

THE UGANDA MALARIA END-USE VERIFICATION



February 2011



PRESIDENT'S MALARIA INITIATIVE



SURE
SECURING UGANDANS' RIGHT
TO ESSENTIAL MEDICINES

ACKNOWLEDGEMENT

This report is made possible by the generous support of the American people through the U.S. Agency for International Development (USAID), under the terms of cooperative agreement number AID-617-A-00-09-00003. The contents are the responsibility of Management Sciences for Health and do not necessarily reflect the views of USAID or the United States Government.

SURE would like to thank the following people for their contribution in the survey and effective contribution in both the data collection and preparation of this report. The SURE team: Belinda Blick, Lawrence Were, Bill Elur, Regional Pharmacists: Margaret Abigaba (Hoima Hospital) John Kyalimpa (Gulu Hospital) Judith Agatha Apio (Mbale Hospital) Paul Ocacachan (Kalisizo Hospital) NMCP staff: Agnes Netunze and Connie Nangobi. A special thank you to everyone who participated in improving the report quality by commenting on the data collection tool, data analysis and editing the draft report.

About SURE

The Securing Ugandans' Right to Essential Medicines (SURE) Program's mandate is to strengthen the national pharmaceutical supply system to ensure that Uganda's population has access to quality essential medicines and health supplies. To achieve this goal, SURE's objectives are to improve Uganda's policy, legal, and regulatory framework to produce pharmaceutical supply chain stability and sustainability; improve capacity and performance of central government entities, especially the National Medical Stores, to carry out their supply chain management responsibilities; and improve capacity and performance of districts, health sub-districts, and implementing partners in their supply chain management roles.

RECOMMENDED CITATION

This report may be reproduced if credit is given to SURE. Please use the following citation.

Belinda B, 2011. *Implementing the second End Use Verification Survey using mobile phone technology*. Submitted to the U.S. Agency for International Development by the Securing Ugandans' Right to Essential Medicines (SURE) Program. Arlington, VA: Management Sciences for Health.

Securing Ugandans' Right to Essential Medicines
Centre for Pharmaceutical Management
Management Sciences for Health
Plot 15, Princess Anne Drive, Bugolobi
P.O. Box 71419
Kampala, Uganda
Telephone: 256.414.235038
Fax: 256.414.235035
E-mail: sure@sure.ug
Web: www.msh.org/sure

TABLE OF CONTENTS

ACKNOWLEDGEMENT.....	i
ACRONYMS AND ABBREVIATIONS.....	iii
Executive Summary	1
Background.....	2
Objectives of the EUV survey.....	2
Study Design.....	2
Results and Observations	5
Malaria Case Management.....	5
Supply Chain Management	9
Deliveries.....	12
Storage Conditions.....	13
Conclusion	14
Malaria case management	14
Supply Chain Management	14
Storage Conditions.....	15
Recommendations	15
Annexes.....	16
Annex A: Data Collection Team.....	16
Annex B: PMI End-Use Verification Tool	17

TABLE OF TABLES

Table 1: Sampled districts and facilities.....	3
Table 2: Data collection forms for the End- Use Verification Tool	4
Table 3: Percent and distribution of facilities in the 2nd EUV survey providing malaria service	5
Table 4: Service delivery indicators: supervision, reference materials and reporting	6
Table 5: Malaria cases- retrieved from the HMIS facility reports	7
Table 6: Treatment prescribed and test performed.....	8
Table 7: Patient age with test performed	9
Table 8: Stock Management Indicator	11
Table 9: Average stock out days and items available on day of survey at HCII and HCIII	11
Table 10: Average month of stock available per facility and duration of stock out per item	12
Table 11: represents percentage of Ordered vs. Received Quantities	13
Table 12: Storage conditions and adequate standards	13

TABLE OF FIGURES

Figure 1: Comparison of human resource trained in areas related to malaria case management, malaria testing, stock management and prevention of malaria in pregnant women	6
Figure 2: Comparison of service delivery indicators	7
Figure 3: Percent of test result with blood slide performed	8
Figure 4: Percent of treatment prescribed based on age and test result.....	9
Figure 5: Comparison of average percent scores for the EUV surveys for stock management indicators.....	10

ACRONYMS AND ABBREVIATIONS

AB	Antibiotic
ACT	Artemisinin-based Combination Therapy
AL	Artemether-lumefantrine
AM	Antimalarial
AQ	Amodiaquine
AS	Artesunate
BS	Blood Slide
EUV	End Use Verification Tool
EUV1	First End Use Verification Survey
EUV2	Second End Use Verification Survey
FEFO	First Expiry First Out
HC	Health Centre
HMIS	Health Management Information System
HW	Health Worker
M&E	Monitoring and Evaluation
MCM	Malaria Case Management
MOH	Ministry of Health
MSH	Management Sciences for Health
NGO	Non-government Organization
NMCP	National Malaria Control Program
OPD	Outpatient Department
PMI	President's Malaria Initiative
PNFP	Private not for Profit
QN	Quinine
RDT	Rapid Diagnostic Test
SOP	Standard Operating Procedure
SP	Sulfadoxine-Pyrimethamine
SPS	Strengthening Pharmaceutical Systems (Program)
SURE	Securing Ugandans' Right to Essential Medicines
USAID	U.S. Agency for International Development

EXECUTIVE SUMMARY

Background: Malaria is the leading cause of morbidity and mortality in Uganda and is endemic in 95% of the country. As one of the main contributors to the control of malaria, the Presidential Malaria Initiative's goal is to reduce malaria related mortality. Under PMI, the second Malaria End Use Verification Survey, a bi yearly activity was conducted in February 2011. This EUV survey was conducted in 30 health facilities at four levels of care: Hospitals and Health Centre (HC) II's, III's, IV's.

The objective: To assess the malaria medicines supply chain and malaria case management at the health facility level in Uganda. The findings are shared with the Ministry of Health, National Malaria Control Program (NMCP), Presidential Malaria Initiative (PMI) and all partners working in malaria control and prevention in order to inform and help guide decision making to generate policies to improve and strengthen health systems that will make malaria commodities available.

Design: Probability proportional to size sampling technique which is the probability of selecting the sampling unit that is proportional to the size of its population. Districts were listed according to their varying number of malaria cases. The cumulative total population was divided by the total number of districts to obtain the six districts visited. Mobile phones were used for data collection

Results: Overall findings for service provision show that all facilities provide uncomplicated malaria treatment, with 57% providing severe malaria treatment. From the survey, 73% of the facilities surveyed provide microscopy and 2% of the facilities use RDT's. 44% of the health workers involved in malaria case management (MCM) have been trained to manage malaria. Of the 25 respondents, only 11 facilities had been supervised for malaria case management. 55% of the malaria cases are treated with ACT only and ACT and another drug was 5%. 26% of the patients 5 years and below with a negative blood slide were given plain ACT. On average 56% of the storage conditions were met. Over 80% of the facilities had stock cards available for ACT's with about 70% of the stock cards updated. This however was a different picture for the laboratory diagnostics that showed only 32% availability and updated stock cards.

Discussions and Conclusions: The purpose of the EUV survey is to inform stakeholders of the malaria situation in the country. Results that reflect the availability and use of malaria commodities can be utilized to influence changes at both the facility and central level. Currently logistic support needs to be strengthened in laboratory diagnostic supplies which would go a long way in strengthening the health system. Recommendations to increase the awareness would need extensive dissemination of EUV results to all stakeholders involved in malaria control and prevention in order to allow for corrective action to be taken.

BACKGROUND

In Uganda the End Use Verification (EUV) survey for malaria was implemented by MOH in collaboration with SURE Program and support from Strengthening Pharmaceutical Systems Program (SPS) with the purpose of assessing the malaria supply chain and malaria case management at the health facility level.

This report presents the results of the assessment of the malaria supply chain and the malaria case management at the health facility level in Uganda which can be used to strengthen efforts in the health system. The data was collected as part of the routine assessment of the availability and use of malaria commodities and management of malaria cases under the United States (US) government Presidential Malarial Initiative (PMI). The malaria EUV survey was presented in two broad theme areas namely, supply chain management and malaria case management. The survey results will inform the National Malaria Control Program (NMCP) and PMI on availability of malaria medicine and malaria case management, which can be used to strengthen the health care system.

OBJECTIVES OF THE EUV SURVEY

The overall objective of the malaria End-User Verification survey was to assess availability and use of malaria commodities at the health facilities.

Specific objectives of the malaria End-User Verification survey are;

1. To assess malaria case management
2. To assess stock management
3. To assess storage conditions
4. To assess human resource training
5. To assess patients receiving treatment with a performed test

STUDY DESIGN

Sampling methodology

The methodology used was probability proportional to size sampling technique. This is the probability of selecting a sampling unit in proportion to the size of its population. It gives a random, representative sample. The sampling frame comprised of facilities from districts with high medium and low incidence rates of malaria¹. 46 districts were listed according to their varying number of malaria cases. The cumulative total population was divided by the total number of districts to obtain the six districts visited.

The sample size was stratified into three groups (32 districts clustered in the high incidence group, 10 districts clustered in the medium group and 4 districts clustered in the low group). Listed according to their cumulative malaria cases, the cumulative total population was divided by the number of districts to obtain the randomly selected desired sample size of six visited districts. (In the high malaria incidence area Apac, Masindi, Katakwi and Kamwenge

¹ source: malaria incidence survey-2009, Uganda malaria endemicity map, page 2

districts, Medium to high malaria incidence was Mbarara district and low malaria incidence was Ntungamo district.

Similarly facilities were selected from the strata; each district had a list of facilities within the same strata that were then randomly selected to consist the sampling frame of 30 facilities (4 hospitals, 7 HC IVs, 7 HC IIIs, 6 HC IIs and 6 PNFPs) as shown below. Additional health facilities were sampled as back-up plan in case sampled facilities were not available (Table 1:)

Table 1: Sampled districts and facilities

District	Health Facilities	Alternative Facilities
APAC High Incidence	Apac Hospital	
	Aboke HCIV	Aduku HCIV
	Ibuje HC III	Apalabarowo HCIII
	Alado HCII	Bung HCII
	Alenga HCIII-PNFP	Aboke HCII
MASINDI High Incidence	Masindi Hospital	
	Bwijanga HCIV	
	Pakanyi HCIII	Kyatiri HCIII
	Kasenene HCII	Kigezi HCII
	Nyamigisa HCII- PNFP	Kyatiri HCII-PNFP
KATAKWI High Incidence	Katakwi HCIV	
	Magoro HCIII	Kapujan HCIII
	Toroma HCIII	Aketa HCIII
	Damasiko HCII	Opeta HCII
	ST. Kevin (Toroma) HCIII- PNFP	Katakwi COU HCII-PNFP
KAMWENGE High Incidence	Ntara HCIV	
	Rukunyu HCIV	
	Rwamwanja HCIII	Kamwenge HCIII
	Bihanga HCII	Nkongoro HCII
	Kakasi HCII- PNFP	Kicwamba HCII- PNFP
MBARARA Medium Incidence	Mbarara Hospital	
	Mbarara MMC HCIV	Kinoni HCIV
	Nyamitanga HCIII	Nyabuhama HCIII
	Ryamiyonga HCII	Nyabikungu HCII
	ST. Fransiska Makonje HCII – PNFP	Mbarara Muslim H/C III- PNFP
NTUNGAMO Low Incidence	Itojo Hospital	
	Rubaare HCIV	Rwashamire HCIV
	Kitondo HCIII	Rukoni HCIII
	Rwamabondo HCII*	Rukarango HCII
	Rushooka Mother Francisca Lechener HCII- PNFP	Kagamba ST. Lucia HCII-PNFP

* Facility was not open at time of survey

Data collection and management

Data collection tools were adapted from the conventional EUV tools that comprised of Seven Forms Summarised in Table 2.

Table 2: Data collection forms for the End- Use Verification Tool

Number	Name	Purpose
Form 1	Facility Identification	Identification information for facilities
Form 2	Facility Questionnaire	General information on the supply and management of commodities. Training of staff.
Form 3	Malaria Case Management Form	Assesses malaria case management (diagnosis and treatment of malaria), by examining records from 20-30 patients
Form 4	Stock Status Collection Form	Information on stock management and stock outs
Form 5	Difference between Quantity Ordered and Quantity Received	Compare the quantity of commodities ordered by a facility with what is has received
Form 6	Difference between Quantity Sent and Quantity Received	Compare the quantity of commodities sent by a facility with what was received
Form 7	Storage Conditions Assessment	To assess the storage conditions of health commodities

Data collectors with pharmaceutical and logistics background and experience, were divided into three teams of three data collectors. They were later trained to use the mobile phone as a data collection tool that consisted of 17 supply chain and 20 malaria case management indicators designed to best measure access, supply chain management and malaria treatment.

Among the methods used to collect data were medical record review (outpatient register and the laboratory registers for malaria case management information) Verification of the stock card to assess the stock status for malaria commodities, order forms plus the delivery invoices for orders and delivery information. Face to face interviews of health workers and observation of medicine storage conditions.

Data collection was done using both paper version and Epi Surveyor Mobile Technology. Epi Surveyor is a soft ware that allows the user to create surveys via online interface. The malaria End Use Verification Tool was created by SPS and tailored to suite the Uganda situation. The tool was then downloaded on E71 and Nokia 6300 phones. Once data was collected it was then uploaded onto the Epi Surveyor website. For the data collectors who could not upload the data on to the website saved the data on the phone memory. The data was later exported to Microsoft Excel 2007 and Microsoft Access for analysis. During data entry, data was sorted to determine whether there was missing information or redundant entries, where follow up was needed the data collectors and health facilities were contacted for verification purposes. The cleaned data was then re entered in the phones, exported and analyzed.

RESULTS AND OBSERVATIONS

MALARIA CASE MANAGEMENT

According to table 3, malaria treatment is available in all the 30 facilities surveyed, with only over half the facilities treating severe malaria cases. Laboratory diagnostic services specifically microscopy were used in 3/4 of the facilities. Compared to the previous survey, all hospitals and HCIV's offered laboratory diagnostic services with similar findings in the second survey. This means majority of patients receiving treatment from the higher level facilities are tested. Demonstration of the presence of malaria parasites prior to treatment with anti malarial medicines is fundamental to effective malaria case management. The use of laboratory diagnostic capacity illustrates a high level of accuracy and can reduce on the overuse and abuse of malaria medicines. However there is need to introduce the use of RDT's at lower level health facilities.

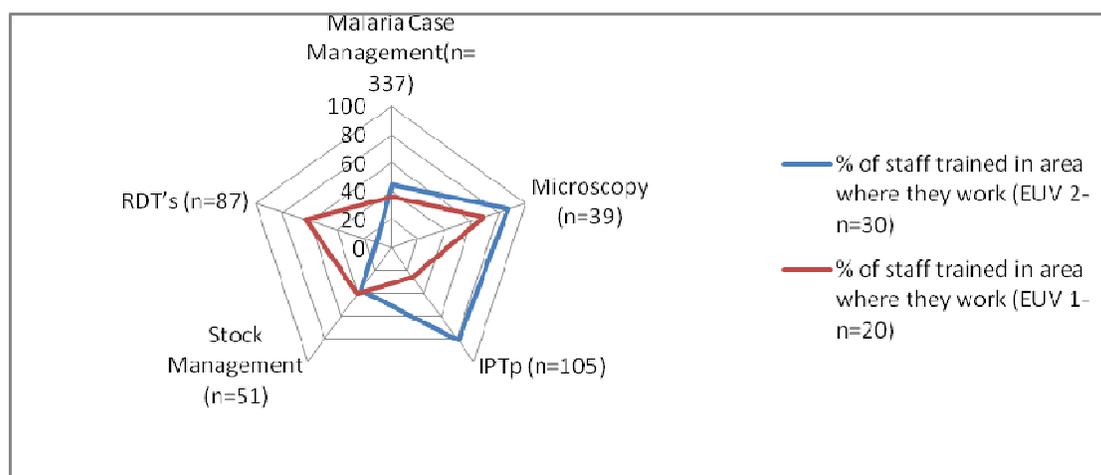
Table 3: Percent and distribution of facilities in the 2nd EUV survey providing malaria service

Malaria Services	% of facilities providing malaria services (n=30)	Level of care (n=30)	% of facilities providing malaria services
Uncomplicated malaria treatment	100	ALL	100
Severe Malaria Treatment	57	Hospital &HCIV	37 (n=11)
		HCIII	17 (n=5)
		HCII	3 (n=1)
Microscopy (testing using blood Slides)	73	Hospital &HCIV	37 (n=11)
		HCIII	23 (n=7)
		HCII	13 (n=4)
Malaria RDT'S	2	Hospital	3 (n=1)
		HCII	3 (n=1)
IPTp	73		

Human Resource

During the survey, health facility staff were interviewed to determine ability to manage malaria cases and their competences. 44% of the staff working in malaria case management have been trained. (Hospital and HCIV level had the highest numbers trained at 44% and 34% while HCIII and HCII were 11% and 10% respectively). 87% of the staff have been trained in microscopy, representing an increment of 18 percentage points compared to the EUV1. There was a decline in the number of staff trained in RDTs and in stock management from 41% to 11% and from 63% to 37% respectively. This means that there is need to coordinate and conduct regular supervision, coaching and mentoring on malaria case management, stock management and laboratory diagnosis to facility staff as these have an effect on the availability and use of malaria commodities and treatment of malaria.

Figure 1: Comparison of human resource trained in areas related to malaria case management, malaria testing, stock management and prevention of malaria in pregnant women



Service Delivery

Data in table 4 shows that facilities are generally supervised in logistics management (88%) but less than half of the facilities are supervised in malaria case management. Though 3/4 of the facilities report that internal supervision takes place, less than 2/3 record in the supervision book. As such it was not possible to verify whether internal supervision actually took place in most of the facilities. Less than 2/3 have reference guidelines for stock management and just over 3/4 for malaria case management. The data also showed that in half of facilities, clinical officers prescribe malaria treatment and 2/3 of enrolled nurses dispense medicines. Pharmacists and Pharmacy technicians are mainly found in hospitals and HCIV's. 7/11 hospitals and HCIV's report on time according to NMS and JMS deadlines. (With the introduction of the kit system only HCIV's and hospitals make orders).

Table 4: Service delivery indicators: supervision, reference materials and reporting

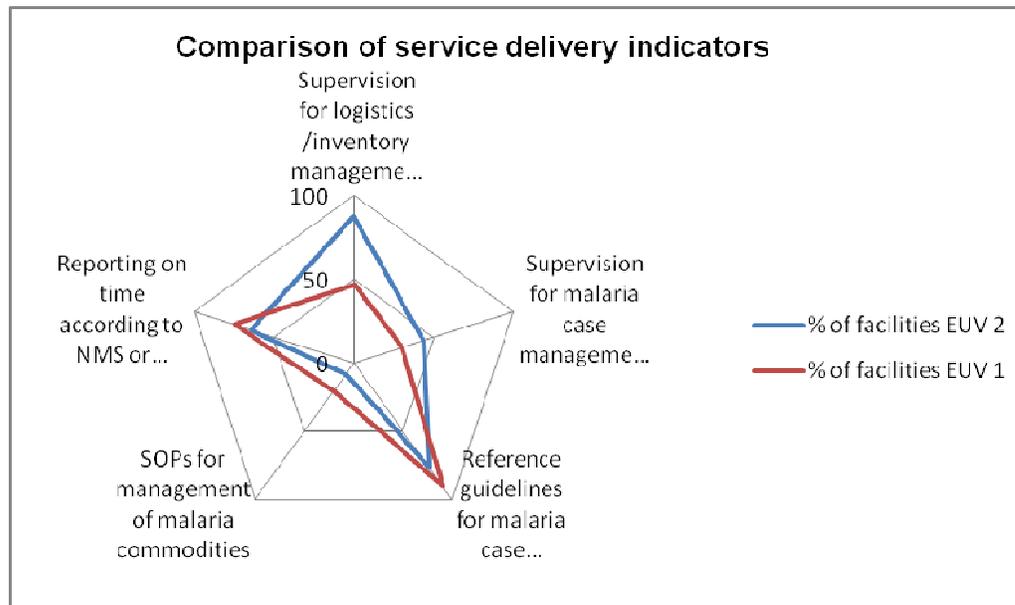
Service delivery indicators	Number of facilities (n=30)	% of facilities
Percent of facilities receiving supervision for logistics /inventory management in the last 6 months	24	88
Percent of facilities receiving supervision for malaria case management in the last 6 months	25	44
Percent of facilities with reference guidelines for malaria case management	26	77
Percent of facilities with SOPs for management of malaria commodities	26	8
Facilities reporting on time according to NMS or JMS deadlines	11	64

In Comparison to the first EUV survey carried out in July 2010, there was an improvement in supervision for logistics /inventory management and malaria case management with 11% decline in the reporting timelines and 12% SOP's for management of malaria.

Overall, the results show the need to strengthen supervision efforts for malaria case management and distribution of the current SOP's for management of malaria commodities. This can potentially limit wastage of anti malarial medicines by enforcing correct stock

management and ensuring that health facility staff understand and adhere to malaria treatment guidelines.

Figure 2: Comparison of service delivery indicators



Malaria Cases

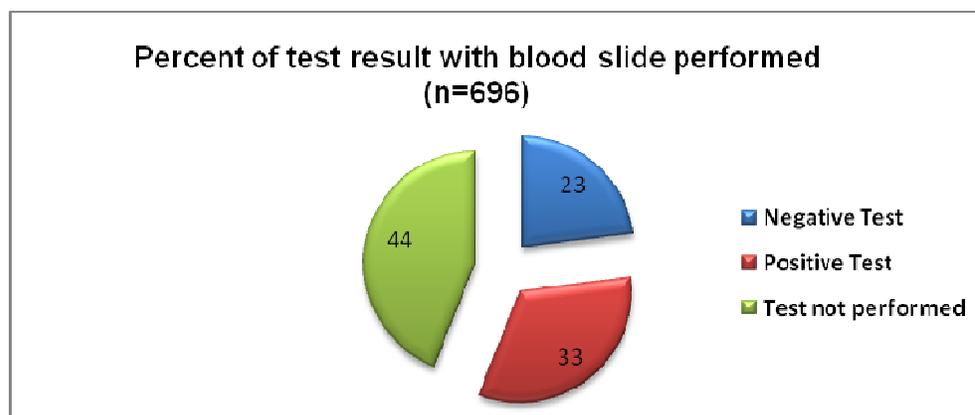
Table 5: Malaria cases- retrieved from the HMIS facility reports

Percentage of malaria cases in total patient population	36%	n=54405
Percentage of malaria cases in patients below age 5	29%	n=19395

Data was retrieved from the HMIS reports in the facilities. Total patient population, malaria cases and ages were recorded in order to assess how many malaria cases account for the total patient population. Out of the 36% patients diagnosed with malaria, 29% were under the age of 5.

More than half of malaria cases are most likely to be diagnosed using blood slides and the rest clinically diagnosed. Results show that clinical diagnosis is relatively high (44%) with blood slide diagnosis at (56%). Use of clinical diagnosis can lead to misdiagnosis of malaria and this can result into mismanagement of non- malarial febrile illness, wastage of anti malarial medicines and potential risk to the development of anti malarial resistance.

Figure 3: Percent of test result with blood slide performed



Treatment of uncomplicated malaria cases

The findings in this section show treatment prescribed, test result and age distribution. 54% of the patients were above the age of five and 46% below the age of five. 53% of the patients are treated with ACT's only, as per the National Malaria Policy Guidelines. There is need for dissemination of treatment guidelines and supervision as avenues that can be used to enforce rational treatment.

Table 6: Treatment prescribed and test performed

Patients receiving treatment	% of patients receiving specific treatment (n=696)	% no. of patients without test performed (n=310)	% no. of patients with positive test (n=227)	% no. of patients with negative test (n=159)
ACT	53	57	48	26
ACT/Antibiotic	8	1	8	4
Antibiotic/Antihelmints	4	0	0	31
Quinine Injection	10	3	21	11
Quinine injection/Antibiotic	1	0	0	1
Quinine Tab	7	3	15	9
Quinine Tab/Antibiotic	0	1	0	2
Other	10	6	3	5
Treatment not recorded	6	29	5	11

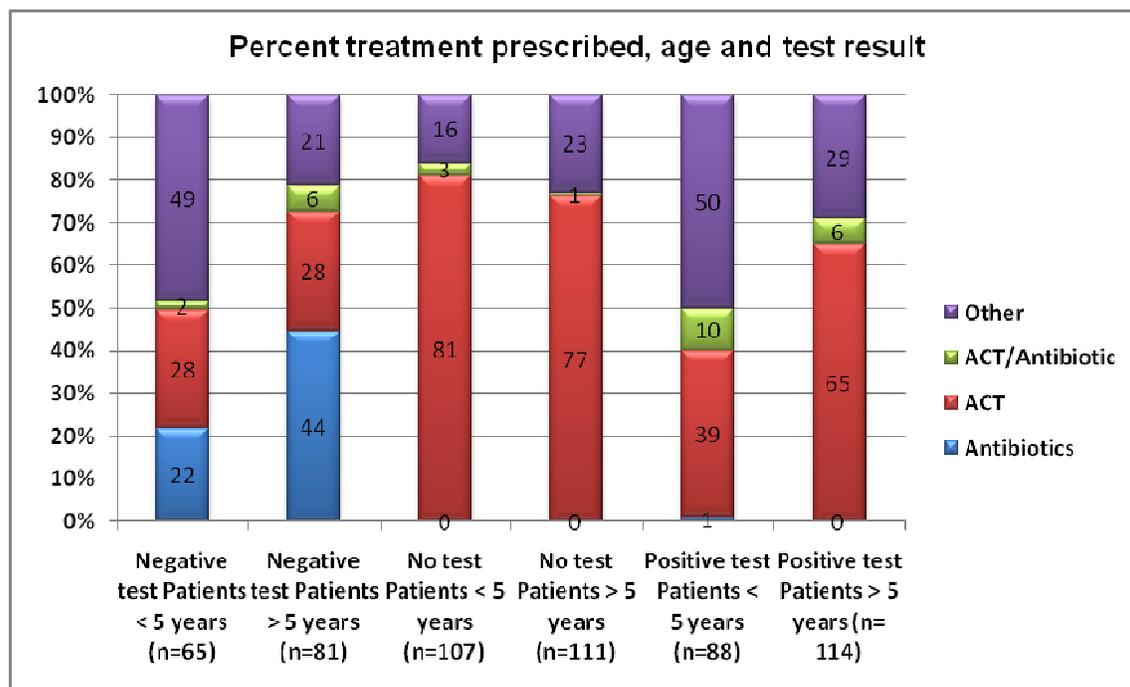
Table 7 shows the proportion of patients in the age category who had negative test result and yet were prescribed malaria medication and those that had treatment prescribed based on clinical diagnosis (no test was performed). This highlights the need to strengthen malaria diagnosis to demonstrate presence of malaria parasites prior to treatment with the assumption that treatment is given based on a confirmed positive test (n=227).

Table 7: Patient age with test performed

Patient age and test performed	% of patients receiving treatment (n=696)	% of patients with negative test (n=157)	Clinical diagnosis (n=223)	% of patients with positive test (n=227)
Patients 5 years and below	46	44	50	39
Patients above 5 years	54	56	50	50

Figure 4, shows treatment prescribed, age and test result, Overall 57% of the patients are given ACT as the first line, but only 53% of patients were given ACT's with a confirmed positive result. This table demonstrates that almost half of the patients are given ACT's without a confirmed positive result. The findings also show 39% of patients received medicine not considered first line treatment for malaria. The assumption could be current treatment guidelines are not widely disseminated or adhered to or ACT's are not always available so other treatments have to be prescribed.

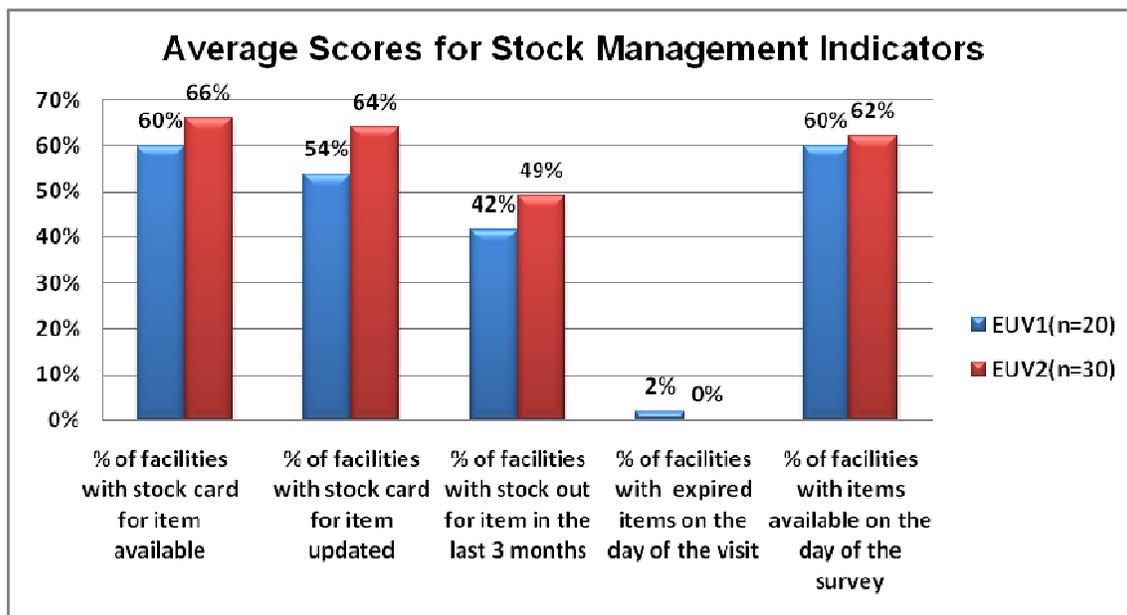
Figure 4: Percent of treatment prescribed based on age and test result



SUPPLY CHAIN MANAGEMENT

This result area focuses on supply chain management which is measured as stock availability, expired stock, stock outs in the last 3 months and updated stock cards. Graph 4 summaries four indicators on stock management comparisons were made with the previous EUV survey that was conducted in June 2010. Average scores for the two EUV surveys carried out show a similar trend, On average less than 70% of facilities have stock cards available and updated, but there is 6% improvement in availability of stock cards, 2% availability of items on the day of survey and 10% updated stock cards from the last EUV survey. Stock outs increased by 7 percentage points.

Figure 5: Comparison of average percent scores for the EUV surveys for stock management indicators



In the survey an updated stock card is defined as a stock card with an entry in the last week. Updated stock cards provide stock balance without having to perform a physical count. However, updated does not mean correctly updated. Only correctly updated stock cards can be used for systematic and accurate management of medicines in facilities. Table 8 shows that medicines are more likely to have stock cards available compared to laboratory items and health supplies. Results show more than half of the facilities did not experience a stock out in the last three months for Artemether-Lumefantrine AL 1x6, AL 2x6, AL 3x6 and AL 4x6. Less than half of facilities had laboratory supplies such as field stain A and B, RDT's available on the day of survey. Availability of Quinine tablets was low (about 52%) on the day of survey. These results show that approximately 40% of the facilities experience ACT stock outs which could explain why more than half the time it is not possible to treat malaria with the first line medicine (see table 8). Stock management indicators for laboratory items are still low which highlights the need to strengthen laboratory logistics through routine supervision, mentoring and coaching.

Table 8: Stock Management Indicator²

Commodity Name	Average month of stock available per facility	Range of Average MOS available per facility	Duration of stock out (days) over the last 3 months
AL 1x6 (tab)	10	0-45	35
AL 2x6 (tab)	3	0-24	42
AL 3x6 (tab)	6	0-48	45
AL 4x6 (tab)	5	0-36	45
Dextrose 5% IV infusion	1	0-4	47
Dextrose 50% 100ml	7	0-23	54
Diazepam 10mg/2ml	14	1-67	16
Field Stains A (Bottle)	2	0-3	86
Field Stains B (Bottle)	2	0-7	86
IV Cannula 18G-22G	3	0-12	35
IV giving set (15drops/min)	2	0-10	37
Insecticide Bednet (Net)	1	1	67
Malaria Rapid Diagnosis Test	6	6	2
Microscope slides	2	0-3	90
Paracetamol 500mg (Tab)	2	0-14	42
Quinine IM/IV 600mg	6	0-40	50
Quinine tab 300mg (Tabs)	3	0-27	55
Sulphadoxine/Pyrimethamine (SP) tab 525mg (Tabs)	4	0-21	45
Syringe	4	0-21	44
Average	4		49

Table 9 shows average stock out days for AL medicines at HCII and HCIII level. Despite the introduction of the kit system, stock outs are still evident at these levels.

Table 9: Average stock out days and items available on day of survey at HCII and HCIII

Commodity Name	HCII		HCIII	
	Average Stock Out Days	Available on day of survey	Average Stock Out Days	Available on day of survey
Artemeter/Lumefantrine (AL) 1x6 (tab)	32	73%	43	50%
Artemeter/Lumefantrine (AL) 2x6 (tab)	50	55%	47	43%
Artemeter/Lumefantrine (AL) 3x6 (tab)	51	55%	42	71%
Artemeter/Lumefantrine (AL) 4x6 (tab)	50	55%	46	88%

Table 10 below shows average months of stock and duration of stock out days for each item. In the week of the survey Mbarara, Kamwenge, Ntungamo and Masindi had received supplies from NMS so many of the facilities were adequately stocked. Prior to this, a number of facilities still had a significant quantity of AL 1x6 and Diazepam. The results show that many of the facilities were overstocked for AL 1x6 with an average of 10 months of stock (MOS).

² PC will equal to stock card balance
Updated stock card is defined as stock card with an entry in the last week

Facilities such as Rwamiyonga HCII, Nyamitanga HCII, Rubaare HCIV, Mbarara MMC HCIV, Mbarara Hospital, Pakanyi HCIII, Bwijanga HCIV, Masindi Hospital and Ntara HCIV had an average of 28 MOS for AL 1x6. Diazepam injection was equally overstocked with an average of 14 MOS. Adequate stocks are between two or four months of stock for medicines and health supplies. According to the consultancy draft of EMLU 2007 including VEN classification and level of care analysis, Diazepam injection is not classified to be used at HCII and HCIII level which means staff at these levels may not be used to prescribing diazepam injection yet it has been distributed a possible reason for overstocking. The table also shows high stock out days for laboratory supplies.

Table 10: Average month of stock available per facility and duration of stock out per item

Commodity Name	Average month of stock available per facility	Range of Average MOS available per facility	Duration of stock out (days) over the last 3 months
AL 1x6 (tab)	10	0-45	35
AL 2x6 (tab)	3	0-24	42
AL 3x6 (tab)	6	0-48	45
AL 4x6 (tab)	5	0-36	45
Dextrose 5% IV infusion	1	0-4	47
Dextrose 50% 100ml	7	0-23	54
Diazepam 10mg/2ml	14	1-67	16
Field Stains A (Bottle)	2	0-3	86
Field Stains B (Bottle)	2	0-7	86
IV Cannula 18G-22G	3	0-12	35
IV giving set (15drops/min)	2	0-10	37
Insecticide Bednet (Net)	1	1	67
Malaria Rapid Diagnosis Test	6	6	2
Microscope slides	2	0-3	90
Paracetamol 500mg (Tab)	2	0-14	42
Quinine IM/IV 600mg	6	0-40	50
Quinine tab 300mg (Tabs)	3	0-27	55
Sulphadoxine/Pyrimethamine (SP) tab 525mg (Tabs)	4	0-21	45
Syringe	4	0-21	44
Average	4		49

DELIVERIES

According to data in table 11, out of the 77 items ordered more than 2/3 was delivered in the right quantity. Due to absence of order forms and delivery notes limited data was obtained. Many of the facilities do not consistently file all the forms so it was hard to compare the quantities ordered with those delivered. Secondly HCII's and HCIII's do not make orders anymore but receive the kit. The results below show quantities ordered are not necessarily delivered; the findings seemed to decline in the second EUV survey. A reason for recurring stock outs at the facilities.

Table 11: represents percentage of Ordered vs. Received Quantities

Ordered vs. Received: Percentage of items falling into categories	EUV1(n=41)	EUV2(n=77)
Quantity ordered is greater than what was received	31	39
Quantity ordered is less than what was received	5	19
Quantity ordered equals what was received	64	42

STORAGE CONDITIONS

Table 12 lists the percent of facilities with different storage criteria. Facilities generally lack adequate fire safety equipment. Observations in facilities showed that the main reason for inability to monitor temperature is lack of thermometers in stores. On average 56% of the storage conditions are met with only 11% of the facilities meeting the storage criteria. More than 3/4 of the facilities do not have damaged and expired medicines or have them separated from useable medicine reducing the risk of dispensing expired medicines to patients. 37% of the staff who manage the stores have been trained in stock management creating a gap in meeting the storage criteria. Stores in lower level facilities are managed by the facility in-charge who is mainly a medical person who may not have the relevant training, time and experience in stock management. With the assumption that the right people are needed to manage the store.

Table 12: Storage conditions and adequate standards

Storage Criteria	Yes%	No%	N/A%
Malaria medicines and supplies are stored and organized according to first-to-expire, first-out (FEFO) counting and general management.	23	77	0
Usable malaria medicines and supplies are arranged so that identification labels and expiry dates and/or manufacturing dates are visible.	73	23	3
Cartons and boxes are in good condition. Not crushed due to mishandling or bad storage.	73	27	0
If RDTs are stored at this facility, determine if RDTs are wet or cracked due to heat/radiation.	3	97	0
Damaged or expired malaria medicine and supplies is separated from usable medicine.	40	7	53
Medicines and supplies are protected from direct sunlight on the day of the visit.	83	17	0
Storage area is visually free from harmful insects and rodents. (i.e. cockroaches, rats, bats, etc)	20	80	0
Storage area is secured with a lock and key, but is accessible during normal working hours. Access is limited to authorized personnel.	90	10	0
Are there burglar bars on the doors of the drug store?	30	70	0
Are there burglar bars for the windows of the drug store?	70	27	3
Malaria medicines and supplies are stored at the appropriate temperature on the day of the visit, according to product temperature specifications.	60	10	30
There are no cracks, holes or signs of water damage in the store.	73	27	0
Store is maintained in good conditions. (Look at cleanliness, organized boxes etc)	57	40	3
The current space and organization is sufficient for malaria medicines and supplies	47	53	0
Is there appropriate safety equipment? If fire extinguisher is it serviced_	10	90	0

Are products stored 30cm off the wall, 10cm from the floor (where appropriate) and stacked not more than 2.5 meters high?	33	67	0
Are there pallets/shelves available to ensure products are off the floor?	47	53	0
Malaria medicines and supplies are stored separately from insecticides and chemicals.	87	3	10
In your estimate, does this facility adequately meet storage standards?	33	67	0

CONCLUSION

In conclusion to the following objectives, malaria case management, stock management, human resource training, laboratory diagnostic capacity and storage conditions.

MALARIA CASE MANAGEMENT

Artemether- Lumefantrine (AL) was adopted as the first line treatment for uncomplicated malaria in 2004. Quinine is the recommended drug for patients with uncomplicated malaria who have failed to respond to AL and parenteral quinine is the drug of choice for treatment of severe malaria. Reference made to the data 56% of the patients are diagnosed with blood slides, with a proportion of 44% patients diagnosed without any malaria test performed. Reliance on clinical diagnosis has limitations and can lead to misdiagnosis of malaria with resultant mismanagement of non-malarial febrile illness, wastage of anti malarial medicines and potential risk of contributing to the development of resistance. Demonstration of the presence of malaria parasites prior to treatment with anti malarial medicines is fundamental to effective malaria case management. With only 44% trained health workers working in malaria case management may result in inappropriate treatment of malaria cases in facilities. Another challenge is the unavailability of first line medicine for malaria treatment. 48% of the patients with a positive test result were given ACT's, an assumption was made that all records in the OPD book were mainly uncomplicated malaria cases because the recording of prescription did not distinguish between the status of diagnosis (severe and uncomplicated). Many facilities did not maintain appropriate treatment of AL as first line treatment though a number of factors listed above could contribute to this fact. The other reason could have been stock out of ACT's.

SUPPLY CHAIN MANAGEMENT

The group of supply chain management indicators include stock availability, stock outs, expiry, stock management, storage management, ordering and receiving procedures.³ Good stock management involves available and updated stock cards. 50-70% of facilities had updated stock cards for AL products though laboratory commodities show 100% updated stock cards this is based on the low percentage of facilities with stock cards available for these items. (20-40%). Stocks out days were ranging from 2-90 days.

From the survey, it was evident that not all facilities received what they ordered; results showed that often facilities receive less quantity than ordered which could be a contributing factor to the risk of stock outs.

³ Uganda National Malaria Control Policy- Draft February 2011
WHO treatment guidelines 2ND Edition
EUUV Verification Report September 2010

STORAGE CONDITIONS

11% of the facilities were able to meet 19 conditions of the storage criteria and on average 56% of the storage conditions were met. Storage conditions that were least adhered to included, arrangement according to FEFO, presence of pest infestation, lack of pallets and shelves and appropriate storage guidelines. The same comparison was made with the last EUV survey where many of the facilities lack adequate storage space. The data suggests that there is also a gap in the staffing. 37% of the staff who manage the stores have been trained in stock management. Stores in lower level health facilities are poorly staffed especially where the in charge is responsible for the store.

The End Use Verification Survey is one tool that can be used for the assessment of malaria supply chain and malaria case management at health facility level in Uganda. The results have highlighted areas such as supervision, training, availability of materials, malaria medicines and health supplies and effort in laboratory logistics that need interventions in order to improve the situation. The following recommendations are necessary to further improve the malaria supply chain and malaria case management at health facility level.

RECOMMENDATIONS

- There is need to reorient, coordinate and conduct regular supervision of health workers on malaria case management, use of RDT's and stock management.
- Laboratory logistics need to be strengthened at the health facilities. There is need to distribute stock cards for laboratory commodities and RDT's and conduct on-job training and supervision in stock management. The survey showed that a number of the staff interviewed had received training in use of RDT's but have never had a chance to use them. Laboratories and RDT's are not found in public HCII facilities and yet this is the first point reference patients will go to because of proximity creating reliance on clinical diagnosis. Distribution and use of RDT's is a viable and feasible option to expand the use of confirmatory diagnosis at the lower levels.
- Dissemination of EUV results to all stakeholders involved in malaria case management and malaria supply chain in order to quickly allow for corrective action to be taken.
- There's need to add more emphasis on regular supervision of health facilities by central and district supervisors to actively monitor the supplies, mentor and coach the health workers. Emphasis should be placed on malaria case management. This could ensure that clinical guidelines for malaria treatment are adhered to in the facilities.

Redistribution of stock by ensuring that there clear guidelines and systems in place especially within facilities, district and region to avoid expiries of certain items, stock outs and overstocking in some facilities.

ANNEXES

ANNEX A: DATA COLLECTION TEAM

Names	Designation
Belinda Blick	M&E/LMIS Field Coordinator (SURE)
Lawrence Were	Logistics Expert (Pharmacy Division-SURE)
Bill Elur	M&E/LMIS Field Coordinator (SURE)
John Kyalimpa	Pharmacist (Gulu Hospital)
Margaret Abigaba	Pharmacist (Hoima Hospital)
Judith Agatha Apio	Pharmacist (Mbale Hospital)
Agnes Netunze	Data Manager (National Malaria Control Program)
Paul Ocakon	Pharmacist (Kalisizo Hospital)
Connie Nangobi	Data Manager (National Malaria Control Program)

ANNEX B: PMI END-USE VERIFICATION TOOL

PMI End-Use Verification Tool

Form 1: Facility Identification Form

1. Facility Code	
2. Today's date (dd-mm-yyyy)	
3. Interviewer's name	
4. District	5. District Code
6. Facility Name	
7. Operating Authority <input type="checkbox"/> MOH <input type="checkbox"/> NGO <input type="checkbox"/> Mission <input type="checkbox"/> Private	8. Facility Type <input type="checkbox"/> Warehouse <input type="checkbox"/> SDP
9. Mark type of facility <input type="checkbox"/> Hospital <input type="checkbox"/> Health centre IV <input type="checkbox"/> Health centre III <input type="checkbox"/> Health centre II	

MALARIA END-USE VERIFICATION

<input type="checkbox"/> Central Warehouse <input type="checkbox"/> District Warehouse <input type="checkbox"/> NA
--

10. Name of the health facility in-charge
11. Telephone number (mobile) for the in-charge
12. Name of principle person being interviewed
13. Telephone number (mobile) for the person being interviewed
14. Name of district person accompanying
15. Telephone number (mobile) for district person accompanying
16. Title of the district person accompanying
17. Take and record GPS for the facility

PMI End-Use Verification Tool
Form 2: Facility Questionnaire

- 1. This includes questions on who is responsible for different areas of malaria treatment, training levels, supervision, and deliveries from NMS/Districts.**

No	Question	Answers /Options
2	Facility Code	Enter the number _____
3	Which services do you offer for malaria control at this facility?	<input type="checkbox"/> Uncomplicated Malaria treatment <input type="checkbox"/> Severe Malaria Referral..... <input type="checkbox"/> Severe Malaria Treatment <input type="checkbox"/> Microscopy <input type="checkbox"/> Malaria RDTs <input type="checkbox"/> IPTp <input type="checkbox"/> ITN (bed net) <input type="checkbox"/> Other
4	Who is the principal person dispensing ACTs at this facility?	<input type="checkbox"/> Medical Officer <input type="checkbox"/> Pharmacist <input type="checkbox"/> Pharmacy Technician <input type="checkbox"/> Pharmacy Assistant <input type="checkbox"/> Clinical Officer <input type="checkbox"/> Enrolled Nurse <input type="checkbox"/> Registered Nurse <input type="checkbox"/> Nurse Assistant <input type="checkbox"/> Other
5	Who is the principal person prescribing ACTs at this facility?	<input type="checkbox"/> Medical Officer <input type="checkbox"/> Pharmacist <input type="checkbox"/> Pharmacy Technician <input type="checkbox"/> Pharmacy Assistant <input type="checkbox"/> Clinical Officer <input type="checkbox"/> Enrolled Nurse <input type="checkbox"/> Registered Nurse <input type="checkbox"/> Nurse Assistant <input type="checkbox"/> Other

No	Question	Answers /Options
6	Who is the principal person managing stock of antimalarial medicines at this facility?	<input type="checkbox"/> Medical Officer <input type="checkbox"/> Pharmacist <input type="checkbox"/> Pharmacy Technician <input type="checkbox"/> Pharmacy Assistant <input type="checkbox"/> Clinical Officer <input type="checkbox"/> Enrolled Nurse <input type="checkbox"/> Registered Nurse <input type="checkbox"/> Nurse Assistant <input type="checkbox"/> Store Keeper <input type="checkbox"/> Other
7	Who is the principal person dispensing SP for (Intermittent Preventive Treatment in pregnancy (IPTp) at this facility?	<input type="checkbox"/> Medical Officer <input type="checkbox"/> Pharmacist <input type="checkbox"/> Pharmacy Technician <input type="checkbox"/> Pharmacy Assistant <input type="checkbox"/> Clinical Officer <input type="checkbox"/> Enrolled Nurse <input type="checkbox"/> Registered Nurse <input type="checkbox"/> Nurse Assistant <input type="checkbox"/> Enrolled Midwife <input type="checkbox"/> Registered Midwife <input type="checkbox"/> Other
8	Where is SP for IPTp dispensed?	<input type="checkbox"/> Pharmacy/dispensary <input type="checkbox"/> OPD <input type="checkbox"/> Antenatal clinic <input type="checkbox"/> Does not apply <input type="checkbox"/> Other
9	Who is the principle person administering RDTs at this facility?	<input type="checkbox"/> Medical Officer <input type="checkbox"/> Pharmacist <input type="checkbox"/> Pharmacy Technician <input type="checkbox"/> Pharmacy Assistant <input type="checkbox"/> Clinical Officer <input type="checkbox"/> Lab Technician <input type="checkbox"/> Lab Technologist <input type="checkbox"/> Lab Assistant <input type="checkbox"/> Enrolled Nurse <input type="checkbox"/> Registered Nurse <input type="checkbox"/> Nurse Assistant <input type="checkbox"/> Other
10	How many health workers are working at this facility? <i>(do not include support staff)</i>	Enter a number: _____
11	How many people at this facility are working in malaria case management (regularly assess, diagnose and/or prescribe malaria medicines)?	Enter a number: _____

No	Question	Answers /Options
12	Of those working in malaria case management, how many people have been trained in the malaria treatment guidelines?	Enter a number: _____
13	How many people working at this facility dispense IPTp?	Enter a number: _____
14	Of the people dispensing IPTp, how many have received organized, structured training in IPTp?	Enter a number: _____
15	How many people working at this facility administer malaria Rapid Diagnostic Tests (RDTs)?	Enter a number: _____
16	How many of the people administering RDTs have been trained in the proper use of RDTs?	Enter a number: _____
17	How many people working at this facility perform microscopy?	Enter a number: _____
18	Of the people performing microscopy, how many have been trained in microscopy?	Enter a number: _____
19	How many people at this facility work in stock management?	Enter a number: _____
20	How many people working in stock management have been trained in stock management?	Enter a number: _____
21	Has any supervision that occurred in the last six months included 3 or more of the following: Reviewed order forms, Examined stock cards, Reviewed storage conditions, Conducted physical inventory, Reviewed dispensing register	<input type="checkbox"/> Yes <input type="checkbox"/> No
22	Has any supervision in the last six months included observation of malaria case management?	<input type="checkbox"/> Yes <input type="checkbox"/> No
23	What was the title of the person who performed the supervision?	Title: _____

MALARIA END-USE VERIFICATION

No	Question	Answers /Options
24	Are you performing internal supervision? (For example does the pharmacy staff supervise how stocks are stored in wards or does the in-charge supervise how malaria cases are handled by clinical staff?)	<input type="checkbox"/> Yes <input type="checkbox"/> No
25	Is internal supervision documented	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
26	Is there a copy of a manual or Standard Operating Procedures (SOP) for management of pharmaceutical products? (ask to see)	<input type="checkbox"/> Yes <input type="checkbox"/> No
27	Is there a copy of the reference guidelines for malaria case management available?	<input type="checkbox"/> Yes <input type="checkbox"/> No
28	When was the last time you sent an order for malaria medicines	Date of order/report: ___ ___ ___ dd mm yy
29	Was the last report you sent in for ordering malaria medicine on time? (Compare reporting date with the NMS/JMS deadline)	Not on Time.....0 On Time.....1 Form not available at the facility.....2 Not applicable.....9
30	On average, approximately how many weeks does it take between ordering and receiving malaria medicines at this facility? (Don't apply for facilities receiving kits)	_____
31	On average how many weeks are there between shipments of malaria medicines? (for facilities receiving kits – PUSH system. For facilities ordering leave blank)	_____

No	Question	Answers /Options
32	Who regularly transports malaria products to your facility? (from district to facility)	<input type="checkbox"/> NMS delivers <input type="checkbox"/> District delivers <input type="checkbox"/> HSD delivers <input type="checkbox"/> Facility collects from district <input type="checkbox"/> Facility collects from NMS/JMS <input type="checkbox"/> Facility collects from Regional Coordinator <input type="checkbox"/> Other
33	What mode of transport is most frequently used to transport malaria products to your facility?	<input type="checkbox"/> NMS Truck <input type="checkbox"/> District Vehicle <input type="checkbox"/> HSD Vehicle <input type="checkbox"/> Facility vehicle <input type="checkbox"/> Public transportation <input type="checkbox"/> Private vehicle <input type="checkbox"/> None <input type="checkbox"/> Other
34	What are the most common problems that you have experienced in ordering and/or receiving malaria products?	<input type="checkbox"/> None <input type="checkbox"/> Changes in delivery schedule <input type="checkbox"/> Ordering cycle <input type="checkbox"/> Completing forms <input type="checkbox"/> Getting signatures on order form <input type="checkbox"/> Delay in distribution from the district <input type="checkbox"/> Wrong quantities delivered <input type="checkbox"/> Orders not being supplied <input type="checkbox"/> Receiving beyond working hours <input type="checkbox"/> Deliveries made in the weekend <input type="checkbox"/> Long lead times <input type="checkbox"/> Rainy season <input type="checkbox"/> No transportation <input type="checkbox"/> Other
35	Do you have any specific recommendations for improving the availability of malaria products at this facility?	<hr/> <hr/> <hr/>

PMI End-Use Verification Tool

Form 3a: Malaria Case Management General

For all tables under form 3, one month data is required.

1. Use the OPD prescription book for the majority of information needed and laboratory book or alike for information on RDTs and total number of tests.

2. Facility code _____	8. Is it possible to identify the number of patients with fever as presenting complaint? <input type="checkbox"/> Yes <input type="checkbox"/> No
3. Total number of patients for a full month: _____	9. Total number of patients with fever as presenting complaint: _____
4. Total number of patients UNDER age 5 in a full month: _____	10. Total number of RDTs used (write 0 if RDTs not used at this facility) _____
5. Total number of days examined: _____	11. Total number of malaria tests performed in one month (hemoglobin, blood slide, RDT)
6. Total number of malaria cases: _____	12. Total number of positive malaria tests in the last month (RDT, blood slide, hemoglobin tests) _____
7. Total number of patients under age 5 with malaria: _____	

PMI End-Use Verification Tool

Form 3c: Malaria Case Management

1. Look in the laboratory book for the same period as the prescription book. Find information on the same patients as in the prescription book (same name or number)
2. Facility Code

Each line represents a patient in the register.

Patient number/name	Test performed (Blood slide, Haemoglobin, RDT)	Test result (Positive/Negative)
³ / ₄	5	6

PMI End-Use Verification Tool

Form 4: Stock Status Data Collection Form

1. Use stock cards and do physical count and observation of commodities.
2. Facility Code _____

Product	Managed at this facility? Yes/No	Stock card available? Yes/No	Stock card updated within last week? Yes/No	Balance recorded on stock card? Write number	Stock on hand 3 months ago (per stock card). Write number	Stock-out most recent 3 months Yes/No	Total # of stock outs lasting longer than 3 days. Write number	Total # of days stocked out in the last three months	Total quantity received (most recent 3 months)	Total quantity issued (most recent 3 months)	# of months of data available in stock card	Physical inventory Count.	Stock-out today? Yes/No	Quantity of product expiring in the next 3 months (excl. any already expired)	Quantity of expired product
3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Artemether/Lumefantrine (AL) 1x6 (tab)															
Artemether/Lumefantrine (AL) 2x6 (tab)															
Artemether/Lumefantrine (AL) 3x6 (tab)															
Artemether/															

MALARIA END-USE VERIFICATION

Product	Managed at this facility? Yes/No	Stock card available? Yes/No	Stock card updated within last week? Yes/No	Balance recorded on stock card? Write number	Stock on hand 3 months ago (per stock card). Write number	Stock-out most recent 3 months Yes/No	Total # of stock outs lasting longer than 3 days. Write number	Total # of days stocked out in the last three months	Total quantity received (most recent 3 months)	Total quantity issued (most recent 3 months)	# of months of data available in stock card	Physical inventory Count.	Stock-out today? Yes/No	Quantity of product expiring in the next 3 months (excl. any already expired)	Quantity of expired product
3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Lumefantrine (AL) 4x6 (tab)															
Sulphadoxine / Primaquine (SP) tab 525mg (Tabs)															
Quinine tablets 300mg															
Quinine IM/IV 600mg (ampoules)															
Duocotexin 8 tabs															
Arco 8 tabs															

Product	Managed at this facility? Yes/No	Stock card available? Yes/No	Stock card updated within last week? Yes/No	Balance recorded on stock card? Write number	Stock on hand 3 months ago (per stock card). Write number	Stock-out most recent 3 months Yes/No	Total # of stock outs lasting longer than 3 days. Write number	Total # of days stocked out in the last three months	Total quantity received (most recent 3 months)	Total quantity issued (most recent 3 months)	# of months of data available in stock card	Physical inventory Count.	Stock-out today? Yes/No	Quantity of product expiring in the next 3 months (excl. any already expired)	Quantity of expired product
3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Artequinine															
Duact															
Paracetamol 500mg (Tab)															
Dextrose 50% 20ml (Bottle)															
Diazepam 10mg/2ml (Ampules)															
Dextrose 5% IV infusion (Bottles)															
Syringes 10ml															
IV Cannula 18G-22G (any size)															
IV giving set (15)															

MALARIA END-USE VERIFICATION

Product	Managed at this facility? Yes/No	Stock card available? Yes/No	Stock card updated within last week? Yes/No	Balance recorded on stock card? Write number	Stock on hand 3 months ago (per stock card). Write number	Stock-out most recent 3 months Yes/No	Total # of stock outs lasting longer than 3 days. Write number	Total # of days stocked out in the last three months	Total quantity received (most recent 3 months)	Total quantity issued (most recent 3 months)	# of months of data available in stock card	Physical inventory Count.	Stock-out today? Yes/No	Quantity of product expiring in the next 3 months (excl. any already expired)	Quantity of expired product
3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
drops/min)															
Insecticide Bednet (net)															
Malaria RDT															
Field Stain A															
Field Stain B															
Microscope slides															
Functional Microscope															

PMI End-Use Verification Tool

Form 5: Difference between Quantity Ordered and Quantity Received

1. Select the newest order for each product. It can be different orders, if not all products were ordered at the same time.
2. Facility Code

Product Name	Is order and invoice available for this product? (Y/N)	Quantity Ordered (Last Order Period)	Quantity Received	Date Order Placed	Date Order Received in District	Date Order Received at facility
3	4	5	6	7	8	9
Artemether Lumefantrine 1x6 (strip of 6)						
Artemether Lumefantrine 2x6 (strip of 12)						
Artemether Lumefantrine 3x6 (strip of 18)						
Artemether Lumefantrine 4x6 (strip 24)						
Sulphadoxine/Primingethamine (SP)						
Quinine tablets 300mg						
Quinine injection						
Diazepam injection						
Paracetamol 500mg						
Malaria RDTs (tests)						
Field Stain A (bottle)						
Field Stain B (bottle)						

10. Comments

PMI End-Use Verification Tool

Form 6: Difference between Quantity Sent and Quantity Received

1. Select the newest NMS delivery note for each product. It can be different delivery notes, if not all products were ordered at the same time.
2. Facility Code

Product Name	Delivery note, reports or comments available to identify sent and received quantities for this product? (Y/N)	Quantity sent from NMS	Quantity Received	Date order was sent from NMS	Date Order Received at District	Date order received at facility
3	4	5	6	7	8	9
Artemether Lumefantrine 1x6 (strip of 6)						
Artemether Lumefantrine 2x6 (strip of 12)						
Artemether Lumefantrine 3x6 (strip of 18)						
Artemether Lumefantrine 4x6 (strip 24)						
Sulphadoxine/Primethamine (SP)						
Quinine tablets 300mg						
Quinine injection						
Diazepam injection						
Paracetamol 500mg						
Malaria RDTs (tests)						
Field Stain A (bottle)						
Field Stain B (bottle)						

10. Comments

PMI End-Use Verification Tool

Form 7: Malaria Products Storage Conditions Form

1. Assess the pharmacy/main store.
2. Facility Code

No.	Description	Y/N	N/A
3	Malaria medicines and supplies are stored and organized according to first-to-expire, first-out (FEFO) counting and general management.		
4	Usable malaria medicines and supplies are arranged so that identification labels and expiry dates and/or manufacturing dates are visible.		
5	Cartons and boxes are in good condition. Not crushed due to mishandling or bad storage.		
6	If RDTs are stored at this facility, determine if RDTs are wet or cracked due to heat/radiation.		N/A – RDTs not used
7	Damaged or expired malaria medicine and supplies is separated from usable medicine.		
8	Medicines and supplies are protected from direct sunlight on the day of the visit.		
9	Storage area is visually free from harmful insects and rodents. (i.e. cockroaches, rats, bats, etc)		
10	Storage area is secured with a lock and key, but is accessible during normal working hours. Access is limited to authorized personnel.		
11	Are there burglar bars on the doors of the drug store?		
12	Are there burglar bars for the windows of the drug store?		
13	Malaria medicines and supplies are stored at the appropriate temperature on the day of the visit, according to product temperature specifications.		
14	There are no cracks, holes or signs of water damage in the store.		
15	Store is maintained in good conditions. (Look at cleanliness, organized boxes etc)		
16	The current space and organization is sufficient for malaria medicines and supplies.		
17	Is there appropriate safety equipment? If fire extinguisher is it serviced.		Yes, and service Yes, not serviced

The additional standards below should be applied to any store room large enough to require stacking of multiple boxes.

No.	Description	Y/N	N/A
-----	-------------	-----	-----

18	Are products stored 30cm off the wall, 10cm from the floor (where appropriate) and stacked not more than 2.5 meters high?		
19	Are there pallets/shelves available to ensure products are off the floor?		
20	Malaria medicines and supplies are stored separately from insecticides and chemicals.		
21	In your estimate, does this facility adequately meet storage standards?		

Comments. All N/A answers must be explained here. Only use the N/A option when it is absolutely necessary