 (60 percent) had a complete microscopy observation.

The results show a fairly strong diagnostic performance, with over 80 percent of facilities meeting MalariaCare’s minimum standard competency, scoring 75 percent or higher on both microscopy and RDTs. Further analysis of the data by those that meet the 90 percent overall competency target reveals differences across competency areas. While 93 percent of facilities met the 90 percent for slide reading, only 53 percent and 69 percent met the target for slide preparation and slide staining, respectively. For RDTs, only 53 percent of facilities met the 90 percent overall competency target. During future OTSS visits, supervisors will be advised to focus on these weaker competency areas.



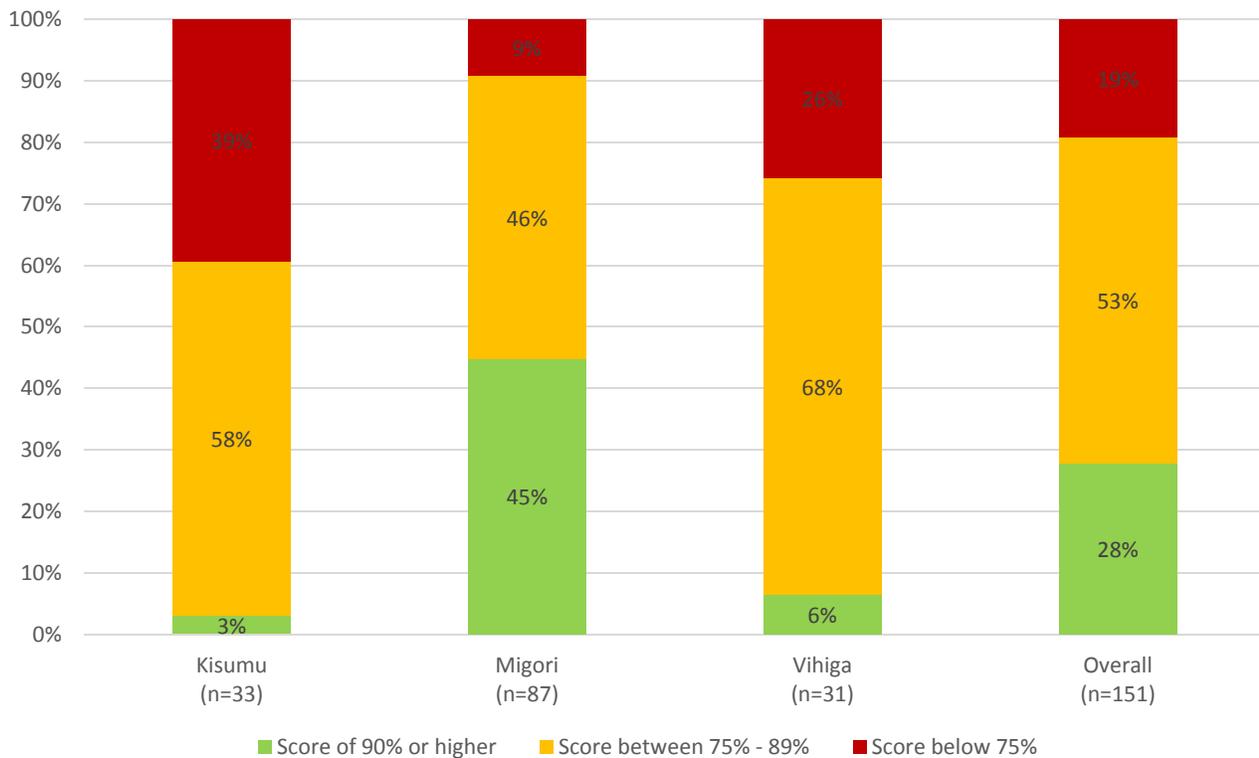
OTSS supervisor reviewing a health facility register.
Photo credit: MalariaCare Kenya.

Figure 25: Proportion of facilities meeting diagnostic minimum standard (75 percent) and overall competency (90 percent) targets at most recent outreach training and supportive supervision (OTSS) visit, Kenya.



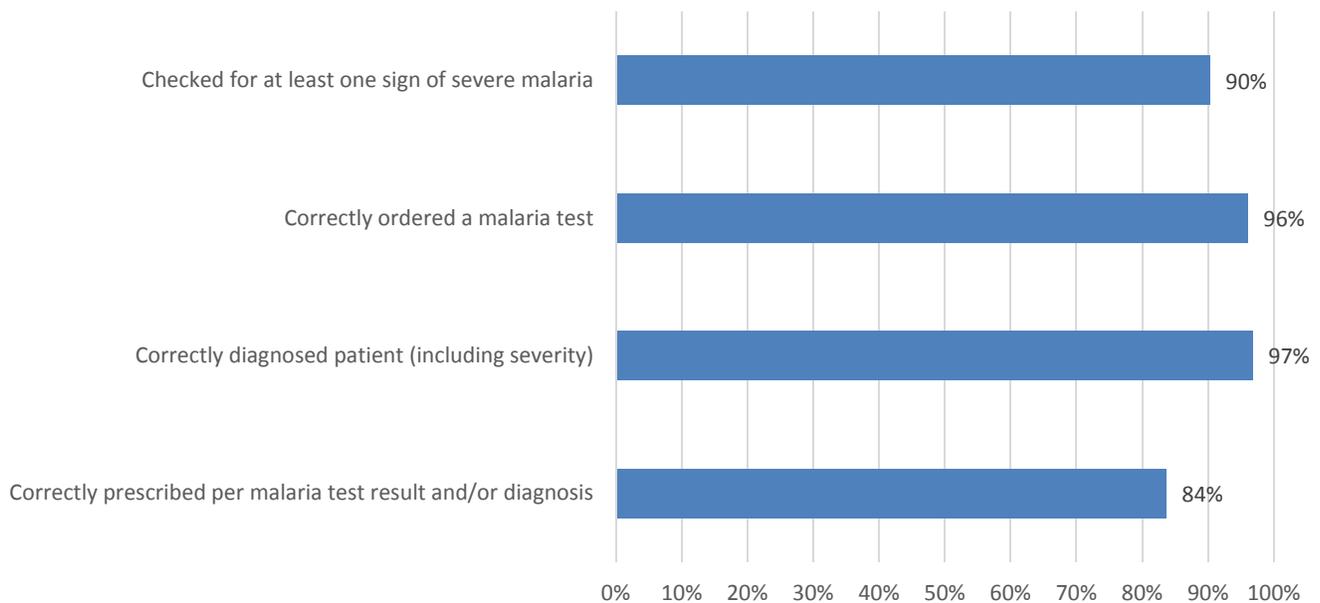
Health facility performance for competency in clinical case management during the most recent round of OTSS is described in Figure 26 below. Of the 280 facilities visited, 151 (54 percent) had at least one complete clinical observation. Overall, 81 percent of facilities assessed met the minimum acceptable standard (score of at least 75 percent) for clinical competency, with Migori scoring highest at 91 percent. Data from Vihiga and Kisumu, however, indicates significant need to improve upon these skills, as only 74 and 61 percent met this 75 percent performance threshold, respectively. MalariaCare is using this data to focus more effort on particularly weak clinical performance areas during the next few rounds of OTSS and will discuss how to improve performance in those health facilities falling below 75 percent in subsequent county-level technical working groups.

Figure 26: Proportion of facilities meeting clinical management minimum standard (75%) and overall competency (90%) targets at most recent outreach training and supportive supervision (OTSS) visit, Kenya (n=151).



The results for key clinical case management indicators are described in Figure 27 below. The facilities performed especially well in some key steps: on average clinicians correctly ordered a malaria test in 96 percent of cases, correctly diagnosed the patient, including the disease severity in 97 percent of cases, and checked for at least one sign of severe malaria in 90 percent of cases. The greatest room for improvement is in correctly prescribing per the malaria test result and diagnosis, which was performed in 84 of cases, on average.

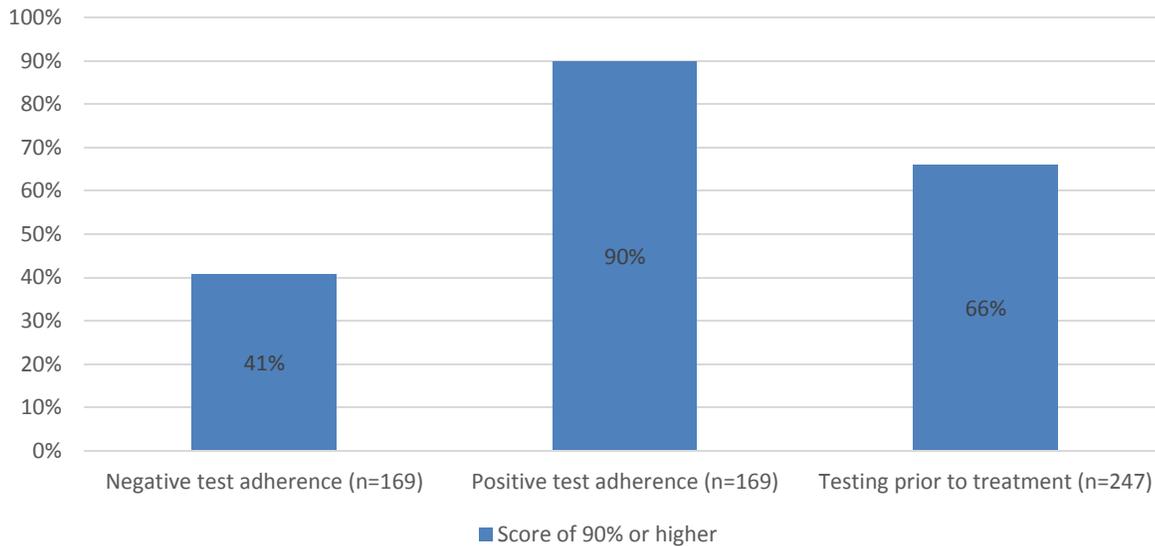
Figure 27: Average health facility performance on key febrile clinical management indicators, Kenya (n=151).



Adherence to test results is a necessity for quality clinical case management performance. To get an accurate assessment, MalariaCare measures this in three ways: provider adherence to positive test results, adherence to negative test results, and to ordering a test in those treated with an ACT – all of which have a target of 90 percent compliance). Figure 28 below illustrates the proportion of facilities that met the targeted 90 percent or higher adherence targets during register review in the time period immediately preceding the most recent OTSS visit.

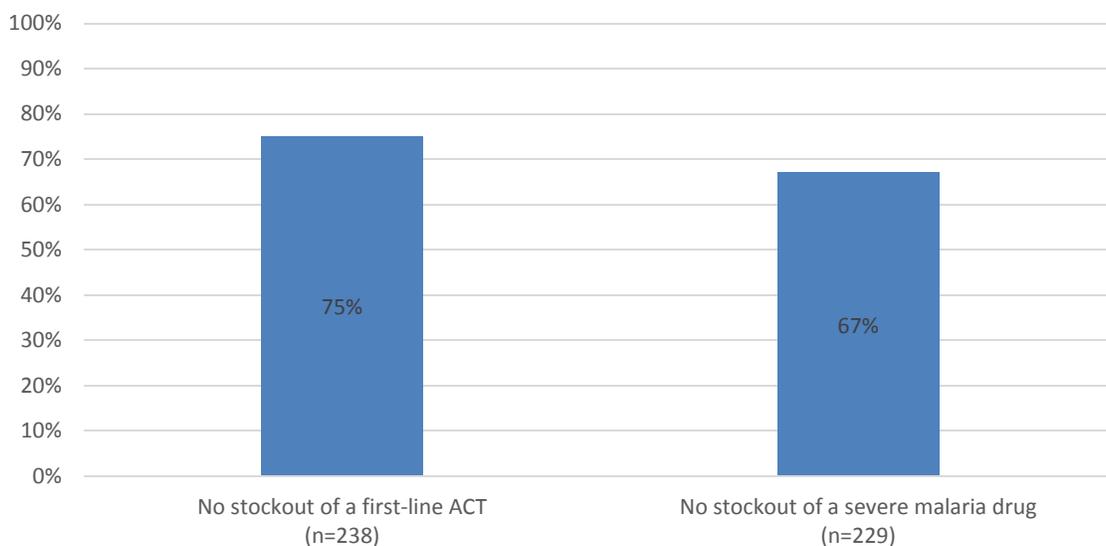
Of the 280 facilities visited, 247 (88 percent) reported results for testing prior to treatment and 169 (60 percent) reported results for adherence to positive and negative test results. Ninety (90) percent of facilities are meeting the critical target for adherence to positive test results, meaning nearly all patients who test positive for malaria are appropriately treated with an ACT, with still room for improvement. Less than half of all facilities (41 percent) are meeting the target for adherence to negative test results. The third measure of adherence—percentage of ACT prescriptions with evidence of any test record found – indicates whether patients who get antimalarial treatment receive a diagnostic test beforehand. During the first round of OTSS, 66 percent of facilities met the target, with 90 percent or more of sampled records having a test result recorded. Additional rounds of OTSS will use this data to focus on improving compliance to positive and negative test results, and increasing testing rates. In addition, we will investigate in more detail factors affecting negative test adherence.

Figure 28: Proportion of facilities meeting 90 percent targets for testing prior to treatment and adherence to test results at most recent outreach training and supportive supervision (OTSS) visit, Kenya.



An important condition for accurate and successful malaria diagnosis and treatment is the availability of ACTs and other malaria drugs. Figure 29 below illustrates the proportion of facilities with no stockouts of first-line ACTs and no stockouts of a severe malaria drug for more than seven days in the past three months. Seventy-five (75) percent of facilities (n=238) had no stockout of a first-line ACT and 67 percent of facilities (n=229) had no stockout of a severe malaria drug for more than seven days in the past three months prior to the most recent OTSS visit.

Figure 29: Proportion of facilities with at least one key drug in stock >7 days in past three months at most recent visit, Kenya.



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

- Led sensitization meeting with county health management teams (CHMTs) of phase two counties. MalariaCare facilitated a meeting with the county directors of health and the CHMTs. During these meetings, county officials were introduced to the OTSS process, selection criteria for the OTSS supervisors were agreed upon, and timelines to pick these nominees were set. In addition, findings from the health facility assessment were disseminated and discussed.
- Provided technical assistance to hospital medicine and therapeutic committees (HMTC). The team is working on strengthening HMTCs at all five county referral hospitals in phase one and phase two counties (hospitals in phase three counties will also be targeted once activities in those counties begin). MalariaCare is working with HMTCs to enforce national and hospital-specific guidelines and standards to enhance adherence to these standards and improve appropriate treatment of malaria cases. During this reporting period, MalariaCare visited all five county referral hospitals to gather information on the current capacity of HMTCs and whether the committees are meeting regularly.
- Began implementation of county-level case management technical working groups. MalariaCare implemented technical working groups at the county level in Homa Bay, Migori, and Vihiga counties. These meetings provide an opportunity for county and sub-county health management teams to discuss and take action on key malaria case management issues – including those emerging from OTSS visits.
- Participated in the two national-level case management technical working group meetings that were held during the reporting period.



The NMCP clinical case management focal person addressing CHMTs from phase two counties.

Photo credit: PATH

Challenges

Challenge	Solution
Paper checklists were used during the first round of OTSS and had to be entered into a database developed by the Kenya team. Gaps in the database prevented all data entry from being included and caused a delay in analyzing round one data.	The database was updated and the missing data entered. The data has since been analyzed and is included in this report. Going forward, it is expected that electronic checklists will be used in place of paper checklists. This would eliminate the need for the database and data entry from paper checklists.
There has been a delay in the roll-out of EDS as the MalariaCare Kenya team waits for the release of the new application, which is anticipated to be more streamlined and have less technical issues. This has resulted in the delay of related activities – specifically OTSS supervisor training for phase two supervisors and the second round of OTSS.	The EDS application development team has released the beta version of the new application and is in initial testing stages. The Kenya team has finalized materials so they are ready to start training on EDS immediately following the release of the new application, expected early June.

Next Steps

In the second half of PY4, the MalariaCare Kenya team will continue to strengthen QA systems in the eight intervention counties. Support will continue in phase one counties and phase two counties, and activity implementation will begin in phase three counties – Busia, Bungoma, and Siaya. Phase three supervisors will participate in technical training – an advanced MDRT for laboratory supervisors and a clinical case management refresher training for clinical supervisors. All supervisors will be trained on the EDS. Phase two and three supervisors will be trained on EDS during the joint OTSS supervisor training. Phase one supervisors, who have already received supervisor training, will be trained in a separate training specific to EDS. MalariaCare will conduct two rounds of OTSS in phase one and two counties, and one in phase three counties, all using the electronic checklist. MalariaCare will conduct a data-user training for national- and county-level managers who will be using the OTSS data for decision-making purposes. MalariaCare has already started discussions with the NMCP regarding transition of the EDS to the national program.

Following the second round of OTSS, MalariaCare will facilitate a cross-county LLW for phase one and phase two counties. OTSS data will also be shared and discussed during the quarterly county-level technical working group meetings, which are supported by the MalariaCare regional coordinators. At the county level, MalariaCare will provide technical assistance to the county health management teams in identifying the county malaria reference lab and will facilitate a basic MDRT for select staff in those laboratories. The team will continue to strengthen HMTCs in county referral hospitals and provide technical assistance to hospitals continuing medical education forums as needed. The HMTC meetings will also be an opportunity to share facility-specific OTSS results. MalariaCare will finalize the RDT QA training for health facility workers and work with APHIAplus to implement the training in all intervention sub-counties.

At the national level, MalariaCare will continue to attend case management technical working group meetings and will support five national malaria reference lab staff to attend the WHO ECAMM.

Liberia

MalariaCare started its intervention in Liberia during PY1. Activities were on hold due to the Ebola virus outbreak from March 17, 2014, through January 14, 2016, when WHO declared that the emergency had resolved. Due to Ebola transmission risk from blood exposure, national policy during this period specified use of clinical criteria alone for diagnosis of malaria—which resulted in a loss of some previous diagnostic capacity gains. To normalize the health system function, the Ministry of Health and Social Welfare is in the process of restoring essential and quality-assured health services in governmental and nongovernmental health facilities. As a first step, both national- and county-level reference staff supporting training and supervision activities were prioritized for retraining and competency assessment in malaria diagnostics. In February 2016, MalariaCare supported the NMCP to conduct the first refresher training and microscopy competency assessment for national- and county-level reference staff post-Ebola outbreak. A slide bank was developed (validation ongoing) to support continuous training and monitoring of health staff performing malaria microscopy.

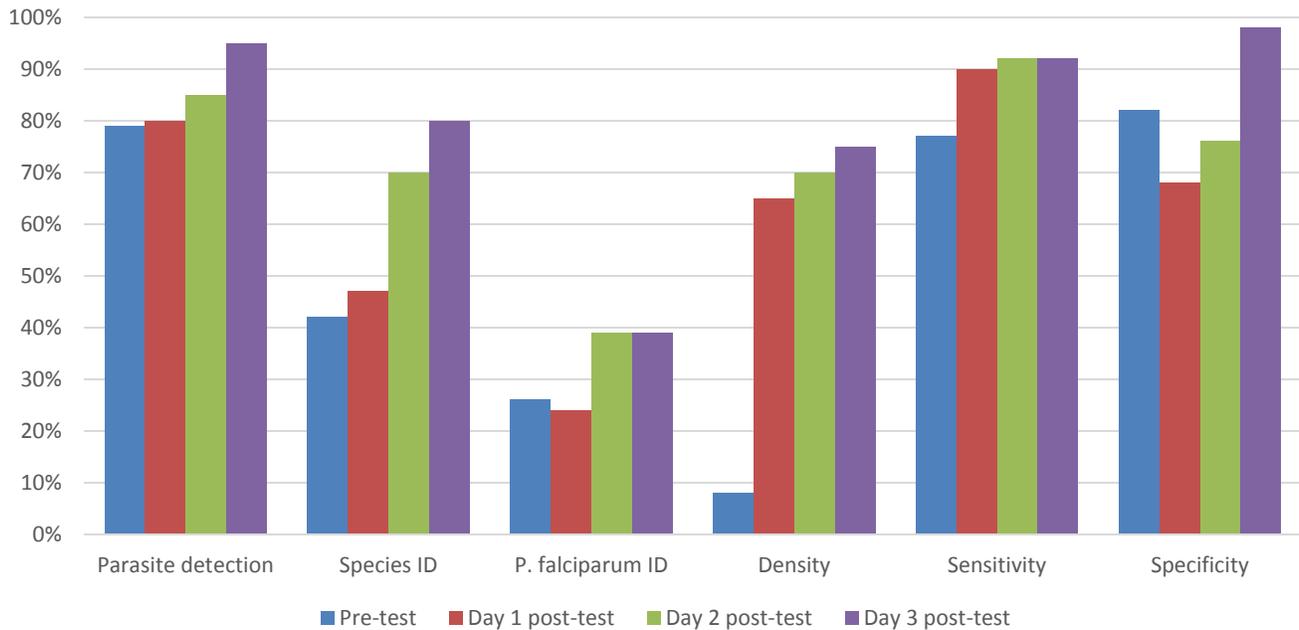
Key accomplishments

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

- Supported refresher training and competency assessment in malaria diagnostics for the national-level reference group. The purpose of this training was to refresh diagnostic skills of the national cadre responsible for overseeing decentralized training and supervision activities and implementing the national QA plan for malaria diagnostics. The long-term objectives for this group are to improve their technical capacity to an equivalent of WHO accreditation L1 or L2 status over time, provided they are offered continuous training and mentorship, with the refresher course as a first step in this process. The refresher training and assessment focused on three microscopy competencies: parasite detection, species identification, and parasite counting.

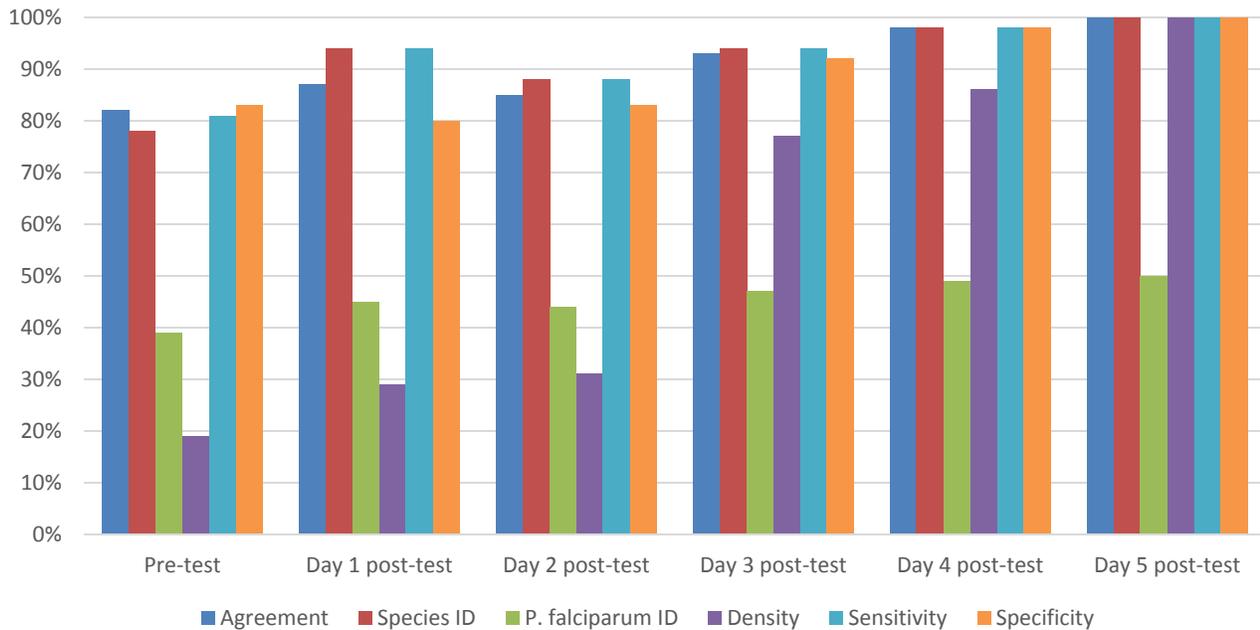
Although only 2 of 10 (20 percent) participants passed all three components of the competency assessment by attaining WHO L1 (n=1) or L2 (n=1), significant and incremental improvements were made by the group overall. Based on class average scores, the greatest gains between pre- and post-test were observed for species identification, up 38 percentage points from 42 percent at pre-test to 80 percent at post-test, and determination of parasite density, which increased by 67 percentage points, from 8 percent at pre-test to 75 percent at post-test. The greatest amount of learning was observed during species identification, but in this component baseline scores were too low and time insufficient to bring scores up above the target 80 percent threshold. All participants (100 percent) performed all RDT steps correctly during an observation. See Figure 30 below for overall group results over the course of the training.

Figure 30: National reference group training results by test component, over time, Liberia (n=10).



- MalariaCare also supported microscopy and RDT refresher training and competency assessment for the county health team (CHT) diagnostic focal points. This cadre is responsible for implementing decentralized training and supervision activities within their counties. The course focused on two microscopy skills: parasite detection and counting. Twelve of thirteen (92.3 percent) participants (from 13 counties) passed the competency assessment at the equivalent of WHO L1 (n=11) or L2 (n=1). Only one participant will require immediate and additional training in parasite detection to reach minimum standards for malaria microscopy. Based on participant performance, 12 counties are technically competent to provide peripheral training and supervision to health facilities in their region. See Figure 31 below for overall group results over the course of the training.

Figure 31: County health team (CHT) diagnostic focal point group training results over time, by test component, Liberia (n=13).



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

No activities under this objective.

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

No activities under this objective.

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

- Worked to develop a standardized malaria slide set for use in ongoing training and proficiency testing. Approximately 300 slides consisting of varying malaria parasite species and densities were prepared by Cheikh Anta Diop University (UCAD) in Dakar, Senegal, under WHO protocols for slide banking. Species identification of slide bank donors was confirmed by polymerase chain reaction (PCR) (conducted at UCAD) and parasite densities are currently being validated by six WHO L1 microscopists from the Research Institute of Tropical Medicine in Manila, Philippines, with support from WHO AFRO. In February 2016, a malaria diagnostic QA specialist from Ghana conducted a two-day orientation on the operational and management aspects of the slide bank in preparation for its arrival early in the second half of PY4. A slide management database (Microsoft Access) was handed over to the NMCP and a brief tutorial was provided.

Challenges

Challenge	Solution
MalariaCare no longer has project staff in Liberia, which made planning the training with the MOH and ensuring the logistics very difficult.	The MalariaCare team had weekly meetings with the NMCP and used checklists to track progress and planning milestones for these activities.

Next steps

- Provide technical support to the NMCP on implementation and management of the slide bank once WHO provides validation and the slide set arrives in-country. This is estimated to occur early in the second half of PY4.
- Close out the MalariaCare program and prepare a transition plan to support malaria diagnostic QA in Liberia by June 2016.

Madagascar

MalariaCare started working in Madagascar in PY2. During PY4, MalariaCare conducted a decentralized clinical case management training in the region of Menabe, a region not yet covered by the Madagascar National Malaria Program's (DLP, for *Direction de la Lutte contre le Paludisme*) case management training plan. In order to ensure high-quality microscopy skills of laboratory technicians who previously attended an MDRT, MalariaCare supported a follow-up training on malaria microscopy in close collaboration with DLP and the Institut Pasteur Madagascar (IPM). This training targeted six laboratory OTSS supervisors of the national core team in Antananarivo. Following the training, MalariaCare conducted joint laboratory and clinical OTSS in Antananarivo to build the capacity of the national core team of supervisors. In collaboration with the DLP and IPM, MalariaCare provided in-country technical assistance to facilitate the development of a NAMS. In all activities, MalariaCare has worked in close collaboration with the DLP to build capacity within the national program in anticipation of the DLP leveraging Global Fund funding to roll out a national malaria case management and supervision program.

Key accomplishments

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

- To ensure high-quality microscopy skills in the national core team of OTSS supervisors, MalariaCare supported a follow-up training on malaria microscopy. A set of 60 malaria slides were procured from the existing slide archive at IPM to serve as proficiency testing (PT) panels for identification of *Plasmodium* species and determination of parasite density. The OTSS supervisors provided their results on parasite detection, density, and species identification to IPM staff who cross-referenced those results in order to provide feedback on correct characterization of the slides. The supervisors and technicians involved in this

activity kept the IPM PT panels to continue practicing reading the slides. Table 7 below displays the results of the PT panel exercise.

Table 7: Results for the malaria proficiency testing (PT) panel exercise done for the core national team of outreach training and supportive supervision (OTSS) supervisors in Madagascar, MalariaCare 2016.

	Number of slides	Parasite detection	Species identification	<i>P. falciparum</i> counting*
Supervisor #1	10	100%	80%	33%
Supervisor #2	10	100%	90%	40%
Supervisor #3	10	100%	100%	25%
Supervisor #4	10	90%	60%	0%
Supervisor #5	10	100%	80%	0%
Supervisor #6	10	100%	80%	25%

* *P. falciparum* quantitation scores were graded against ± 25 percent of the true count provided by Institut Pasteur Madagascar (IPM).

Parasite detection scores were high, with a mean score of 98 percent and a median of 100 percent. Species identification scores were generally strong with a mean score of 83 percent and median of 70 percent. Parasite quantification scores were weaker, with a mean score of 22 percent and a median of 29 percent. Based on these results, the project recommends that supervisors continue to practice reading the malaria slides provided to them in the PT panels with guidance and feedback from IPM, especially as relates to parasite quantitation. Additionally, the project recommends that the DLP and IPM continue to support refresher microscopy training to ensure the improvement and maintenance of microscopy skill in the country.

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

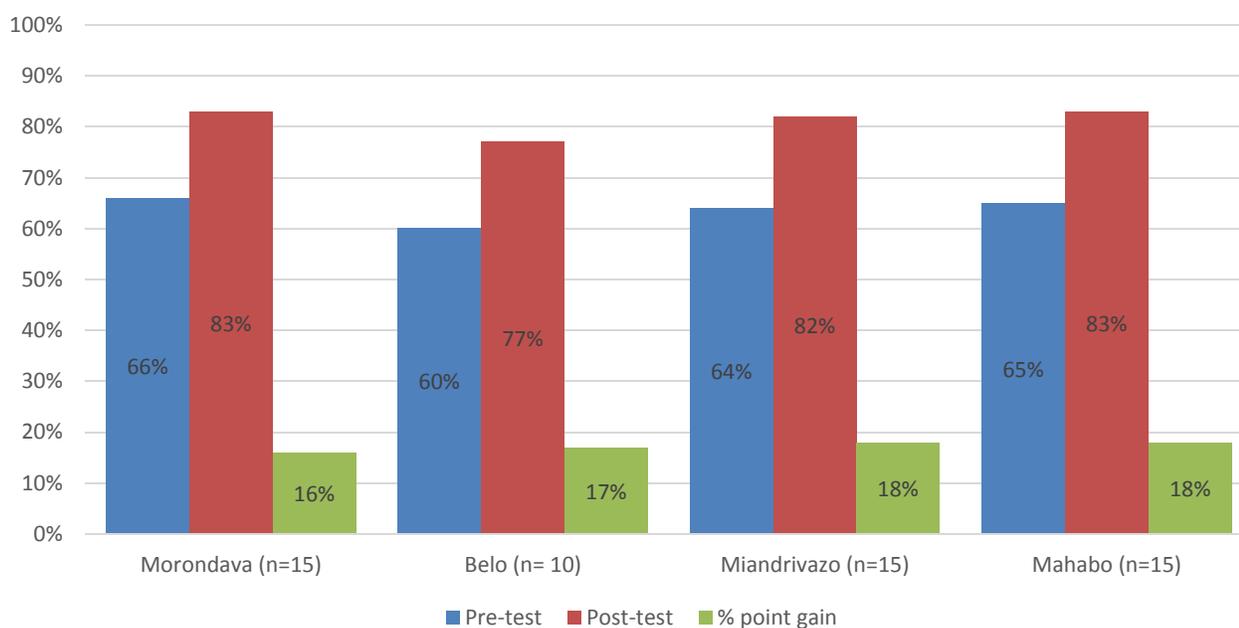
- In coordination with the DLP, MalariaCare supported two clinical case management refresher training courses for 55 district-level clinicians in the target districts of Morondava, Belo, Miandrivazo, and Mahabo. Of the 55 participants, 71 percent were nurses and 29 percent were physicians. The training materials were aligned with the guidelines of the MOH and DLP to improve case management capacity for malaria and other febrile illnesses. The curriculum focused on the new national policy of a three-day ACT regimen as first-line treatment for uncomplicated malaria, injectable artesunate treatment for severe malaria, and RDT administration.



Practical exercises on use of rapid diagnostic tests (RDTs). Miandrivazo, December 2015.
Photo credit: MCDI

Analysis of pre- and post-test scores showed notable improvements, particularly in participants' understanding of correct diagnosis and management of complicated and severe malaria. Additionally, the participants received feedback on pre-test performance to help address areas that required strengthening. Learning tools, such as CDs, reference guidelines, participant workbooks, job aids, and bench aids for using injectable artesunate were printed and were given to the participants at the end of the workshop. Please refer to Figure 32 below for more detail on pre- and post-test scores.

Figure 32: Average pre- and post-test scores for clinical case management refresher training, December 2015, Madagascar.



- In preparation for OTSS, MalariaCare supported a three-day theoretical and practical training on OTSS methodology and the use of the MalariaCare supervision tool. Nine participants from the DLP who act as OTSS supervisors in Antananarivo were trained. Classroom training sessions were delivered at the DLP and practical training took place at health facilities in and around Antananarivo.
- In collaboration with the DLP, MalariaCare conducted one round of joint laboratory and clinical OTSS at 24 health facilities in Antananarivo. The objective of this activity is to strengthen the skills of the central supervisory team so that they may train, mentor, and supervise other regional and district supervisory teams in anticipation of nationwide rollout of OTSS. Figures 33 through 36 below show performance in malaria microscopy, RDT use, clinical case management, and adherence to test results during this round.

Figure 33 below shows data on assessment of laboratory technicians on five main diagnostic competencies: overall microscopy, slide preparation, slide staining, slide reading, and RDT use. Of the 24 facilities visited, 19 facilities (79 percent) had at least one complete microscopy observation and 18 facilities (75 percent) had at least one complete RDT observation. Performance as captured in current checklist data is generally strong, given that nearly all facilities evaluated met the 75 percent target for microscopy competency (93 percent) and a majority met the 75 percent target for RDT competency (83 percent). Facilities showed the highest competency in slide reading, in which all facilities scored at or above the 90 percent competency level.

Competency is also high in slide staining, with only 7 percent of facilities scoring below the target 75 percent minimum competency score. On the other hand, slide preparation was notably weaker, with 57 percent of facilities scoring below the minimum 75 percent competency level. Incorrect slide preparation may lead to slides that are difficult to read, which increases the risk of slide reading errors. The low competency in slide reading could also be due to the lack of recent microscopy training for many technicians. The team will focus on supervision and mentorship in the next round of supervision at these facilities to address this gap.

Figure 33: Proportion of facilities meeting MalariaCare’s minimum standard (75 percent) and overall competency (90 percent) targets at most recent OTSS visit for diagnostics and febrile case management, Madagascar.

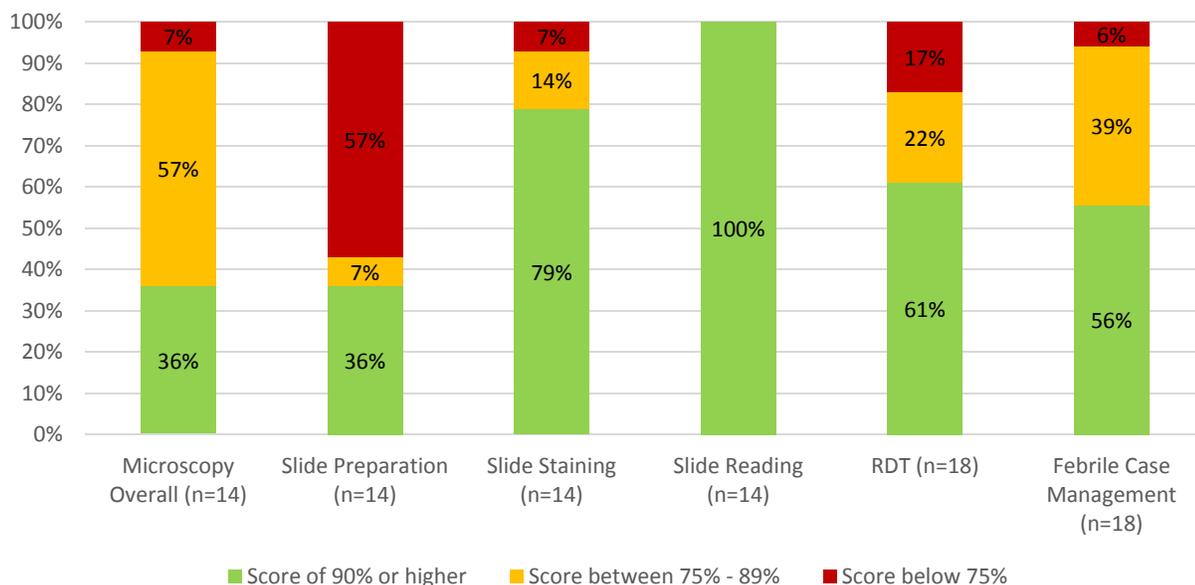
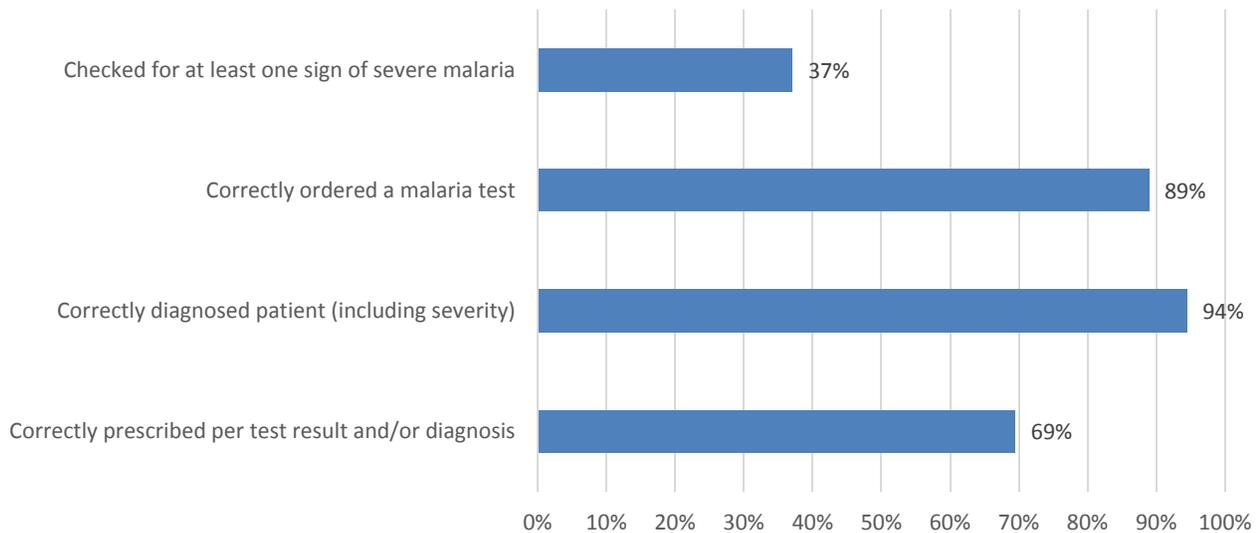


Figure 33 also shows the competency scores for clinical case management. Of the 18 facilities with data on clinical competency observations (out of 24 facilities, or 75 percent), 17 facilities (94 percent) met the minimum standard of 75 percent or higher for clinical competency. The project will share this information with the DLP to influence training and supervision moving forward.

Figure 34 below shows item analysis of clinical competency steps. In observations averaged across each facility, healthcare workers observed during this round of OTSS correctly ordered a malaria test 89 percent of the time, and correctly diagnosed a patient 94 percent of the time. However, only 37 percent of clinicians observed correctly checked for at least one sign of severe malaria during examinations. Additional improvement is also needed for prescribing in accordance with test results/the diagnosis: on average facilities prescribed medication correctly 69 percent of the time. The most common error was in prescribing an antimalarial despite negative test results, and at the time of the OTSS round, febrile patients testing negative for malaria constituted the majority of the observations. These results echo the need for more clinical case management refresher training with a focus on the updated guidelines on checking for severe malaria.

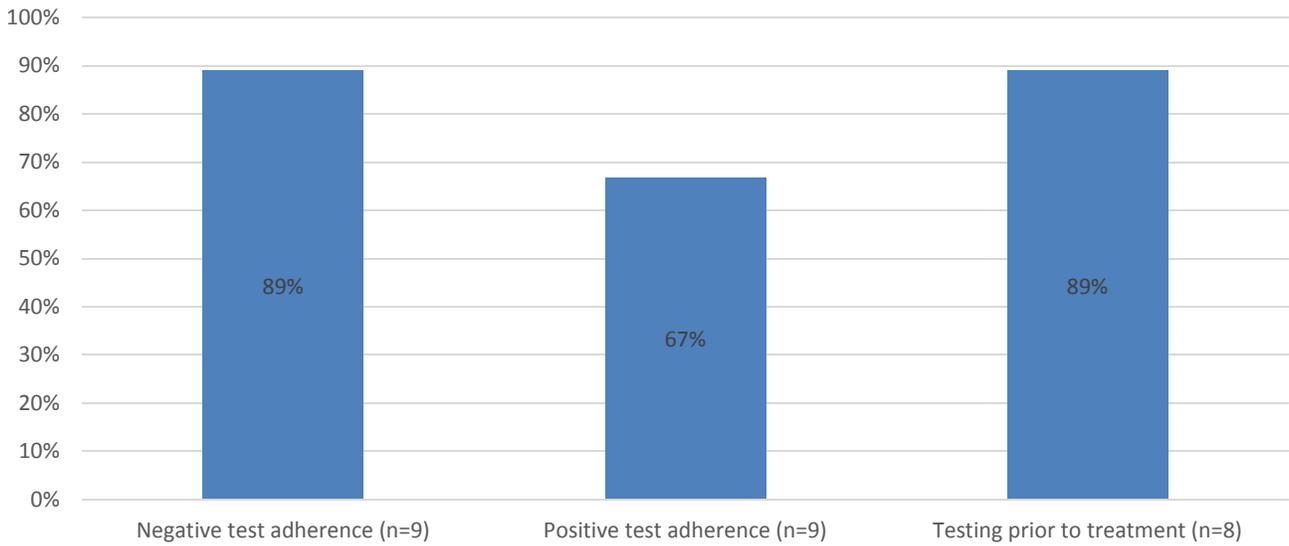
Figure 34: Average health facility performance on key febrile clinical management indicators (n=18), Madagascar.



MalariaCare measures adherence to diagnostic test results in three ways: provider adherence to positive test results (target 90 percent compliance), adherence to negative test results (target 90 percent compliance), and ordering a test in those treated with an ACT (target 90 percent compliance). Figure 35 below illustrates the proportion of facilities that met the targeted 90 percent or higher adherence to test results at the most recent OTSS visit.

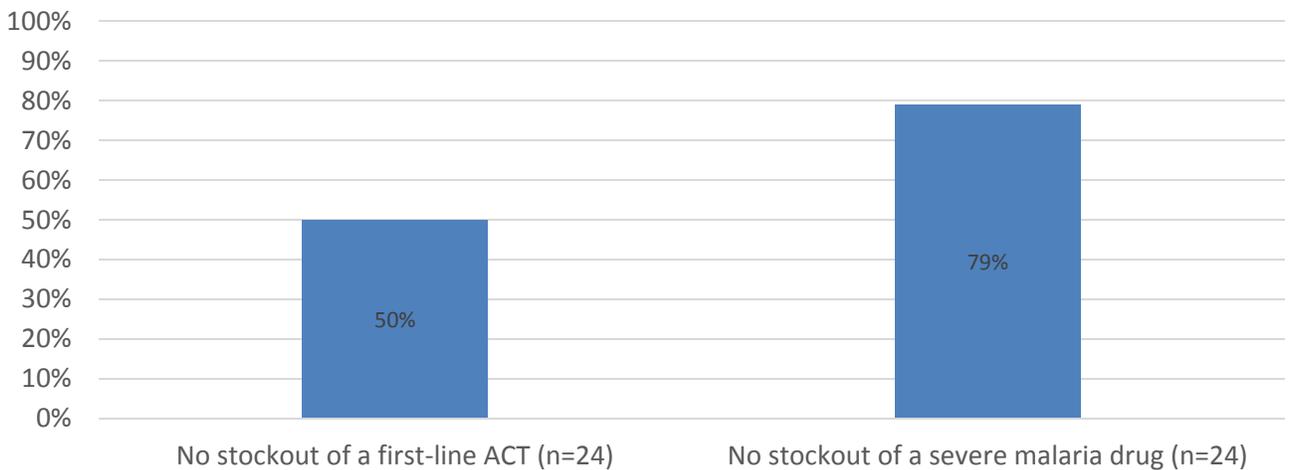
Of the 24 facilities visited during the most recent round of OTSS, few facilities had enough data to fully evaluate this indicator: 9 facilities (38 percent) had sufficient data to calculate test adherence, and 8 facilities had sufficient data to calculate testing before treating (33 percent). This may be due to the fact that Antananarivo, where these supervision visits took place, has a very low prevalence of malaria, especially in March and April. Thus, supervisors reported that there were few-to-no malaria cases found in the registers. Of the facilities reporting enough data for analysis of this indicator, 89 percent met the 90 percent target when evaluating adherence to a negative test results and 89 percent of facilities met the target for testing patients prior to treatment based on register reviews. However, when evaluating adherence to positive test results, only 67 percent of facilities accurately prescribed ACTs with a positive test result, meaning 33 percent of facilities inappropriately treated a positive test result with a treatment regimen that is counter-indicated by the national guidelines. While the causes for not meeting this target may vary by facility, potential factors could include poor record keeping and clinicians' low confidence in the accuracy of RDT results. Additional rounds of OTSS will focus on improving adherence to test results.

Figure 35: Proportion of facilities meeting MalariaCare’s 90 percent target for testing prior to treatment and adherence to test results at most recent OTSS visit, Madagascar.



Availability of ACTs and other malaria drugs is an important condition for accurate and successful malaria diagnosis and treatment. Figure 36 below illustrates the proportion of facilities with no stock outs of first-line ACTs and a severe malaria drug for more than seven days in the past three months. Of the facilities in Antananarivo visited, 79 percent of facilities had no stock out of a severe malaria drug for more than seven days in the past three months at the time of the most recent visit, meaning 21 percent of facilities did experience a significant stock out. Furthermore, the project data revealed that 50 percent of facilities visited had a stock out of a first-line ACT that lasted more than seven days. The stock outs detected show that many facilities do not have the necessary inventory to properly treat malaria cases. This information will be shared with the DLP and other implementation programs such as Global Fund to correct and prevent future stock outs.

Figure 36: Proportion of facilities with at least one key drug in stock >7 days in past three months at most recent visit, Madagascar.

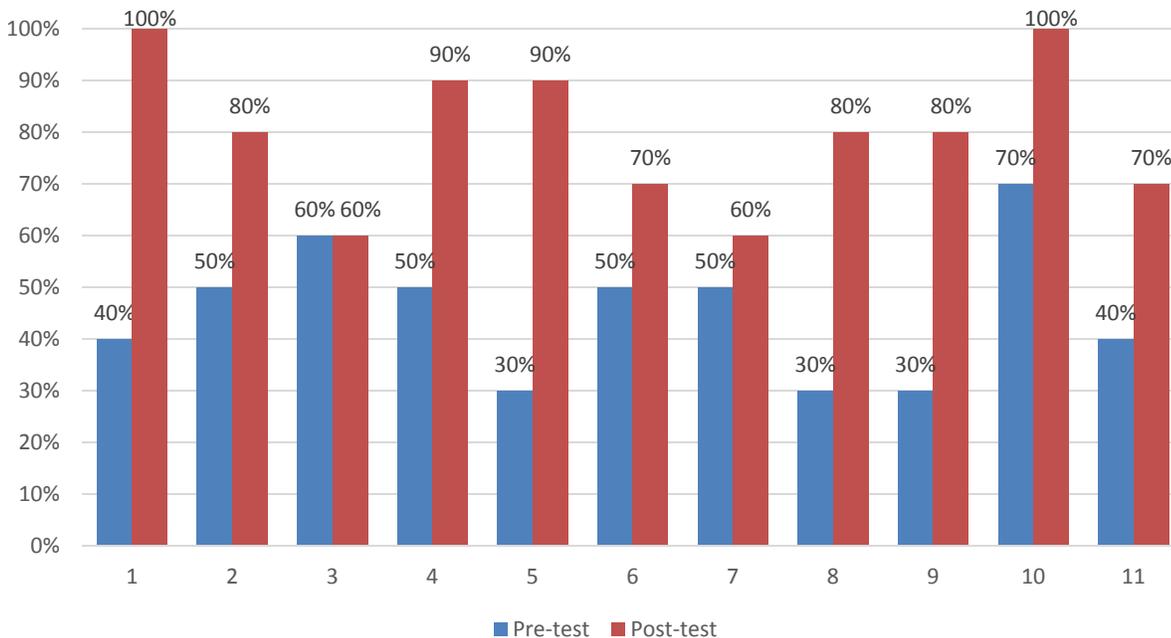


Objective 4: Strengthened laboratory systems at the country level for detecting malaria and other infectious diseases.

- Provided technical assistance to the DLP to lay the foundation for development of a NAMS. In coordination with the DLP, the project conducted a five-day NAMS training to orient participants to the essential competencies needed to develop a national slide bank. Twelve (12) laboratory technicians and clinicians from IPM and the DLP who are directly involved in the development of the Madagascar NAMS were trained.

Significant improvements were made in the theory evaluation from pre- to post-test. At pre-test, the median score was 50 percent (average 45 percent; range 30 to 70 percent). At post-test, the median score was 80 percent (average 80 percent; range 60 to 100 percent). The average score improved from pre- to post-test by 35 percentage points. Please see Figure 37 for more detail on pre- and post-test scores.

Figure 37: Pre- and post-test scores, MalariaCare Madagascar national archive of malaria slides (NAMS) training, Madagascar.



During the training, seven slide sets were prepared in accordance with WHO procedures for thick and thin blood film preparation, staining, mounting, and storage (see Table 8 below). These slides can be used by the DLP to support microscopy training, prepare microscopists for national and WHO-level accreditation, and develop PT panels that can be used for skills testing and ongoing training during on-site supervision visits at the regional and district level.

Table 8: Slide sets prepared during MalariaCare Madagascar national archive of malaria slides (NAMS) training, Madagascar.

	Donor	Parasite density (p/μL)	Total slides
Negative slides	1	N/A	100
<i>P. falciparum</i>	2	458,133	14
<i>P. falciparum</i>	3*	228,000	63
<i>P. falciparum</i>	3	114,000	84
<i>P. falciparum</i>	3	76,000	48
<i>P. falciparum</i>	3	45,000	30
<i>P. falciparum</i>	3	22,000	45

*From this donor, several dilutions were performed to make different parasite density.

- Since 2008, the DLP has been working on implementing a QA program; currently the program is drafting a document on malaria diagnostic QA systems. Since MalariaCare has extensive experience in developing frameworks for and implementing QA programs, the project is supporting the development of an OTSS QA framework.
- Supported a one-day training on malaria diagnostic QA that followed the WHO's plan for malaria QA as detailed in the WHO *Malaria Microscopy Quality Assurance Manual*. The training targeted six participants from the DLP who are involved in the development of the national QA framework. The training focused on providing an overview of NAMS development and function; the structure, function, and implementation of a national QA system; internal quality control; and an external microscopy competency assessment program. As an outcome of the training, the DLP plans to finalize the malaria diagnostic QA manual. The DLP has already implemented several QA activities including printing and distributing bench aids and standards of practice to health facilities; conducting OTSS in both public and private health facilities; on-site proficiency testing; supporting health facilities to implement internal QA measures; and distributing reagents and supplies to health facilities.

Challenges

Challenge	Solution
Clinical case management training participants had a wide range of skills, as the session combined physicians, nurses, and health technicians.	The trainers made a special effort to deliver course content in a way that was understandable to all trainees and to provide clarifications and be responsive to questions as needed. Moving forward, it is recommended to train individuals of relatively the same cadre in one training.
DLP staff has competing priorities, making it difficult to coordinate MalariaCare activities such as training and supervision (OTSS).	MalariaCare made a concerted effort to coordinate its training activities with other activities requiring the participation of DLP staff.

Next steps

- To continue to establish expert-level capacity at the national level, MalariaCare will support four participants from the national core supervisor team to participate in a WHO ECAMM session in Dakar, Senegal. This is tentatively scheduled for June 2016.
- MalariaCare will support an LLW after analysis of OTSS data is complete. This workshop will give supervisors, the DLP, and IPM staff opportunities to debrief on OTSS activities, identify common issues encountered during the supervisory process, and develop actionable steps to resolve issues. The outcomes of these discussions will be used to guide the supportive supervision process moving forward.
- At the end of PY4, assuming no PMI funding is allocated to MalariaCare for PY5, the project will close out activities in Madagascar. The project will hold a one-day workshop for DLP and IPM staff directly involved in continuing case management QA activities in Madagascar. The workshop will serve as a forum for presentation and discussion on MalariaCare work to-date and recommendations for the DLP and IPM going forward.

Malawi

Since PY1, 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. In the first half of this PY, MalariaCare supported targeted diagnostic refresher training for low-performing laboratory supervisors, conducted two rounds of electronic OTSS nationwide, and launched several new clinically focused activities and partnerships. The project remains committed to working with the MOH and NMCP in the coming year to provide and help transition successful approaches 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.

- Conducted an advanced MDRT for 19 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 species counting), scores are shown in Table 9 below.

Table 9: MalariaCare Malawi malaria diagnostics refresher training (MDRT) practical skills testing (n=19), Malawi.

Competency area	Average pre-test score (median [range])	Average post-test score (median [range])	% point change in score
Parasite detection	84% (87% [47%–100%])	85% (86% [74%–98%])	1%
Species identification	44% (40% [10%–70%])	58% (57% [32%–71%])	14%
Parasite counting	50% (50% [0%–100%])	34% (33% [13%–60%])	-16%

- All 19 MDRT participants were OTSS supervisors and were ascribed competency levels based on their parasite detection and parasite counting scores. Seven (7) of the 19 participants (36.8 percent) achieved 80 percent or higher on parasite detection and 40 percent or higher on parasite counting (i.e., attaining at least WHO L2 equivalency for these two competency areas). The seven laboratory supervisors that achieved L2 were those who had attended the prior training in PY3. However, six other participants who had attended the PY3 training did not achieve proficiency in this refresher training. Malaria microscopy performance in Malawi is low and difficult to improve, as limited numbers of malaria slides are sent to laboratories due to the national policy that recommends the use of RDTs. MalariaCare is still working to identify potential reasons for the low performance on parasite counting; however, anecdotal evidence from the field suggests that providers more often conduct testing by RDT, rather than by microscopy. The project team is also reassessing the pre- and post-test data for parasite counting to determine whether any errors occurred.

During upcoming OTSS rounds, to provide ongoing support to laboratory supervisors, MalariaCare will pair low-performing supervisors with higher-performing supervisors (including from national level) to ensure improved overall supervision. In addition, as part of planned microscopy support activities, MalariaCare will provide supervisors with slides from South African PT panels to practice their skills and observe them for a period of six months to determine needs for further support. In the case of supervisors with consistently low performance, MalariaCare may suggest that NMCP consider removing these supervisors from MalariaCare-supported activities. The project started the second round of OTSS (Round 13) using EDS nationwide. In March, 143 health facilities were visited by supervisors. During the visits, supervisor teams used district profiles to provide facility staff with feedback on performance gaps (which were uncovered during the previous OTSS Round 12) as well as recommendations to improve performance. Each district profile includes a summary of individual facility performance, graphs indicating the percentage of facilities in the district that scored at or above the MalariaCare targets for quality standards, main challenges encountered, and recommended follow-up action (specific to each facility in the district) to address those challenges. Round 13

will be completed in April 2016 and full results will be shared in the annual report. By the end of PY4, OTSS district profiles emphasizing facility performance will be available through DHIS2.

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

- Trained 38 additional district-level supervisors (19 diagnostic and 19 clinical supervisors) to support lower-level health facilities on RDT testing procedures, use of test results, clinical case management, and providing on-site mentoring at facility level. This training combined activities 2.1 and 3.2 of the work plan. Following the training, these supervisors were deployed to assist with OTSS Round 13. See Table 10 below for a summary of pre- and post-test scores for the district supervisor training.



Newly trained supervisors conduct hospital practical at Ntchisi District Hospital, Malawi. Photo credit: McPherson Gondwe

Table 10: District-level supervisor training pre- and post-test scores, Malawi.

	Average pre-test score (median [range])	Average post-test score (median [range])	% point change in score
Case management clinical supervisors only (n=19)	66% (65% [46%–86%])	79% (78% [68%–95%])	13
Rapid diagnostic test (RDT) quality assurance (n=38)	81% (80% [55%–95%])	90% (91% [71%–98%])	9

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

- Trained a core group of 10 severe malaria trainers (clinicians) in partnership with the NMCP and Queen Elizabeth’s Hospital in Blantyre. The training established a core group of expert-level severe malaria trainers and mentors that are now being supported to provide on-site clinical mentoring support to district supervisors to strengthen QA efforts at facility level. The training focused on clinical management of simple and severe malaria and complications as well as pre-referral and appropriate treatment for severe malaria. The trainers were carefully selected based on their clinical experience, ability to function as on-the-job trainers in a clinical setting, and geographic location (northern, central, and southern regions). Competency areas assessed included: triaging, clinical examination of patients presenting with fever, signs and symptoms of severe malaria, proper malaria diagnosis, management of patients with severe malaria, management of severe malaria complications, properly ordering laboratory tests, nursing care for patients with severe malaria, use of correct antimalarial drugs and dose calculation, and administration of injectable artesunate.

On average, participants’ overall scores were 62 percent at pre-test and improved to 87 percent at post-test. All participants scored above 60 percent on both the pre-test and post-test. During the pre-test, most

participants had difficulty with question number seven (what type of malaria test should be ordered first when a child is suspected of having malaria?). A number of factors might have contributed to low scores on this question, such as conflicting information on whether microscopy or RDT should be the first type of malaria test used, lack of confidence in RDTs among some of the participants, and lack of previous training on malaria case management. Participants improved their scores most (by an average of 43 percentage points at post-test) on calculating the correct dose of first-line treatment. Participants scored 100 percent at pre-test and post-test on questions related to correct triage procedures, steps to be taken if the facility does not have hospitalization infrastructure, and correct diagnosis of malaria. Participants scored highest on questions related to malaria diagnosis, management of severe malaria, ordering of additional laboratory tests, management of complications of severe malaria, and correct dosing of injectable artesunate. Participants scored lowest on clinical examination of patients with fever and correctly assessing patients for signs of severe malaria.

During the training, MalariaCare forged an exciting collaboration with the Queen Elizabeth's Hospital's International Center of Excellence in Malaria Research and Malawi's Malaria Alert Center to support follow-up clinical mentoring. Following the training, the project team worked closely with senior advisors at the Malaria Alert Center to develop clinical mentoring tools that are being used to support the newly trained core group of severe malaria trainers and mentors to conduct intensive clinical supervision and mentoring visits to select district/health zones supervisors and/or hospitals where OTSS data show low-performance health facilities.

- Launched pre-service training activities to orient new health providers to Malawi's updated malaria case management guidelines. Pre-service training offers an important but often ignored opportunity to improve the quality of malaria case management on a large geographic scale. MalariaCare trained 22 lecturers from eight training institutions, representing half of all medical training institutions in Malawi. During the training, the NMCP's updated malaria treatment guidelines were presented to the group, and participants identified key competencies to be incorporated into the new national malaria case management curriculum and clinical log books. Next steps for ensuring that new graduates continue to be well-prepared include partnering with training institutions and the NMCP to orient final year students to the updated malaria case management guidelines.

- Following the pre-service training, MalariaCare worked closely with the NMCP to provide follow-up support to 20 clinical tutors at the Ekwendeni College of Health Sciences. During the follow-up workshop, the clinical tutors worked with NMCP and MalariaCare staff to incorporate Malawi’s 2013 malaria case management guidelines into the college’s training curricula, course content, and log books to ensure that all students have access to the latest national guidelines. Prior to this, the malaria components in the curriculum had not been updated since 2013. Key changes incorporated into the college’s nursing, clinical medicine, and midwifery curricula included testing prior to treatment for all febrile cases, injectable artesunate as the first-line treatment for severe malaria, and administration of three intermittent preventive treatment in pregnancy (IPTp) doses during pregnancy, as well as recent updates in reporting and recording of malaria cases. Additional follow-up with the other training institutions that were trained is planned for next quarter.



Clinical tutors from Ekwendeni College of Health Sciences.
Photo credit: MalariaCare Malawi

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

- 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. In March 2016, 10 laboratory technicians were trained on NAMS donor collection and mass slide production. Sample collection is now in progress, and thus far over 5,000 slides have been prepared from 42 donors across the two MalariaCare-supported sample collection sites (Nkhotakota and Mchinji). Throughout sample collection, L2 laboratory technicians from the NMCP will be available on-site to provide guidance and quality assurance support in Nkhotakota and Mchinji. The project team is currently holding discussions with the Malawi College of Medicine regarding next steps, including PCR validation.

Operational capacity

To enhance operational capacity in-country, a program coordinator, technical advisor for clinical care, iCCM officer, and receptionist were hired early in PY4. The team also worked to establish office, financial, and operational procedures for the new project staff.

Challenges

Challenge	Solution
Ongoing development of a national iCCM implementation plan has contributed to delays in implementation of iCCM activities.	PMI leadership is currently liaising with other donors and the MOH to develop a plan for successful implementation of iCCM activities in Malawi. To address technical recommendations identified during the previous pilot evaluation of the feasibility and acceptability of introducing RDTs and pre-referral rectal

	artesunate into community case management, MalariaCare will focus on addressing gaps in referral and follow-up when project-supported iCCM activities are able to begin.
Competing priorities among NMCP and other malaria implementing partners have contributed to schedule conflicts with MalariaCare activities, such as OTSS.	Some activities were rescheduled to ensure maximum participation of key partners. For example, OTSS was implemented in two phases to ensure that the activity did not overlap with a net distribution campaign. In areas where net distribution was taking place, MalariaCare used newly trained supervisors to allow existing supervisors to support national net distribution efforts. MalariaCare will continue to work closely with the NMCP, PMI, and other implementing partners to coordinate activities.

Next steps

- MalariaCare will work closely with the NMCP in training facilitators, OTSS supervisors, and other implementing partners to ensure follow-up supervision of health staff trained in case management and on-the-job training for these health workers during upcoming joint and clinical-focus OTSS rounds.
- In addition to OTSS, MalariaCare will work to build the capacity of core groups of local trainers that are being established (in both diagnostic and clinical services) at different levels of the health system. The project will support development of a new core group of microscopy trainers at the national level, while continuing support for development of Malawi’s NAMS to enhance longer-term national microscopy training and capacity-building efforts. MalariaCare will continue to work closely with the Malaria Alert Center and Queen Elizabeth Hospital to support the newly established core group of severe malaria mentors to provide intensive mentoring at facility level.
- Pending finalization of Malawi’s national plan for rollout of RDTs at community level, MalariaCare will support the NMCP through implementation of planned community-level iCCM activities in Blantyre.
- Following the launch of EDS in PY3, the project will conduct data use training to facilitate the access, analysis, and use of project data for decision-making by key decision-makers, including the NCMP, district malaria coordinators, and in-country MalariaCare staff (data users).
- To share project data and lessons learned, MalariaCare will support the NMCP to convene two national malaria case management technical working group meetings. LLWs will follow these meetings (and OTSS rounds) to provide fora for discussion with other stakeholders and implementing partners. As MalariaCare enters its final year, these fora will also be used to discuss transition and sustainability plans.

Mali

In Mali, MalariaCare works since PY3 in partnership with the National Institute of Public Health Research (*Institut National de Recherche en Santé Publique* [INRSP]) and the NMCP to build and strengthen the capacity

of laboratory technician and clinician supervisors to work with providers on strengthening their competence in diagnosis and treatment of malaria according to the revised national guidelines. Through technical assistance to other malaria intervention partners, the project supports case management QA activities in the four previous MalariaCare target regions: Bamako, Sikasso, Koulikoro, and Kayes. MalariaCare also expanded its work to the regions of Segou and Mopti and the three northern regions of Timbuktu, Gao, and Kidal. In doing so, it has created synergies with Global Fund and High Impact Health Service (HIHS) interventions by standardizing case management QA activities such as training and supervision nationwide, to enable comparison of indicators across all regions that will inform targeted QA interventions to address any gaps detected. The project also supports case management quality control in the private sector, mainly through technical assistance to PSI's network of enrolled clinics.

Key accomplishments

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

- In collaboration with the INRSP, the project organized a five-day basic MDRT on microscopy and RDT skills for 20 lab technicians from the two target regions of Mopti and Segou. Significant improvements were observed between pre- and post-test scores relating to disease pathogenesis, laboratory knowledge, and QA. The mean score for the knowledge test increased from 36 percent at pre-test to 72 percent at post-test (an increase of 36 percentage points).



Malaria diagnostics refresher training (MDRT) participants practice reading malaria slides.
Photo credit: MalariaCare Mali

Of all 20 participants, none attained the minimum competency standards for expert microscopists at a WHO L2 for all three competency areas (parasite detection: 80 percent, species identification: 80 percent, parasite counting: 40 percent). However, when supervisor competency is assessed for only parasite detection, 40 percent of participants obtained L1 equivalent scores, and 20 percent attained L2 equivalency. Species identification and parasite counting have been identified as challenges in Mali, however. Species identification is generally not a part of routine practice and is difficult to master during a one-week MDRT course. During this training, the mean score for species identification rose from 39 percent at pre-test to 47 percent at post-test, falling far short of the L2 minimum of 80 percent. Parasite counting scores remained low over the course of the training, increasing by only three percentage points from 17 percent at pre-test to 20 percent at post-test. Table 11 below provides additional information on pre- and post-test results.

Table 11: Malaria diagnostics refresher training (MDRT) microscopy practical pre- and post-test results, Mali (n=20).

Competency area	Average pre-test score (median [range])	Average post-test score (median [range])	% point change in score
Parasite detection	76% (77% [54%–92%])	86% (89% [57%–100%])	10
Species identification	39% (40% [12%–73%])	47% (48% [33%–66%])	8
Parasite counting	17% (20% [0%–60%])	20% (22% [0%–44%])	3

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

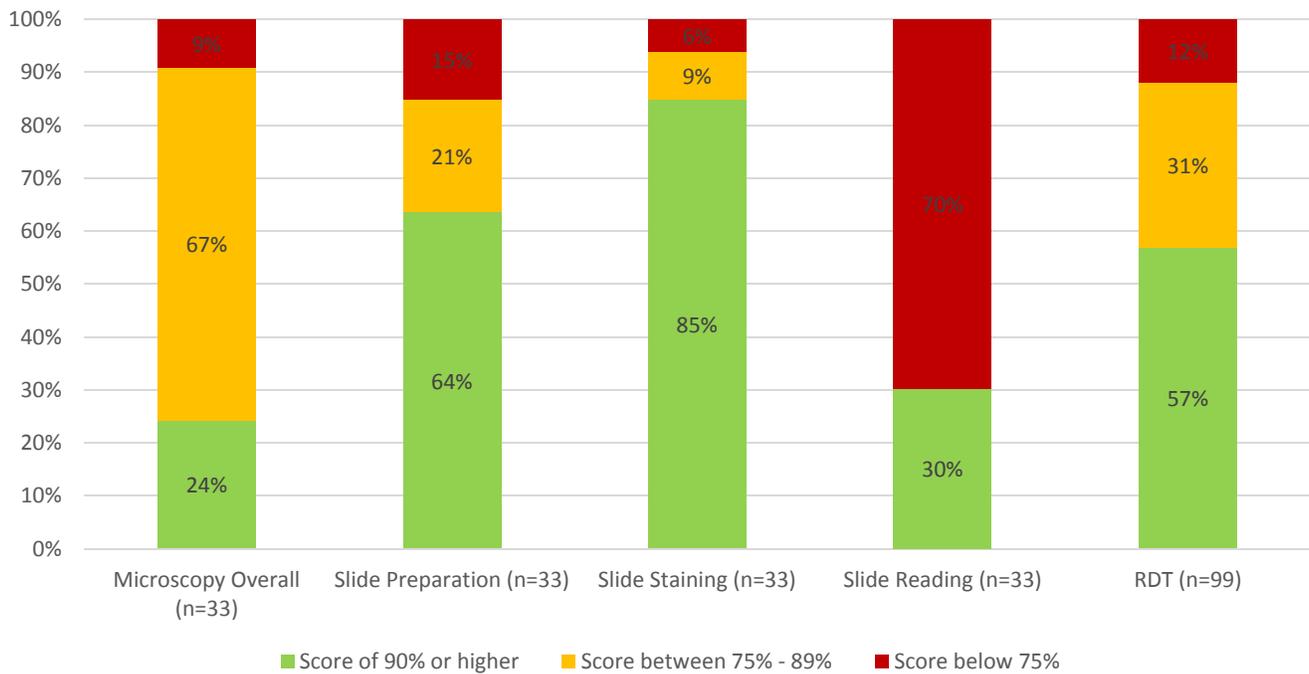
- MalariaCare conducted an OTSS supervisor training for 18 supervisors (nine clinical and nine diagnostic) selected from each of the nine districts in Kayes region. There was an observed increase from pre- to post-test scores (average increase of 17.5 percentage points) during the training. The trained supervisors subsequently carried out OTSS visits at targeted health facilities in Kayes.

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

- MalariaCare conducted the project’s first round of OTSS (Round 1) in Bamako, Koulikoro, Kayes, and Sikasso regions. OTSS visits were conducted in 136 health facilities, including 34 reference facilities and 102 community health centers. Figures 38 through 42 below show performance in malaria microscopy, RDT use, clinical case management, and adherence to test results during this round.

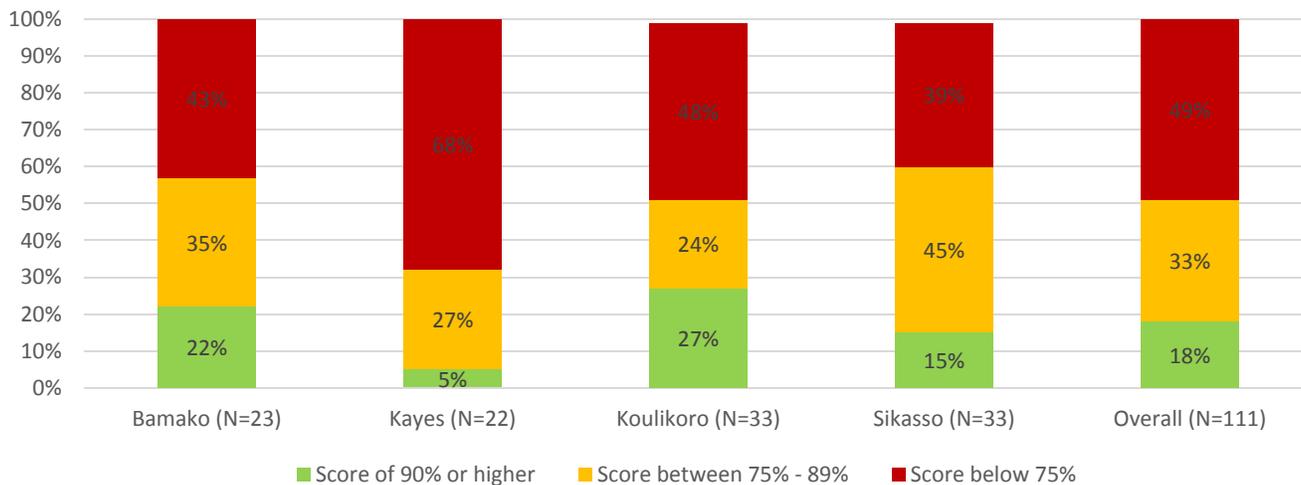
The capacity of health facility laboratories to correctly identify febrile illnesses is key to ensuring the proper case management of both severe and uncomplicated malaria. Figure 38 below shows data on assessment of laboratory technicians on five main diagnostic competencies: overall microscopy, slide preparation, slide staining, slide reading, and RDT use. Out of the 136 facilities visited, 33 facilities out of 60 facilities offering malaria microscopy services conducted at least one complete microscopy observation (or 55 percent), and 99 facilities (or 73 percent of all facilities) had at least one complete RDT observation. Performance as captured in current checklist data is generally strong, since nearly all facilities evaluated meet the 75 percent target for microscopy competency (91 percent) and RDT competency (88 percent). Competency is highest in slide staining, with only six percent of facilities failing to meet the target for competency. Of the 94 percent of facilities that do meet the competency target, 85 percent of facilities score at 90 percent or higher in this area. RDT performance was also high, with 87 percent of facilities reaching the competency target and 57 percent of facilities scoring at 90 percent or higher. However, slide reading competency was notably weak, with only 30 percent of health facilities reaching the target, meaning that 70 percent of facilities are considered below competency in slide reading. Of the 87 observations conducted across the health facilities, supervisors agreed with the health worker’s reading of the slide only 49 percent of the time. In addition, there was no significant difference in scores between reference-level and community-level facilities. This may be due to the lack of recent formal training in microscopy at all levels of the health system and would point to a need for consistent quarterly OTSS rounds and annual MDRT for supervisors to improve performance.

Figure 38: Proportion of facilities reaching MalariaCare’s diagnostic minimum standard (75 percent) and overall target (90 percent) competency at most recent outreach training and supportive supervision (OTSS) visit, Mali.



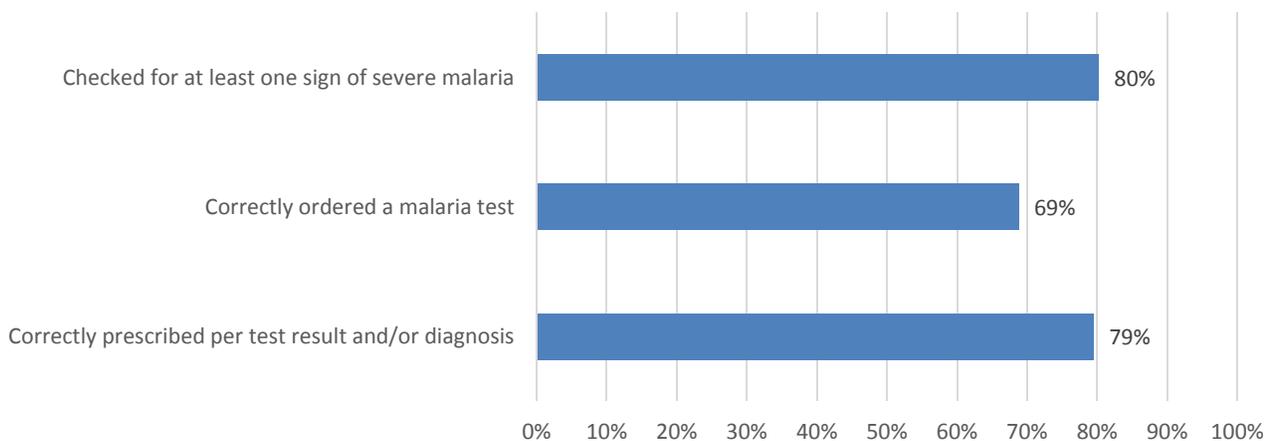
Evaluation scores of competency for clinical case management by region during Round 1 are described in Figure 39 below. Of the 136 facilities visited, 111 (or 82 percent) had data for at least one full clinical observation. Overall, 51 percent of facilities met the minimum standard (75 percent or higher) for clinical competency across the four regions. Sikasso and Bamako scored the highest for clinical case management with scores of 61 percent and 57 percent, respectively, while Koulikoro came in just behind with a score of 52 percent. Performance in Kayes was notably lower, with 68 percent of facilities failing to meet the target. All four regions, in particular Kayes, indicate a significant need to improve these skills with 49 percent of all targeted facilities not reaching the 75 percent performance threshold. MalariaCare will share this information with and provide technical assistance to HIHS, the implementing partner continuing with OTSS in these regions, in order to focus training and supervision on weak performance areas and prioritize health facilities most in need of support. In general, it is expected that future rounds of OTSS will improve performance and that the overall percentage of facilities meeting performance targets will increase over time.

Figure 39: Proportion of facilities reaching MalariaCare’s minimum standard (75 percent) and overall target (90 percent) competency for febrile case management at most recent outreach training and supportive supervision (OTSS) visit, Mali.



Item analysis of clinical competency steps taken in the four regions can be seen in Figure 40 below. In observations averaged across each facility, health care workers checked for at least one sign of severe malaria during examinations 80 percent of the time, correctly ordered a malaria test 69 percent of the time, and correctly prescribed treatment in accordance with the diagnosis and national guidelines 79 percent of the time. Incorrect prescription includes treatment of uncomplicated malaria by monotherapy and failure to prescribe injectable artesunate for severe malaria, as indicated in the recently updated national guidelines. Prescribing any antimalarial for patients with negative test results also appears to be a problem: on average (among facilities with scores), this was done for 31 percent of the time. MalariaCare will focus its support on those performance areas that are contributing to lower competency scores.

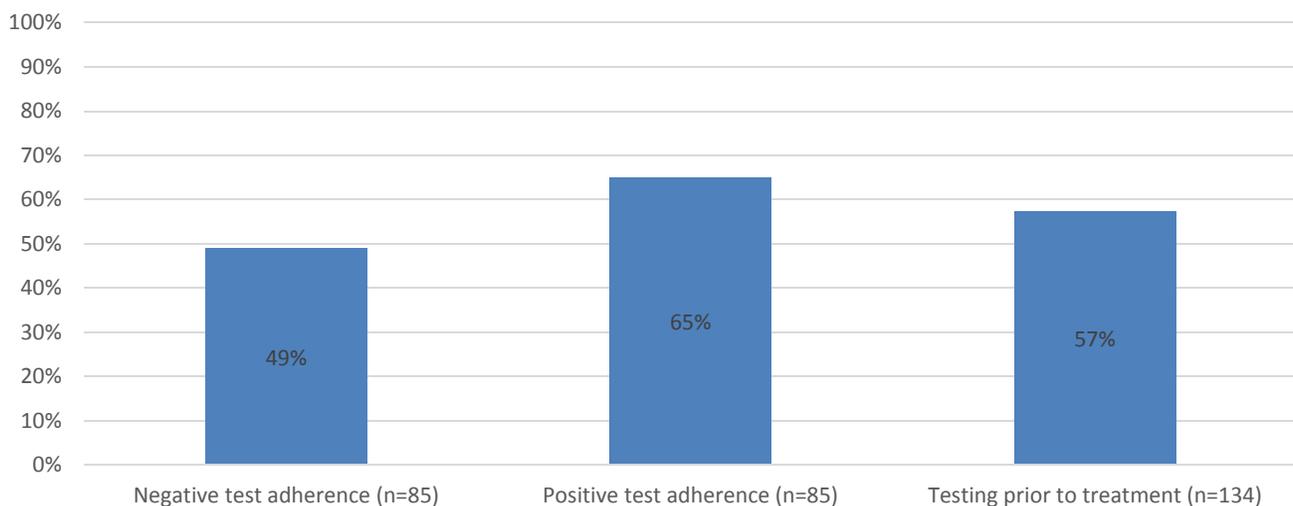
Figure 40: Average health facility performance for key clinical competency checklist items at most recent visit (n=111), Mali.



Adherence to test results is a key component to ensure effective treatment of malaria and other febrile illnesses in accordance with the national guidelines. The project measures adherence to diagnostic test results in three ways: provider adherence to positive test results (target 90 percent compliance), adherence to negative test results (target 90 percent compliance), and ordering a test in those treated with an ACT (target 90 percent compliance). Figure 41 below illustrates the proportion of facilities that met the targeted 90 percent or higher adherence to test results at the most recent OTSS visit. Of the 136 facilities visited, all but two facilities had sufficient data to calculate testing prior to treatment rates, and 85 facilities (or 63 percent) had enough data on test adherence.

When evaluating adherence to negative test results, only 44 percent of facilities reached the 90 percent target, meaning 56 percent of the sampled facilities were inappropriately prescribing a malaria medication despite negative test results. Conversely, when evaluating adherence to positive test results, 65 percent of facilities accurately prescribed ACTs with a positive test result, leaving 35 percent of facilities inappropriately treating a positive test result with a treatment regimen that is counter-indicated by the national guidelines. The third measure of adherence—percentage of ACT prescriptions with evidence of any test record found—estimates whether patients who get antimalarial treatment receive a diagnostic test beforehand. Slightly more than half (57 percent) of health facilities met the target for testing patients prior to treatment based on register reviews. Stated differently, when reviewing the records of those prescribed an ACT, 43 percent of patients were treated without evidence of any malaria test. While the causes for not meeting this target may vary by facility, potential factors could include treatment based only on clinical criteria, poor record keeping, and a clinician’s low confidence in the accuracy of RDT results. Additional rounds of OTSS will focus on improving adherence to testing performance for all three scores.

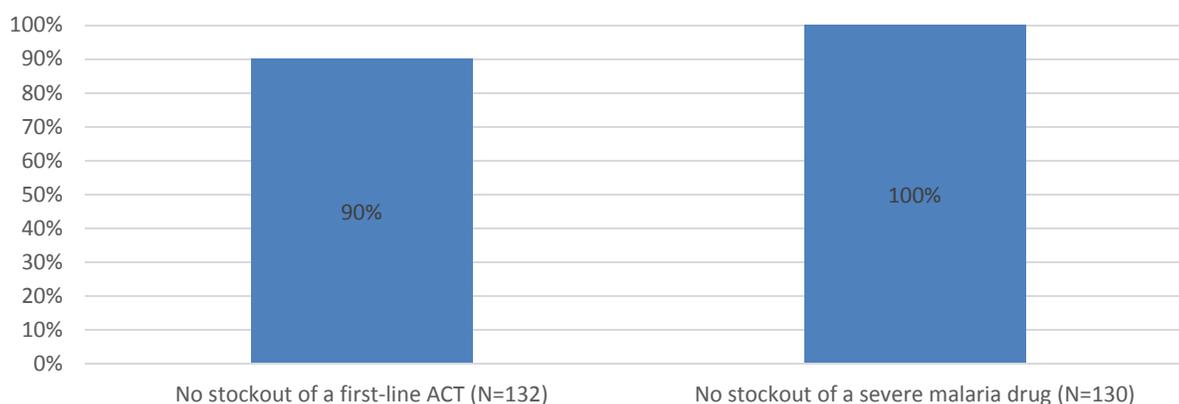
Figure 41: Proportion of facilities meeting MalariaCare’s 90 percent targets for testing prior to treatment and adherence to test results at most recent OTSS visit, Mali.



An important condition for accurate and successful malaria diagnosis and treatment is the availability of ACTs and other malaria drugs. Figure 42 below illustrates the proportion of facilities with no stockouts of first-line ACTs and a severe malaria drug for more than seven days in the past three months. Ninety (90) percent of facilities (n=132) had no stockout of a first-line ACT and every facility visited (n=130) had no

stockout of a severe malaria drug for more than seven days in the past three months (at the most recent visit). The facilities visited during this round of OTSS appear to have the stock and inventory needed for proper clinical case management.

Figure 42: Proportion of facilities with at least one key drug in stock more than seven days in past three months at most recent visit, Mali.



- In collaboration with the NMCP, MalariaCare organized a clinical case management refresher training to build the capacity of clinicians to improve the knowledge of and adherence to the national clinical case management guidelines. Thirty-eight (38) clinicians from all 16 districts in Mopti and Segou regions attended the training, which focused on clinical management of severe and uncomplicated malaria. Significant improvements and generally good performance were observed between pre- and post-test scores. The average score increased by 11 percentage points, from 82 percent pre-test (median score 85 percent; range 40 to 100 percent) to 93 percent post-test (median score 100 percent; range 50 to 100 percent). Sixteen (16) of the clinicians trained will be selected as clinical supervisors who will go on to join their laboratory counterparts in the joint clinical and laboratory OTSS later in the project year.

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

- Procured 11 Olympus CX training microscopes and a microscope camera and projection equipment. The project will properly brand the equipment with the PMI logo and coordinate with the INRSP to distribute these microscopes to training facilities around the country to support improved microscopy training and quality assurance activities in Mali.

- Provided technical assistance to the Global Fund to support a four-day MDRT for laboratory technicians from the northern regions of Kidal, Gao, and Timbuktu. The training was facilitated in collaboration with the NMCP and INRSP and provided diagnostics refresher training to 11 laboratory technicians. This training is the first in a series of cascading training sessions aimed at enabling participants to acquire and develop essential knowledge and competency in malaria diagnosis and to be capable of subsequently passing on acquired knowledge and skills to other technicians in the northern regions through successive training, mentoring, and supervision.



A malaria diagnostics refresher training (MDRT) participant preparing a thick smear.
Photo credit: Boubacar Guindo

Pre-test scores showed low performance levels of microscopy overall, and most notably in parasite counting, where no participant correctly quantified parasite density. At pre-test, parasite detection ranged between 46 to 77 percent with an average of 58 percent (median 54 percent); parasite identification ranged from 22 to 64 percent with an average score of 46 percent (median 47 percent). Low pre-test scores are partially explained by the lack of prior formal training provided to technicians in these regions.

Substantial improvement was seen at post-test in all competency areas (see Table 12). Parasite detection post-test scores ranged from 79 to 100 percent with an average of 92 percent (median 93 percent); parasite identification post-test scores ranged from 61 to 78 percent with an average and median score of 72 percent; and parasite density scores ranged from zero to 40 percent, with an average and median of 20 percent. Additionally, there were significant gains in diagnostic microscopy theory, where pre-test scores ranged from 25 to 51 percent with a median score of 35 percent. This increased at post-test to a range of 55 to 85 percent, with a median score of 73 percent. MalariaCare will continue to work with Global Fund to ensure follow-up with the trained technicians to ensure upkeep of acquired skills.

Table 12: Participant performance in parasite detection, identification, density, and diagnostic microscopy theory; MalariaCare malaria diagnostics refresher training (MDRT), December 2015, Mali (n=11).

Competency area	Average pre-test score (median [range])	Average post-test score (median [range])	% point change in score
Parasite detection	59% (54% [46%–77%])	92% (93% [79%–100%])	34
Species identification	46% (47% [22%–64%])	72% (72% [61%–78%])	26
Parasite counting	0% (0% [0%–0%])	20% (20% [0%–40%])	20
Theory evaluation	35% (35% [25%–51%])	70% (73% [55%–85%])	35

- Provided technical assistance to HIHS to conduct a two-day training in RDT QA for district-level supervisors from Kayes region. This training aimed to improve RDT competency and confidence in RDT results to improve provider adherence to test results. District supervisors from Sikasso, Bamako, and Koulikoro will also benefit from this training later in the year.

This training on quality assurance of RDTs and the management of malaria cases was well received. Sincerely, we, healthcare providers, have always said that the RDTs from the government and other partners are of poor quality. This training made me realize that we [healthcare providers] do not respect the proper procedures as we are always rushed in reading the results and never respect the correct number of drops of diluent or the amount of blood taken from the patient. Now I see why we were never satisfied with RDTs.

- Given that a sizeable proportion of the population with malaria initially seeks help from the private sector (including pharmacies and patent drug dealers), which accounts for about 44 percent of service provision³ in Mali, MalariaCare expanded its support to the private sector in the first half of PY4.

As a first step, MalariaCare supported a clinical supervisor training for 15 midwife supervisors who supervise private community-level health facilities in Bamako. During the training, these supervisors were introduced to the clinical OTSS tool and methodologies and were trained on key supervision and mentoring skills. Participants will use acquired skills to improve the quality of malaria case management in the private sector during OTSS visits to clinics in the current network of franchisees.



Role-play of a medical consultation during supervisor training.

Photo credit: MalariaCare Mali

³ Rapport de mise à jour de la Carte Sanitaire 2011 CPS/MS, http://www.clustersantemali.net/docs/Carte_sanitaire_2011.pdf

Challenges

Challenge	Solution
Delay between supervisor training and the launch of OTSS in Sikasso, Kayes, Koulikoro, and Bamako regions due to an outbreak of polio and the subsequent vaccination activities.	Before supervisors started OTSS visits, MalariaCare held an orientation meeting to refresh the skills they had learned during supervisor training. Moving forward, the project team will plan to implement supervisor training and OTSS within a two-month period.
Two identified MalariaCare supervisors (one clinical and one laboratory supervisor) who were previously trained through MalariaCare’s MDRT and clinical case management training were not available for supervisor training.	When a supervisor is not able to attend supervisor training, MalariaCare provides a short “crash course” and orientation to the supervisor either directly before and/or during the supervisors first OTSS visit.

Next steps

- MalariaCare will continue to support the NMCP to enshrine 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. To this end, the project will continue to support standardized case management quality assurance interventions nation-wide, such as training, supportive supervision and lessons learned workshops, through implementation in MalariaCare focus regions and technical assistance to Global Fund and HIHS interventions.
- With the use of RDTs becoming more widespread in both health facilities and at the community level, MalariaCare will use trained district-level supervisors to train facility-level supervisors to oversee the work of community health workers using RDTs in the community and to extend implementation of QA for case management in support of interventions by iCCM partners.
- To improve case management in the private sector, MalariaCare will support the trained clinical private-sector supervisors to carry out OTSS at selected private health facilities in Bamako. The team is also coordinating with regional laboratory supervisors to support laboratory supervision and mentorship at private facilities with laboratories in Bamako.
- MalariaCare expects to roll out the use of an electronic data collection system in Mali in July 2016. In anticipation of introduction of the DHIS2 system by the MOH, MalariaCare will collaborate with Measure Evaluation to ascertain interoperability between the OTSS electronic data collection and the DHIS2 platform. Harmonizing HMIS routine data collection through DHIS2 with OTSS data would strengthen national data management systems and encourage data use for decision-making at multiple levels. MalariaCare has also started discussions with the PLNP, Global Fund and SDDI regarding use of the EDS for malaria supervision across all regions of Mali and the transition of the EDS to the national program in PY5.

Mozambique

MalariaCare works in Mozambique since PY2. In PY4, MalariaCare has continued to strengthen central- and provincial-level managerial, diagnostic and clinical case management capacity to plan and coordinate implementation of QA interventions at all levels. MalariaCare has worked with the NMCP to focus on priority areas of capacity building at the national- and provincial-levels: early and adequate diagnosis of malaria using both microscopy and RDTs; appropriate treatment, referral and clinical management of complications of severe malaria; and responsive M&E systems capable of providing real time data on quality of care for use at all levels of decision-making. MalariaCare's QA strategy is anchored around district-level supervision and mentoring of health facilities. During MalariaCare PY3, the first year of implementation in Mozambique, the capacity of district level supervisors was not sufficient to independently conduct OTSS. MalariaCare, through technical training, has been building the capacity of district supervisors who are now capable of conducting OTSS. In PY4 these district-level supervisors will be supported to scale up OTSS to health facilities within the districts.

In the first half of PY4, MalariaCare continued current interventions underway in the two high-burden provinces – Zambezia and Nampula – and expanded its work to two other high-burden provinces – Cabo Delgado and Tete. MalariaCare has trained a pool of clinical and laboratory supervisors in the two new provinces in both malaria case management and mentoring skills, and has further strengthened the capacity of the supervisors in Nampula and Zambezia. Two rounds of OTSS were implemented in each province with all data being collected via the electronic checklist. Supervisors recruited and trained during PY3 were trained on the EDS in a stand-alone EDS training and all new supervisors were trained on the electronic system during the joint clinical and laboratory supervisor training of trainers (TOT).

To support operations in both Cabo Delgado and Tete, the project hired a provincial coordinator for each province. Both coordinators are based in the Provincial Health Authority (PHA) office in their respective provinces. To support central operations, a finance officer and program assistant were hired. MalariaCare has established an office in Maputo where the program coordinator, finance officer, and program assistant are based.

Key accomplishments

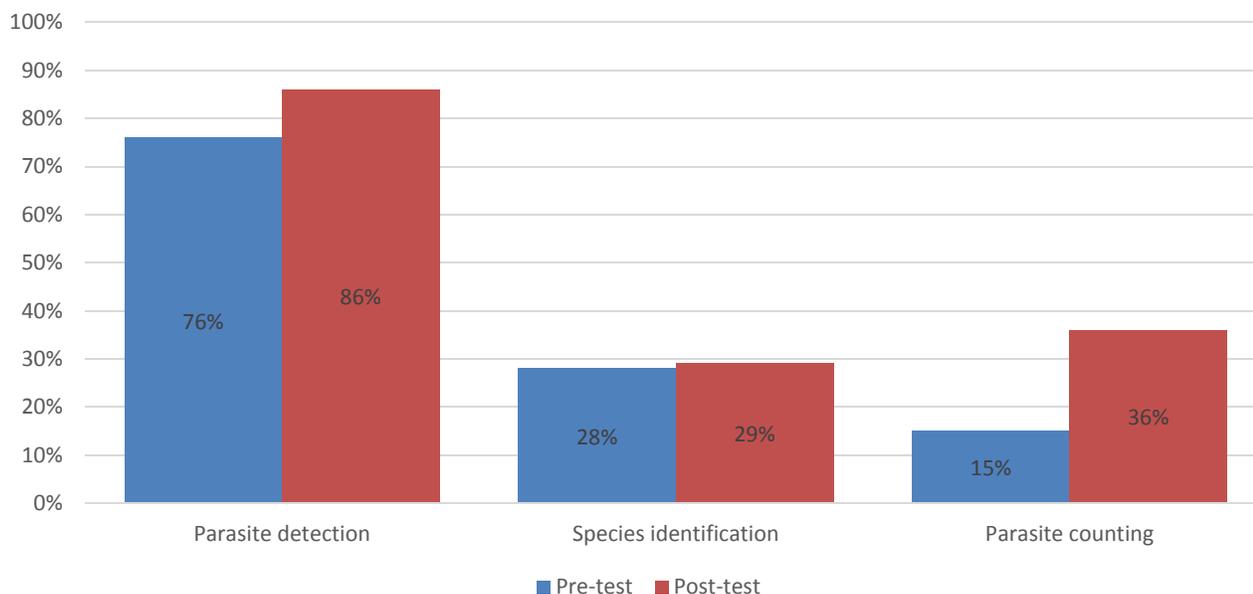
Objective 1: The accuracy of diagnostic testing for malaria is improved to greater than 90 percent.

- Facilitated two four-day basic MDRT sessions for 37 district-level laboratory staff. One training was held in Tete, training 12 district-level laboratory staff. The second was held in Nampula and trained a total of 25 laboratory staff – 11 from Cabo Delgado, eight from Nampula, and six from Zambezia. Pre- and post-tests were used to assess microscopy skills including parasite identification, species identification and parasite density. 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 basic MDRT in all four provinces. On average, participant scores increased at post-test (Figure 43). However, none of the participants met the WHO L1 or L2 standards across all three competency areas (parasite detection, species identification, and parasite counting). Species identification was the main barrier to meeting WHO L1 or L2 standards (80 percent or greater) –

none of the participants reached proficiency in this area. For parasite detection, 28 participants (76 percent) met the WHO L1 or L2 standards (score of 80 percent or greater). For parasite counting, 18 participants (49 percent) met the WHO L1 or L2 standards (score of 40 percent or greater).

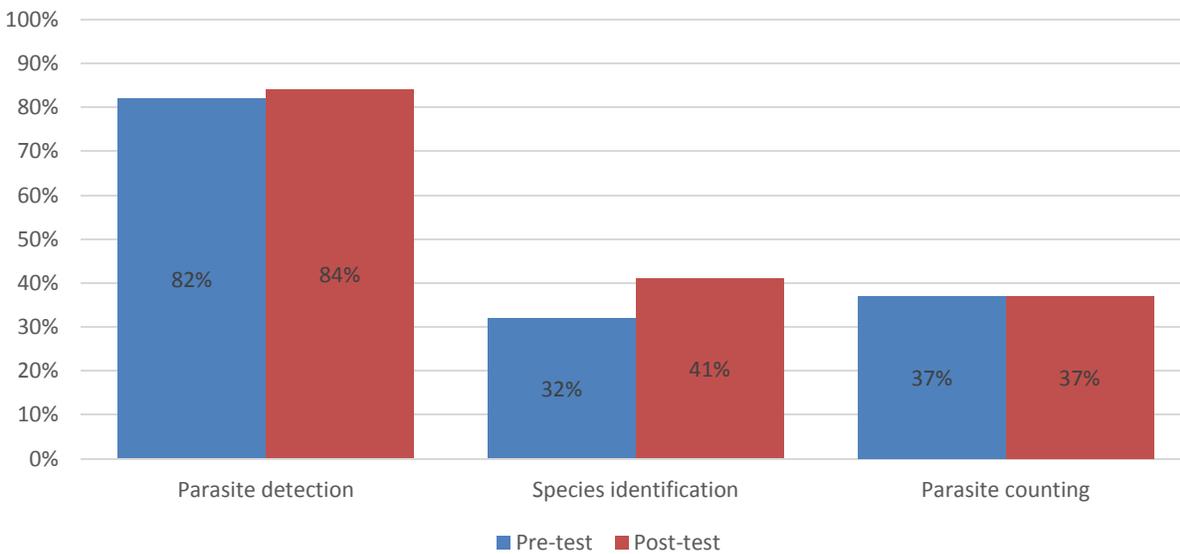
Figure 43: Basic MDRT: Average scores for microscopy competency areas, Mozambique (n=25).



- Facilitated two five-day advanced MDRT sessions for 25 laboratory OTSS supervisors. One training was held in Tete, training seven supervisors. The second was held in Nampula training a total of 18 laboratory staff – seven from Cabo Delgado, five from Nampula, and six from Zambezia. Pre- and post-tests were used to assess diagnostic theory and microscopy skills, such as parasite detection, species identification and parasite density. The theory test results increased 35 percent (25 percent to 60 percent) from pre- to post-test; however, just five participants scored above 80 percent. For microscopy skills, several indicators improved; however, averages did not indicate significant gains.

The following graph shows average scores for the advanced MDRT training in all four provinces. On average, participant scores moderately increased in parasite detection and species identification, and did not improve in parasite counting at post-test (Figure 44). None of the participants met the WHO L1 or L2 standards across all three areas (parasite detection, species identification, and parasite counting). Species identification was the main barrier to meeting WHO L1 or L2 standards (80 percent or greater) – no participant met L1 or L2 standards in this area. When not considering the species identification score, 10 participants (40 percent) met L1 or L2 standards for both parasite detection (score of 80 percent or greater) and parasite counting (score of 40 percent or greater).

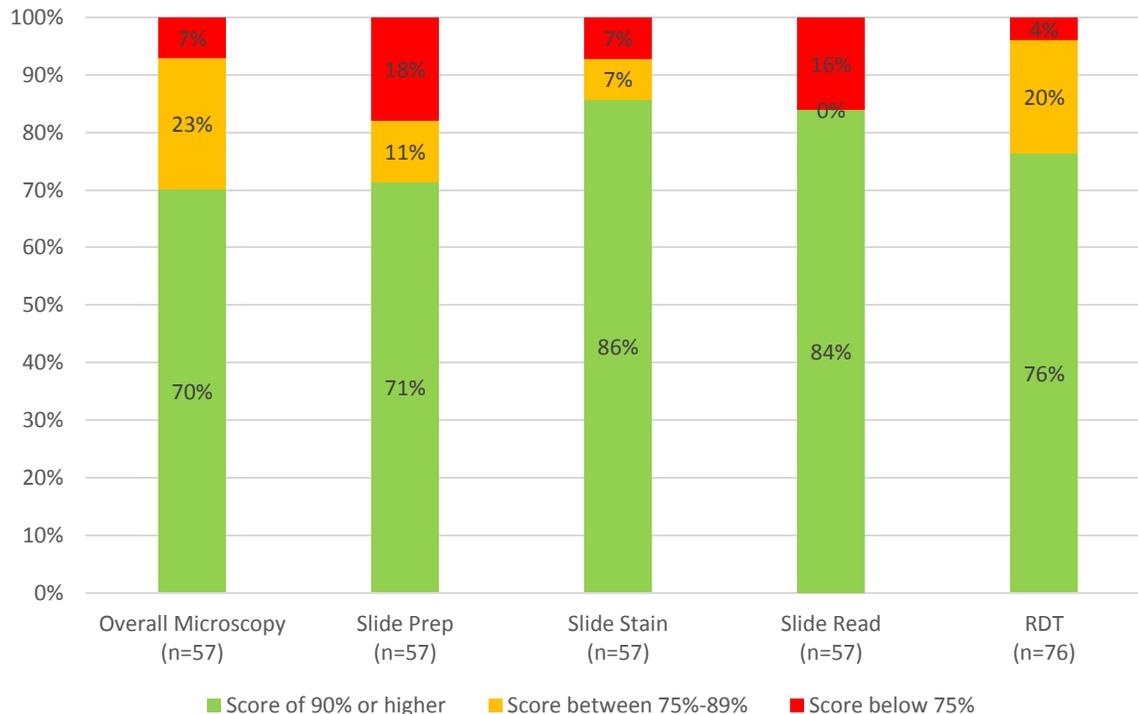
Figure 44: Advanced MDRT: Average scores for microscopy competency areas, Mozambique (n=25).



- In collaboration with the NMCP and PHAs, one round of OTSS was conducted in each of the four provinces: Cabo Delgado, Nampula, Zambezia, and Tete. Across all rounds, 79 health facilities were visited in 52 districts. A total of 20 facilities were visited in Cabo Delgado, 22 in Nampula, 21 in Tete, and 16 facilities in Zambezia. Graphs included in this report, that report OTSS results, show performance in malaria microscopy, RDT use, clinical case management, and adherence to test results during this most recent round of OTSS.

Diagnostic competency is key to identifying malaria cases, both severe and uncomplicated, for appropriate treatment and to stop the further spread of transmission. Figure 45 describes the current status of key diagnostic competencies during the most recent round of OTSS: comparative facility competency in overall microscopy performance (a combined score of slide preparation, slide staining and parasite detection) and overall RDT use.

Figure 45: Proportion of facilities meeting MalariaCare’s diagnostic minimum standard (75 percent) and overall competency (90 percent) targets at most recent OTSS visit, Mozambique.



Of the 79 facilities visited, 76 (96 percent) had at least one complete RDT observation; of the 68 facilities with microscopy, 57 (84 percent) had at least one complete microscopy observation. Overall, facilities performed well on microscopy, with 93 percent of facilities meeting the minimum standard of 75 percent competency level. Of the three microscopy sub-competencies, performance was weakest in slide preparation. Within this sub-competency, two steps emerged as the biggest gaps in performance: (i) wiping off the first drop of blood after a finger prick and placing the subsequent drop on the slide without touching the finger; and (ii) spreading thick films. Facilities also performed well on RDTs, with labeling the cassette being the step most often not completed.

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

- Conducted RDT on-site refresher training for health care workers was incorporated into OTSS visits, training a total of 136 health care workers on using RDTs – 114 from Nampula and 32 from Zambezia. No on-site RDT training was completed during the first round of OTSS in Cabo Delgado and Tete as these initial rounds focused on addressing major gaps emerging in OTSS. RDT training will commence with the second round of OTSS in those provinces.

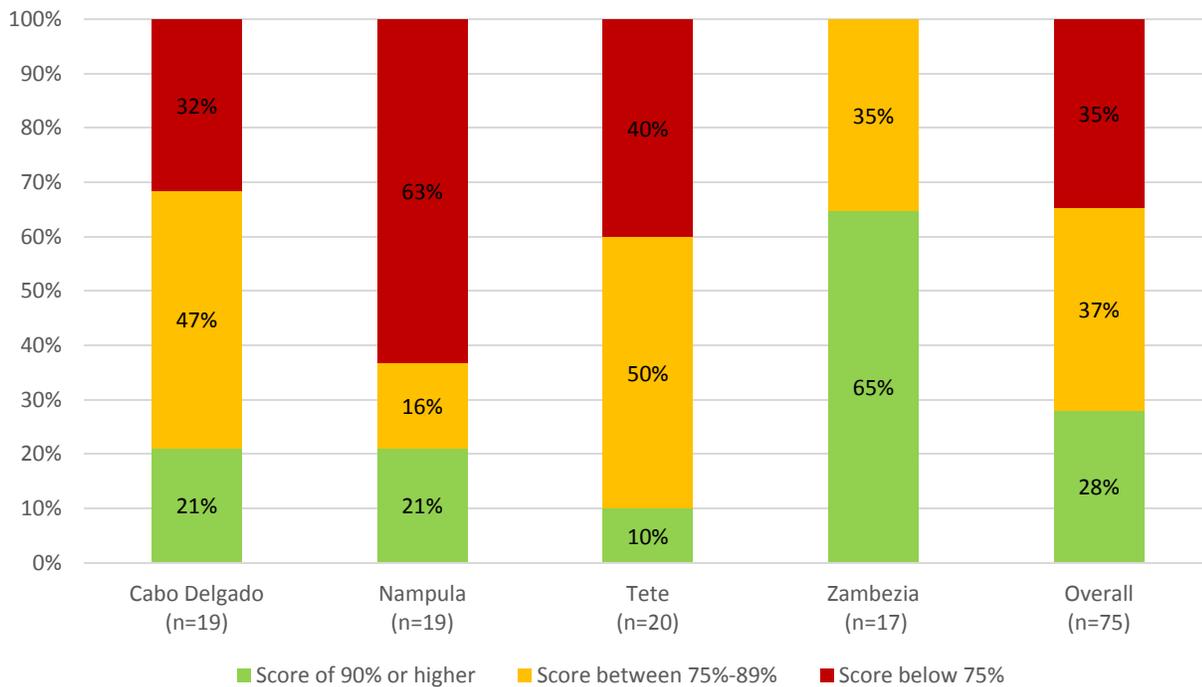
Training was conducted as part of the feedback session at the close of the OTSS visit. These sessions included all clinical and laboratory staff members, to the greatest extent possible without sacrificing service quality in the facility. Supervisors first demonstrated use of the RDTs and then required participants to demonstrate

correct use. Weak areas in RDT performance identified during the OTSS visit were discussed and addressed during this time.

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 36 supervisors in clinical case management – 9 from Zambezia, 10 from Tete, 11 from Cabo Delgado, and 6 from Nampula. One training was held in Nampula and included participants from Nampula, Cabo Delgado, and Zambezia. A second training was held in Tete which included the 10 Tete supervisors as well as an additional 33 participants who were not supervisors, per the request of the Tete PHA. The PHA supported these participants (22 nurses and 11 medical assistants) from Tete health facilities. Across the two training sessions, participants increased scores from 63 percent at pre-test to 74 percent at post-test.
- Trained 52 provincial- and district-level clinical and laboratory supervisors during the combined clinical and laboratory TOT in Nampula, Cabo Delgado, and Tete. The training included a day focused on mentoring and supervision skills, a day introducing and reviewing the electronic checklist, and a third day of practical application at local health facilities. In addition, several modules focused on important topics that are critical to effective case management across both clinical and laboratory staff, including identification and basic management of severe malaria and diagnosis using malaria microscopy test results (specifically parasite density and species identification).
- Of the 79 facilities visited, 75 (95 percent) had at least one complete clinical observation. Of the facilities visited during OTSS, 49 (65 percent) scored above the 75 percent minimum standard. Health facility performance for competency in clinical case management during the most recent round of OTSS is described in Figure 46.

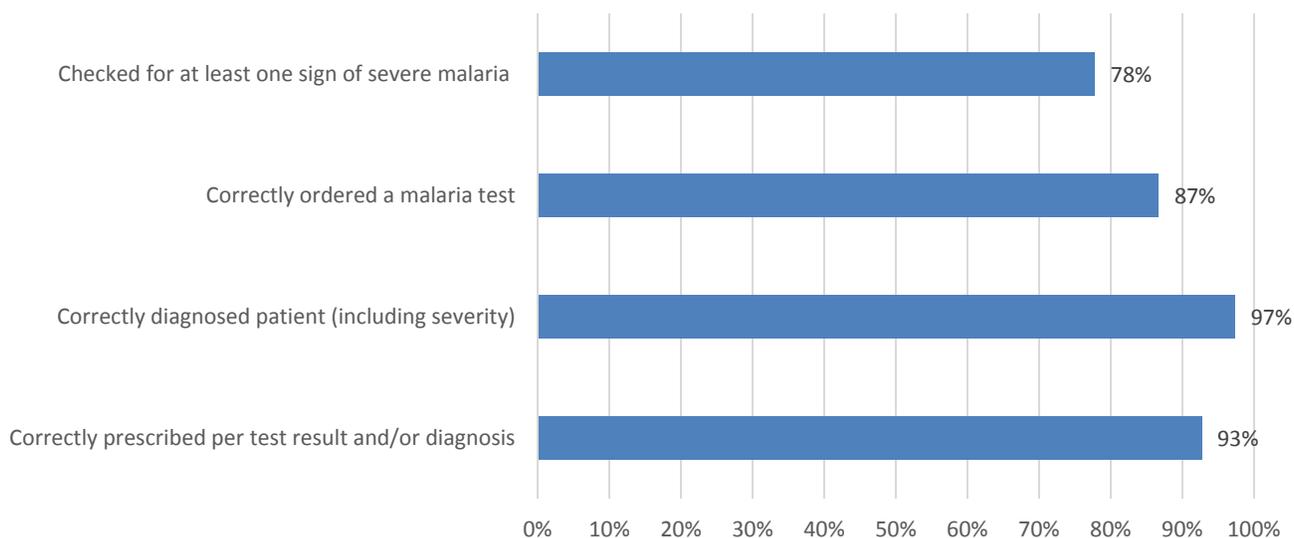
Figure 46. Proportion of facilities meeting MalariaCare’s febrile clinical management minimum standard (75 percent) and overall competency (90 percent) targets at most recent outreach training and supportive supervision (OTSS) visit, Mozambique (n=75).



At the provincial level, Zambezia demonstrated the strongest performance with the largest percent of facilities scoring above the target competency. In the second half of the project year, select low-performing facilities in each province will be targeted to participate in intensive mentoring which will focus on addressing performance gaps emerging from OTSS visits.

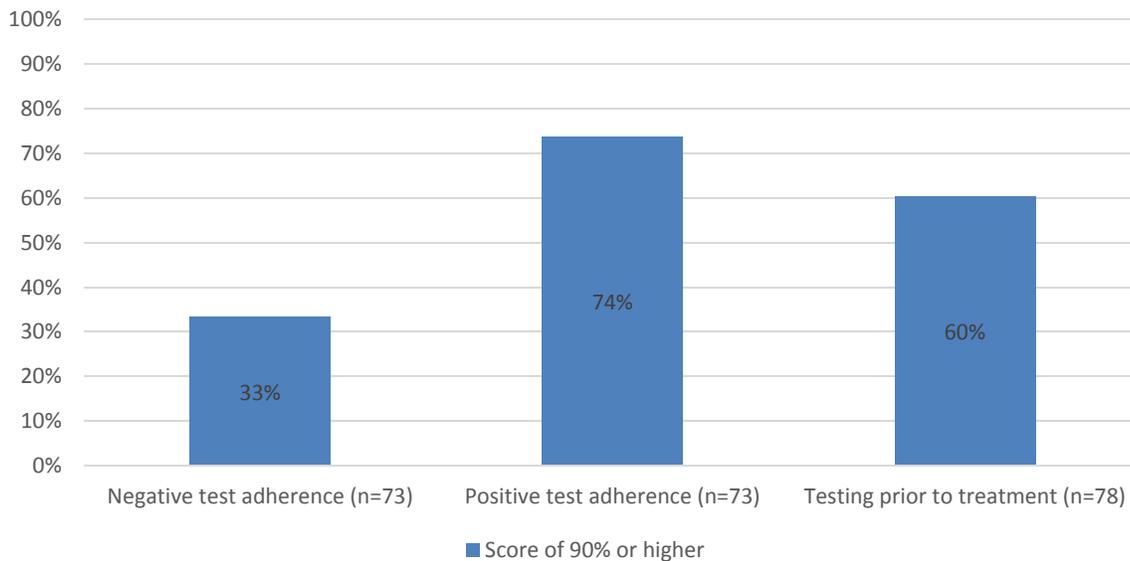
The results for key individual data elements collected for evaluation of observed clinical case management are described in Figure 47, below. Facilities performed well in correctly diagnosing patients (97 percent on average) and correctly prescribing per the test result or diagnosis. The other steps have room for improvement – 87 percent correctly ordered a malaria test and 78 percent of clinicians checked for at least one sign of severe malaria during the patient consultation.

Figure 47: Average health facility performance on key febrile clinical management indicators, Mozambique (n=75).



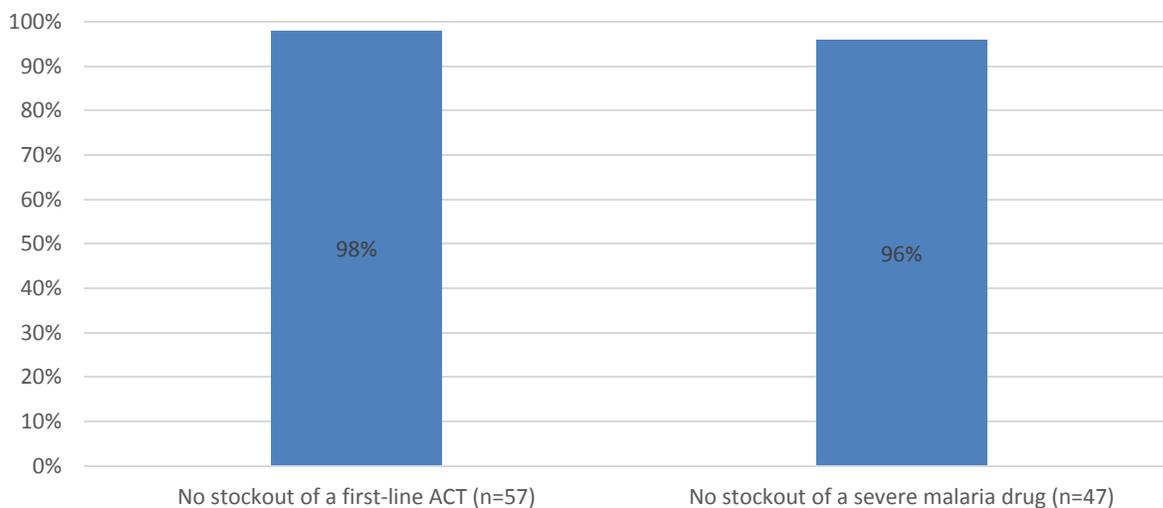
Adherence to test results is another key measure of quality clinical case management performance. To get an accurate assessment, MalariaCare measures this in three ways: provider to positive test results, adherence to negative test results, and testing prior to treatment with an ACT—all which have a target of 90 percent compliance. Figure 48 below illustrates the proportion of facilities that met the adherence targets (90 percent or higher) when performing chart reviews during the most recent OTSS visit for the time period immediately preceding the visit. Of the 79 facilities visited, 78 (99 percent) had a testing prior to treatment register review and 73 (92 percent) had an adherence to positive and negative test results register review. Facilities are adhering best to positive test results with 74 percent of patients who tested positive receiving an ACT. However, there is room for improvement on this as well as in the two other indicators—negative test adherence and testing prior to treatment. Further exploration in future OTSS rounds will be needed to understand reasons for adherence performance gaps. Once identified MalariaCare will work to address underlying causes of poor adherence and focus on improving adherence across all indicators.

Figure 48: Proportion of facilities meeting MalariaCare’s 90 percent targets for testing prior to treatment and adherence to test results at most recent outreach training and supportive supervision (OTSS) visit, Mozambique.



An important condition for accurate and successful malaria diagnosis and treatment is the availability of ACTs and other malaria drugs. Figure 49 below illustrates the proportion of facilities with no stockouts of first-line ACTs and a severe malaria drug for more than seven days in the three months prior to the most recent OTSS visit. Almost no facilities (two percent) had stockouts greater than seven days of a first-line ACT (two percent) or a severe malaria drug (four percent) in the three months prior to the last OTSS visit.

Figure 49: Proportion of facilities with at least one key drug in stock >7 days in past three months at most recent visit, Mozambique.



- Continued supporting the malaria case management committees established in four facilities last year, and established committees in an additional six facilities so far this year. These multidisciplinary committees meet monthly at the facility level, specifically the reference health facilities, 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.

- Conducted an EDS end-user training for Nampula supervisors recruited and trained in PY3. A total of 20 participants attended the training. The training included an introduction to the electronic tablet, a TOT session to prepare participants to facilitate similar training to lower levels, and a practical session using the tablets in local health facilities. All supervisors recruited in PY4 were trained on EDS as part of the TOT described under Objective three. Supervisors used the electronic checklist to collect data from all facilities visited during OTSS this year. The roll-out of the electronic checklist has improved the completeness of reporting OTSS data. However, technical challenges in sending data to the server, due to internet connectivity and system bugs has delayed the ability to rapidly analyze and feedback data. This has affected Mozambique much more than any other OTSS country.
- Conducted an EDS data-user training for those who will read, use and interpret data collected during OTSS. A total of 10 participants attended the training, including national-level representatives and MalariaCare staff. A second data-user training will be held for Cabo Delgado and Tete in the second half of PY4.

Challenges

Challenge	Solution
<p>The PY4 work plan approval has been significantly delayed. This is due to several factors. MalariaCare Mozambique was asked to collaborate with another implementing partner. In order to understand how best to collaborate, both partners had to meet and several discussions were necessary before the role of each was understood. Also, the MalariaCare Mozambique obligation was less than anticipated due to re-programming, requiring further adjustments to work plan and budget.</p>	<p>MalariaCare worked closely with PMI and the new implementing partner in the region to understand expectations and disaggregation of roles. The work plan has since been updated and resubmitted.</p>
<p>OTSS data analysis has been delayed due to issues in data quality in PY3 and technical issues in sending data to the server via the electronic data system.</p>	<p>MalariaCare is working to compress rounds one through three data to hopefully create a dataset robust enough for analysis. Since EDS implementation, data quality has significantly improved. Several of the technical issues emerging in the use of EDS have been resolved, with the remaining targeted for resolution in the next version of the application, which is anticipated to launch in June 2016. If technical issues continue with next version of the application, MalariaCare will take all necessary steps needed to resolve – including sending a member of the EDS development team to Mozambique.</p>

Next steps

In the second half of 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. Two more rounds of OTSS will be conducted in each of the four provinces. During OTSS, supervisors will continue to conduct on-site RDT refresher training during OTSS for health care workers. MalariaCare will facilitate the roll-out of the next EDS application, which will have improved functionality and address technical issues identified in the first version. In addition, a second data-user training will be held for additional NMCP staff and provincial-level managers from Cabo Delgado and Tete.

Once all provinces complete the second round of OTSS, MalariaCare will facilitate two cross-provincial LLWs – one for Cabo Delgado and Zambezia, and a second for Tete and Nampula. Provincial coordinators will continue to work closely with the PHAs and district-level management teams through provincial-level technical working

groups (TWGs) and facility-based malaria case management committees, working to disseminate OTSS data and identify actions to understand and close gaps emerging from visits. For those facilities demonstrating the lowest performance during OTSS, supervisors trained by MalariaCare will spend additional time with the facilities during intensive mentoring sessions outside of regular OTSS visits.

At the national-level, MalariaCare will support the NMCP in finalizing and disseminating the malaria diagnostics QA policy manual. In addition, MalariaCare will disseminate bench aids and SOPs for malaria case management to those facilities visited during OTSS.

Nigeria

Starting in PY2, in conjunction with the Expanded Social Marketing Project in Nigeria (ESMPIN) led by the Society for Family Health (SFH), MalariaCare has partnered with the National Malaria Elimination Program and FMOH to evaluate and monitor an iCCM pilot using private-sector health providers, also known as patent proprietary medicine vendors (PPMVs). The pilot aims to demonstrate that case management of common childhood illnesses (malaria and other febrile illnesses) can be substantially improved on a population basis by using PPMVs to provide quality case management of these diseases.

MalariaCare leads the monitoring and evaluation of the pilot at baseline, during implementation, and at endline, in addition to providing technical assistance to ESMPIN while implementing the pilot. The project conducted baseline household surveys, outlet surveys, and focus group discussions to provide preliminary data, which will be used as a comparison to endline data gathered through similar sources for an overall evaluation of the pilot's success. The final report on the baseline and outlet surveys' findings was presented during the reporting period.

To monitor PPMV case management knowledge and practices throughout actual implementation of the nine-month pilot, MalariaCare designed and is currently overseeing an electronic management and information system, which is being utilized by canvassers to collect data via electronic tablets. MalariaCare is also leading a costing analysis to provide the 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

- Developed a report on baseline findings emerging from analysis of the data collected during the baseline evaluation. MalariaCare will formally disseminate the report to FMOH and Ebonyi State in the second half of PY4.
- Provided technical assistance in capturing iCCM pilot costing data for the costing analysis. In October 2015, a costing consultant traveled to Nigeria to observe the PPMV iCCM step-down training to understand the capture of cost data at the field level, and to provide recommendations on how to improve data capture and reporting. The costing data from the iCCM training of trainers facilitated by ESMPIN is currently being collected and entered into the costing template. An analysis to determine the cost-effectiveness of the pilot will be completed once all pilot activity data are captured. MalariaCare expects to present this analysis in September/October 2016.

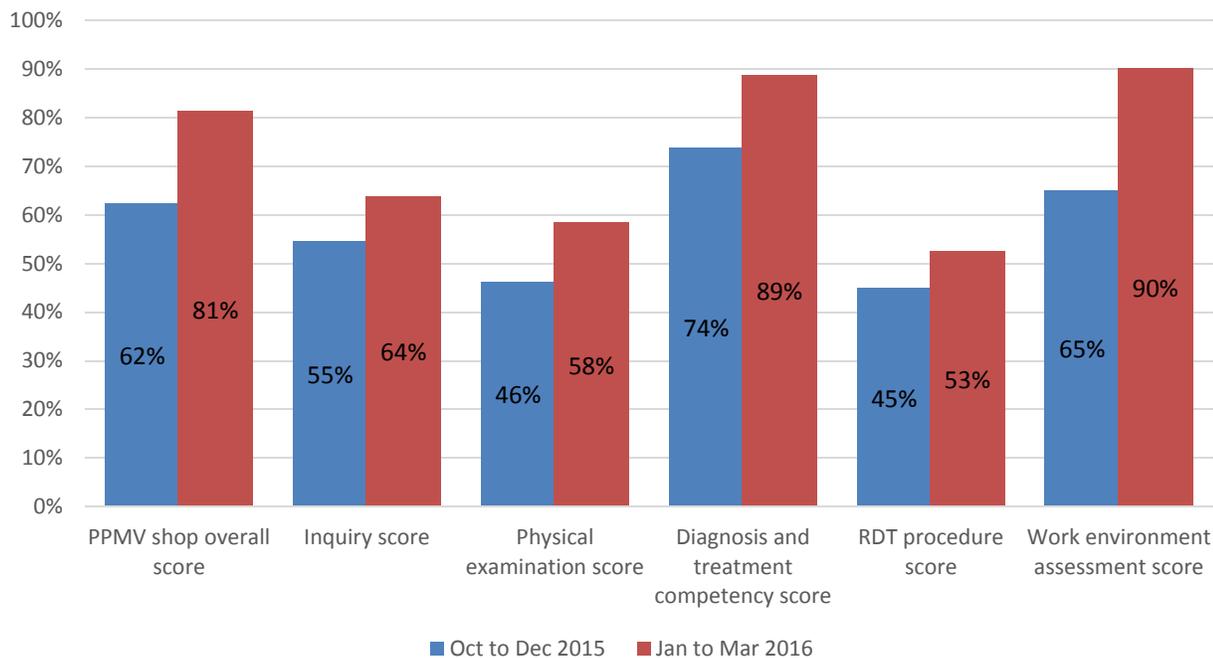
- The MalariaCare in-country coordinator attended the iCCM training for PPMVs in early PY4. The step-down training was facilitated by the FMOH and instructors already trained by the ESMPIN led an iCCM training of trainers held in PY3 in Ebonyi State. In total, 325 PPMVs from both intervention local government areas (LGAs) were invited to participate: 200 PPMVs from Ikwo and 125 PPMVs from Onicha. Due to illiteracy, 30 PPMVs did not complete the iCCM training and did not continue participation in the pilot. A total of 186 PPMVs from Ikwo and 109 PPMVs from Onicha completed the training. Following the training, pilot implementation began in November 2015.
- Facilitated canvasser training on the management information system and mentoring PPMVs. In October 2015, following the development and launch of the management information system, also known as the HNQIS, MalariaCare conducted a training for the nine canvassers hired to support the pilot on the HNQIS and mentoring. The three-day training focused on using HNQIS to collect and guide feedback during PPMV monitoring visits as well as improving mentoring and communication skills. The canvassers were also trained on how to capture GPS coordinates of the PPMV shops during monitoring visits. Canvassers participated in role-playing, using the Assess module, to refine feedback and mentoring skills. The canvasser training ended with two days of practical field sessions with local PPMV shops in both intervention LGAs (Ikwo and Onicha).
- Conducted regular monitoring visits; ongoing monitoring visits of the iCCM activities continued from pilot implementation through March 2016. A total of five PPMV shops were visited and assessed from both intervention LGAs. During these monitoring visits, MalariaCare assessed PPMV participant satisfaction in the pilot as well as stock levels, case management practices, and quality of data being collected by canvassers. Patient registers and records were reviewed to determine whether the PPMVs were adhering to the case management treatment algorithm taught during the iCCM step-down training. To ensure that the progress of implementation activities being conducted by both PPMVs and canvassers is captured to allow for immediate corrections and feedback, MalariaCare works closely with ESMPIN to finalize an extensive monitoring plan that will guide the routine field visits of pilot activities going forward.
- In December 2015, MalariaCare, in collaboration with ESMPIN, led a monitoring visit by USAID to Ebonyi State. During this visit, MalariaCare and USAID visited PPMVs in both intervention LGAs to observe progress made in the first month of the intervention and identify any challenges emerging in the field. The team checked iCCM commodity stock levels and got feedback from PPMVs on implementation of the pilot, including any challenges faced. Following the visit, it was concluded that PPMVs were adhering to the iCCM curriculum based on the step-down iCCM training. Challenges identified during the visit included caregivers seeking care from PPMVs without a child present and low patronage of PPMV shops by caregivers due to the lack of knowledge of the recent PPMV iCCM training. PPMVs asked for identification materials, which would provide caregivers and community members validation of the PPMVs' credibility and participation in the iCCM pilot. ESMPIN has decided not to issue identification for PPMVs in the pilot, but has since increased community advocacy efforts. Based on canvasser and staff observations, this is enhancing community awareness of the newly acquired skills among the PPMVs.
- Continued management of electronic management system. In PY3, MalariaCare launched the HNQIS, a tablet-based android application made up of four modules: *Assess*, *Monitor*, *Plan*, and *Improve*. The first two modules (*Assess* and *Improve*) were launched with the implementation of the pilot and are currently being

used by canvassers in the field to assess PPMVs' skills and knowledge in iCCM and to provide on-the-spot coaching to improve their malaria testing and fever case management practices. The second two modules (*Plan* and *Monitor*) are still in development. *Monitor* will allow program managers to create charts and tables based on the information captured by canvassers. *Plan* determines the frequency of canvasser visits to PPMV shops based on the knowledge level of the PPMV. Technical glitches identified in these modules during initial testing are currently being addressed.

Since the start of the pilot in November 2015, the application supported 317 supervisory visits to 196 PPMVs in Ebonyi State. The data collected from these visits was submitted and synced into the project's DHIS2. MalariaCare has configured several dashboards on the DHIS2 that summarize data and reports on key indicators collected during the supervisory visits. See the figures below for examples of pilot results emerging from the data reported in DHIS2.

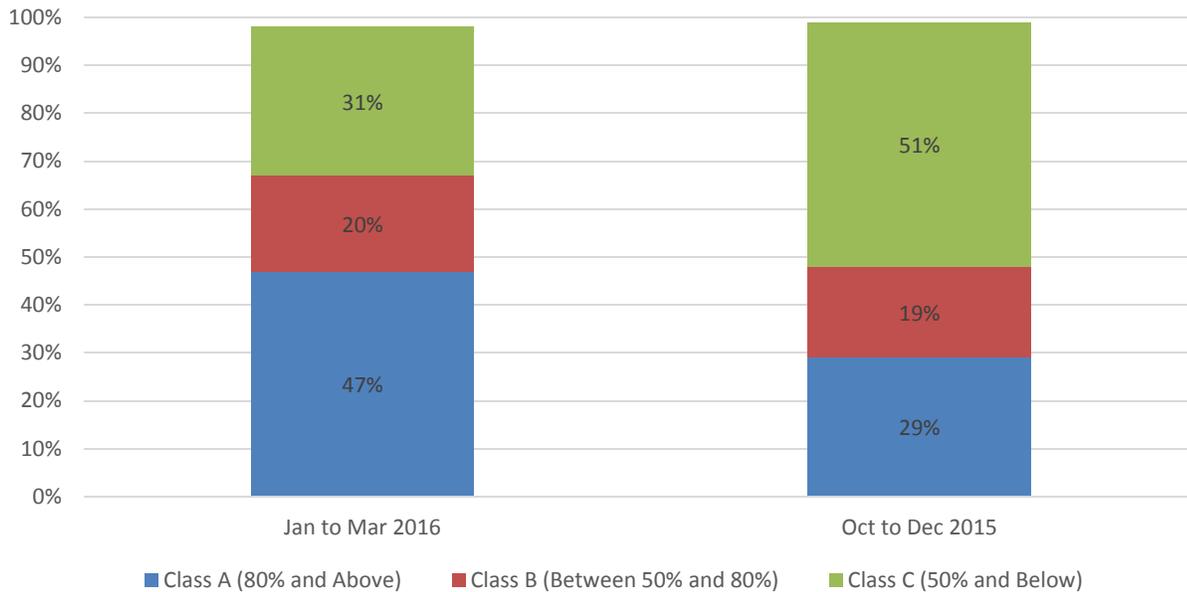
Figure 50 shows results on PPMV iCCM quality of care, which is assessed as part of the canvasser monitoring visits and collected through the electronic tablet. The average PPMV shop overall score (of shops visited by canvassers) is displayed as well as the average score for the five sections included in the assessment: The inquiry score assesses whether the PPMV asks specific questions about patient symptoms when first seeing the patient; the physical examination score assesses whether the PPMV is completing an adequate physical examination; the diagnosis and treatment competency score assesses whether the PPMV follows iCCM diagnostic and treatment algorithms; the RDT procedure score assesses whether the PPMV completes all necessary steps in performing RDTs; and the work environment assessment score assesses whether the facility has adequate infrastructure and supplies to provide quality case management services, and whether the facility properly documents and reports case information. Across all five sections, PPMV competency has improved, increasing 19 percentage points from the first to the second report period.

Figure 50: Average patent proprietary medicine vendor (PPMV) scores on integrated community case management (iCCM) quality of care assessment, Nigeria (n=317).



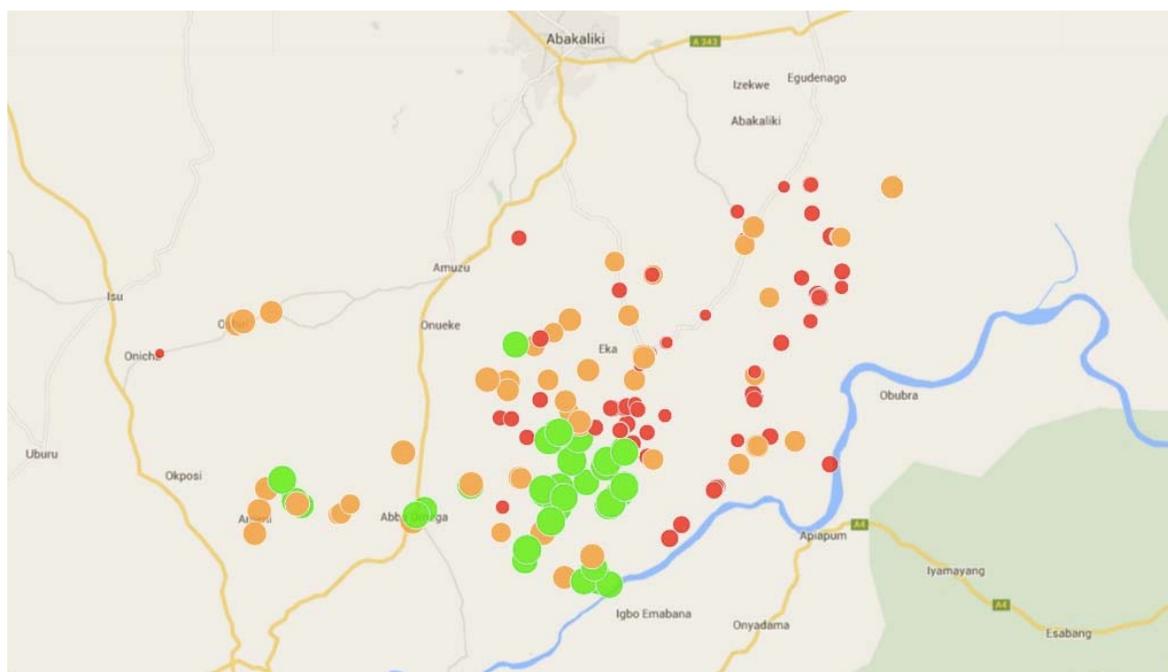
In Figure 51 below, the average scores are divided into classes: Class A for the percentage of PPMVs scoring 80 percent and above on the quality of care assessment during that period, Class B for the percentage of PPMVs scoring between 50 and 80 percent, and Class C for PPMVs scoring 50 percent and below. The target is to see as many PPMVs as possible score in the Class A range, or above 80 percent. From the first reporting period (October to December 2015) to the second reporting period (January to March 2016), there was an increase in the number of PPMVs scoring in the Class A range and a decrease in those scoring in the Class C range.

Figure 51: Average patent proprietary medicine vendor (PPMV) overall score on integrated community case management (iCCM) quality of care assessment, by classes, Nigeria (n=317).



During monitoring visits, canvassers are also collecting GPS coordinates. This allows for map-based outputs like the one shown in Figure 52 below, which maps the PPMVs visited during the last reporting period (January to March 2016), displaying the overall quality of care score received. This map can be used by program managers to identify potential geographical areas of focus when prioritizing mentoring and supervision visits.

Figure 52: Map of patent proprietary medicine vendors (PPMVs) and overall quality of care score received in January to March 2016 monitoring visit, Nigeria (n=196).



**Green is Class A (80% and above), yellow is Class B (Between 80% and 50%), and red is Class C (50% and below)*

- Developed two additional data collection forms. MalariaCare, in collaboration with ESMPIN, finalized and approved the content of two additional electronic data collection forms for use by canvassers during PPMV supervisory visits:
 - Sales and Stock Tracking Form: monitor stock availability, stockouts, and price of key health commodities at the PPMV level, such as RDTs, quality-assured ACTs, oral rehydration salts, and zinc.
 - Case Management Summary Form: track case load and patient statistics (age, weight, gender, symptoms) at the PPMV level. This form is the same as the Case Management Summary Form developed by the FMOH for community health workers to record the percentage of patients suspected to have febrile illness that receive a diagnostic test for malaria.

In January 2016, MalariaCare and ESMPIN conducted field testing of the two electronic tablet-based forms. MalariaCare is currently incorporating the changes emerging from the field test and will finalize the forms for use by the canvassers in the next reporting period.

Challenges

Challenge	Solution
The push feature of the application, which allows data to be pushed from the tablet to DHIS2, was not working correctly. Therefore, data collected from the canvassers early in the pilot were not showing up in the system.	A member of the PSI development team traveled to Nigeria to fix the issue and retrieve all the data that were on the tablets. The issue has been resolved and all data now upload directly to DHIS2.
The server used by HNQIS was upgraded, causing interruptions in obtaining the original and accurate analytics that were set up in the server prior to the upgrade.	The PSI development team has addressed the issues and HNQIS analytics are functioning correctly.
Baseline evaluation analysis was delayed, leading to delays in the final report.	MalariaCare is redesigning how the endline evaluation will be managed to improve survey methodology and data collection. MalariaCare will be playing a larger role in survey implementation—leading data collection and analysis. The survey contractor role will be limited to supporting data collection, survey operations, and recruitment of enumerators and survey participants.
Technical glitches in HNQIS led to delays in the release of the final two modules: Monitor and Plan.	MalariaCare is working with the PSI development team to solve technical issues. The two modules are planned for release in May 2016 for improved program operations.

Next steps

MalariaCare will continue to monitor the iCCM pilot and start the endline evaluation in August 2016. In preparation for this, MalariaCare will release a request for application (RFA) to recruit a survey contractor to support enumeration, data collection, data quality, and survey operations. MalariaCare will continue routine monitoring visits through the end of the pilot, using the monitoring plan developed by MalariaCare and ESMPIN as a guide. Costing data on implementing the pilot will be analyzed to determine cost-effectiveness.

MalariaCare, in collaboration with ESMPIN, will launch the final two HNQIS modules and the two additional data collection forms. Prior to the launch, MalariaCare will train canvassers and project managers on the effective use of the modules and the entry of data into the data collection forms. MalariaCare will also train project managers to analyze data collected during supervisory visits in DHIS2 so they can use the data to make evidence-based and informed decisions.

Once the HNQIS system is fully functional, MalariaCare will shift focus toward ensuring continuous support to improve PPMV performance over time and toward correctly identifying and addressing areas that need special attention from the canvassers. This support will come by conducting quality assurance workshops as well as data analysis workshops, both of which will be followed by tailored action plans for canvassers.

Senegal

In Senegal, starting in PY4, MalariaCare is supporting the NMCP and Cheikh Anta Diop University (UCAD) in Dakar to implement an antimalarial artemisinin therapeutic efficacy study (TES) to monitor and evaluate for clinical and/or genetic evidence of *Plasmodium falciparum* artemisinin resistance. This TES will be the fourth round of efficacy testing supported by PMI in Senegal in recent years. The plan and budget were approved in March 2016, and sample collection is scheduled to begin in September.

Next steps

- Finalization of the sub-award agreement and institutional review board approval of the TES protocol.

Tanzania

MalariaCare started working in Tanzania in PY3 through the NMCP with the newly-renamed Ministry of Health, Community Development, Gender, Elderly and Children to improve the quality of malaria case management, both diagnostics and clinical care. In its second year of operation in the country, the project continued to implement 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. MalariaCare also provides technical assistance to the Zanzibar Malaria Elimination Program (ZAMEP) to support implementation of its malaria case management QA program.

Key accomplishments

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

- Conducted a three-day RDT QA training-of-trainers for RHMT and district health management team (DHMT) supervisors in Dar es Salaam, Pwani, and Morogoro regions for 90 RHMT and DHMT members. The course focused on mentoring skills associated with quality testing procedures, monitoring for problems with test kits, and improving use of test results by clinicians to improve clinical decision-making. A theory pre- and post-test revealed that participant knowledge improved by 20 percentage points, from a mean score of 65 percent (median 67 percent) to 85 percent at post-test (median 90 percent).
- Conducted the first MDRT for 22 laboratory technologists from the Eastern Zone regions. The objective of this course is to identify and train regional and district-level microscopists who will act as supervisors during OTSS visits. The course, which was conducted over the course of five days, covered malaria epidemiology

and the biology of the malaria vector and parasite; preparation of high-quality thick and thin blood films; and microscopy skills including parasite identification, species identification, and quantification.

Performance was evaluated through both practical knowledge (theory) testing and hands-on microscopy skills (parasite detection, species identification, and parasite counting) testing. As shown in Table 13 below, the participants showed significant improvement in all categories, with overall best performances in parasite detection (68 percent mean) and theoretical knowledge (65 percent mean). As noted in other countries, performance on species identification and parasite counting was significantly lower, at 43 percent and 31 percent, respectively. Overall, while showing improvement, the microscopists in this cadre need further training before they would be performing at an acceptable level—for example, reaching target performances consistent with WHO L1 or L2 accreditation (i.e., L2 criteria: 80 percent or higher in parasite detection and species identification and 40 percent or higher in parasite quantification).

Table 13: Malaria diagnostics refresher training (MDRT) microscopy practical pre- and post-test results for Eastern Zone microscopists, Tanzania (n=22).

Competency area	Pre-test	Post-test	Average % point change in score
	Mean (median [range])	Mean (median [range])	
Parasite detection	40% (37% [21%–64%])	68% (70% [48%–83%])	28
Species identification	9% (0% [0%–33%])	43% (40% [16%–60%])	32
Parasite counting	19% (10% [0%–75%])	31% (29% [0%–57%])	12
Theory	46% [31%–58%]	65% [43.5%–87%]	19

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

- Supported implementation of a cascade RDT QA training for health care workers on RDT skills and use of test results in the three Eastern Zone regions. A total of 915 health care workers were trained on RDT QA, drawn from 646 (86 percent) of the estimated 752 of the targeted facilities in all three regions, including all public facilities in Dar es Salaam and Pwani, and all public, parastatal, faith-based facilities and nongovernmental organization facilities in Morogoro. The training was facilitated by the OTSS supervisors trained during the training-of-trainers; it covered proper test kit storage and testing procedures, addressed common errors in testing technique, provided opportunities for practical experience, and discussed how test results should be used in clinical decision-making. The mean post-test score was 77 percent (an increase of 33 percentage points from the pre-test mean) and 24 percent of attendees scored 90 percent or higher on the



Rapid diagnostic test (RDT) quality assurance (QA) training participants assess used RDT cassettes to identify common errors made during testing.

Photo credit: PATH Tanzania

post-test. To achieve a cascading effect, the trainees were expected to use the materials provided to them during the training to share their learning with other RDT test providers in their respective facilities. Participants were instructed to record the names of those that they shared the RDT training with. During the next round of OTSS, supervisors will collect these lists and independently confirm with the workers named that they received training.

- Printed and distributed 5,000 copies of malaria case management algorithms developed jointly by the NMCP, WHO, and CHAI to outpatient and inpatient departments in public health facilities across the project's eight regions.

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 Eastern 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. To avoid duplication, MalariaCare worked closely with district and regional malaria focal persons to select prescribers who were newly employed or those who were not earlier trained by the ministry. Training evaluation indicated improvement in knowledge: the post-test mean was 84 percent (range of 69 to 97 percent), and a 19 percentage point improvement from pre-test.



Materials used in the Tanzania case management guideline update training.
Photo credit: Goodluck Tesha

- Conducted OTSS supervisor training (including updating mentoring skills and instructions on using the tablet-based EDS tool) for 182 clinical and laboratory supervisors in seven of the project's focus regions. The last region—Morogoro—will have this training in late May, just prior to initiation of OTSS in that region.
- An electronic data use training was performed for a core group of seven MalariaCare staff, key personnel from the NMCP, and the Mwanza regional malaria focal person. This workshop focused on using OTSS data from within the DHIS2 platform and included training on building graphs and tables and use of the data to evaluate individual health facility performance. The training was timely, as the NMCP is currently reviewing all the tools its partners are using and collapsing them into 17 different modules. The NMCP staff present at this training identified EDS as a potential platform that could incorporate all NMCP modules for the purpose of health facility visits in one integrated system.
- Initiated Round 2 of joint clinical and laboratory OTSS (the first round this year). This round, which represents the full rollout of EDS, will reach all public health facilities in the Eastern Zone regions and five low-performing facilities in each district in the Lake Zone target regions. OTSS visits are used to observe and

refresh the skills of laboratory workers on microscopy, of clinicians on patient examination and appropriate treatment in adherence to test results, and of both cadres on RDT competency. While Round 2 is now complete in seven regions, its start in Morogoro has been delayed due to the rainy season. Current road conditions due to heavy rains make it impossible for supervision teams to travel to all facilities in the region. It is anticipated that OTSS can begin in Morogoro in early June 2016, immediately following the supervisor training. A third and fourth round are scheduled to occur in the remainder of PY4.

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

- Conducted an initial introductory meeting with ZAMEP to discuss and plan for implementation of MalariaCare's technical assistance. During this meeting, ZAMEP and MalariaCare presented orientations to their respective work plans, agreed on the modalities for provision of technical support by the project, and begin developing an implementation timeline for activities. This meeting was also used to discuss the ways in which MalariaCare can provide further technical assistance to ZAMEP given the additional \$25,000 to be set aside for this purpose. It was agreed that the project will support the development of a Zanzibar malaria microscopy QA manual; provide technical input to the development of training materials for malaria case management training; participate in the semi-annual supervision feedback meetings, which are used to share feedback with health facility leadership after supervision visits; and support the development of a terms of reference for a Zanzibar malaria case management technical working group, which will bring together MalariaCare, Global Fund, ZAMEP, and other implementers to discuss ongoing issues of malaria case management, control, and elimination. The amended work plan that includes these additional activities is currently pending approval by PMI.
- Provided technical support to ZAMEP during its monthly round of diagnostics supervision by participating in a week of supervision visits. During this visit, the supervision team visited 14 health facilities to conduct slide rechecking activities, evaluate microscopist competency, and provide feedback and mentorship to facility staff. General findings were that 98 percent of lab staff were trained and that documentation and record keeping is excellent.

Challenges

Challenge	Solution
Conflicting priorities in the Morogoro region led to delays in schedule and implementing multiple activities.	MalariaCare adjusted its budget to allow additional participants to be trained in the Morogoro session.
Budgetary considerations due to an underestimated carryover amount during initial work planning led to budgeting for only one worker per public health facility to be provided RDT QA training in the three Eastern Zone regions, in discord with the national guideline to train two workers per public facility.	Following the determination that the pipeline is larger than had been anticipated when the PY4 work plan was developed, MalariaCare will support a session for one additional worker per public facility in Dar es Salaam and Pwani regions before the end of PY4.
Faith-based, parastatal, and police/military health facilities in the project focus regions were inadvertently left off by any implementing partner of RDT QA training and OTSS during the initial round.	MalariaCare proposes to conduct another session of RDT QA training in PY5 for two workers from each of these facilities, in accordance with the national guideline.
During the data use training, it was determined that, due to the varied experience with DHIS2, MalariaCare needs to revise its approach to data use training going forward. Those participants who were familiar with DHIS2 were able to understand the sections on building graphs to analyze data, but those who were not familiar with the system had trouble internalizing and understanding the process.	MalariaCare will revise its approach and focus very closely on training the regional malaria focal points (who do not regularly use DHIS2) to use the dashboard system to interpret graphs that are already provided. DHMTs will be given an orientation to standard graphs and will be taught how to interpret them during the lessons learned workshops. Based on progress and understanding at the end of the year, we will plan to continue in PY5 to reinforce this training or expand it to train district staff to create their own graphs.

Next steps

- Support the NMCP in developing a national malaria microscopy QA manual by supporting a MalariaCare technical expert to provide technical input at the document development meetings.
- Conduct supervisor training for OTSS supervisors in Morogoro, followed immediately by the first round of OTSS to reach all public health facilities in the region. In subsequent rounds, visits will be targeted to high-volume and low-performing facilities.
- Conduct targeted DHIS2 dashboard training (EDS data use) for regional malaria focal points and M&E officers in each region, to provide these staff with the capacity to use the EDS dashboard to analyze OTSS

information and prepare performance reports for use by DHMTs and at LLWs. This intensive training will be followed by the first round of regional LLWs.

- Support two more rounds of joint clinical/laboratory OTSS to health facilities in all eight target regions (Rounds 3 and 4). These subsequent quarterly rounds will target 10 high-volume and low-performing facilities in each district.
- Provide financial support to the National Institute of Medical Research to initiate the first year of its artemisinin therapeutic efficacy study, which will begin on April 25, 2016.
- Conduct technical assistance trips to Zanzibar to support to ZAMEP in the development of a Zanzibar malaria microscopy QA manual and malaria case management training materials; continuing planning and activity management meetings; implementation of malaria diagnostics supportive supervision and semi-annual supervision feedback meetings; and establishment of a Zanzibar malaria case management technical working group.

Zambia

MalariaCare has been active in Zambia since PY1, building upon the work started by the former IMaD project. The project has targeted support across four provinces in Zambia (Central, Copperbelt, North Western, and Western) to strengthen malaria case management, with a focus on utilizing the country's highly-trained OTSS supervisors to target low-performing facilities. The project continues to work closely with the NMCC to strengthen case management capacity at provincial, district, and local level. During the reporting period, MalariaCare rolled out EDS, and supervisors in the four provinces have now completed Zambia's first electronic OTSS round. MalariaCare and the NMCC also launched a TES at three field sites.

Key accomplishments

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

- Identified two qualified microscopists to attend the next ECAMM course in July 2016. To ensure that the candidates are reaching L2 proficiency (and are prepared to attend the ECAMM), the team has started preparations for pre-ECA training. The goal is for each microscopist to complete bi-weekly assessments (using the WHO-recommended grading template) for two months in advance of the ECAMM course.

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

- Provided supervisor training and EDS orientation to 25 laboratory and clinical supervisors, in order to improve case management in lower-level facilities and address the high turn-over of supervisors. This training, which was supported and co-facilitated by the supervisors trained for the EDS pilot during PY3, included several new NMCC supervisors from Central, Copperbelt, North Western, and Western provinces. Laboratory supervisors participated in five days of diagnostic knowledge and skill refresher training, while clinical supervisors underwent two days of update training on malaria case management guidelines.

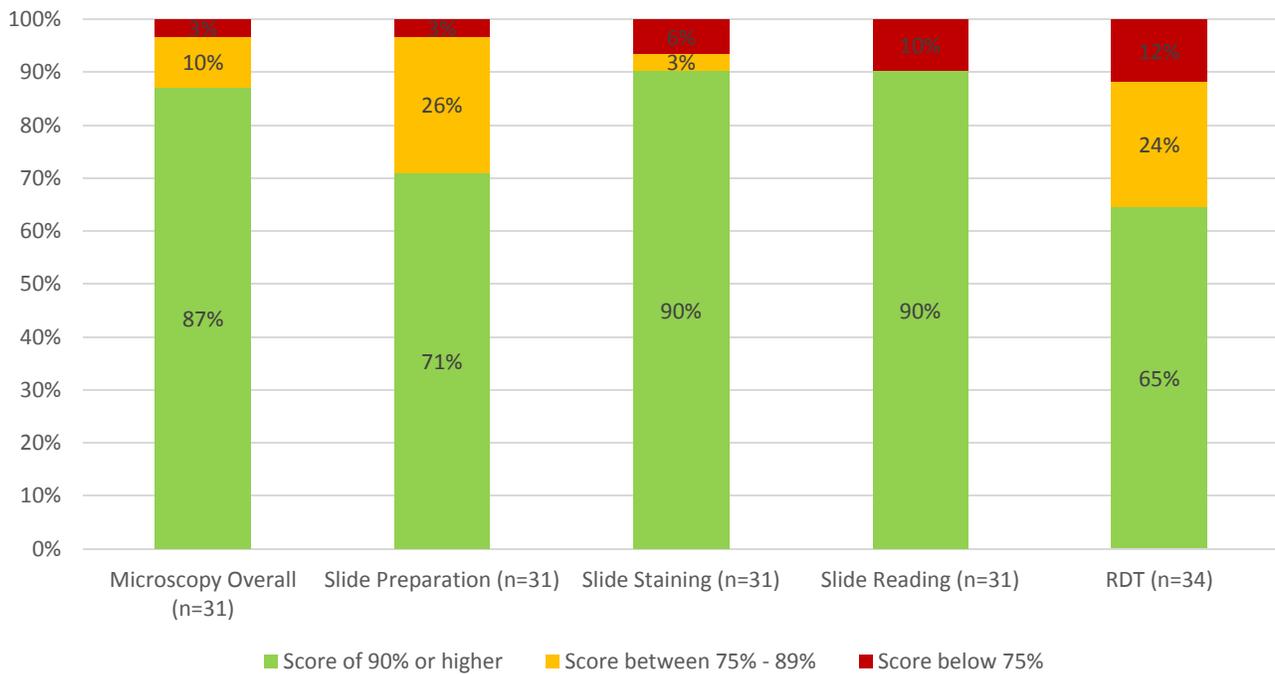
Following these activities, participants came together for two days of training on the OTSS system and mentorship skills. Overall, laboratory supervisors improved their knowledge scores from an average pre-test score of 62 percent (median 63 percent, range 53 to 69 percent) to 81 percent at post-test (median 76 percent, range 63 to 97 percent)—an average 19 percentage point improvement. Clinical supervisors improved on knowledge pre- and post-tests from an average score of 74 percent at pre-test (75 percent median; range 60 to 86 percent) to 91 percent at post-test (median 93 percent; range 85 to 95 percent)—an average 17 percentage point improvement. These supervisors then went on to conduct Zambia’s first EDS-supported OTSS round (Round 15) across the four provinces.

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 OTSS Round 15 between December 2015 and January 2016 across 41 high-volume and reference-level facilities in Central, Copperbelt, North Western, and Western regions. Figures 52, 53, 54 and 55 below show performance in malaria microscopy, RDT use, clinical case management, adherence to test results, and drug stockouts during this round.

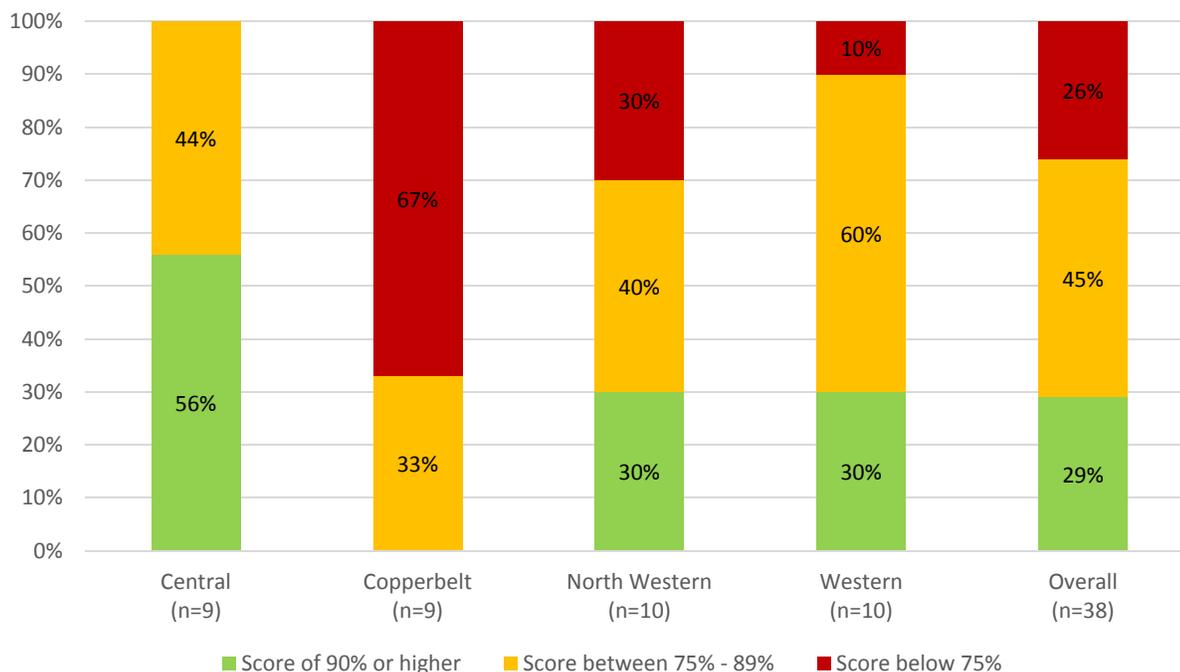
Diagnostic competency is critical to diagnose uncomplicated and severe malaria, determine effective treatment, and halt further transmission. Figure 53 describes the current status of key diagnostic competencies assessed during Round 15 of OTSS: facility competency in overall microscopy performance (a combined score of three sub-competencies: slide preparation, slide staining, and parasite detection) and overall performance in RDT use. The results indicate high microscopy performance, with 97 percent of facilities (with complete scores) attaining the overall target of 90 percent for microscopy. However, additional improvement is needed for RDTs: 89 percent of facilities achieved the minimum standard target of 75 percent, but only 65 percent achieved the overall performance target. Commonly missed important steps included collecting an adequate amount of blood and—if results are negative—waiting for the correct amount of time for RDT results. Due to differences in number of facilities visited compared to previous reports—now focusing on high-volume reference facilities in only four provinces—and due to the updated scoring system, these data are not directly comparable to data presented in previous reports; however, the trends continue to show steady improvement in all indicator categories.

Figure 53: Proportion of facilities reaching MalariaCare’s diagnostic minimum standard (75 percent) and overall target (90 percent) competency during the most recent round of outreach training and supportive supervision (OTSS), Zambia.



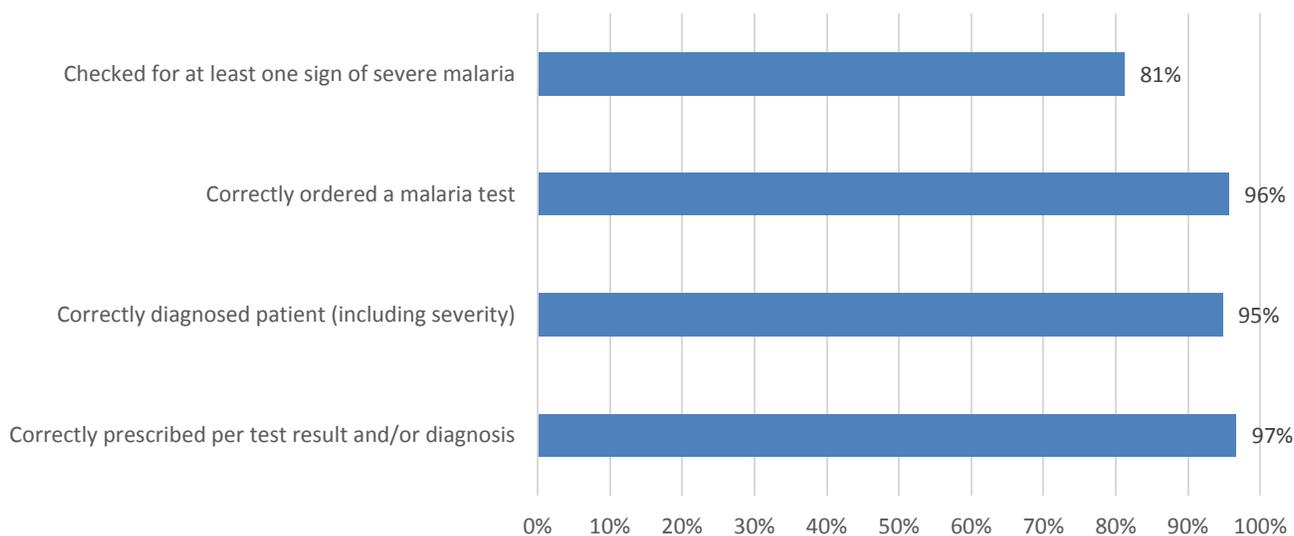
Health facility performance for competency in clinical case management during the most recent round of OTSS is described in Figure 54. Of note, 66 percent of facilities within all four regions met the minimum acceptable standard (75 percent) for clinical competency, with Central and Western scoring highest at 100 percent and 90 percent, respectively. Data from Copperbelt region indicate significant need to reinforce these skills—67 percent of their facilities did not reach the 75 percent performance threshold. MalariaCare is using these data to focus the next few rounds of OTSS on weak clinical performance areas—particularly on the health facilities falling below 75 percent.

Figure 54: Proportion of facilities reaching MalariaCare’s minimum standard (75 percent) and overall target (90 percent) competency for febrile case management during the most recent round of outreach training and supportive supervision (OTSS), Zambia.



The results for key individual data elements collected for evaluation of observed clinical case management are described in Figure 55 below. The facilities performed extremely well in some key steps: on average 95 percent of clinicians correctly ordered a malaria test, and 96 percent correctly diagnosed the patient, and 97 percent prescribed treatment in accordance with the test result and diagnosis. The lowest-performing step was checking for at least one sign of severe malaria (on average this was done 81 percent of the time); additionally, in general the poorest performance in clinical observations was clinical history taking and conducting a full physical exam.

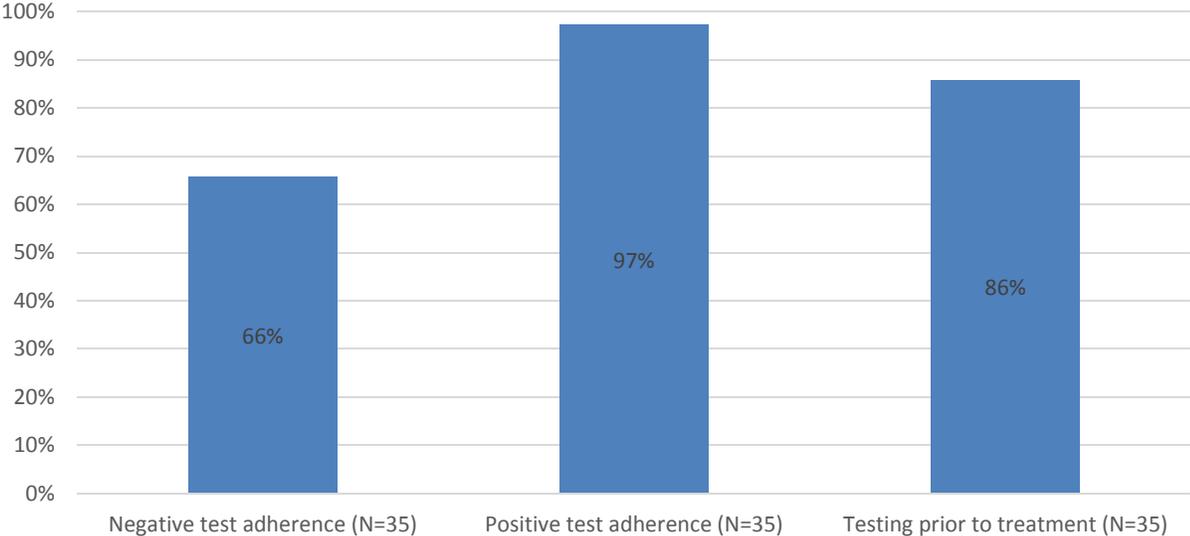
Figure 55: Average health facility performance on key febrile clinical management indicators Zambia (n=38).



Adherence to test results is another key measure of quality clinical case management performance. To get an accurate assessment, MalariaCare measures this in three ways: provider adherence to positive test results (target 90 percent compliance), adherence to negative test results (target 90 percent compliance), and percentage of ACT prescriptions with evidence of any test record found (target 90 percent compliance). Of the 41 facilities visited, 35 facilities (85 percent) had sufficient data from the registers to calculate these three measures. Figure 56 below illustrates the proportion of facilities that met or exceeded the 90 percent adherence targets based on records review immediately preceding the most recent OTSS visit. Of note, 97 percent of facilities are meeting the critical target for adherence to positive test results. A significant proportion (34 percent) of the facilities are not yet meeting the target for compliance to negative test results, although underperforming facilities have continued to improve in this respect with increasing rounds of OTSS (data not shown). The third measure of adherence—percentage of ACT prescriptions with evidence of any test record found—estimates whether patients who get antimalarial treatment receive a diagnostic test beforehand.⁴ Eighty-six (86) percent of facilities met the target for testing before treatment—that is, at least 90 percent of the ACT prescriptions sampled had a test record found. While the causes for not meeting this target may vary by facility, potential factors could include stockouts of RDTs (only 27 percent of facilities reported no significant stockouts in the past three months) or poor record-keeping of test results. Rounds of OTSS will use this data to further improve compliance to positive test results to reach 100 percent compliance and to strengthen adherence to negative test results.

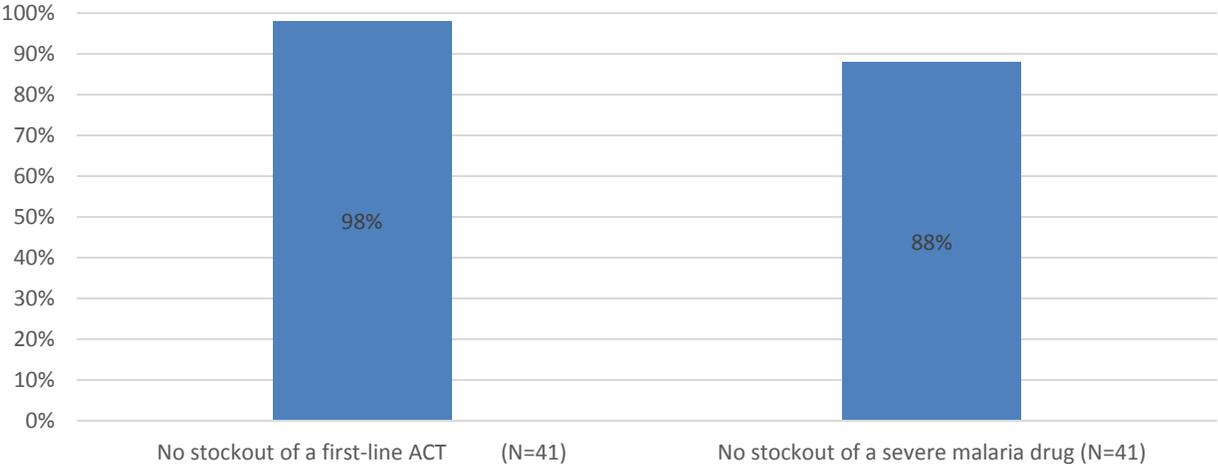
⁴ MalariaCare uses the clinical or pharmacy registers to sample up to 20 records on patients who received ACTs and assesses whether these patients can be found in the laboratory registers as having a test result. Although this method does not capture patients who are suspected of malaria but do not receive an ACT, this measure allows for a larger sample of test ordering behavior than the clinical observations do.

Figure 56: Proportion of facilities meeting MalariaCare’s 90 percent targets for testing prior to treatment and adherence to test results at most recent OTSS visit, in Zambia (n=35).



A consistent supply of antimalarial drugs is critical to providing appropriate malaria treatment. Figure 57 below illustrates the proportion of facilities with no stockouts of first-line ACT or a severe malaria drug for more than seven days in the past three months. Ninety-eight (98) percent had no stockout of a first-line ACT and 88 percent had no stockout of a severe malaria drug, for more than seven days in the past three months (at the most recent visit).

Figure 57: Proportion of facilities with at least one key drug in stock more than seven days in past three months at most recent visit, Zambia.



- With the rollout of EDS in all of MalariaCare’s focus provinces, OTSS data can be analyzed more quickly than in prior years when paper-based checklists were used. To facilitate the accessibility and use of data for local decision-making following each OTSS round, MalariaCare in coordination with the NMCC supported an EDS data-user training where participants were first oriented on the content of the OTSS checklist and MalariaCare’s global scoring system for health facility competencies. Then, trainees learned how to retrieve,

analyze, and produce graphical results of actual data from OTSS Round 15 within the EDS database. Future data use and EDS troubleshooting will be supported by the new EDS consultant, who assisted with the training.

- Supported the launch of the TES in all three sites: Katete (Eastern Province), Mansa (Luapula Province), and Gwembe (Southern Province). This study, which is designed to assess the safety and clinical effectiveness of three common ACTs for treatment of uncomplicated malaria, has now begun data collection. Initial reports are summarized in Table 14:

Table 14: Therapeutic efficacy study enrollment progress in Mansa, Luapula Province, Zambia, February to March 2016.

Item	February 2016			March 2016		
	# Male	# Female	Total	# Male	# Female	Total
Screened	108	116	224	135	141	276
# Positive	48	47	95	62	59	121
# Enrolled	40	33	73	54	42	96
# Withdrawn	0	1	1	1	1	2
# Loss to follow up	2	1	3	4	3	7

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

- Collaborated with the NMCC to develop a protocol for a Zambian NAMS. Following final institutional review board approval in early PY4, MalariaCare and NMCC conducted NAMS training in Kabwe for 10 laboratory technicians from the three sample collection sites: Katete (Eastern Province), Kalabo (Western Province), and Samfya (Luapula Province). Participants were trained in WHO protocols for national slide banking. A total of six QA visits are currently being planned. The first QA visit is scheduled for May 2–6, 2016. During this visit, two WHO L1 and L2 microscopists will confirm species identity and parasite quantitation for donors collected thus far. A qualitative score will be given to already-prepared slides and on-site corrective action provided.

Challenges

Challenge	Solution
Logistical challenges made it difficult to ensure that patient travel reimbursements could reach all three TES study sites on time.	MalariaCare has instituted new financial mechanisms to track each site's advances separately. The team continues to work closely with the NMCC to ensure coordinated planning and communication to avoid delays.
As the first electronic round of OTSS was implemented in Zambia this reporting period, there were some technological issues surrounding uploading checklist data.	MalariaCare staff worked closely with supervisors, provincial medical offices, and EDS programmers throughout the round. The data upload issues were addressed, and supervisors were able to submit nearly complete data sets for almost all facilities visited.

Next steps

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

- Extending EDS to sub-district level by conducting supervision/EDS end-user training for 80 district supervisors who were trained to conduct paper-based OTSS in PY3. Zambia's first round of electronic sub-district OTSS is scheduled to closely follow this training in early May 2016.
- In subsequent rounds of OTSS, MalariaCare will address the diagnostic and clinical performance gaps identified above and, where necessary, focus more effort on low-performing facilities in Western, Central, North Western, and Copperbelt provinces through prolonged and/or targeted OTSS. The next round of provincial OTSS (Round 16) is scheduled to occur in May 2016.
- In collaboration with NMCC, MalariaCare will support provincial-level EDS data-user training in all four project-supported provinces to help facilitate supervisors and facilities to access and use OTSS data for decision-making.
- As NAMS training has been completed, MalariaCare will support mass slide production for Zambia's NAMS.
- MalariaCare will continue to support the NMCC to implement the TES to assess the clinical effectiveness and safety of three common treatments for uncomplicated malaria at clinical sites in Katete, Gwembe, and Mansa.
- The team will continue to collaborate with PMI, NMCC, and the Program for Advancement of Malaria Outcomes (PAMO) to help transition OTSS, mentorship, and EDS approaches to supervisors in the new PAMO-supported provinces (Eastern, Luapula, Muchniga, and Northern provinces).

Appendix B: Performance monitoring plans

Analysis notes:

- 1) The target is provided for all indicators that are based on supervision checklist scores, which is the proportion of health facilities/providers meeting a pre-defined score (usually 85 percent to 90 percent). The numerator indicates the number of health facilities/providers meeting the pre-defined score, and the denominator indicates the total number of health facilities/providers assessed. The mean and median scores on the checklist are also provided as applicable, and can help gauge whether the majority of health facilities/providers are approaching the threshold score.
- 2) These indicators are the same as those proposed in the PY4 work plans and are not the proposed PMP indicators sent to PMI in April 2016 that are still being examined for approval.
- 3) All indicators are presented out of the total non-missing data available. We have noted where data is missing by providing the number and proportion of complete data.
- 4) For the indicators “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” and “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”, the results are based on record review and so represent the proportion of instances in which the providers adhered to test results.

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: 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												
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 intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
1	Percentage of service providers participating in basic MDRT courses who demonstrate competence in malaria microscopy	Number of basic MDRT participants performing 80% or higher (i.e. WHO Level 1 or Level 2 equivalent) on parasite detection / Number of basic MDRT participants with completed the training course	1.1	Providers demonstrate competence in RDTs and/or microscopy	Training reports.	50%	47%	9	19			Target not reached. Three (3) participant(s) were not present for the pre-test session and were excluded from this indicator 8 participant(s) at L1 equivalent 1 participant(s) at L2 equivalent 3 participant(s) at L3 equivalent 7 participant(s) at L4 equivalent

#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
2	Proportion of national- and provincial-level microscopy trainers and laboratory supervisors participating in advanced MDRT courses who demonstrate competence in malaria microscopy	Number of advanced MDRT participants performing 80% or higher on parasite detection and performing 40% or higher on parasite density (i.e. WHO Level 1 or Level 2 equivalent for these two competency areas) / Number of advanced MDRT participants who completed the training course	1.1	Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illnesses	Training Reports	65%	55%	11	20			Target not reached. 9 participant(s) at L1 equivalent 2 participant(s) at L2 equivalent 5 participant(s) at L3 equivalent 4 participant(s) at L4 equivalent
3	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	3.3	Providers demonstrate competence in RDTs and/or microscopy	Team Supervision Reports.	70%	49%	21	43	86.0%	86.7%	Target not reached. Item analysis for this composite indicator: Slide preparation average = 90.0% Slide staining average = 85.3% Slide reading (agreement) average = 88.0%

#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
4	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	3.3	Providers demonstrate competence in RDTs and/or microscopy	Team Supervision Reports	70%	0%	0	26			<p>Target not reached.</p> <p>Of the 41 facilities visits, 26 (63%) reported all variables required for a quality diagnosis assessment. There were no instances in which the 26 HF's with available data responded in the affirmative to each of the following:</p> <ul style="list-style-type: none"> - Lab has functional microscope for malaria microscopy (96% of HF's) - No stock-outs in past 3 months that impeded malaria microscopy (15% of HF's) - Availability of malaria microscopy bench aids or standard operating procedures (92% of HF's) - At least one person trained in malaria microscopy in the past two years (23% of HF's). <p>MalariaCare activities have a limited role in improving this indicator. MalariaCare is sharing this information with the national malaria program for future action that may be needed. MalariaCare is also currently discussing PMP modifications with PMI.</p>

#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
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 visit within the reporting period/Total number targeted facilities at the time of the most recent supervisory visit within the reporting period	3.3	Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness	Team Supervision Reports	80%	67%	22	33		<p>Target not reached.</p> <p>Of the 41 facilities visited, 33 (80%) reported all variables required for a quality diagnosis assessment.</p> <p>Among these 33 facilities 22 met all quality diagnosis of malaria standards:</p> <ul style="list-style-type: none"> - No stock-outs of RDTs on the day of the visit (79% of HFs) - Availability of RDT bench aids and/or SOPs (82% of HFs) - At least on person trained in RDT in the past two years (94% of HFs) <p>MalariaCare activities have a limited role in improving this indicator. MalariaCare is sharing this information with the national malaria program for future action that may be needed. MalariaCare is also currently discussing PMP modifications with PMI.</p>	

Outputs												
#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
6	Percentage of targeted service providers participating in MDRT courses	Number of targeted service providers participating in MDRT courses/Total number of targeted service providers	1.1	Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases	Training reports	100%	105%	42	40			Target exceeded. There were 22 participants in the basic MDRT and 20 in the advanced MDRT courses.
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												
<i>No PY4 project activities correspond to the indicators associated with Objective 2</i>												
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												
Intermediate Outcomes												

#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
7	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	3.3	Service providers demonstrate competence in malaria treatment	Team Supervision Reports	85%	75%	178	237			Target not reached.
8	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	3.3	Service providers demonstrate competence in malaria treatment	Team Supervision Reports. Baseline: PY3 annual report.	55%	46%	125	269			Target not reached.

Outputs												
#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
9	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	3.3	Country has supervisory structures and implementation of supervision of malaria case management practices	Team Supervision Reports	90%*	44%	41	94			Target not yet reached. Another round of OTSS is expected in Jul/Aug; an additional 53 visits are planned during that round. *Due to challenges in transportation to remote facilities, we expect to visit at least 90% of targeted facilities in the next round.
10	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%	N/A	N/A	N/A	N/A	N/A	This activity has not yet occurred.
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												
Intermediate Outcomes												

#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
11	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	3.1	Reference laboratories and facilities able to provide high quality diagnostics for malaria and other febrile illnesses	Team Supervision Reports	45%	3%	1	31		<p>Target not reached.</p> <p>Of the 41 health facilities visited, 31 (76%) reported all variables required for an IQA assessment.</p> <p>There was only 1 instance in which the 31 HFs with available data responded in the affirmative to each of the following:</p> <ul style="list-style-type: none"> Use of positive controls (23% HFs) Use of pH meter (6% HFs) Rechecks slides (45% HFs) Records slide cross-checking results (19% HFs) Stores slides for rereading (45% HFs) Stores slides for rereading in a slide storage box (35% HFs) Conducts species ID (45% HFs) Conducts parasite counting (84% HFs) <p>MalariaCare has developed a tool to help guide lab supervisors during OTSS visits that provide a list of essential components of IQA to help them organize and identify gaps in the IQA system.</p>	
Outputs												

#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
12	Percentage of Lessons Learned Workshops with action plans developed	Number of LLWs with clearly defined clinical and laboratory action plans within the reporting period/ Total number of sponsored LLWs within the reporting period	4.2	Reference laboratories and facilities able to provide high quality diagnostics for malaria and other febrile illnesses	Activity Reports	100%	N/A	N/A	N/A	N/A	N/A	This activity has not yet occurred.
13	Proportion of targeted service providers (re)trained in ECAMM	Number of target service providers (re)trained in ECAMM / Total number of target service providers	4.5	Service providers are able to provide high quality case management services for malaria and other febrile illnesses	Training reports	75%	N/A	N/A	N/A	N/A	N/A	This activity has not yet occurred.

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												
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	Median	
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 $\geq 90\%$ 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	1.4	Providers demonstrate competence in RDTs and/or microscopy	Team supervision reports	90%	60%	96	160	89.2%	91.6%	Target not reached. Of the 186 facilities visited, 186 HFs had an observation for at least the slide preparation component; 160 (86%) HFs had valid scores for all 3 observation components; 96 HFs reached the target of performing at least 90% of steps correctly across all 3 technical components

#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
2	Percentage of service providers participating in basic NCAMM accreditation courses who demonstrate competence in malaria microscopy	Number of service providers participating in basic NCAMM accreditation courses who meet minimum competency levels for peripheral level microscopists in malaria microscopy/Total number of service providers participating in basic NCAMM accreditation courses	1.3	Providers demonstrate competence in RDTs and/or microscopy	Training reports	85%	N/A	N/A	N/A	N/A	N/A	This activity has not yet occurred.
3	Percentage of national level microscopy trainers and laboratory supervisors participating in advanced NCAMM accreditation courses who demonstrate competence in malaria microscopy	Number of national level microscopy trainers and laboratory supervisors who achieve at least 80% competency in parasite detection, species identification and quantitation during the advanced NCAMM accreditation post-test/Total number of national level microscopy trainers and laboratory supervisors participating in advanced NCAMM accreditation courses	1.2	Country has supervisory structure for laboratory case management of malaria	Training reports	80%	N/A	N/A	N/A	N/A	N/A	This activity has not yet occurred.
Outputs												
4	Percentage of targeted service providers participating in basic NCAMM accreditation courses	Number of targeted service providers participating in basic MDRT courses/Total number of targeted service providers	1.3	Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness	Training/ Activity reports	90%	N/A	N/A	N/A			This activity has not yet occurred.

#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
5	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 by CLU/ICD 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	Team supervision reports	90%	93%	186	200			Target exceeded.
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 the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
6	Percentage of targeted service providers demonstrating competence in RDTs use at the time of the most recent supervisory visit within the reporting period	Number of targeted service providers who score $\geq 90\%$ 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, 2.3, 2.5	Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases	Team supervision reports	85%	65%	87	133	91.9%	92.3%	<p>Target not reached.</p> <p>Of the 186 facilities visited, 133 (72%) had at least 1 observation for RDTs with valid scores. 50 HFs did not have any observations; 40 of these 50 HFs provided a reason (50% w/no observations due to RDT stock-outs; 50% w/no observations due to lack of requests for the lab to perform an RDT, RDTs not used in the HF at all, or no lab staff present to conduct RDTs).</p> <p>87 HFs reached or reached the indicator of performing at least 90% of RDT steps correctly - this only constituted, however, 65% of the HFs that reached the indicator target of 85%. The average score among those facilities not meeting the indicator (n=46) was 84.0%.</p>

#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
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 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	2.1, 2.5	Providers demonstrate competence in detecting suspected malaria cases	Team supervision reports	80%	N/A	N/A	N/A	N/A	N/A	Data from clinical/M&E OTSS will be included in the annual report, as OTSS was not completed in time for inclusion in the SAR.
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	2.1, 2.5	Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases	Team supervision reports	90%	N/A	N/A	N/A			Data from clinical/M&E OTSS will be included in the annual report, as OTSS was not completed in time for inclusion in the SAR.
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	2.1, 2.2, 2.5	Facilities are able to provide high quality case management services for malaria and other febrile illness	Team supervision reports	50%	N/A	N/A	N/A	N/A	N/A	Readiness includes steps from clinical observations, thus this indicator will be included in the annual report, as clinical OTSS was not completed in time for inclusion the SAR.

#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
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	2.1, 2.2, 2.3, 2.5	Service providers demonstrate competence in malaria treatment	Team supervision reports	95%	N/A	N/A	N/A			Data from clinical/M&E OTSS will be included in the annual report, as OTSS was not completed in time for inclusion in the SAR.
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	2.1, 2.2, 2.3, 2.5	Service providers demonstrate competence in malaria treatment	Team supervision reports	70%	N/A	N/A	N/A			Data from clinical/M&E OTSS will be included in the annual report, as OTSS was not completed in time for inclusion in the SAR.

#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
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	2.1, 2.2, 2.3, 2.5	Service providers demonstrate competence in malaria treatment	Team supervision reports	80%	N/A	N/A	N/A		Data from clinical/M&E OTSS will be included in the annual report, as OTSS was not completed in time for inclusion in the SAR.	
13	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	2.1, 2.2, 2.3, 2.5	Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness	Team supervision reports	90%	91%	159	175		Target exceeded. 1 person per HF was targeted for on-the-job training and/or mentoring in malaria microscopy and/or RDT use. Only 175 HFs had any data on training and 159 of these HFs had at least 1 staff trained/mentored in malaria microscopy and/or RDT use.	
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	2.1, 2.2, 2.3, 2.4, 2.5	Providers demonstrate competence in malaria treatment	Team supervision reports	90%	N/A	N/A	N/A		Data from clinical/M&E OTSS will be included in the annual report, as OTSS was not completed in time for inclusion in the SAR.	

Outputs												
#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
15	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	2.3, 2.5	Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases	Training reports	90%	108%	623	575		Target exceeded. Sought to train 575, but ended up (re)training more.	
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	2.1, 2.3, 2.5	Service providers demonstrate competence in malaria treatment	Training/Activity reports	90%	108%	623	575		Target exceeded. Sought to train 575, but ended up (re)training more.	
17	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	2.1, 2.4, 2.6, 2.10	Country has supervisory structures and implementation of supervision of malaria case management practices	Training/Activity reports	90%	114%	569	500		Target exceeded. Sought to train 500, but ended up (re)training more.	
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												

Intermediate Outcomes												
#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	De n	Mean	Media n	
18	Percentage of targeted records persons competent in malaria data management at the district level	Number of district data managers scoring 80% and above on post-tests during training on malaria data management/Total number of district data managers participating in malaria data management training	3.1	Reporting and monitoring information for malaria is integrated, complete and accurate	Training/ Activity reports	80%	N/A	N/A	N/A	N/A	N/A	This activity has not yet occurred.
19	Percentage of targeted records persons competent in malaria data management at the facility level at the time of most recent supervisory visit	Number of facility records managers scoring 80% and above on supervision questionnaire /Total number of facility records managers supervised during the recent round of supervision	3.5	Reporting and monitoring information for malaria is integrated, complete and accurate	Team superviso n reports	80%	N/A	N/A	N/A	N/A	N/A	This activity has not yet occurred.
Outputs												
20	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	3.1, 3.5	Reporting and monitoring information for malaria is integrated, complete and accurate	Training/ Activity reports	90%	N/A	N/A	N/A	N/A	N/A	Data from clinical/M&E OTSS will be included in the annual report, as OTSS was not completed in time for inclusion in the SAR.
21	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	3.5	Reporting and monitoring information for malaria is integrated, complete and accurate	Team superviso n reports	90%	N/A	N/A	N/A			Data from clinical/M&E OTSS will be included in the annual report, as OTSS was not completed in time for inclusion in the SAR.

#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
22	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	3.4, 3.5	Reporting and monitoring information for malaria is integrated, complete and accurate	Team supervision reports	90%	N/A	N/A	N/A			Data from clinical/M&E OTSS will be included in the annual report, as OTSS was not completed in time for inclusion in the SAR.
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												
23	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	Reporting on malaria indicators is complete and accurate [Regional and district directors and health management teams use DHIMS2 and OTSS data to guide programmatic decision-making and demonstrate good governance and accountability practices]	Training/Activity reports	90%	131%	47	36			Target exceeded. Initially planned to train 36 management team staff, but trained 47 participants total.

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 the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
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 $\geq 90\%$ 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	OTSS Reports	50%	62%	99	160	87%	93%	Target exceeded. As this was the first year of implementation, the target was based on health facility assessment results and other MalariaCare country performance. The target for PY5 will be updated to reflect Kenya performance in PY4. Of the 136 facilities with microscopy, 81 (60%) had at least one microscopy observation. Out of the 160 observations with a complete microscopy score, average performance was 85% for slide preparation; 88% for slide staining, and 96% for slide reading.

#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
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 ID and quantitation during the advanced MDRT post-test/Total number of national level microscopy trainers and laboratory supervisors participating in advanced MDRT courses	1.1,4.4	Providers demonstrate competence in RDTs and/or microscopy	Activity Reports	50%	32%	8	25	83%	83%	Target not reached. Nineteen out of 48 (76%) of participants scored at a WHO L1 or L2 (>=80%) for parasite density. Three out of 25 (12%) scored at a WHO L1 or L2 for parasite counting (>40%)
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	Activity Reports	70%	53%	42	80	PD: 78%	PD: 81%	Target not reached. Peripheral microscopists were assessed on their ability to detect parasites as the "minimum competency". While only 53% met the L1 or L2 WHO standard in parasite density; average scores were relatively high, at 78%.
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%	16%	4	25	76%	78%	Target not reached. Because of the low scores in RDT performance, supervisors will receive a refresher training in the OTSS supervisor training, to be held in the second half of PY4.

#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
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	OTSS Reports	75%	37%	60	161		Target not reached. Although a basic MDRT for 80 lab staff was held this year, many other facilities do not have adequately trained lab staff. Therefore, training should be expanded in PY5 to ensure there is at least one trained staff in all facilities.	
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 Reports	100%	80%	80	100		Target not yet reached. This activity is still ongoing. A third bMDRT will be held in the second half of PY4 for supervisors from phase three counties.	
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 Reports	100%	48%	25	52		Target not yet reached. This activity is still ongoing. An aMDRT will be held in the second half of PY4 for supervisors from phase three counties.	
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												
<p>Providers demonstrate competence in detecting suspected malaria cases</p> <p>Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases</p> <p>Providers demonstrate competence in malaria treatment</p> <p>Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness</p> <p>Private facilities are linked with the public sector</p>												

Intermediate Outcomes												
#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
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 score $\geq 90\%$ 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	OTSS Reports	70%	60%	229	384	89%	96%	Target not yet reached. Of the 280 facilities visited, 191 (68%) had at least one RDT observation. Given that this is the first OTSS visit, the result is within 10% of the target and that the average score is 89%, we believe this is a reachable target by the end 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	2.1	Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases	OTSS Reports	85%	79%	189	240			Target not yet reached. In the second half of PY4 MalariaCare will be rolling out RDT QA training.
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 $\geq 85\%$ 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	OTSS Reports	60%	44%	56	126	82%	84%	Target not yet reached. Of the 280 facilities visited, 151 (54%) had at least one complete clinical observation. This is the first OTSS visit. With a mean score close to the cut-off, we should approach the target in future OTSS rounds.

#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
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	OTSS Reports	95%	95%	336	353		Target reached. Of the 280 facilities visited, 151 (54%) had at least one complete clinical observation. Providers are consistently ordering malaria tests during clinical observations.	
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	Activity Reports	100%	N/A	N/A	N/A		This activity has not yet occurred.	
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												
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	OTSS Reports	95%	96%	1213	1268		Target exceeded. Of the 280 facilities visited, 169 (60%) had a register review for adherence to positive and negative test results.	

#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
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	OTSS Reports	90%	81%	1067	1316		Target not yet reached. Of the 280 facilities visited, 169 (60%) had a register review for adherence to positive and negative test results. This is the first OTSS visit. In future visits supervisors will work with staff at health facilities to ensure that patients with negative test results are not prescribed antimalarials.	
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	OTSS Reports	95%	88%	2283	2584		Target not reached. Of the 280 facilities visited, 169 (60%) had a register review for adherence to positive and negative test results. This is due to low performance in adhering to negative malaria tests. In future OTSS visits, focus will be on identifying and addressing underlying causes of poor adherence.	
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	Activity Reports	100%	49%	25	51		Target not yet reached. This activity is still ongoing. Another training will be held in the second half of PY4 for supervisors from phase three counties.	

#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
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	OTSS Reports	100%	20%	1	5			Target not yet reached. The target of 100% anticipated 5 OTSS rounds to be conducted, one round in PY3 and 4 in PY4. It is unlikely that all five rounds will be implemented due to delays in the start of activities in Kenya and delays in roll-out of EDS. A total of 3 rounds is expected to be completed in PY4.

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: 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
- 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	Median	
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 performed at 80% or higher on parasite detection and 40% or higher on parasite density (i.e. WHO Level 1 or Level 2 equivalent for these two competency areas)/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	Training reports	60%	50%	5	10		Target not reached. All advanced MDRT participants scored L1 equivalent in parasite quantitation; however, 5 participants scored L3 equivalent in parasite detection.	

#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
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 performed at 80% or higher (i.e. WHO Level 1 or Level 2 equivalent) on parasite detection/Total number of service providers participating in basic MDRT courses	1.2	Providers demonstrate competence in RDTs and/or microscopy	Training reports	45%	92%	12	13		Target exceeded. 1 participant scored a Level 3 equivalent in parasite detection. Of note, although parasite quantitation is not calculated for this indicator, 11 of 13 basic MDRT participants scored L1 equivalent for this test component.	
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 reports	95%	92%	23	25		Target not reached. 2 of the 15 counties did not have representation at the MDRT course.	
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 case management of malaria	Training reports	95%	87%	13	15		Target not reached. 2 of the 15 counties did not have representation at this OTSS supervisor training course.	

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: 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 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 intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
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 $\geq 90\%$ 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	55%	30%	6	20			Target not reached. Item analysis for this composite indicator: Slide preparation average: 84% Slide staining average: 83.5% Slide reading (agreement) average: 100% While the majority of facilities did not attain the target 90% score, average and median scores nearing this mark (85% and 84%.)

#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
9	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 time of the most recent supervisory visit within reporting period	3.2	Service providers demonstrate competence in malaria treatment	Team Supervision Reports	75%	88%	66	75			Target exceeded.
10	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 time of the most recent supervisory visit within the reporting period	3.2	Service providers demonstrate competence in malaria treatment	Team Supervision Reports	60%	98%	157	161			Target exceeded.
11	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	60%	94%	223	236			Target exceeded.

Outputs												
#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
12	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%	50%	24	48			Target not reached.
13	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	Service providers demonstrate competence in malaria treatment	Training reports	90%	92%	55	60			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												
Intermediate Outcomes												
14	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 labs 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 labs 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	Reference laboratories and facilities able to provide high quality diagnostics for malaria and other febrile illnesses	Team Supervision Reports	50%	N/A	N/A	N/A	N/A	N/A	No data generated for this indicator this round of OTSS.

#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
15	Percentage of targeted OTSS Laboratory Supervisors demonstrating competence in malaria microscopy via PT panels within the reporting period	Number of targeted OTSS Laboratory Supervisors that meet minimum competency levels for peripheral level microscopists in malaria microscopy via PT panels within the reporting period/Total number of targeted OTSS Laboratory Supervisors evaluated for minimum competency levels for peripheral level microscopists in malaria microscopy via PT panels within the reporting period	1.1	Reference laboratories and facilities able to provide high quality diagnostics for malaria and other febrile illnesses	Team Supervision Reports	75%	100%	6	6	98%	100%	Target exceeded. This indicator focuses on parasite detection. The mean and median presented here are specific to parasite detection. Species identification and <i>P.f.</i> parasite quantitation were also evaluated, but not incorporated into the indicator definition. The averages for these 2 PT components were 83% and 22%, respectively.
16	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	Reference laboratories and facilities able to provide high quality diagnostics for malaria and other febrile illnesses	Team Supervision Reports	55%	0%	0	24			Target not reached. There were no instances in which facilities fulfilled all of the following IQA requirements: Use of positive controls (4% HF) Use of pH meter (4% HF) Rechecks slides (29% HF) Records slide cross-checking results (17% HF) Stores slides for rereading (54% HF) Stores slides for rereading in a slide storage box (46% HF) Conducts species ID (79% HF) Conducts parasite counting (50% HF) MalariaCare has developed a tool to help guide lab supervisors during OTSS visits that provide a list of essential components of IQA to help them organize and identify gaps in the IQA system.

Outputs												
#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
17	Percentage of Lessons Learned workshops with action plans developed	Number of LLWs with clearly defined clinical and laboratory action plans within the reporting period/ Total number of sponsored LLWs within the reporting period	4.2	Reference laboratories and facilities able to provide high quality diagnostics for malaria and other febrile illnesses	Activity Reports	100%	N/A	N/A	N/A	N/A	N/A	This workshop has not yet occurred.

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: 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 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 intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
1	Proportion of national- and provincial-level microscopy trainers and laboratory supervisors participating in advanced MDRT courses who demonstrate competence in malaria microscopy	Number of advanced MDRT participants performing 80% or higher on parasite detection and performing 40% or higher on parasite density (i.e. WHO Level 1 or Level 2 equivalent for these two competency areas) / Number of advanced MDRT participants who completed the training course		Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illnesses	Training Reports	65%	37%	7	19			Target not reached. In nearly 60% of instances (11 out of 19), parasite quantitation was the component pulling scores to a lower accreditation level 0 participant(s) at L1 equivalent 7 participant(s) at L2 equivalent 4 participant(s) at L3 equivalent 8 participant(s) at L4 equivalent. MalariaCare is examining potential causes for this low performance.

#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
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	N/A	N/A	N/A	N/A	N/A	N/A	This activity has not yet occurred.
3	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 $\geq 90\%$ 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	3.3	Providers demonstrate competence in RDTs and/or microscopy	Team supervision reports	N/A	N/A	N/A	N/A	N/A	N/A	This activity has not yet occurred.
4	Percentage of supervisors participating in any RDT training courses who demonstrate competence in RDTs	Number of supervisors who score 90% or greater in reading and interpretation of RDTs during any RDT post-test/Total number of supervisors participating in any MRDT courses	2.1,3.2	Supervisors demonstrate competence in RDTs and/or microscopy	Activity reports	90%	63%	24	38	90%	91%	Target not reached. Although only 63% of supervisors scored 90% or higher at post-test, the average score was 90% - indicating that many fall just under the 90% cut-off.

#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
5	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	2.2, 3.3	Providers demonstrate competence in detecting suspected malaria cases	Team supervision reports	N/A	N/A	N/A	N/A	N/A	N/A	This activity has not yet occurred.
Outputs												
6	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	Supervisors demonstrate competence in RDTs and/or microscopy	Training/Activity reports	95%	95%	19	20			Target exceeded.
7	Percentage of targeted service providers participating in basic MDRT courses	Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness	1.2	Providers demonstrate competence in RDTs and/or microscopy	Training reports	95%	N/A	N/A	N/A	N/A	N/A	This activity has not yet occurred.

#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
8	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, 2.2, 2.3, 3.2	Providers demonstrate competence in detecting suspected malaria cases	Training reports	95%	22%	38	204			<p>Target not yet reached.</p> <p>Two activities (2.2 and 2.3) under this indicator have not yet occurred. Activity 2.2 involves training of 139 health surveillance assistants on RDT use. Activity 2.3 involves training of 25 senior HSAs who would supervise the HSAs. Activities 2.2 and 2.3 have been put on hold pending discussions between the NMCP and PMI.</p>

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 the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
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 $\geq 85\%$ 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	3.3	Providers demonstrate competence in detecting suspected malaria cases	Team supervision reports	80%	N/A	N/A	N/A	N/A	N/A	This activity has not yet occurred.
10	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	3.3	Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases	Team supervision reports	80%	N/A	N/A	N/A	N/A	N/A	This activity has not yet occurred.

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

Intermediate Outcomes

#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
11	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	3.3	Health care providers demonstrate competence in malaria treatment	Team supervision reports	85%	n/a	n/a	n/a	n/a	n/a	This activity has not yet occurred.
Outputs												
12	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	3.1; 3.2	Health care providers demonstrate competence in malaria treatment	Training/ Activity reports	100%	121%	29	24			Target exceeded. Included in the numerator are the 19 clinicians trained under activity 3.2 (health center clinician OTSS supervisors) and 10 other clinicians trained under activity 3.1 (severe malaria supervisors and trainers)
13	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	Health care providers demonstrate competence in malaria treatment	Training/ Activity reports	100%	110%	22	20			Target exceeded. Two participants more than the 20 planned were trained in clinical case management.
14	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	3.3	Country has supervisory structures and implementation of supervision of malaria case management practices	Team supervision reports	100%	n/a	n/a	n/a	n/a	n/a	This activity has not yet occurred.

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

Intermediate Outcomes

#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
15	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	3.3	Reference laboratories and facilities able to provide high quality diagnostics for malaria and other febrile illnesses	Training reports	50%	n/a	n/a	n/a	n/a	n/a	This activity has not yet occurred.

Outputs

16	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	4.2	Reporting and monitoring information for malaria is integrated, complete and accurate	Training/ Activity reports	100%	n/a	n/a	n/a	n/a	n/a	This activity has not yet occurred.
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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: 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												
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 intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
1	Proportion of service providers participating in basic MDRT courses who demonstrate competence in malaria microscopy	Number of basic MDRT participants performing 80% or higher (i.e. WHO Level 1 or Level 2 equivalent) on parasite detection / Number of basic MDRT participants with completed the training course		Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illnesses	Training Reports	45%	60%	12	20			Target exceeded. 8 participant(s) at L1 equivalent 4 participant(s) at L2 equivalent 6 participant(s) at L3 equivalent 2 participant(s) at L4 equivalent

#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
2	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	2.2	Providers demonstrate competence in RDTs and/or microscopy	Team Supervision Reports	40%	33%	22	66	85.3%	84.4%	Target not reached. Of the 60 facilities visited with microscopy, 33 (55%) had at least one complete microscopy observation. Item analysis for this composite indicator: Slide preparation average = 85.9% Slide stain average = 94.5% Slide reading (agreement) average = 52.9%

#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
3	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	2.2	Providers demonstrate competence in RDTs and/or microscopy	Team Supervision Reports	35%	9%	4	46		<p>Target not reached.</p> <p>Of the 60 health facilities with labs, 46 (77%) reported all variables required for a quality diagnosis assessment.</p> <p>There were only 4 instances in which the 46 HFs with available data responded in the affirmative to each of the following:</p> <ul style="list-style-type: none"> - Lab has functional microscope for malaria microscopy (96% HFs) - No stock-outs in past 3 months that impeded malaria microscopy (11% HFs) - Availability of malaria microscopy bench aids or standard operating procedures (59% HFs) - At least one person trained in malaria microscopy in the past 2 years (59% of HFs) <p>MalariaCare activities have a limited role in improving this indicator. MalariaCare is sharing this information with the national malaria program for future action that may be needed. MalariaCare is also currently discussing PMP modifications with PMI.</p>	

Outputs												
#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
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	2.1	Country has supervisory structure for laboratory diagnosis of malaria	Training reports	90%	33%	9	27			Target not yet reached. Within the reporting period, only 1 joint supervisor training was held in the region of Kayes. District-level supervisors for the regions of Mopti and Segou will be trained in the second half of PY4.
5	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	2.1	Country has supervisory structure for laboratory diagnosis of malaria	Training reports	90%	33%	9	27			Target not yet reached. Within the reporting period only 1 joint supervisor training was held in the region of Kayes. District-level supervisors for the regions of Mopti and Segou will be trained in the second half of PY4.
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 the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
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 $\geq 90\%$ 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	2.2, 3.2	Providers demonstrate competence in detecting suspected malaria cases	Team Supervision Reports	50%	61%	117	192	89%	92%	Target reached. Of the 136 facilities visited, 99 (73%) had at least one complete RDT observation. Note: Results were not available for one component of this indicator, "collects adequate amount of blood," as the question was asked incorrectly.
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 $\geq 85\%$ 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	2.2, 3.2	Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases	Team Supervision Reports	55%	47%	77	163	79%	82%	Target not reached. Of the 136 facilities visited, 111 (82%) had at least one complete clinical observation. Results were not available for one component of this indicator, "supervisor agrees with final diagnosis and severity assessment," as the question was not asked during OTSS Round 1. The checklist will be revised to include this question in the next round.

#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
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	2.2, 3.2	Providers demonstrate competence in malaria treatment	Team Supervision Reports	80%	69%	204	296			Target not 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 visit within the reporting period/Total number targeted facilities at the time of the most recent supervisory visit within the reporting period	2.2, 3.2	Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness	Team Supervision Reports	45%	33%	14	43			Target not reached. Of the 136 facilities visited, 43 (32%) reported all variables required for a quality RDT diagnosis assessment. In only 14 instances did the 43 HF's with available data respond in the affirmative to each of the following: - No stock-outs of RDTs on the day of the visit (72% HF's) - Availability of RDT bench aids and/or SOPs (56% HF's) - At least one person trained in RDT in the past two years (79% HF's)

Outputs												
#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
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	4.7	Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases	Training reports	90%	22%	14	64		MalariaCare provided technical assistance to HIHS to conduct a 2-day training in RDT QA for district-level supervisors from Kayes region. The same training will be rolled out for district-level supervisors from Sikasso, Koulikoro and Bamako regions later in PY4.	
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												
Intermediate Outcomes												

#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
12	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	2.2, 3.2	Facilities are able to provide high quality case management services for malaria and other febrile illness	Team Supervision Reports	30%	58%	61	106			Target exceeded. Of the 136 facilities visited, 61 (45%) reported all variables required for a malaria service readiness assessment. There were 61 instances in which the 106 HF's with available data responded in the affirmative to each of the following: - Most recent malaria case management guidelines or clinical algorithms available (68% HF's) - At least 1 staff trained in case management of malaria (79% HF's) - First-line antimalarial in stock (90% HF's) - Paracetamol cap/tab in stock (98% HF's)
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	2.2, 3.2	Service providers demonstrate competence in malaria treatment	Team Supervision Reports	75%	90%	491	548			Target exceeded. Of the 136 facilities visited, 85 (63%) had a register review for adherence to positive and negative test results. Of 548 providers observed, 491 (90%) demonstrated treatment compliance to a positive malaria test result.

#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
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	2.2, 3.2	Service providers demonstrate competence in malaria treatment	Team Supervision Reports	60%	77%	425	551		Target exceeded. Of the 136 facilities visited, 85 (63%) had a register review for adherence to positive and negative test results. Of 551 providers observed, 425 (77%) demonstrated treatment compliance to a negative malaria test result.	
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	2.2, 3.2	Service providers demonstrate competence in malaria treatment	Team Supervision Reports	60%	83%	916	1099		Target exceeded. Of the 136 facilities visited, 85 (63%) had a register review for adherence to positive and negative test results. Review of 1099 records found that 916 indicated treatment adhered to the malaria test result.	
Outputs												
16	Percentage of scheduled clinical only supervisory visits to targeted facilities that occurred within the reporting period	Number of scheduled clinical only supervisory visits to targeted facilities that occurred within the reporting period/Total number of scheduled clinical only supervisory visits to targeted facilities	3.2	Country has supervisory structures and implementation of supervision of malaria case management practices	Team Supervision Reports	90%	37%	76	204		Target not yet reached. More clinical-only OTSS visits will occur in later rounds in the PY. An additional 128 HF's are expected to be visited during the remainder of the PY.	

#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
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	2.2	Country has supervisory structures and implementation of supervision of malaria case management practices	Team Supervision Reports	90%	79%	60	76			MalariaCare provided technical assistance to HIHS to conduct a 2-day training in RDT QA for district-level supervisors from Kayes region. The same training will be rolled out for district-level supervisors from Sikasso, Koulikoro, and Bamako regions later in PY4.
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	3.1	Service providers demonstrate competence in malaria treatment	Training reports	90%	100%	38	38			Target exceeded. All targeted providers received (re)training in clinical case management.
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												
Intermediate Outcomes												
19	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 or slide cross-checking 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 and slide cross-checking at the time of the most recent supervisory visit within the reporting period	1.2; 2.2, 4.3	Reference laboratories and facilities able to provide high quality diagnostics for malaria and other febrile illnesses	Team Supervision Reports	55%	N/A	N/A	N/A	N/A	N/A	This activity has not yet occurred.

#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
20	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	2.2	Reference laboratories and facilities able to provide high quality diagnostics for malaria and other febrile illnesses	Team Supervision Reports	60%	8%	4	52		<p>Target not reached.</p> <p>Of the 60 facilities visited with microscopy, 52 (87%) had completed information required for an IQA assessment. In only 4 instances did the 52 HFs with available data respond in the affirmative to each of the following:</p> <ul style="list-style-type: none"> Use of positive controls (54% HFs) Use of pH meter (14% HFs) Rechecks slides (47% HFs) Records slide cross-checking results (19% HFs) Stores slides for rereading (58% HFs) Stores slides for rereading in a slide storage box (54% HFs) Conducts species ID (46% HFs) Conducts parasite counting (58% HFs) <p>MalariaCare has developed a tool to help guide lab supervisors during OTSS visits that provide a list of essential components of IQA to help them organize and identify gaps in the IQA system.</p>	
Outputs												

#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
21	Percentage of Lessons Learned workshops with action plans developed	Number of LLWs with clearly defined clinical and laboratory action plans within the reporting period/ Total number of sponsored LLWs within the reporting period	4.1	Reference laboratories and facilities able to provide high quality diagnostics for malaria and other febrile illnesses	Activity Reports	100%	N/A	N/A	N/A	N/A	N/A	This activity has not yet occurred.

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	Median	
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	3.3	Providers demonstrate competence in RDTs and/or microscopy	OTSS Reports	50%	73%	69	95	92%	99%	Target exceeded. Of the 68 facilities with microscopy 57(84%) had at least one microscopy observation. In the absence of quality OTSS data, the target was based on other MalariaCare country performance. The target for PY5 will be updated to reflect Mozambique performance in PY4. Slide preparation: 80% met standard Slide staining: 88% met standard Slide reading: 91% met standard

#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
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	Activity reports	40%	76%	28	37	PD: 86%	PD: 86%	Target exceeded. In the absence of quality OTSS data, the target was based on other MalariaCare country performance. The target for PYS will be updated to reflect Mozambique performance in PY4. Peripheral microscopists were assessed on their ability to detect parasites.
3	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	50%	40%	10	25	PD: 83% Count: 37%	PD: 85% Count: 36%	Target not reached. 10 out of 25 (40%) participants meet the competence criteria for aMDRT (PD=>80% and counting=>40%). MalariaCare staff and high-performing supervisors will continue to work with those low-performing laboratory supervisors during OTSS visits to strengthen microscopy skills.

#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
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	2.1	Providers demonstrate competence in RDTs and/or microscopy	Activity reports	60%						RDTs not available during the MDRT trainings: RDT scores were not assessed.
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	3.3	Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness	OTSS Reports	40%	72%	46	64			Target exceeded. In the absence of quality OTSS data, the target was based on other MalariaCare country performance. The target will be increased in PY5 to reflect Mozambique performance in PY4. 46 of 64 facilities visited had at least one service provider who had been (re)trained in malaria microscopy in the past 2 years.

#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
6	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	OTSS Reports	50%	0%	0	49		<p>Target not yet reached. OF the 68 facilities with microscopy, 49 (72%) had complete information on all variables required for a quality diagnosis assessment. (Zero of 49 facilities that had information on all items met all standards for quality diagnosis of microscopy. 0% had all stock materials, 71% had reference materials, 73% had at least one staff person trained, and 100% had functional microscopes. The greatest limiting factor was stock of ph paper meter which only 9% of facilities had.)</p> <p>MalariaCare activities have a limited role in improving this indicator. MalariaCare is sharing this information with the national malaria program for future action that may be needed. MalariaCare is also currently discussing PMP modifications with PMI.</p>	

#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
Outputs												
7	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	1.1	Providers demonstrate competence in RDTs and/or microscopy	Activity reports	95%	106%	37	35			Target exceeded Aimed to train 35 participants, but trained 37.
8	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	1.2	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	95%	104%	25	24			Target exceeded Aimed to train 24 providers, but trained 25.
9	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	3.2	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	95%	106%	37	35			Target exceeded. Aimed to train 35 participants, but trained 37.

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: 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	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
10	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	OTSS Reports	90%	77%	137	178	93%	96%	Target not yet reached. Of the 79 facilities visited, 76 (95%) had at least one complete RDT observation. Many providers were just under the threshold, as indicated by the 93% mean score.
11	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	OTSS Reports	90%	91%	73	80			Target exceeded.

#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
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 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	OTSS Reports	65%	59%	96	163	81%	88%	Target not yet reached. Of the 79 facilities visited, 75 (95%) had at least one complete clinical observation. Providers are approaching the target, as shown by a mean score of 79% - close to the 85% target.
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	3.2, 3.3	Providers demonstrate competence in malaria treatment	OTSS Reports	85%	88%	185	211			Target exceeded. Of the 79 facilities visited, 75 (95%) had at least one complete clinical observation.
Outputs												
14	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	Activity reports	95%	29%	112	390			Target not reached. This activity will continue to be facilitated during future OTSS visits.
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	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
15	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	3.3	Facilities are able to provide high quality case management services for malaria and other febrile illness	OTSS Reports	40%	57%	28	49		Target exceeded.	
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	OTSS Reports	85%	96%	592	619		Target exceeded. Of the 79 facilities visited, 73 (92%) had a register review for adherence to positive and negative test results. Of 619 records reviewed, 592 (96%) demonstrated treatment adherence to a positive malaria test result.	

#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
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	OTSS Reports	70%	88%	556	630			Target exceeded. Of the 79 facilities visited, 73 (92%) had a register review for adherence to positive and negative test results. Of 630 records reviewed, 556 (88%) demonstrated treatment compliance to a negative malaria test result.
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	OTSS Reports	75%	92%	1148	1249			Target exceeded. Of the 79 facilities visited, 73 (92%) had a register review for adherence to positive and negative test results. Of 1249 records reviewed, treatment adherence to a malaria test result was demonstrated in 1148 (92%) records.

Outputs												
#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
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	OTSS Reports	95%	33%	1	3			Target not yet reached. The remaining two rounds of OTSS will be held in the second half of PY4.

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	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
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	OTSS Reports	70%	16%	9	58		<p>Target not reached. Of the 68 facilities with microscopy, 58 (85%) had complete information for all variables required for an IQA assessment. Very few facilities (5%) of facilities assessed are using standards to calibrate a pH meter. 54% have positive control slides available for testing stain batches, 25% conduct slide re-checking, 31% record IQA results, 39% store slides for rereading, 47% have a slide box to store slides, 51% routinely perform species ID, and 58% perform parasite counting. MalariaCare has developed a tool to help guide lab supervisors during OTSS visits that provide a list of essential components of IQA to help them organize and identify gaps in the IQA system.</p>	

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	Median	
1	Percentage of supervisors participating in any RDT training courses who demonstrate competence in RDTs	Number of regional and district level supervisors who score 90% or greater in reading and interpretation of RDTs during any RDT post-test/Total number of service providers participating in any RDT courses	1.1	Supervisors demonstrate competence in RDTs and/or microscopy	Activity reports	85%	51%	46	90	85%	90%	Target not reached. Many participants were just under the threshold, as shown by an average score of 85%
2	Percentage of targeted supervisors demonstrating competence in malaria microscopy at the time of the most recent supervisory visit within the reporting period	Number of targeted supervisors who score ≥ 90% or greater in slide preparation, staining and reading at the time of the most recent supervisory visit within the reporting period/Total number of targeted supervisors evaluated on malaria microscopy at the time of the most recent supervisory visit within the reporting period	1.2	Supervisors demonstrate competence in RDTs and/or microscopy	Team supervision reports	70%	N/A	N/A	N/A	N/A	N/A	An OTSS round was started but not completed during the reporting period. This will be included in the Annual Report.

Outputs												
#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
3	Percentage of targeted supervisors participating in basic mRDT courses	Number of targeted supervisors participating in basic mRDT courses/Total number of targeted supervisors	1.1	Providers demonstrate competence in RDTs and/or microscopy	Training/Activity reports	100%	120%	90	75			Target exceeded. Additional participants were trained in Morogoro region to support cascade RDT QA training to a higher number of participants.
4	Percentage of targeted service providers trained in laboratory supervision of malaria microscopy	Number of targeted supervisors trained in laboratory supervision of malaria microscopy/Total number of targeted supervisors	1.2	Country has supervisory structure for laboratory case management of malaria	Training/Activity reports	100%	110%	22	20			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												
<p>Providers demonstrate competence in detecting suspected malaria cases</p> <p>Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases</p> <p>Providers demonstrate competence in malaria treatment</p> <p>Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness</p> <p>Private facilities are linked with the public sector</p>												
Intermediate Outcomes												

#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
5	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 $\geq 90\%$ 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 RDTs and/or microscopy	OTSS Reports	80%	N/A	N/A	N/A	N/A	N/A	An OTSS round was started but not completed during the reporting period. This will be included in the Annual Report.
6	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 $\geq 85\%$ 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 RDTs and/or microscopy	OTSS Reports	65%	N/A	N/A	N/A			An OTSS round was started but not completed during the reporting period. This will be included in the Annual Report.
7	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 malaria treatment	OTSS Reports	90%	N/A	N/A	N/A	N/A	N/A	An OTSS round was started but not completed during the reporting period. This will be included in the Annual Report.

Outputs												
#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
8	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/Activity reports	100%	179%	915	510		<p>Target exceeded.</p> <p>When planning we expected to train one person in each of the 510 facilities known to us. With the updated facility list, we expanded the number of facilities we covered. After completing the training in Dar es Salaam and Pwani, the NMCP requested MalariaCare to train 2 staff per facility rather than one as originally planned - which increased the number trained in Morogoro.</p>	
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	3.2	Country has supervisory structure for laboratory case management of malaria	OTSS Reports	95%	N/A	N/A	N/A		<p>An OTSS round was started but not completed during the reporting period. This will be included in the Annual Report.</p>	

#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
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	3.2	Country has supervisory structure for laboratory case management of malaria	OTSS Reports	95%	N/A	N/A	N/A		An OTSS round was started but not completed during the reporting period. This will be included in the Annual Report.	
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												
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	Country has supervisory structure for laboratory case management of malaria	OTSS Reports	95%	N/A	N/A	N/A		An OTSS round was started but not completed during the reporting period. This will be included in the Annual Report.	

#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
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	Country has supervisory structure for laboratory case management of malaria	OTSS Reports	95%	N/A	N/A	N/A		An OTSS round was started but not completed during the reporting period. This will be included in the Annual Report.	
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	Country has supervisory structure for laboratory case management of malaria	OTSS Reports	95%	N/A	N/A	N/A		An OTSS round was started but not completed during the reporting period. This will be included in the Annual Report.	
Outputs												

#	Indicator	Definition	Relevant Activity #	Contributes to the following intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
14	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	3.4	Country has supervisory structure for laboratory case management of malaria	OTSS Reports	100%	N/A	N/A	N/A			An OTSS round was started but not completed during the reporting period. This will be included in the Annual Report.
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												
15	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	3.4	Country has supervisory structure for laboratory case management of malaria	OTSS Reports	55%	N/A	N/A	N/A	N/A	N/A	An OTSS round was started but not completed during the reporting period. This will be included in the Annual Report.

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: 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												
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 intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
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	55%	81%	71	88	94%	100%	Target exceeded. Of the 40 facilities visited with microscopy, 31 (77%) had at least one complete microscopy observation. Breakdown of individual components for this composite indicator: Slide preparation average = 82.4% Slide stain average = 90.6% Slide reading (agreement) average = 88.0%

Outputs												
#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
2	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	3.1	Country has supervisory structure for laboratory diagnosis of malaria	Training reports	90%	75%	15	20			Target not reached.
3	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	3.1	Country has supervisory structure for laboratory diagnosis of malaria	Training reports	90%	50%	10	20			Target not reached.
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												
<p>Providers demonstrate competence in detecting suspected malaria cases</p> <p>Providers demonstrate competence in ordering/conducting malaria diagnostic tests for suspected cases</p> <p>Providers demonstrate competence in malaria treatment</p> <p>Reference laboratories and facilities are able to provide high quality diagnostics for malaria and other febrile illness</p> <p>Private facilities are linked with the public sector</p>												

Intermediate Outcomes												
#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
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 $\geq 90\%$ 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, 3.3	Providers demonstrate competence in detecting suspected malaria cases	Team Supervision Reports	70%	64%	69	107	90%	96%	Target not yet reached. Of the 41 facilities visited, 34 (83%) had at least one complete RDT observation. Many participants performed just under the threshold, as shown by an average score of 90%.
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 $\geq 85\%$ 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	60%	59%	29	49	83%	89%	Target not reached. Of the 41 facilities visited, 38 (93%) had at least one complete RDT observation.
6	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%	96%	107	112			Target exceeded Of the 41 facilities visited, 38 (93%) had at least one complete RDT observation. Of the 112 records reviewed, 110 demonstrated competence in ordering malaria tests for suspected cases.

#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
7	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 visit 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	85%	2%	1	41		<p>Target not reached.</p> <p>Of the 41 facilities visited, all 41 (100%) had complete information for a quality RDT diagnosis assessment. There was only one instance in which any of the 41 visited HFs responded in the affirmative for each of the following:</p> <ul style="list-style-type: none"> - No stock-outs of RDTs on the day of the visit (41% of HFs) - Availability of RDT bench aids and/or SOPs (72% of HFs) - At least on person trained in RDT in the past two years (63% of HFs) <p>MalariaCare activities have a limited role in improving this indicator. MalariaCare is sharing this information with the national malaria program for future action that may be needed. MalariaCare is also currently discussing PMP modifications with PMI.</p>	

#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
8	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, 3.3	Facilities are able to provide high quality case management services for malaria and other febrile illness	Team Supervision Reports	35%	28%	11	40			Target not reached. Of the 41 facilities visited, all 40 (98%) had complete information for a malaria service readiness assessment. Individual analysis of each indicator component shows the following: - Most recent malaria case management guidelines available (68% of HFs) - At least 1 staff trained in case management of malaria (39% of HFs) - First-line antimalarial in stock (98% of HFs) - Paracetamol cap/tab in stock (93% of HFs) MalariaCare activities have a limited role in improving this indicator. MalariaCare is sharing this information with the national malaria program for future action that may be needed. MalariaCare is also currently discussing PMP modifications with PMI.
9	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, 3.3	Service providers demonstrate competence in malaria treatment	Team Supervision Reports	90%	100%	264	265			Target exceeded.

#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
10	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, 3.3	Service providers demonstrate competence in malaria treatment	Team Supervision Reports	85%	80%	238	296			Target not reached. Of the 41 facilities visited, 35 (85%) had a register review for adherence to negative test results. Of the 296 record assessed, 238 (80.4%) demonstrated compliance to treatment for a negative malaria test result in during the last OTSS visit.
11	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	Service providers demonstrate competence in malaria treatment	Team Supervision Reports	80%	89%	502	561			Target exceeded.

Outputs												
#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
12	Percentage of scheduled clinical only supervisory visits to targeted facilities that occurred within the reporting period	Number of scheduled clinical only supervisory visits to targeted facilities that occurred within the reporting period/Total number of scheduled clinical only supervisory visits to targeted facilities	3.3	Country has supervisory structures and implementation of supervision of malaria case management practices	Team Supervision Reports	90%	N/A	N/A	N/A	N/A	N/A	This activity (district-level OTSS) has not yet occurred.
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%	51%	41	80			Target not reached. 41 high-volume and reference level facilities were visited in the Central, Copperbelt, North Western, and Western regions. Additional visits are scheduled for the remainder of PY4.

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

Intermediate Outcomes

#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
14	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	Reference laboratories and facilities able to provide high quality diagnostics for malaria and other febrile illnesses	Team Supervision Reports	35%	3%	1	38		<p>Target not reached.</p> <p>Of the 40 facilities with microscopy visited, 38 (95%) had complete information required for an IQA assessment. Only 1 HF had all of the following IQA measures in place:</p> <ul style="list-style-type: none"> Use of positive controls (65% HFs) Use of pH reader (3% HFs) Rechecks slides (45% HFs) Records slide cross-checking results (20% HFs) Stores slides for rereading (68% HFs) Stores slides for rereading a slide storage box (68% HFs) Conducts species ID (53% HFs) Conducts parasite counting (80% of HFs) <p>MalariaCare has developed a tool to help guide lab supervisors during OTSS visits that provide a list of essential components of IQA to help them organize and identify gaps in the IQA system.</p>	

#	Indicator	Definition	Relevant Activity #	Contributes to the intermediate objective of MalariaCare	Data Source	Targets	Results					Comment
							%	Num	Den	Mean	Median	
15	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	3.2	Providers demonstrate competence in RDTs and/or microscopy	Team Supervision Reports	25%	0%	0	40			<p>Target not reached.</p> <p>There was no instance in which any of the 40 visited HFs responded in the affirmative for each of the following:</p> <ul style="list-style-type: none"> - Lab has functional microscope for malaria microscopy (98% of HFs) - No stock-outs in past 3 months that impeded malaria microscopy (0% of HFs) - Availability of malaria microscopy bench aids or standard operating procedures (85% of HFs) - At least one person trained in malaria microscopy in the past two years (18% of HFs) <p>MalariaCare activities have a limited role in improving this indicator. MalariaCare is sharing this information with the national malaria program for future action that may be needed. MalariaCare is also currently discussing PMP modifications with PMI.</p>

Appendix C: Environmental mitigation and monitoring

In the first half of PY4, MalariaCare organized malaria diagnostic, clinical, and supervisor training. During these training sessions, small amounts of biomedical waste were generated: sharps materials, non-sharps-contaminated medical waste (blood-exposed tubes and devices), and chemical waste (standard laboratory reagents) used for preparation of malaria microscopy slides. Consequently, MalariaCare has been working with in-country teams and NMCPs to assure that all sponsored training and on-site supervision activities discuss and adhere to the following three principles of medical waste management:

1. Safe collection of potentially infected body fluids or tissue samples.
2. Proper disposal of sharps and potentially infected body fluids/tissues into collection receptacles.
3. Appropriate disposal and/destruction of these infectious waste materials.

This section describes the current status of these environmental mitigation measures across MalariaCare-supported countries. It also describes the ongoing measures MalariaCare has put into place to assure 100% compliance with the measures during project intervention, so that all medical waste is monitored and accounted for.

In the first half of PY4, laboratory training was held in nationally accredited laboratories with appropriate safety measures in place. When clinical and supervisor training occurred outside of a health facility, and RDT demonstration and role-play are part of the training, it is standard practice for facilitators to bring RDT kits with appropriate waste-collection equipment and to transport any waste generated from the training sites back to the nearest health facility for appropriate disposal. Table 15 below describes key results for generation and management of biohazardous waste during the course of MalariaCare-sponsored training activities.

Table 15: Environmental impact indicators for MalariaCare-sponsored training.

Describe specific environmental threats of your organization's activities (based on analysis in Section 3 of IEE)	Describe mitigation measures for these activities as required in Section 5 of IEE	Who is responsible for monitoring	Monitoring indicator	Monitoring method	Countries with implicated training in PY4	Proportion of countries adhering to mitigation measures
1. Education, technical assistance, training etc.						
<p>Training activities will generate small-scale medical waste (the mitigation of which is described below under "2. Management of medical waste").</p>	<p>MalariaCare includes in its training curriculum procedures to handle, label, treat, store, transport, and properly dispose of medical waste.</p>	<p>MalariaCare Country Coordinator (or country technical lead) in collaboration with trainers.</p>	<p>Training materials include appropriate references to management of medical waste.</p> <p>Proportion of countries conducting MalariaCare training with curriculum on proper medical waste management.</p>	<p>Review training materials; training reports</p>	<p>DRC Ghana Kenya Liberia Madagascar Malawi Mali Mozambique Tanzania Zambia</p>	<p>MalariaCare reviewed training materials for 31 clinical, diagnostic, and supervisor training for 10 countries. Five of these countries (Ghana, Kenya, Liberia, Madagascar, and Malawi) adequately addressed all three principles in all of their training, and five countries (DRC, Mali, Mozambique, Tanzania, and Zambia) addressed components, but not all three key principles, in all of their training. Of the 31 trainings for which materials were reviewed, 26 addressed all three principles; three addressed some, but not all three principles; and two addressed none of the principles. MalariaCare will work with countries to assure that all countries meet 100% compliance to education on the three waste management principles by the next reporting period.</p>

2. Management of medical waste						
Describe specific environmental threats of your organization's activities (based on analysis in Section 3 of IEE)	Describe mitigation measures for these activities as required in Section 5 of IEE	Who is responsible for monitoring	Monitoring indicator	Monitoring method	Countries with implicated training in PY4	Proportion of countries adhering to mitigation measures
In most MalariaCare-supported countries, the project procures materials and reagents used for small-scale malaria microscopy slide preparation. The slides are generated for training purposes only—to improve diagnostic provider skills on slide preparation and reading. Biohazard waste materials generated during training include: contaminated latex gloves and plastic packaging, some hazardous chemicals (excess methanol and Giemsa solution), and blood-contaminated items (test tubes, needles, syringes, and rapid diagnostic tests).	MalariaCare will use availability of appropriate waste management structures as a criterion for choice of training sites. MalariaCare will inspect medical waste disposal procedures and processes at facilities where training will occur to ensure that they meet national guidelines and WHO best practices ("WHO's Safe Management of Waste from Healthcare Activities"). MalariaCare will institute processes to ensure that waste materials generated from MalariaCare training are in compliance with this international standard.	MalariaCare National Coordinator (or country technical lead); MalariaCare training expert.	Completed training report that endorses appropriate collection and disposal of medical waste compliant with the three principles outlined above; copy of medical waste management procedures provided to project staff.	Training reports; site inspections	DRC Ghana Kenya Liberia Madagascar Malawi Mali Mozambique Tanzania Zambia	Out of a total of 10 countries with relevant training sessions (diagnostic, clinical and supervisor), MalariaCare reviewed 28 activity reports. Eight countries (DRC, Ghana, Kenya, Liberia, Madagascar, Malawi, Mali, and Tanzania) include a section focused on waste management in all training reports, two countries (Mozambique and Zambia) included a section focused on waste management in at least one report, and zero countries did not mention waste management in any report. Of the 28 activity reports reviewed, 27 included a section focused on waste management, and one did not include a section focused on waste management. MalariaCare has assessed medical waste management during RDT and microscopy observations conducted as a part of the OTSS visits. (See Table 16 below showing analysis of the data from these sections of checklists)

Describe specific environmental threats of your organization's activities (based on analysis in Section 3 of IEE)	Describe mitigation measures for these activities as required in Section 5 of IEE	Who is responsible for monitoring	Monitoring indicator	Monitoring method	Countries with implicated training in PY4	Proportion of countries adhering to mitigation measures
MalariaCare procures and develops slides for the national archive of malaria slides (NAMS) for national quality assurance programs.	<p>As part of all training, MalariaCare will provide procedures on the handling of medical waste and make the procedures available to staff as needed.</p> <p>As part of all training, MalariaCare will train project staff on medical waste protocols.</p>	MalariaCare National Coordinator; MalariaCare training expert.	Completed training report that includes information determining proper disposal and management of medical waste; copy of medical waste management procedures provided to project staff.	Training reports; site inspections	Madagascar Malawi Zambia	Of the three countries in which NAMS training occurred in the first half of PY4, all three countries adequately addressed all three principles in all of their training.
In Ethiopia, MalariaCare will procure supplies for DNA extraction/ polymerase chain reaction (PCR) for a special study.	In Ethiopia, MalariaCare-procured supplies will be disposed of in accordance with national guidelines and WHO best practices guidelines.				Ethiopia	The PCR supplies that were used in Ethiopia were disposed of in accordance with WHO best practices.

In addition, in the MalariaCare OTSS checklist, the project is able to track compliance to waste management standards at the facility level through our microscopy and RDT observations. Results of this analysis are presented in the Table 16 below.

Table 16: Summary of waste management indicators picked up from site inspections during outreach training and supportive supervision (OTSS).

Competency area	DRC		Kenya		Madagascar		Mali		Mozambique		Zambia		Overall		Ghana*	
	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N
Microscopy[†]																
Waste management: Sharps waste segregated and safely disposed of in a safety box	92%	33	97%	95	90%	20	96%	55	96%	68	92%	33	95%	304	N/A	
Waste management: Infectious waste disposed of in appropriate waste containers	91%	33	88%	95	85%	20	89%	55	94%	68	93%	33	90%	304	N/A	
Waste management: Liquid waste appropriately washed off/disinfected	82%	32	89%	95	65%	20	84%	55	84%	68	90%	33	85%	303	N/A	
Rapid diagnostic tests																
Used tests, transfer devices, and other blood-contaminated material disposed of	81%	32	80%	214	100%	19	81%	118	88%	84	87%	41	19%	2173	98%	1665
Used lancet disposed in sharps container	82%	31	97%	209	100%	19	89%	118	93%	84	97%	41	22%	2167	95%	1665

*Ghana analysis is by individual observation, rather than health facility level analysis.

[†]Slide recycling, which was reported on in the PY3 EMMR is not recommended by any MalariaCare countries, although it does occur due to resource constraints in some countries. This indicator has been removed from our EMMR reporting.



PRESIDENT'S MALARIA INITIATIVE

