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CDC Centers for Disease Control and Prevention

Operational capacity to provide malaria services in Madagascar

Health Facility Assessment

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The Maternal and Child Survival Program (MCSP) is a global, $560 million, 5-year cooperative agreement funded by the United States Agency for International Development (USAID) to introduce and support scale-up of high-impact health interventions among USAID's 25 maternal and child health priority countries, as well as other countries. The program is focused on ensuring that all women, newborns and children most in need have equitable access to quality health care services to save lives. MCSP supports programming in maternal, newborn and child health, immunization, family planning and reproductive health, nutrition, health systems strengthening, water/sanitation/hygiene, malaria, prevention of mother-to-child transmission of HIV, and pediatric HIV care and treatment.

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Acronyms and Abbreviations

ACT	Artemisinin-based Combination Therapy
ASAQ	Artesunate-Amodiaquine
CHW	Community Health Worker
CSB	Centre de Santé de Base (Basic Health Center)
DLP	Directorate of Malaria Control (Direction de Lutte contre le Paludisme)
GTS	Global Technical Strategy
HF	Health Facility
HFA	Health Facility Assessment
HMIS	Health Management Information System
HP	Health Provider
IDI	In-depth Interview
IPM	*Institut Pasteur de Madagascar*
IRB	Institutional Review Board
IT	Information Technology
JHU	Johns Hopkins University
JHSPH	Johns Hopkins School of Public Health
MCM	Malaria Case Management
MCSP	Maternal and Child Survival Program
MER	Malaria Elimination Readiness
MOH	Ministry of Health
NMCP	National Malaria Control Program
NSP	National Strategic Plan
PI	Principal Investigator
PII	Personally Identifiable Information
PMI	President's Malaria Initiative
RDT	Rapid Diagnostic Test
SP	Sulfadoxine-Pyrimethamine
US	United States
WHO	World Health Organization

Executive Summary

Background: Although malaria incidence is declining globally, it remains a major cause of morbidity and mortality worldwide, particularly in Africa, where 90% of malaria cases occur.[i] Madagascar is no exception to this trend. Despite a fall in malaria cases between 2013 and 2016,[ii,iii] malaria remains the fourth leading cause of morbidity and mortality in Madagascar. A health facility assessment of 65 facilities conducted in 2014 (Malaria care survey) found that only 47.5% of patients presenting with fever or history of fever were categorized as suspect cases of malaria. Fewer than a third of health workers surveyed were able to report the correct amount of blood or buffer required when using a malaria rapid diagnostic test (RDT). Over half of surveyed health facilities reported antimalarial stockouts in the preceding three months[7]. Encouragingly, according to health facility monitoring data in Madagascar in 2016, 94% of confirmed malaria cases among public and private health facilities received first-line treatment as per the national policy.[iv] In 2018, USAID's Maternal and Child Survival Program (MCSP) in Madagascar in partnership with the National Malaria Control Program (NMCP) conducted a health facility assessment (HFA) to better understand health facility readiness and operational capacity to provide quality febrile illness and malaria case management in public and private HFs across all eight malaria zones in Madagascar. The assessment aimed to evaluate the health system's capacity to manage malaria, including detecting, examining, treating, and reporting febrile illness.

Methods: The study team assessed the availability and functionality of equipment, infrastructure, and stocks of medicine. The study team also interviewed health providers' (HPs) to better understand their experience with MOH led training and supervision, and documented provider knowledge of malaria. Finally, the study team observed HPs during outpatient consultations in order to evaluate the patient management process, including malaria testing, diagnosis, and treatment at the facility level. The assessment collected data from a total of 113 HFs, 130 HPs, and 894 patients. The results were weighted to provide nationally representative estimates. In districts targeted for elimination, MCSP supplemented the HFA with a Malaria Elimination Readiness (MER) survey to better understand malaria elimination phase readiness in districts targeted for elimination phase activities in advance of the MOH developing a national malaria elimination strategic plan. The results of this assessment are documented in a separate report.

Results: HPs took the client's temperature in 62% (557/894) of outpatient visit consultations and nearly always did so correctly. Nearly half (44%, or 404/894) of the patients had a fever, defined as at least one of the following: 1) Client reported fever in the previous 48 hours either during the consenting process or during the consultation with the HP and/or clients with temperature 37.5°C or greater as measured by the HP during the consultation. Of those with fever, 66% received a malaria RDT and none received microscopy. Nearly all patients with a positive RDT received an ACT (90%) and received counseling on the use of that ACT (86%).

Only 53% of surveyed HPs had received a malaria specific training in the past two years. Of those, only 45% had received training on malaria in pregnancy and 49% had received training on malaria diagnosis. Nearly three quarters (71%) had received a training on management of uncomplicated malaria cases. A significant percentage of surveyed providers also reported that they are in need of malaria trainings. The topics that HPs most frequently requested training on in relation to malaria were case management of severe malaria (53% of HPs), malaria treatment (44%), and malaria diagnosis (21%). Sixty eight percent of facilities received at least one supervision visit in the last six months. Sixty seven percent of HPs scored above 85% on a malaria knowledge assessment. Specifically, HP knowledge is lowest for the symptoms of uncomplicated malaria, choosing tests to be performed in case of fever in a child under 5, and the process for determining whether a patient is cured of malaria.

Almost all facilities had a functional thermometer (95%) on the day of the survey. Only 30% of HFs, however, had a printed copy of the latest national guidelines on malaria. While RDTs were available in 87% of facilities on the day of the survey, 38% experienced a stockout of at least one day in the last two months and 34% experienced a stockout of at least three days. Microscopy was available 7%, or 6 of the 113 facilities. When asked what the major challenge was in diagnosing malaria at the CSB level, 37% said that the major issue was stockouts of RDTs. While ASAQ was in stock in most public HFs on the day of the survey, roughly half of private clinics had ASAQ available. Artemether-lumefantrine was available in

two of the 113 study facilities. Only 33% of public facilities had injectable artesunate and no private clinics did. Chloroquine were in stock in less than 1% of HFs. About half of the facilities in the elimination districts had primiquine (15 of the 28 facilities). Quinine for treatment of malaria during the first trimester of pregnancy was available in tablet form in 40% of facilities and in injectable form in 62% of facilities. When asked what the challenges were to using knowledge from malaria trainings, the highest percentage of providers (36%) said that a main challenge is a lack of malaria supplies and commodities to provide care.

Discussion and Recommendations: Gaps were seen in both public and private facilities with regard to malaria commodities and supplies, training and supervision of providers, and febrile illness/malaria care at the facility level. With the above HFA findings in mind, MCSP recommends that the MOH, implementing partners and stakeholders in Madagascar:

- Strengthen assessment of fever practices and diagnosis of malaria. In addition to training and supervision, ensure that necessary job aids and national malaria guidelines are available to providers at the facility level. Having educational and directive materials on hand in the facility will provide an accessible resource for providers to use and improve their skills in fever and malaria care, even when supervisory activities are not available.
- Conduct in-person or telephone supervisory visits at least quarterly at all HFs. Increase the dissemination of malaria-specific technical support, particularly at private HFs, and improve the continuity of supervision between district and central government and all HFs. Increasing supervision and technical assistance to facilities will provide health workers with the opportunity to ask questions, receive guidance and practice their clinical skills related to fever and malaria care.
- As part of regular refresher trainings, verify that certain topics on fever and malaria case management/prevention are included in the training content for both public and private providers. Focus specifically on the topics of: 1) the importance of asking about fever and taking patient temperature at all outpatient visits; 2) the importance of conducting a malaria RDT or other diagnostic for every patient with febrile illness; 3) symptoms of uncomplicated malaria; 4) severe malaria case management; 5) malaria commodity management; 6) the tests to be performed in case of a fever in a child under 5; and 7) malaria in pregnancy. Integrate training programs with periodic knowledge and skills assessments among HPs. Refresher courses and skills assessments will give HPs the opportunity to better understand their strengths and weaknesses in providing quality fever and malaria care, and allow them to focus on and improve areas of weakness.
- Conduct a supply chain assessment (from national to community level) to better understand gaps in continuous supply of quality commodities to diagnose and treat malaria at all levels. Use the results of the supply chain assessment to design and improve a system that ensures the Ministry of Health has adequate supplies of these materials to restock supplies promptly when there are shortages, and improve tracking systems for accountability in the use of these supplies.
- Include private facilities in training, supervision, supply chain management and SBCC efforts to ensure all providers and surrounding populations have access to quality fever and malaria care services.
- Engage key stakeholders in developing HF-specific and context-relevant communication and sensitization plans for both public and private facilities. Communication and sensitization plans that are specific to the communities reached by a HF can help improve care seeking behavior in clients and improve specific provider skills in febrile illness and malaria case management. Centralize the design, production, and delivery of printed sensitization materials for malaria prevention and treatment.

Efforts should be made to ensure that suspected febrile illness is investigated among all patients in outpatient visits and when fever is confirmed, that a malaria RDT is administered. The MOH and implementing partners can collaborate to ensure that HFs have the resources, materials and commodities needed to provide all patients with quality fever and malaria care. If higher quality care is available in HFs in Madagascar, surrounding populations may be more likely to seek timely care for fever and other illnesses which will reduce the burden or malaria for women and their families.

Introduction

Although malaria incidence is declining globally, it remains a major cause of morbidity and mortality worldwide, particularly in Africa, where 90% of malaria cases occur.[v] Madagascar is no exception to this trend. Malaria is endemic in 90% of Madagascar with the entire population at risk of infection. Pregnant women and young children remain most vulnerable. Between 2013 and 2016, Madagascar experienced a decline in malaria cases (confirmed with RDT) among children under 5 at the national level, from 10% to 5.2%.[vi,vii] However, Malaria remains the fourth leading cause of morbidity and mortality in Madagascar, accounting for 5.9% of all outpatient visits, 4,913 HF admissions, and 6.7% of deaths in 2016. A health facility assessment of 65 facilities conducted in 2014 (Malaria care survey) showed that only 47.5% of patients presenting with fever or history of fever were categorized as suspect cases of malaria[viii]. Fewer than a third of health workers surveyed were able to report the correct amount of blood or buffer required when using a malaria rapid diagnostic test (RDT). Over half of surveyed health facilities reported antimalarial stockouts in the preceding three months[7]. While more than two-thirds of the HFs (67.8%) had copies of the National Malaria Control Policy (NMCP) and more than half (54.5%) had the National Case Management Policy, only 17.5% had a printed copy of the most recent national guidelines on malaria. In addition, capacity and knowledge surrounding malaria diagnosis and treatment was lacking; the assessment found that HPs had limited capacity to establish the differential diagnoses of fever and poor understanding of the management of uncomplicated and severe malaria as well as malaria in pregnant women.

The 2014 survey, however, was conducted one year after the US government sanctions banning support to public HFs were lifted. Due to lack of support, the health system faced challenges in almost every facet of operations. Since 2014, however, the President's Malaria Initiative (PMI) and other US government programs have been supporting the improvement of MCM in public HFs. As such, it might be expected that some aspects of fever and malaria care will have improved by the time of this survey, in 2018. Subsequent routine monitoring data from 2016 revealed that 94% of confirmed malaria cases in public and private HFs received the first line of treatment in line with the national guidelines[ix].

To guide the improvement of fever and malaria case management at outpatient facilities across Madagascar, MCSP in partnership with the NMCP conducted a Health Facility Assessment (HFA) Survey to better understand the operational capacity of health facilities to provide adequate management of malaria cases and febrile illness in selected districts. Under this objective, the specific objectives were to:

- Document the availability of key guidelines, equipment, drugs and supplies for malaria and febrile disease prevention and case management at HFs
- Assess health providers' knowledge and capacity to provide quality malaria prevention and management services
- Document health provider and health facility access to training, supervision and technical assistance from supporting entities
- Evaluate whether fever management protocols are implemented according to national guidelines at the facility level

Methodology

Sites and Assessment Population

The sampling strategy was implemented to include districts targeted for malaria elimination activities because a separate assessment that is not captured in this report was implemented in parallel to this health facility assessment and was focused on malaria elimination phase readiness. As indicated in the 2018-2022 National Strategic Plan (NSP), Madagascar's 114 districts are distributed into eight *faciès* (zones) based on malaria prevalence. Of the 114 districts, two were removed from the sampling base as they were unsafe or inaccessible, leaving 112 districts. The team sought a final sample that included two districts selected from each of the eight malaria transmission zones, for a total of 16 districts. The 16 districts were chosen in the following way. Eight districts nationwide were targeted for malaria elimination phase planning in

accordance with a NSP definition of an elimination district as one that has a malaria incidence <1/1000 people and a pre-elimination district as one that has a malaria incidence of 1-10/1000 and a malaria RDT positivity of < 5% (NSP 2018-2022). The eight elimination districts were in four different transmission zones, and four of these districts were purposefully selected for the assessment. One additional district was randomly selected from each of the four zones that contain the four chosen elimination districts, for a total of two districts per zone. Of the four remaining malaria zones, two districts were randomly selected from each. During data collection, the number of outpatient consultation observations were too few (to reach the adequate sample) in Ansiranana I; thus facilities from nearby district of Antsiranana II were added, increasing the total number of districts in the study to 17.

The populations from which the study subjects/study facilities were selected are listed below.

Health facilities

Across the accessible and secure 112 districts, lower level HF (Basic Health Center or *Centre de Santé de Base* [CSB I] and CSB II) offer outpatient febrile illness and malaria case management services. A total of 120 HFs were included in the sample for this assessment based on a sample size calculation with the key outcome of interest: proportion of patients with febrile illness who received a malaria diagnostic (see sample size section below). The number of HFs selected per zone for the study was proportional to the number of HFs in the zone. Once this number was determined, it was divided equally between the two districts in the zone. In each district, one private facility was randomly selected. The remainder of the sample in that district was completed with public facilities.

Health providers

One health provider per sampled HF was selected to participate in the assessment. At the start of each HF visit, the team counted the number of clinicians providing outpatient care present on that day. If there was only one clinician providing outpatient care, as is largely the case at CSBs in Madagascar, that provider was chosen for the survey, knowledge test, and observation. If more than one clinician providing outpatient care was present, the senior outpatient clinician was selected. If this clinician did not consent to participate, other outpatient clinicians providing outpatient care were selected at random until one consented to participate. In private facilities, all interested and consenting providers were included for the provider survey and knowledge test to increase the representation from private facilities.

Provider observations with clients

Provider/client observations took place in HFs with consenting providers and their clients. All clients who attended the clinic were eligible for participation in the assessment.

Sample size

The survey aimed to be representative at the national level. The outcome used to determine the sample size for client observations was the proportion of clients with febrile illness who are tested for malaria with an RDT or by microscopy. Assuming that 20% of all outpatient visits to the HF are for febrile illness as per routine surveillance data in Madagascar, that 50% of clients seeking care for fever are tested with an RDT or by microscopy, and using a cluster design effect of 2, the minimum sample size necessary to calculate the outcome of interest with 95% confidence precision of +/- 10%, assuming a 10% non-response rate, was 1078 outpatient visits to observe 970 visits and 97 fever clients. More details on sample calculations are included in Annex 1.

The study team was able to obtain a final sample of 894 outpatient consultation observations. The final sample is detailed in Table 1 below.

Table 1. Sample distribution by district, site, and HF type

Malaria operational zone	District	Public HFs	Private HFs	Total HFs	Tool #1: HF checklist	Tool #2: HW interview	Tool #3: Outpatient consultations observations	Tool #4: HW knowledge test
Central Highlands	Manandriana	2	1	3	3	3	18	3
	Antsirabe II	2	1	3	3	5	20	5
Highland Margin East	Ambatolampy	13	1	14	14	24	104	24
	Antananarivo Atsimondrano	14	1	15	15	18	134	18
Highland Margin West	Amparafaravola	6	1	7	7	7	59	7
	Mandoto	7	1	8	8	8	63	8
North East	Fenerive Est	10	1	11	11	11	99	11
	Antsiranana I	3	1	4	4	4	36	4
North West	Antsohihy	4	1	5	5	5	47	5
	Mahajanga I	5	1	6	6	6	54	6
South	Toliary I	2	1	3	3	4	27	4
	Ambovombe Androy	2	1	3	3	3	21	3
Southeast	Fort Dauphin	9	1	10	10	10	74	10
	Anosibe An'ala	8	1	9	9	9	49	9
Southwest	Amboasary Atsimo	5	1	6	6	6	37	6
	Morombe	5	1	6	6	7	52	7
Total	16	97	16	113	113	130	894	130

Approval by Institutional Review Boards

This study received approval from the Johns Hopkins Institutional Review Board (JHSPH-IRB) as well as ethical clearance from the Madagascar Ethics Committee.

Data collection

The assessment team visited each selected HF for two days and used the following tools: 1) HF checklist on key malaria equipment, commodities, job aids, training of providers, 2) interview guide for HPs, 3) checklist for assessing the work of HPs, and 4) HP knowledge test questionnaire. All HFs and participants in the assessment were informed in advance about the visit and data collection.

Health facility checklists were administered by the assessment team either with *HF in-charge or available HPs*. The checklist took 60 to 90 minutes to complete and was conducted when a participant was available and no patient needed care. The health facility checklist was adapted from the WHO Service Availability and Readiness Assessment (SARA) tool and the Measure DHS Service Provision Assessment (SPA) survey tool.

For the *observation, interview, and knowledge test with the HP,* direct observations started right after the HP and patient gave their consent. Typically, when the assessment team arrived at a HF, they checked the registers for the number of new outpatient visits on the same day of the previous week visit (for example, if the assessment team arrived at an HF on a Thursday, they reviewed the registers for the previous Thursday). When less than 20 outpatient visits were anticipated, the team approached each patient and conducted observations of patient visits until nine observations were completed. If 20 or more outpatient visits were anticipated, the team approached every other patient until nine patients were consented for observation. If no physician agreed to participate, or if no physician was available at the HF on the day of the visit, nurses or midwives providing care to patients were randomly selected until one of them agreed to participate in the observations. The assessment team checked that patients reported having fever

before conducting observations. HPs were interviewed and knowledge tests were administered when they did not have to care for patients. Patient observations usually took place in the morning depending on HPs' availability and patient visits to the HF. When there were fewer than nine patients at the HF on the first day of visit, the team remained another day to obtain at least nine observations. If there were still fewer than nine patients observed after the second day, the team supplemented the assessment through additional observations from other HFs, as noted above.

All potential participants were interviewed to assess their eligibility and interest before being enrolled in the assessment. Recruitment scripts were used to determine HP eligibility before explaining the assessment and assessing their interest in participating. Participants expressed their consent in private and in Malagasy after reading the consent form. Upon confirmation of eligibility, respondents were asked to provide informed consent to an assessment team member either in an office or a closed meeting room. Recruitment and eligibility for patient observations were done using prepared scripts. Written consent was requested from adult patients while caretakers gave consent for children aged 0-6 years. As regards to children aged 7-17 years, their parents or caretakers gave their written consent along with the child's verbal assent.

Each consent form was translated into Malagasy for use with participants. Consent and recruitment forms as well as data collection tools were translated into French to facilitate the training and coordination of assessment staff with foreign financial and technical associates.

During the courtesy visits at selected districts, the assessment team monitored stockout records at the CSBs. In the event of a stockout at the CSB, the team had commodities on hand to supply the facilities. CSB staff were not informed about the team's supply of drugs. After the greetings and introductions with CSB staff, the assessment team checked the list of drugs in stock at the center before starting patient observations. In case the assessment team encountered cases where a patient was diagnosed as having malaria but was not given the appropriate treatment, the team recorded the case in the observation form and gave medication directly to the patient. If the team did not encounter any case of confirmed malaria not receiving appropriate treatment, the drugs were handed over to the HF at the end of the assessment visit. As a result, no patient with confirmed malaria was left without appropriate medication during the team visit. In addition, stockouts of essential antimalarials were reported at the health district and Direction de Lutte contre le Paludisme (DLP) (Malaria control directorate at the MOH) at the end of the day to ensure urgent stock replenishment.

Response Rates and Clients Characteristics

Overall, the number of respondents required for the assessment was reached during data collection phase. The assessment conducted a high number of client observations, representing 87.9% of target number. The gap was because of the limited number of patients who visited the HFs for consultations. In some HFs, only three or four patients came for consultations when the assessment team was at the health facility. Response rates were very high for the HF checklist (100%) and HP interviews (115%). The number of HPs interviewed exceeded the target number as the teams systematically interviewed the HPs observed during patient consultations.

Table 2. Response rate

Replies		HF type	
	Total	Public	Private
Clients observed			
Intended sample size	1017	872	144
Actual sample size	894	772	122
Completeness rate (observed/sampled)	87.9%	88.5%	84.7%
HFs visited			
Intended sample size	113	97	16
Actual sample size	113	97	16
Response rate (visited/sampled)	100%	100%	100%

Replies		HF type	
	Total	Public	Private
Providers interviewed			
Intended sample size	113	97	16
Actual sample size	130	114	16
Response rate (interviewed/sampled)	115.0%	117.5%*	100.0%

*Response rate is over 100%. Though the study planned for one provider per facility, some facilities had more than one provider and as such, the final sample included more than one provider in those facilities.

Definitions of key outcomes

Definitions of key study outcomes referenced throughout this report are presented in Table 3 below.

Table 3. Definitions of key study outcomes

Outcome	Definition
Fever/history of fever	One or more of the following: 1) patient reports having fever in the previous 48 hours when directly asked by study team during consenting process, 2) patient spontaneously complains of fever in the previous 48 hours to health provider during consultation visit, 3) temperature upon examination was 37.5°C or greater
Malaria Diagnosis	Rapid diagnostic test is positive
Correct treatment of malaria	Prescription of an artemisinin-based combination therapy (ACT) at the correct dose for age (artesunate-amodiaquine or artemether-lumefantrine) for patients with malaria
Incorrect treatment of malaria	Failure to prescribe an ACT for patients with malaria (includes no antimalarial prescribed or a non-ACT antimalarial, such as sulfadoxine-pyrimethamine or quinine among any patient not a pregnant woman in her first trimester, prescribed)
Overtreatment of malaria	Prescription of an ACT for patients without a positive rapid diagnostic test

*Information on pregnancy status was not collected.

Data management and analysis

Quantitative data

Data were collected on paper questionnaires and transferred into tablets with the CSPro software. To ensure data quality, programs with consistency checks and skip patterns were predefined. A unique code was assigned to each HF and registered in the tablets to avoid coding errors and duplicates. Paper questionnaires were used to have a physical backup of the data in the event tablets had problems. Tablets were used to ensure data quality and speed up data processing. Supervisors checked the data recorded in the paper tools to ensure data were complete and consistent. At the end of data collection, quantitative data were cleaned using StataIC 15 to check data quality and prepare analysis.

Quantitative data were analyzed with StataIC 15 to extract the main results, including factors related to compliance with national malaria guidelines. Data were weighted in order to make results nationally representative (see Annex 2). Descriptive analysis was conducted using Stata by comparing selected indicators to target objectives. Comparisons were also made between public HFs and private HFs to document differences between the two types of facilities. Direct observations of HPs and HP knowledge tests were performed and then analyzed to document compliance with national malaria guidelines.

Assessment limitations

Given that data collection occurred during low malaria transmission season, it is difficult to generalize the results of the survey to other transmission periods when malaria burden and commodity availability might be different.

Another limitation was the small sample of private facilities. Though the number is proportional to the number of private facilities in the districts, the results should be interpreted with the understanding that the sample of facilities is still small and may not be able to be generalized to other private facilities.

Assessment Findings

Patient characteristics and case management

Patient age group

Table 4 below shows the age groups of the patients observed during outpatient consultations. At the 113 HFs included in the survey, 894 provider/client outpatient visits were observed. Of these, 35.5% of the observations were with children under 5 years of age, with a slightly higher percentage of patients from the private facilities being from the age group of <5 (49% of observations in private facilities and 32% of observations in public facilities).

Table 4. Characteristics of patients, Madagascar HFA, 2018 N = 950

		HF type where outpatient consultation occurred	
	Total	**Public**	**Private**
Number of patients (n)	894	772	122
	%	%	%
Patient Age			
<5 years old	35.5	32.3	49.1
5 years old and above (5+)	64.5	67.7	50.9

Malaria diagnosis and treatment

The primary outcome of the health facility survey was proportion of clients with recorded or reported febrile illness who are tested for malaria with an RDT or by microscopy. Table 5a shows overall malaria diagnosis and treatment by fever and malaria status among all age groups and across all facilities. Table 5b shows malaria diagnosis and treatment disaggregated by facility type. Table 5c shows malaria diagnosis and treatment disaggregated by patient age. Less than half (44%) of all patients had fever, which is defined has having at least one of the following: 1) reported fever during the previous 48 hours during the consenting process, 2) spontaneously reported fever experienced in the previous 48 hours during the consultation visit, and/or 3) had a temperature reading 37.5°C or greater. 316 patients reported fever during the consenting process, 348 complained of fever during the consultation and 176 clients had a temperature 37.5°C or greater. Two-thirds (66%) of the clients with febrile illness received a malaria RDT, including 69% of the children under-five years of age and 57% of the patients over five years of age (Table 5c). Of the clients who received an RDT, 18% of clients had a positive malaria RDT result. All but three of the patients with a positive malaria RDT were treated with ACTs. A small proportion of patients with a malaria diagnosis were given other medications including antibiotics, injectable quinine and ORS. Nearly all patients with a malaria diagnosis received paracetamol. A malaria RDT was performed for 8% of clients who did not have fever and 23% of those clients had a positive RDT. Nearly all clients (46/52) who had a malaria diagnosis and received an ACT were counseled on the use of the medication.

Table 5a. Malaria diagnosis and treatment by fever and malaria status, overall, N = 894

	n/N	**Weighted percent**
Fever reported or recorded		
Fever*	**404/894**	**43.5**
RDT performed, of those with fever	**242/404**	**65.9**

	n/N	Weighted percent
Malaria RDT positive, of those who had RDT	**47/242**	**18.1**
Treated with ACT, of those with malaria diagnosis	**44/47**	**92.1**
Treated with non-recommended antimalarial, of those with malaria diagnosis**	**5/45**	**10.2**
No fever reported or recorded		
No fever	**490/894**	**56.5**
RDT performed, of those without fever	**31/490**	**7.9**
Malaria diagnosed, of those who had RDT	**5/31**	**22.8**
Treated with ACT, of those with malaria diagnosis	**4/5**	**77.1**
Treated with non-recommended antimalarial, of those with malaria diagnosis	**0/5**	**0.0**
Treated with other medication, of those with malaria diagnosis***	**1/5**	**18.2**
Malaria Diagnosed (positive RDT)		
Malaria diagnosed, of all observations	**52/894**	**6.2**
RDT performed, of all who had a malaria diagnosis	**52/52**	**100/0**
Treated with ACT, of all who had diagnosed malaria	**48/52**	**89.7**
Treated with ACT and counseled on how to take the medication, of all who had malaria diagnosis	**46/52**	**86.0**

* Fever = Client reported fever in the previous 48 hours either during the consenting process or during the consultation with the HP and/or clients with temperature 37.5°C or greater as measured by the HP during the consultation

** Some patients with a positive RDT also received the following: 4 patients were treated with injectable quinine, 2 were treated with amoxicillin, 1 was treated with another antimalarial (unspecified), 3 were treated with Cotrimoxazole, 4 were treated with other antibiotics (unspecified), 1 was treated with Iron

*** 1 patient was treated with cotrimoxizol, 1 was treated with oral rehydration therapy

Table 5b. Malaria diagnosis and treatment by fever and malaria status, Facility type

	HF type where outpatient consultation occurred			
	Public		Private	
	n/N	Weighted percent	n/N	Weighted percent
Fever				
Fever*	345/772	41.2	59/122	53.9
RDT performed, of those with fever	207/345	68.5	35/59	57.2
Malaria diagnosed, of those who had RDT	40/207	19.5	7/35	12.4
Treated with ACT, of those with malaria diagnosis	38/40	92.8	6/7	87.9
Treated with non-recommended antimalarial, of those with malaria diagnosis	4/40**	0.0	0/7	0.0
Treated with another medication, of those with malaria diagnosis	4/40	9.2	1/7****	12.5
No fever				
No fever	427/772	58.9	63/122	46.2
RDT performed, of those without fever	29/427	8.3	2/63	5.4
Malaria diagnosed, of those who had RDT	4/29	19.6	1/2	50.0
Treated with ACT, of those with malaria diagnosis	4/4	100.0	0/1	0.0
Treated with non-recommended antimalarial, of those with malaria diagnosis	0/4	0.0	0/1	0.0
Treated with another medication, of those with malaria diagnosis***	1/4	22.0	1/1	100.0
Malaria Diagnosed (positive RDT)				
Malaria diagnosed, of all observations	44/772	6.5	8/122	5.1
RDT performed, of all who had malaria diagnosis	44/44	100.0	8/8	100.0
Treated with an ACT, of all who had diagnosed malaria	42/44	93.9	6/8	66.4
Treated with ACT and counseled on how to take the medication, of all who had malaria diagnosis	40/44	89.5	6/8	66.4
Treated with non-recommended antimalarials, of all who had malaria diagnosis	4/44	8.7	2/8	24.3

* Fever = Client reported fever in the previous 48 hours either during the consenting process or during the consultation with the HP and/or clients with temperature 37.5°C or greater as measured by the HP during the consultation
** 4 patients were treated with injectable quinine, 1 treated with another anti-malarial (unspecified), 2 were treated with amoxicillin, 3 treated Cotrimoxazole, 3 treated with another antibiotic (unspecified)
***1 patient was treated with Cotrimoxazole. 1 ORS
**** 1 patient was treated with an antibiotic (unspecified), 1 with Iron

Table 5c. Malaria diagnosis and treatment by fever and malaria status, Age of patient

	Age of patient			
	Children < 5		5+	
	n/N	Weighted percent	n/N	Weighted percent
Fever				

	Age of patient			
	Children < 5		5+	
	n/N	Weighted percent	n/N	Weighted percent
Fever*	190/297	61.3	214/597	33.8
RDT performed, of those with fever	115/190	65.9	127/214	66.0
Malaria diagnosed, of those who had RDT	13/115	10.9	34/127	25.3
Treated with ACT, of those with malaria diagnosis	12/13	90.7	32/34	94.9
Treated with non-recommended antimalarial, of those with malaria diagnosis	0/13	0.0	4/34**	0,0
Treated with another medication, of those with malaria diagnosis	2/13****	14.2	2/34***	10.2
No fever				
No fever	107/297	38.7	383/597	66.2
RDT performed, of those without fever	9/107	8.3	22/383	7.7
Malaria diagnosed, of those who had RDT	2/9	38.1	3/22	17.5
Treated with ACT, of those with malaria diagnosis	2/2	100.0	2/3	65.0
Treated with non-recommended antimalarial, of those with malaria diagnosis	0/3	0.0	0/4	0.0
Treated with another medication, of those with malaria diagnosis	1/3*****	30.0	0/4	0.0
Malaria Diagnosed (Positive RDT)				
Malaria diagnosed, of all observations	15/297	5.6	37/597	6.5
RDT performed, of all who had malaria diagnosis	15/15	100.0	37/37	100.0
Treated with correct ACT, of all who had diagnosed malaria	14/15	88.8	34/37	90.1
Treated with ACT and counseled on how to take the medication, of all who had malaria diagnosis	14/15	88.8	32/37	84.6
Treated with non-recommended antimalarials, of all who had malaria diagnosis	0/15	0.0	4/37	0.0

* Fever = Client reported fever in the previous 48 hours either during the consenting process or during the consultation with the HP and/or clients with temperature 37.5°C or greater as measured by the HP during the consultation

** 4 patients treated with quinine injectable, 1 with another antimalarial (unspecified),

*** 2 patients were treated with Cotrimxazole, 4 with antibiotics, 1 with Iron

**** 2 patients treated with amoxicillin, 1 Cotrimxazole

***** 1 patient treated with Cotrimxazole, 1 with ORS,

Table 6a presents identification of fever, malaria diagnosis, and malaria treatment among all age groups and across all facilities. The same information is further disaggregated by facility type (public/private) and by age (over/under five years) in Annex X in tables 6b1, 6b2, 6c1, and 6c2, respectively. Among the 316 patients who reported fever in the previous 48 hours during the consenting process, 66% received an RDT. Among the 348 patients who spontaneously reported fever in the previous 48 hours during a consultation, 67% received an RDT. Among the 200 patients with a temperature 37.5°C or greater, 74% received a RDT.

Table 6a. Identification of fever, malaria diagnosis, and malaria treatment OVERALL

	Fever Identification	RDT performed		RDT positive among patients who received a RDT		Result shared with patient among patients who received a RDT		Positive RDT treated with ACT among patients who received a RDT		Negative RDT treated with ACT among patients who received a RDT		No RDT treated with ACT		Microscopic examination performed	
		n/N	weighted %	n/N	weighted %	n/N	weighted %	n/N	weighted %	n/N	weighted %	n/N	weighted %	n/N	weighted %
1	Fever during the previous 48 hours reported by patient during consenting process (n=316)	192/316	66.2	42/192	20.3	172/192	87.5	40/42	93.3	0/150	0.0	0/124	0.0	0/316	0.0
2	Fever during the previous 48 hours reported spontaneously by patient during consultation with HP (n=348)	220/348	66.8	44/220	19.1	194/220	86.0	41/44	91.9	0/176	0.0	0/128	0.0	0/348	0.0
3	HP asks client about fever during the previous 48 hours (if not spontaneously reported by patient) (n=259)	47/259	21.6	7/47	17.4	36/47	82.0	6/7	77.1	0/40	0.0	0/212	0.0	0/259	0.0
4	Patient temperature taken (n=557)	246/557	44.8	48/246	19.3	213/246	84.3	46/48	94.2	0/199	0.0	0/311	0.0	0/557	0.0
5	Patient temperature 37.5 degrees or greater (n=200)	155/200	74.4	33/155	22.9	138/155	85.3	31/33	92.0	0/122	0.0	0/45	0.0	0/200	0.0
6	Fever not reported by patient during consenting; fever not reported spontaneously by client during consult; HP did not ask about temperature; and patient temperature was not taken (n=199)	1/199	0.8	0/1	0.0	1/1	100.0	-	-	0/1	0.0	0/199	0.0	0/199	0.0

Table 6d presents possible facilitators for fever diagnosis, among patients whose fever was assessed compared to those whose fever was not assessed. In addition, table 6d examines facilitators for malaria diagnosis among patients with fever who received a RDT versus those with fever who did not receive a RDT. For example, among patients whose fever was assessed, 57% were seen by a provider who received malaria training in the last two years, compared to 66% of patients whose fever was not assessed. Among patients with fever who received a RDT, 73% were seen by provider who received supervision in the last 6 months, compared to 65% of patients with fever who did not receive a RDT. Of the 140 patients who had fever but did not receive a RDT, 72% were seen in facilities that did not have a RDT in stock on the day of the survey. A copy of the most recent national malaria guidelines was available in 30% of the patient cases where fever was assessed compared to 21% of cases where fever was not assessed.

Table 6d. Facilitators for fever diagnosis

	Patient was seen by a provider who received training in malaria in the last two years	Patient seen by provider who scored 85% or higher on their knowledge test	Patient seen by provider who received supervision in the last 6 months	RDT was present on the day of the survey	Functional thermometer was available on the day of the survey	Copy of most recent national malaria guidelines was available on the day of
	n/N, weighted %	n/N, weighted %	n/N, weighted %	n/N, weighted %	n/N, weighted %	n/N, weighted %
Fever assessed (Client reported fever either during the consenting process or during the consultation with the HP and/or clients with temperature was measured by the HP during the consultation, or provider asked about fever) (n=695)	423/695 57.0	523/695 71.9	475/695 67.9	614/695 88.0	648/695 93.5	206/695 30.4
Fever not assessed (patient did not spontaneous report during consenting or consultation, provider did not take the persons temperature, provider did not ask about fever) (n=199)	118/199 53.1	145/199 68.1	143/199 71.6	177/199 91.6	178/199 89.8	46/199 21.6
Patient with fever* receives a RDT (n=240)	133/240 56.8	196/240 78.1	172/240 72.7	223/240 92.2	225/240 93.5	65/240 28.9
Patient with fever* does not receive a RDT (n=140)	96/140 56.5	88/140 53.2	95/140 63.7	106/140 71.5	128/140 92.9	36/140 22.3

*Client reported fever in the previous 48 hours either during the consenting process or during the consultation with the HP and/or clients with temperature 37.5°C or greater as measured by the HP during the consultation

Clinical symptoms

Overall, fever was the symptom most frequently (44%) reported by patients and 29% reported having a cough. Diarrhea was reported by 15% of patients. Roughly 11% of all patients reported having a runny nose and/or headache. Less than 10% of patients reported having other symptoms, including shivering, loss of appetite, soreness, and stomach ache. Abnormal breathing was reported by 5% of clients, and seizures were reported by less than 1% of clients. Most symptoms were more common among children under the age of five years, including fever. (Table 7)

Table 7. Symptoms reported by patients to health workers

			Age of patient			
	Overall		Children < 5		5+	
	n/N	Weighted percent	n/N	Weighted percent	n/N	Weighted percent
Symptom reported to health workers						
fever	380/894	43.5	180/297	61.3	200/597	33.8
cough	245/894	29.0	137/297	47.5	108/597	18.8
runny nose	89/894	10.7	60/297	20.8	29/597	5.1
headache	97/894	11.2	4/297	2.2	93/597	16.2
shivering	69/894	8.4	8/297	2.9	61/597	11.5
stomachache	47/894	4.9	4/297	1.7	43/597	6.6
loss of appetite	57/894	7.9	36/297	16.4	21/597	3.3
diarrhea	127/894	15.2	84/297	30.0	43/597	7.1
seizures	5/894	0.8	1/297	0.7	4/597	0.8
abnormal breathing	29/894	4.9	13/297	5.9	16/597	4.3
vomiting	108/894	14.2	56/297	19.4	52/597	11.3
soreness	72/894	8.3	2/297	1.3	70/597	12.1
body pain	19/894	1.8	2/297	0.7	17/597	2.4

HP training, knowledge, and capacity to provide quality malaria prevention and case management services

HP characteristics

Table 8 shows the distribution of HPs by their qualifications. Of 130 interviewed health workers, roughly half were physicians, and nurses and midwives represented 22% and 28%, respectively. HPs interviewed had been in their position for a mean of 5 years (median of 4 years, range less than 6 months to 27 years). The median number of years for physicians was four years and three years for nurses and midwives. Most of the providers (69%) interviewed in private facilities were physicians; 19% were nurses and 12% were midwives.

Table 8. HP characteristics

	Overall		Provider type			
			Public		Private	
	n/N	percent	n/N	percent	n/N	percent
Qualification						
Physician	66/130	50.8	55/114	48.3	11/16	68.8
Nurse	28/130	21.5	25/114	21.9	3/16	18.7
Midwife	36/130	27.7	34/114	29.8	2	12.5
Experience						
Mean number of years in position	130	5	114	5.04	16	4.88

Note: All results are unweighted

Training on malaria received by HPs

As seen in Table 9, only about half (52%) of HPs had received malaria specific training during the past two years. Of the providers who had received malaria specific training (n=68), a percentage of providers had received training on the following themes: malaria diagnosis, use of RDTs, and use of a microscope (98%); management of fever cases (38%); management of uncomplicated malaria cases (71%); management of severe malaria cases (69%); and malaria in pregnancy (46%).

Roughly one quarter (23%) of HPs had attended at least one training on malaria monitoring and evaluation. Of those, a higher percentage of private providers had received training on HMIS (75%) compared with public providers (50%). Training on electronic reporting using tablets had been received by 47% of providers. Roughly one third (36%) of providers had received training on tracking malaria cases and 53% of providers received training on epidemic thresholds.

Table 9. Training received in the past two year

	Overall		Provider type			
			Public		Private	
	n/N	percent	n/N	percent	n/N	percent
Training on malaria received	68/130	52.3	64/114	56.1	4/16	25.0
Training topic, of those who received training (n=68)						
Malaria diagnosis/use of RDTs/use of microscope	33/68	48.5	30/64	46.9	3/4	75.0
Management of fever cases	26/68	38.4	24/64	37.5	2/4	50.0
Management of uncomplicated malaria cases	48/68	70.6	45/64	70.3	3/4	75.0
Management of severe malaria cases	47/68	69.1	45/64	70.3	2/4	50.0
Malaria in pregnancy	31/68	45.6	30/64	46.9	1/4	25.0
Epidemics surveillance	9/68	13.2	9/64	14.1	0/4	0.0
Malaria elimination strategy	2/68	2.9	2/64	3.1	0/4	0.0
Malaria surveillance and monitoring	7/68	10.3	7/64	10.9	0/4	0.0

	Overall		Provider type			
			Public		Private	
	n/N	percent	n/N	percent	n/N	percent
Training on monitoring and evaluation of malaria received	30/130	23.1	26/114	22.8	4/16	25.0
Training topic, of those who received training (n=30)						
HMIS (Monthly Activity Report/MAR)	16/30	53.3	13/26	50.0	3/4	75.0
IDSR (weekly integrated disease surveillance and reporting system)	6/30	20.0	5/26	19.2	1/4	25.0
Tracking Cases	11/30	36.7	10/26	38.5	1/4	25.0
Epidemic Threshold	16/30	53.3	13/26	50.0	3/4	75.0
Electronic reporting (on tablet)	14/30	46.7	12/26	46.2	2/4	50.0

Note: all results are unweighted.

The training topics that HPs most frequently requested included severe malaria case management (52%) and malaria treatment (45%). A larger percentage of private providers requested training on treatment and management of severe malaria, compared with public providers (56% and 52%, respectively). Nearly a quarter of HPs mentioned that they need training in malaria diagnosis (22%). A portion of providers (10%) requested training on malaria-related monitoring and evaluation (22%), while 9% of HPs requested training on detection and management of epidemics. A larger proportion of private providers reported wanting training on malaria in pregnancy (31%) compared with 13% of public providers.

Table 10. Additional training needs reported by HPs

	Overall		Provider type			
			Public		Private	
	n/N	percent	n/N	percent	n/N	percent
Management of severe malaria	68/130	52.3	59/114	51.8	9/16	56.3
Malaria treatment	58/130	44.6	47/114	41.2	11/16	68.8
Malaria-related Monitoring and Evaluation	14/130	10.8	12/114	10.5	2/16	12.5
Malaria diagnosis	29/130	22.3	24/114	21.1	5/16	31.3
Malaria in pregnancy	20/130	15.4	15/114	13.2	5/16	31.3
Communication for social and behavioral change (CSBC) and malaria	16/130	12.3	14/114	12.4	2/16	12.5
Management of non-malarial fevers	14/130	10.8	12/114	10.5	2/16	12.5
Epidemics detection and management	12/130	9.2	11/114	9.7	1/16	6.3
Community-based integrated management of childhood illnesses (iCCM) in children under 5	8/130	6.2	7/114	6.1	1/16	6.3

	Overall		Provider type			
			Public		Private	
	n/N	percent	n/N	percent	n/N	percent
No training needed	7/130	5.4	5/114	4.4	2/16	12.5

Note: all results are unweighted.

When asked what the main challenges are in using the knowledge gained from the malaria trainings received, 38% HPs responded that there are a lack of malaria supplies and commodities in the facilities (Table 11). About a quarter (24%) said there are not enough trainings on malaria and 17% said there were no challenges. Some providers gave 'other' responses which included not enough cases of uncomplicated and severe malaria; lack of a tablet tool; and problems with RDTs.

Table 11. Self reported challenges with using knowledge gained from malaria trainings

		Overall	
	Number of HPs (n)	N	%
Challenges	There are no challenges	22/130	16.9
	Not having enough trainings	31/130	23.9
	The topics covered during the trainings do not help with work	3/130	2.3
	Logistical problems (financial, distance) attending the training	4/130	3.1
	Malaria supplies/commodities not available at facility	49/130	37.7
	High staff turnover	3/130	2.3
	Other*	55/130	42.3

Note: All results are unweighted

* Other responses included: not enough cases of malaria; lack of an electronic tablet tool; problems with RDTs.

Supervision and technical assistance at HFs

About 68% of HFs received at least one supervisory visit during the last six months, including 69% of public facilities and 60% of private facilities. Of those who had received supervision visits, most (72%) of the visits were done by district staff rather than regional or central staff (43% and 29%, respectively). During these visits, commodity management (49%) and management of malaria cases (26%) were the topics most often addressed. Commodity management was included in supervision visits more commonly in public facilities (51%) than in private facilities (33%) and malaria case management was included in similar proportions for both public facilities (27%) and private facilities (33%). Discussions during supervision regarding vector control were included in just 15% of facility staff who reported receiving supervision (Table 12).

Technical assistance was received by few facilities overall on the following topics: training on the detection and management of malaria (42%), malaria in pregnancy (15%) and data management and reporting (18%). A higher percentage of private facilities (33%) reported technical assistance in data management and reporting than did public facilities (16%) (Table 12).

Table 12. Supervision and technical assistance in facilities (n=112* facilities)

			Provider type			
	Overall		Public		Private	
	n/N	percent	n/N	percent	n/N	percent
Received at least one supervision in the last 6 months	76/112	67.9	67/97	69.1	9/15	60.0
Entity that did the supervision, of those who received supervision (line 1)						
Central staff	22/76	29.0	19/67	28.4	3/9	33.3
Regional staff	33/76	43.3	28/67	41.8	5/9	55.6
District Staff	55/76	72.4	50/67	74.6	5/9	55.6
Other	27/76	35.5	23/67	34.3	4/9	44.4
Topics addressed during supervision, of those who received supervision (line 1)						
Commodity management (drugs, RDT, LLIN)	37/76	48.9	34/67	50.8	3/9	33.3
Vector control (Indoor spraying with insecticide), Use of Long-Lasting Insecticide-treated Nets (LLIN)	11/76	14.5	10/67	14.9	1/9	11.1
Data/reports on malaria	13/76	17.1	12/67	17.9	1/9	11.1
Laboratory supplies (RDT = Rapid Diagnostic Test, pipettes, reagents, etc.)	2/76	2.6	2/67	3.0	0/9	0.0
Case management (diagnosis, treatment and follow-up)	20/76	26.3	17/67	27.4	3/9	33.3
Social Communication for Behavioral Change (SCBC)	5/76	6.6	5/67	7.5	0/9	0.0
Type of technical assistance regularly received						
Training on the detection and management of malaria	32/76	42.1	28/67	41.8	4/9	44.4
Malaria in pregnancy	11/76	14.5	9/67	13.4	2/9	22.2
Data management and reporting	14/76	18.4	11/67	16.4	3/9	33.3

Note: all results are unweighted.

*One facility of the 113 did not respond to these questions, leaving an n=112

HP knowledge on malaria

Table 13 shows that, except for a few topics, most HPs answered questions regarding several different topics related to malaria correctly. Most (89%) HPs knew that fever was a potential indication of malaria. The topics on which the lowest percentage of HPs answered correctly were the symptoms of uncomplicated malaria (39%); selecting the tests to be performed in case of fever in a child under 5 (54%); and the process for determining whether a patient is cured of malaria (65%). More HPs answered correctly on the topic of the need to perform a malaria test in cases of fever and provide first-line treatment of uncomplicated malaria in pregnant women (76% and 66% respectively). More HPs at private facilities knew the key information needed for interpreting microscopy test results compared with public facilities (88% compared with 75%). Despite their level of knowledge on malaria, only two-thirds (67%) of HPs scored above 85% on the knowledge test, including 68% of public providers and 63% of private providers.

Table 13. Health provider knowledge on malaria

	Overall		Provider type			
			Public		Private	
	n/N	percent	n/N	percent	n/N	percent
Test topics						
Mode of transmission of malaria	108/130	83.1	95/114	83.3	13/16	81.3
Fever is a potential indication of malaria	116/130	89.1	101/114	88.6	15/16	95.8
Symptoms of uncomplicated malaria	51/130	39.2	43/114	37.7	8/16	50.0
Malaria prevention actions	127/130	97.7	111/114	97.4	16/16	100.0
Necessity of performing a malaria test in case of fever	99/130	76.2	88/114	77.2	11/16	68.8
First-line treatment of uncomplicated malaria in patients in their second or third trimester of pregnancy	86/130	66.2	76/114	66.7	10/16	62.5
Procedure to follow in case of negative test	126/130	96.6	112/114	98.3	14/16	87.5
Signs of severe malaria with complications	125/130	96.2	110/114	96.5	15/16	93.8
Other causes of fever	129/130	99.2	113/114	99.1	16/16	100.0
First-line treatment of uncomplicated malaria in a woman in her first trimester of pregnancy	84/130	64.4	76/114	66.7	8/16	50.0
Key information needed when interpreting microscopy results	100/130	76.9	86/114	75.4	14/16	87.5
Tests to be performed in case of fever in children under 5	70/130	53.9	63/114	55.3	7/16	43.8
Decision-making process to follow to establish if a patient is cured of malaria	85/130	65.4	74/114	64.9	11/16	68.8
Health providers who scored above 85% on the knowledge test	87/130	66.9	77/114	67.5	10/16	62.5

Note: all results are unweighted.

Availability of key equipment, commodities, guidelines and SBCC activities for fever and malaria care at the facility level

All facilities (100%) reported offering services for the diagnosis and treatment of malaria (data not shown) and almost all facilities had a malaria RDT (87%) and a functional thermometer (95%) on the day of the survey. Few facilities had the latest copy of the national malaria guidelines (30.3%).

Table 14. Malaria equipment, commodities and guidelines in HFs

	Overall		Facility type			
			Public		Private	
	n/N	Weighted percent	n/N	Weighted percent	n/N	Weighted percent
Microscope available	6/113	6.8	3/97	4.1	3/16	22.6
RDT available	100/113	87.0	87/97	89.4	13/16	73.3
Functional thermometer available	104/113	94.9	89/97	94.7	15/16	96.6
Functional baby scale available	101/113	88.9	87/97	90.8	14/16	77.7
Functional weighing scale available	103/113	89.2	87/97	87.3	6/16	100.0
Latest copy of the national guidelines on malaria in the HF						
Observed, latest copy	32/113	30.3	28/97	31.5	4/16	23.1
Observed, out of date	3/113	2.9	3/97	3.4	0/16	0.0
Reported in facility, not observed	48/113	38.8	42/97	39.7	6/16	33.5
No guidelines available	30/113	28.0	24/97	25.4	6/16	43.4

Product stocks in HFs

Table 15 shows the availability of malaria commodities in HFs. The percentage of HFs with artesunate-amodiaquine (ASAQ) in stock ranged between 86% and 91%, depending on formulation (indicated age group). Roughly one quarter to third of facilities reported a stockout of at least one day in the past two months of some formulation of ASAQ. More than one third of public HFs (38%) had injectable artesunate at the time of the assessment while none of the private HFs did. The percentage of HFs that had artemether-lumefantrine and chloroquine in stock was 2% and 0%, respectively. The survey found that sulfadoxine-pyrimethamine (SP) was available in 70% of HFs. The percentage of HFs with quinine in stock was 40% for tablet formulation and 62% for the injectable formulation, though 45% reported a stockout in the last two months of the injectable formulation and 65% in the tablet formulation. Roughly half (15 of 28) of HFs in the elimination districts had primaquine in stock. Forty percent of facilities (41%) had long-lasting insecticide-treated nets (LLINs) in stock. Malaria RDTs were available in 87% of facilities, though 38% reported to have had a stockout of at least one day of malaria RDTs in the past two months, and 11% reported to have had at least one expired RDT.

Table 15a. Products in and out of stock in HFs

	Overall		Facility type			
			Public		Private	
	n/N	Weighted percent	n/N	Weighted percent	n/N	Weighted percent
Product in stock on the day of the survey						
ASAQ (for <1 year of age)	95/113	85.7	86/97	91.1	9/16	54.5
ASAQ (for 1-5 years)	102/113	90.8	92/97	96.7	10/16	56.6
ASAQ (for 6-13 years)	101/113	86.9	91/97	92.1	10/16	56.6
ASAQ (for 14+ years)	96/113	87.8	86/97	91.7	10/16	64.9
Artemether-Lumefantrine (AL)	2/113	1.5	2/97	1.8	0/16	0.0
Artesunate (injectable)	35/113	32.6	35/97	38.2	0/16	0.0

	Overall		Facility type			
			Public		Private	
	n/N	Weighted percent	n/N	Weighted percent	n/N	Weighted percent
SP (Sulfadoxine-Pyrimethamine)	64/113	69.6	57/97	74.3	7/16	42.0
Quinine (tablet)	36/113	39.8	31/97	41.8	5/16	28.5
Quinine (injectable)	63/113	62.3	54/97	62.2	9/16	62.8
Chloroquine	0/113	0.0	0/97	0.0	0/16	0.0
Primaquine	28/113	12.9	28/97	15.1	0/16	0.0
Malaria RDT	100/113	87.0	87/97	89.4	13/16	73.3
LLIN for ANC and children <5 with malaria	37/113	40.9	33/97	43.6	4/16	25.3
Products out of stock for at least one day over the two past months						
ASAQ (for < 1 year)	31/113	26.3	21/97	20.6	10/16	59.9
ASAQ (for 1-5 years)	27/113	27.2	18/97	22.0	9/16	57.7
ASAQ (for 6-13 years)	31/113	36.3	22/97	32.6	9/16	57.7
ASAQ (for 14+ years)	37/113	35.2	29/97	33.4	8/16	45.7
Artesunate (injectable)	83/113	75.3	67/97	71.0	16/16	100.0
SP (Sulfadoxine-Pyrimethamine)	69/113	52.3	59/97	49.8	10/16	67.5
Quinine (tablet)	81/113	65.4	70/97	64.4	11/16	71.6
Quinine (injectable)	58/113	45.4	51/97	46.8	7/16	37.2
Malaria RDT	34/113	38.0	29/97	38.1	5/16	37.2
Insecticide-Treated Nets for ANCs and children under 5 with malaria	87/113	69.2	75/97	68.3	12/16	74.7
Expired RDTs in stock	15/113	11.3	11/97	9.8	4/16	19.8
Expired ACT in stock	15/113	13.3	9/97	10.1	6/16	31.6

Table 15b shows LLIN stocks in facilities on the day of the survey, disaggregated by district.

Table 15b. LLINs in stock in facilities on the day of the survey, by district

District	n/N	Percent
Manandriana	0/3	0%
Antsirabe II	0/3	0%
Ambatolampy	1/14	7.1%
Antananarivo Atsimondrano	0/15	0%
Amparafaravola	0/7	0%
Mandoto	3/8	37.5%
Fenerive Est	0/11	0%
Antsiranana I	3/4	75%
Antsohihy	3/5	60%
Mahajanga I	4/6	66.7%
Toliary I	3/3	100%
Ambovombe Androy	2/3	66.7%

District	n/N	Percent
Fort Dauphin	7/10	70%
Anosibe An'ala	1/9	11.1%
Amboasary Atsimo	5/6	83.3%
Morombe	5/6	83.3%

Stockouts of important malaria commodities were frequent across facilities. Stockouts lasting more than three days in the previous two months before the survey were documented in HFs for several commodities, including: malaria RDTs (34%), some formulation of ASAQ (ranging from 12% to 23%), LLINs (46%), and injectable artesunate (42%). Stockouts were more common in public facilities than they were in private facilities.

Table 16a. Products out of stock in HFs for 3+ days

			Facility type			
	Overall		Public		Private	
	n/N	Weighted percent	n/N	Weighted percent	n/N	Weighted percent
Stockouts of commodities (more than 3 days in the 2 months prior to the survey)						
ASAQ (for < 1 year)	12/113	11.5	10/97	11.7	2/16	10.5
ASAQ (for 1-5 years)	15/113	17.5	13/97	18.7	2/16	10.5
ASAQ (for 6-13 years)	18/113	22.6	16/97	24.7	2/16	10.5
ASAQ (for 14+ years)	19/113	22.4	17/97	24.5	2/16	10.5
Artesunate (injectable)	45/113	41.6	39/97	42.2	6/16	38.1
SP (Sulfadoxine-Pyrimethamine)	19/113	20.5	19/97	24.0	0/16	0.0
Quinine (tablet)	0/113	0.0	0/97	0.0	0/16	0.0
Quinine (injectable)	8/113	7.7	8/97	9.0	0/16	0.0
Malaria RDT	32/113	34.4	29/97	37.4	3/16	17.2
Insecticide-Treated Nets for ANCs and children under 5 with malaria	55/113	45.6	51/97	84.4	4/16	29.2

When asked what the major challenge was in diagnosing malaria at the CSB level, 37% of providers said that there were no challenges and 37% said that the major issue was stockouts of RDTs (data not shown).

Table 16a shows Primaquine availability in facilities by district type (elimination versus non-elimination district). Primaquine was available in 31.8% of facilities in elimination districts and in 9% of facilities in non-elimination districts.

Table 16a. Primaquine in facilities

	Elimination districts n/N (%)		Non- elimination districts n/N (%)	
In stock	15/28	(31.8)	13/85	(8.7)
Products out of stock for at least one day over the two past months	n/a	n/a	n/a	n/a
Stockouts of commodities (more than 3 days in the 2 months prior to the survey)	n/a	n/a	n/a	n/a

Social and Behavior Change Communication

Overall 92% of HFs conduct social and behavior change communication (SBCC) activities, with almost all (95%) of public facilities conducting SBCC activities and only 68% of private facilities. Across facilities, 75% had a communication plan for malaria prevention and treatment. Group sensitization in the community was conducted significantly more by public facilities (72%) than private facilities (16%) and slightly more public facilities (19%) had printed sensitization materials than private facilities (12%). Over half of facilities (55%) conducted sensitization activities at the facility, with a similar proportion of both public and private facilities. Home visits were more frequently conducted by public facilities (26%) compared to private facilities (9%).

Table 1 Social and Behavior Change Communication

			Provider type			
	Overall		Public		Private	
	n/N	Weighted percent	n/N	Weighted percent	n/N	Weighted percent
SBCC activities conducted by the HF						
No sensitization	8/113	6.8	5/97	3.1	3/16	28.3
Home visit	21/113	23.5	19/97	26.0	2/16	8.7
Group sensitization in the community	68/113	63.5	65/97	71.7	3/16	15.6
Printed sensitization materials	20/113	18.2	18/97	19.4	2/16	11.6
Sensitization at the health facility	59/113	55.4	49/97	55.4	10/16	55.4
Available Malaria prevention and treatment community plan	88/113	74.5	76/97	75.7	12/16	67.1

Discussion

The objective of this assessment was to evaluate the operational capacity of HFs and HPs to provide quality fever and malaria case management as well as other activities relating to the prevention of malaria. Given that in Madagascar clients usually delay seeking care for fever or other illness[x], it is recommended that clients have their temperature taken at all outpatient consultations and are asked about fever with their current illness. Though HPs nearly always took temperatures correctly, they only took the client's temperature in 62% of outpatient visit consultations. HPs administered a RDT to only 66% of the 44% of patients that presented with a fever. One reason for this might be lack of RDTs in stock given that of the 140 patients who had fever but did not receive a RDT, 72% were seen in facilities that did not have a RDT in stock on the day of the survey. Identifying fever as part of a patient's illness is vital to recognizing the need to conduct a malaria RDT, and conducting a malaria RDT allows for confirmation of disease. These two steps were missed among patients in this survey; as such, both suspected and confirmed

malaria cases were likely missed. Nearly all patients with a positive RDT received an ACT (90% or 48/52) and received counseling on the use of that ACT (86% or 46/52). While those numbers are high, not all patients received malaria care in line with the national malaria guidelines.

Several issues may be affecting the quality of fever and malaria care services in Madagascar, such as retention rates in providers. The mean tenure of the physicians, nurses, and midwives sampled for this assessment was four years (median of 5 years, range of less than six months to 27 years), which may contribute to losses in contextual knowledge and practical skills. In addition, only 53% of surveyed HPs had received a malaria specific training in the past two years. Of those, only 45% had received training on malaria in pregnancy and 49% had received training on malaria diagnosis. With only 68% of facilities receiving any kind of supervision in the last six months, HPs are not receiving the opportunities to practice interventions that are crucial to being a sufficiently skilled provider in malaria case management. A significant percentage of surveyed providers also reported that they are in need of malaria trainings. The topics that HPs most frequently requested training on in relation to malaria were case management of severe malaria (53% of HPs), malaria treatment (44%), and malaria diagnosis (21%). Training and supervision deficits appear to be translating into knowledge deficits, as only 67% HPs scored above 85% on a malaria knowledge assessment. Specifically, HP knowledge is lowest for the symptoms of uncomplicated malaria, selecting the diagnostic tests to be performed in the case of fever in a child under 5, and the process for determining whether a patient is cured of malaria. Some of the areas where HPs scored poorly on the knowledge test are different than the areas where HPs requested training, suggesting that HPs might not be pinpointing where strengths and weaknesses lie with regard to fever and malaria case management and malaria prevention.

Almost all facilities had a functional thermometer (95%) on the day of the survey, which is key to identifying febrile illness. Only 30% of HFs, however, had a printed copy of the latest national guidelines on malaria. This lack of malaria guidelines, combined with a lack of supported supervision from district and regional MOH staff, may make it difficult for HPs to access resources that will provide guidance to help improve their clinical skills in the areas of fever and malaria case management and prevention.

Stock shortages for diagnosis and treatment of malaria are also a challenge for HPs to provide quality malaria care for clients, especially in private HFs. While RDTs were available in 87% of facilities on the day of the survey, 38% experienced a stockout of at least one day in the last two months and 34% experienced a stockout of at least three days. Given that microscopy is not available in more facilities, stockouts of malaria RDTs render primary health facilities in Madagascar unable to diagnose malaria. While ACTs were in stock in most public HFs, less than two-thirds of private clinics had ACTs, the first line malaria treatment, in stock on the day of the survey. Only 32% of public facilities had injectable artesunate, crucial for treatment of severe malaria in all populations, and no private clinics did. No chloroquine was found in HFs, which is reassuring given that it should not be stocked due to resistance challenges[xi]. Quinine for treatment of malaria during the first trimester of pregnancy was available in tablet form in only 42% of facilities and in injectable form in only 63% of facilities. When stocks are unavailable for malaria treatment in pregnant women, health outcomes can be devastating for both the pregnant woman and her child. Further, these observed stock shortages are not anomalous. Approximately one in four HFs had a stockout of artesunate-amodiaquine for infants s and young children in the past two months, and the stockout prevalence of other products (e.g., ACTs, injectable artesunate) is even higher. Interestingly, a higher proportion of private facilities experienced longer stockouts (more than 3 days) of several commodities than did public facilities. This suggests that follow up mechanisms to replace stocks that need replenishment take longer to respond to stock outs in private facilities than they do in public facilities. The sentiment that stockouts play a role in not being able to provide quality malaria care services was echoed during the provider survey. When asked what the major challenge was in diagnosing malaria at the CSB level, 37% said that the major issue was stockouts of RDTs. When asked what the challenges were to using knowledge from malaria trainings, the highest percentage of providers (36%) said that a main challenge is a lack of malaria supplies and commodities to provide care. Lacking drugs to treat malaria can have severe consequences for the patient. Left untreated, malaria can cause anemia and jaundice and if the infection becomes severe, can cause seizures, kidney failure and death. Consequences can be the most severe in children less than 5 years of age, pregnant women and newborns.

Regarding the broader patient care environment surrounding malaria care, the assessment showed mixed findings. On the positive side, more than three-fourths (77%) of HFs have a communication plan for malaria prevention and treatment, and more than half engage in community-based sensitization (65%) or sensitization in HFs (51%). A minority, however, engage in home visits (22%) or offer printed sensitization materials (15%) and no HFs engage in sensitization through the military. Though not all facilities participate in sensitization efforts, the proportion that do may contribute to patient care seeking at facilities in cases of fever or suspected malaria. Improved sensitization efforts, including offering printed materials at both public and private facilities may help reduce the malaria disease burden in communities by encouraging timely care for fever and malaria diagnostics and treatment.

Recommendations

With the above HFA findings in mind, MCSP recommends the following for uptake by the MOH, implementing partners, and stakeholders in Madagascar:

- Strengthen provider practices for the assessment of fever and diagnosis of malaria through training and supervision. In addition to training and supervision, ensure that necessary job aids and national malaria guidelines are available to providers at the facility level. Having educational and directive materials on hand in the facility will provide an accessible resource for providers to use and improve their skills in fever and malaria care, even when supervisory activities are not available.
- Conduct in-person or telephone supervisory visits at least quarterly at all HFs. Increase the dissemination of malaria-specific technical support, particularly at private HFs, and improve the continuity of supervision between district and central government and all HFs. Increasing supervision and technical assistance to facilities will provide health workers with the opportunity to ask questions, receive guidance and practice their clinical skills related to fever and malaria care.
- As part of regular refresher trainings, verify that certain topics on fever and malaria case management/prevention are included in the training content for both public and private providers. Focus specifically on the topics of: 1) the importance of asking about fever and taking patient temperature at all outpatient visits; 2) the importance of conducting a malaria RDT or other diagnostic for every patient with febrile illness; 3) symptoms of uncomplicated malaria; 4) severe malaria case management; 5) malaria commodity management; 6) the tests to be performed in case of a fever in a child under 5; and 7) malaria in pregnancy. Integrate training programs with periodic knowledge and skills assessments among HPs. Refresher courses and skills assessments will give HPs the opportunity to better understand their strengths and weaknesses in providing quality fever and malaria care, and allow them to focus on and improve areas of weakness.
- Evaluate HP retention policies to incentivize physicians, midwives, and nurses to remain in their positions longer to avoid "brain drain" out of the health sector which can result in the loss of context-specific knowledge. Examples of incentives could include extra or specific trainings; supportive supervision to create a safe environment to ask questions, learn, succeed, and experience job satisfaction; or friendly competitions between facilities to include recognition ceremonies.
- Conduct a supply chain assessment (from national to community level) to better understand gaps in continuous supply of quality commodities to diagnose and treat malaria at all levels. Use the results of the supply chain assessment to design and improve a system that ensures the Ministry of Health has adequate supplies of these materials to restock supplies promptly when there are shortages, and improve tracking systems for accountability in the use of these supplies.
- Include private facilities in training, supervision, supply chain management and SBCC efforts to ensure all providers and surrounding populations have access to quality fever and malaria care services.
- Engage key stakeholders in developing HF-specific and context-relevant communication and sensitization plans for both public and private facilities. Centralize the design, production, and delivery of printed sensitization materials for malaria prevention and treatment.

Efforts should be made to ensure that suspected febrile illness is investigated among all patients in outpatient visits and when fever is confirmed, that a malaria RDT is administered. The MOH and implementing partners can collaborate to ensure that HFs have the resources, materials and commodities

needed to provide all patients with quality fever and malaria care. If higher quality care is available in HFs in Madagascar, surrounding populations may be more likely to seek timely care for fever and other illnesses.

Annex 1: Sample Size Calculation

Sample size calculations were based upon estimating the prevalence of the primary indicator, use of a malaria diagnostic for patients with febrile illness, with a precision of ±10% with 95% confidence and accounting for a design effect of 2 per zone. The following equation was used to calculate sample size.

$$n = \frac{Deff \times t^2 \times p(1-p)}{\varepsilon^2}$$

Where:

- n the required sample size
- Deff is the design effect (2)
- t=1.96 corresponding to an α (type I) error of 5% with a two-sided test
- p is set at 50% corresponding to the key indicator "Proportion of individuals with febrile illness during outpatient consultation who received a malaria diagnostic"
- ε^2 is the margin of error and set to 10%

P =Percentage of Patients with febrile illness given a malaria diagnostic:

$$\frac{\text{Patients with febrile illness given a malaria diagnostic}}{\text{All patients with febrile illness presenting to health facility for initial illness consultation}}$$

The outcome used to determine the sample size for client observations was the proportion of clients with febrile illness who are tested for malaria with a malaria RDT or by microscopy. Using a 95% confidence interval, assuming 50% of clients seeking care for fever are tested with an RDT or by microscopy, and using a ±10% margin of error, the minimum sample size was 97 fever clients. Assuming that 20% of all outpatient visits to the HF were for febrile illness as per routine surveillance data in Madagascar, and using a cluster design effect of 2, the minimum sample size necessary to calculate the outcome of interest with 95% confidence, assuming a 10% non-response rate, was 1078 outpatient visits. Thus, the study team aimed to visit 120 facilities and aimed to observe nine clinical encounters per facility to reach this sample size. As noted above, this number was reached by determining a number of facilities per zone that is proportional to the number of facilities in that zone. Once this number was determined, it was divided equally between the two districts in the zone. In each district, one private facility was randomly selected. Then, the remainder of the sample in that district was completed with public facilities. In total, 104 public facilities and 16 private facilities were included in the assessment across the 16 districts. Table X provides details on the parameter estimates used in the sample size calculation.

Table 1. Estimates of parameters used in sample size calculation

95% CI	% febrile pts tested by RDT/ microscopy	Margin of Error (+/-)	No. of pts with fever required (a^2 *b * (1-b))/c^2	% febrile	No. of outpt consults (d/e)	Design effect	Sample size (no. of outpt consults) (f*g)	Total Patients including non-response (h/0.9)	No. of facilities needed (i/8)
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
1.96	0.5	0.1	97	0.2	485	2	970	1078	120

Annex 2: Patient and Facility Weights

Sampling

Sampling for the Madagascar health facility assessment used a three-stage stratified sampling design, with sampling of districts within the eight malaria zones at the first stage, random sampling of facilities stratified by district at the second stage, and systematic sampling of patients within facilities and outpatient departments at the third stage. 112 of the 114 districts in Madagascar were sampled, removing two due to insecurity and inaccessibility. Eight health districts are targeted for malaria elimination; these fall into four different transmission zones. Four of these eight districts were purposefully selected into the study. In the zones that include these selected four districts, one other district was randomly selected. In the remaining four zones, two districts were randomly selected in each zone. The final sample included two districts from each of the eight malaria transmission zones for a total of 16 districts. After the sample size calculation, a total of 120 HFs was the target number of facilities for this assessment. The number of HFs selected per zone for the study was proportional to the number of HFs in the zone. Once that number was determined, it was divided equally between the two districts in the zone. In each district, one private facility will be randomly selected. The remainder of the sample in that district was completed with randomly selected public facilities. At each sampled health facility, the number of outpatient visits from the same weekday one week prior to the survey date was used to calculate the sampling interval. If the number of outpatient client visits was less than 20, the study team approached every client in succession and conducted client visit observations until they had reached nine consenting clients. If the number of outpatient visits was 20 or greater, the study team selected every other client for recruitment/consent until they reached nine consenting clients for observation. Patients who met the eligibility criteria and completed an informed consent form were recruited and enrolled in the assessment.

Probably of selection

Survey weights were used in all analyses to ensure the representativeness of the sample at the national level, reflecting two-stage sampling stratified by district. To calculate survey weights, the survey probabilities for each degree of pull were calculated by stratum and for each cluster. For the i^{th} cluster/facility of stratum/district h, the notations are as follows:

P1hi : probability of first-degree sampling of the ith facility of district h
P2hi : probability of second degree sampling of the ith facility of district h

Let a_h be the number of facilities drawn from district h, M_i the number of clients in facility i, and t_{hij} the estimated size in proportion to the size of the segment j chosen for facility i in district h, noting that t_{hij} =1 if the facility has not been segmented and the sum of the t_{hij} is equal to 1. The probability of first-degree sampling of the i^{th} facility of district h is given by:

$$P_{1hi} = \frac{a_h \times M_i}{\sum_i M_i} \times t_{hij}$$

In the second degree, a number b_{hi} of patients was drawn from the L_{hi} patients newly counted by the team in the i^{th} facility of district h during the process of counting patients.

$$P_{2hi} = \frac{b_{hi}}{L_{hi}}$$

The overall probability of selecting a patient from the facility *i* of district *h* is then:

$$P_{hi} = P_{1hi} \times P_{2hi}$$

The survey weight is the inverse of the product of the probabilities of sampling as given above. It is given by the following formula:

$$W_{hi} = \frac{1}{P_{hi}}$$

All patients from the same facility are therefore have the same survey weight. This survey weight is adjusted for non-response. Therefore, several sets of weights were calculated: one set for patients and one set for facilities. Client weights are calculated on the basis of survey weights, with the correction for non-response. All non-response corrections were made at the district level. At the national level, final weights are standardized so that the number of weighted cases equals the number of unweighted cases for surveyed clients.

An Excel sheet containing all survey parameters was prepared to facilitate the calculation of survey weights.

Annex 3: Additional Data Tables

Table 6b1. Identification of fever, malaria diagnosis, and malaria treatment, facility public

Unweighted Numerator/Denominator (weighted %)

	Fever Identification	RDT performed		RDT positive among patients who received a RDT		Result shared with patient among patients who received a RDT		Positive RDT treated with ACT among patients who received a RDT		Negative RDT treated with ACT among patients who received a RDT		No RDT treated with ACT		Microscopic examination performed	
1	Fever during the previous 48 hours reported by patient during consenting process	165/273	67.0	37/165	22.4	145/165	84.6	35/37	92.6	0/128	0.0	0/108	0.0	0/273	0.0
2	Fever during the previous 48 hours reported spontaneously by patient during consultation with HP	188/298	68.9	33/188	21.2	165/188	85.0	36/38	92.8	0/150	0.0	0/110	0.0	0/298	0.0
3	HP asks client about fever during the previous 48 hours (if not spontaneously reported by patient)	43/230	22.1	5/43	13.1	32/43	79.6	5/5	100.0	0/38	0.0	0/187	0.0	0/230	0.0
4	Patient temperature taken	216/472	47.3	42/216	20.2	185/216	83.3	40/42	93.4	0/174	0.0	0/256	0.0	0/472	0.0
5	Patient temperature 37.5°C or greater	137/172	82.2	28/137	23.7	122/137	85.6	26/28	90.8	0/109	0.0	0/35	0.0	0/172	0.0
6	Fever not reported by patient during consenting; fever not reported spontaneously by client during consult; HP did not ask about temperature; and patient temperature was not taken	1/178	1.0	0/1	0.0	1/1	100.0	-	-	0/1	0.0	0/178	0.0	0/178	0.0

Table 6b2. Identification of fever, malaria diagnosis, and malaria treatment, facility private
Unweighted Numerator/Denominator (weighted %)

	Fever Identification	RDT performed		RDT positive among patients who received a RDT		Result shared with patient among patients who received a RDT		Positive RDT treated with ACT among patients who received a RDT		Negative RDT treated with ACT among patients who received a RDT		No RDT treated with ACT		Microscopic examination performed	
1	Fever during the previous 48 hours reported by patient during consenting process	27/43	62.8	5/27	11.4	27/27	100.0	5/5	100.0	0/22	0.0	0/16	0.0	0/43	0.0
2	Fever during the previous 48 hours reported spontaneously by patient during consultation with HP	32/50	59.8	6/32	11.1	29/32	89.8	5/6	85.5	0/26	0.0	0/18	0.0	0/50	0.0
3	HP asks client about fever during the previous 48 hours (if not spontaneously reported by patient)	4/29	18.6	2/4	50.0	4/4	100.0	1/2	33.3	0/2	0.0	0/25	0.0	0/29	0.0
4	Patient temperature taken	30/85	34.6	6/30	14.4	28/30	89.4	6/6	100.0	0/24	0.0	0/55	0.0	0/85	0.0
5	Patient temperature 37.5°C or greater	18/28	49.7	5/18	18.9	16/18	83.3	5/5	100.0	0/13	0.0	0/10	0.0	0/28	0.0
6	Fever not reported by patient during consenting; fever not reported spontaneously by client during consult; HP did not ask about temperature; and patient temperature was not taken	0/21	0.0	-	-	-	-	-	-	-	-	0/21	0.0	0/21	0.0

Table 6c1. Identification of fever, malaria diagnosis, and malaria treatment, age 5+
Unweighted Numerator/Denominator (weighted %)

	Fever Identification	RDT performed		RDT positive among patients who received a RDT		Result shared with patient among patients who received a RDT		Positive RDT treated with ACT among patients who received a RDT		Negative RDT treated with ACT among patients who received a RDT		No RDT treated with ACT		Microscopic examination performed	
1	Fever during the previous 48 hours reported by patient during consenting process	92/157	65.0	29/92	28.8	84/92	89.1	28/29	96.9	0/63	0.0	0/65	0.0	0/157	0.0
2	Fever during the previous 48 hours reported spontaneously by patient during consultation with HP	109/176	65.3	32/109	28.2	98/109	89.0	30/32	94.7	0/77	0.0	0/67	0.0	0/176	0.0
3	HP asks client about fever during the previous 48 hours (if not spontaneously reported by patient)	34/187	23.8	4/34	12.9	29/34	86.2	3/4	60.0	0/30	0.0	0/153	0.0	0/187	0.0
4	Patient temperature taken	131/323	41.0	35/131	26.6	117/131	87.2	34/35	97.5	0/96	0.0	0/192	0.0	0/323	0.0
5	Patient temperature 37.5°C or greater	77/107	68.7	11/77	16.0	67/77	83.1	10/11	87.1	0/66	0.0	0/30	0.0	0/107	0.0
6	Fever not reported by patient during consenting; fever not reported spontaneously by client during consult; HP did not ask about temperature; and patient temperature was not taken	1/174	0.9	0/1	0.0	0/1	0.0	-	-	0/1	0.0	0/174	0.0	0/174	0.0

Table 6c2. Identification of fever, malaria diagnosis, and malaria treatment, age <5
Unweighted Numerator/Denominator (weighted %)

	Fever Identification	RDT performed		RDT positive among patients who received a RDT		Result shared with patient among patients who received a RDT		Positive RDT treated with ACT among patients who received a RDT		Negative RDT treated with ACT among patients who received a RDT		No RDT treated with ACT		Microscopic examination performed	
1	Fever during the previous 24 hours reported by patient during consenting process	100/159	67.2	13/100	13.0	88/100	86.1	12/13	86.5	0/87	0.0	0/59	0.0	0/159	0.0
2	Fever during the previous 48 hours reported spontaneously by patient during consultation with HP	111/172	68.2	12/111	11.1	96/111	83.4	11/12	85.7	0/99	0.0	0/61	0.0	0/172	0.0
3	HP asks client about fever during the previous 48 hours (if not spontaneously reported by patient)	13/72	16.4	3/13	32.5	7/13	68.0	3/3	100.0	0/10	0.0	0/59	0.0	0/72	0.0
4	Patient temperature taken	115/234	49.6	13/115	11.8	96/115	81.2	12/13	86.5	0/102	0.0	0/119	0.0	0/234	0.0
5	Patient temperature 37.5°C or greater	78/93	82.4	22/78	31.0	71/78	87.8	21/22	96.1	0/56	0.0	0/15	0.0	0/93	0.0
6	Fever not reported by patient during consenting; fever not reported spontaneously by client during consult; HP did not ask about temperature; and patient temperature was not taken	0/25	0.0	-	-	-	-	-	-	-	-	0/25	0.0	0/25	0.0

Annex 4: References

1. World Health Organization. *World Paludisme Report 2017*. Geneva; 2017.
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