REVIEW OF MONITORING OF MALARIA IN PREGNANCY THROUGH NATIONAL HEALTH MANAGEMENT INFORMATION SYSTEMS: UGANDA

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The findings of this review are based on Uganda's Health Management Information System forms that were collected and reviewed during the period of October 2012–March 2013. Every attempt was made to get the latest tools available. Qualitative information included in this report was collected during key informant interviews conducted in September 2013.

This report was compiled by the Maternal and Child Health Integrated Program (MCHIP) for review by the President's Malaria Initiative and Roll Back Malaria Initiative.

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Abbreviations

AHSPR	Annual Health Sector Performance Report
ANC	Antenatal Care
BS	Blood Serum
CTX	Co-trimoxazole
DHIS	District Health Information System
DHS	Demographic and Health Survey
DQA	Data Quality Assessment
HMIS	Health Management Information System
HSD	Health Sub-District
HSS	Health Systems Strengthening
HSSIP	Health Sector Strategic and Investment Plan
IRS	Indoor Residual Spraying
IPTp	Intermittent Preventive Treatment of Pregnant Women
IPT2	Second Dose of Intermittent Preventive Treatment
IPT3	Third Dose of Intermittent Preventive Treatment
IPT4	Fourth Dose of Intermittent Preventive Treatment
ITN	Insecticide-Treated Bed Net
LLIN	Long-Lasting Insecticide-Treated Bed Net
M&E	Monitoring and Evaluation
MCHIP	Maternal and Child Health Integrated Program
MIP	Malaria in Pregnancy
MIS	Malaria Indicator Survey
MOH	Ministry of Health
MOP	Malaria Operational Plan
NGO	Nongovernmental Organization
NMCP	National Malaria Control Program
ORS	Oral Rehydration Solution
PMI	President's Malaria Initiative
RBM	Roll Back Malaria
RDT	Rapid Diagnostic Test
RH	Reproductive Health
SP	Sulfadoxine Pyrimethamine
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WHO	World Health Organization

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Introduction

The Maternal and Child Health Integrated Program (MCHIP) works closely with the President's Malaria Initiative (PMI) and the Roll Back Malaria (RBM) Partnership community including key stakeholders in maternal health and child health to support the reduction in the global burden of malaria morbidity and mortality. MCHIP does this by helping to improve the quality of malaria programs, strengthening health systems, and helping countries achieve sustained results. A critical aspect of health systems strengthening (HSS) is ensuring that appropriate high quality data on malaria service delivery is available to policymakers and program managers.

Obtaining reliable, valid, and timely malaria service data, especial data related to the control of malaria in pregnancy (MIP) is challenging. Although population-based MIP indicators are very useful, the timing of population-based surveys, which general occur every two to five years, is too infrequent for program monitoring. National health management information system (HMIS) data are more frequently collected, complement survey data, and have the potential to be more useful for ongoing service improvement and decision-making. However, the quality of HMIS data in low-income settings is poor; often data are missing, report formats are outdated, and reporting is late. Furthermore, it is not widely known what data are being recorded at the facility level, what data are reported up through the health system, and whether those data are being used at the facility.

MCHIP, with support from PMI, decided to conduct a review of national HMIS in a sample of six PMI focus countries to improve our understanding of how ministries of health (MOHs)—both national malaria control programs and reproductive health (RH) units—are monitoring and reporting on their MIP-related program results and how the data are being used. This activity will provide specific recommendations for improving MIP-related, routine data collection and use. This activity fits within a larger review of routine maternal and newborn data collection systems by MCHIP in the same six countries and additional non-PMI/ non-malaria endemic countries.

The PMI countries selected for this review include Kenya, Malawi, Mozambique, Mali, Tanzania, and Uganda. Each of these countries is among the19 focus countries benefiting from PMI, which is implemented by the United States Agency for International Development (USAID) in partnership with the United States Centers for Disease Control and Prevention. The review focuses on the public sector and examines how HMIS and supplemental routine data collection and reporting strategies are used at different levels of the health system to capture MIP indicators. The review describes MIP information, data quality gaps, and best practices.

This report presents findings from the review and recommendations on priority indicators that should be monitored at the facility level, data collection formats, as well as ways to interpret and use data to improve services and ways to report data up through the health system. Information from this report, along with the other five country reviews, will be used to propose revisions to the 2007 World Health Organization (WHO)/RBM manual, *MIP: Guidelines for Measuring Key Monitoring and Evaluation Indicators* (referred to from here forward as WHO MIP M&E Guidelines).

The findings and recommendations from this review will be shared with the countries to help improve their routine monitoring systems. Findings and recommendations will also be shared with PMI, as well as the RBM MIP working group and RBM Monitoring and Evaluation (M&E) Group, for further review, discussion, and development of final recommendations for global and country levels.

Background

MALARIA SITUATION IN UGANDA

Malaria remains the leading cause of morbidity and mortality among all age groups and accounted for 20.6% of all inpatient deaths in 2012/13 (Uganda 2013 Annual Health Sector Performance Report [AHSPR]). The 2011 Uganda Demographic Health Survey (DHS) report 2011 showed a decline in women receiving two or more doses of intermittent preventive treatment of pregnant women (IPTp) from 32% to 25%. The 2012 MOH 2012 Annual Statistical abstract, based on HMIS data, noted that the number of women who received the second dose of IPT (IPTp2) decreased from 47% in 2010 to 43% in 2010/11, and the 2013 annual health data from the HMIS estimated this figure to be again at 47% (AHSPR 2013). General malaria indicators are summarized below in Table 1.

Table 1. Uganda Malaria Indicators

UGANDA MALARIA INDICATORS	MIS 2009	DHS 2011	AHSPR 2013
All-cause under-5 mortality rate	-	90/1,000	–
Proportion of households with at least one ITN	47%	60%	–
Proportion of children under 5 years old who slept under an ITN the previous night	33%	43%	–
Proportion of pregnant women who slept under an ITN the previous night	44%	47%	–
Proportion of women who received 2 or more doses of IPTp during their last pregnancy in the last 2 years	32%	25%	47% (HMIS data)
Percentage of facilities without stock- out of any of the 6 tracer medicines (first line antimalarials [ACTs], Depo-Provera, Sulfadoxine/Pyrimethamine, measles vaccine, ORS and co-trimoxazole [CTX])	–	–	53% (HMIS data)
Percentage of women attending 4 ANC visits	–	–	31% (HMIS data)

ANC: Antenatal care; ITN: Insecticide-treated bed net; MIS: Malaria Indicator Survey; ORS: Oral Rehydration Solution.

WORLD HEALTH ORGANIZATION AND UGANDA MALARIA MONITORING AND EVALUATION RECOMMENDATIONS

The WHO Evidence Review Group meeting, held in July 2012, resulted in new recommendations for frequency and timing of sulfadoxine-pyrimethamine (SP) dosing with IPTp dosing, based on review of the latest evidence of the efficacy of IPTp-SP. The recommendations were presented to the WHO Malaria Policy Advisory Committee in September 2012 and adopted as the Updated WHO Policy Recommendation on IPTp-SP in October 2012. To help facilitate MIP program implementation, it is important to have harmonization of country policies, guidelines, training, and supervision materials between RH and malaria control. In light of the Updated WHO Policy Recommendation and recognizing that many countries will need to revise their national-level documents to disseminate the new guidance, MCHIP conducted a systematic review of

WHO Updated Policy Recommendation (October 2012)

- In areas of moderate-to-high malaria transmission, IPTp with SP is recommended for all pregnant women at each scheduled ANC visit. WHO recommends a schedule of four ANC visits.
- The first IPTp-SP dose should be administered as early as possible during the second trimester of gestation.
- Each SP dose should be given at least one month apart.
- The last dose of IPTp with SP can be administered up to the time of delivery, without safety concerns.

national-level MIP policies and guidance documents in Kenya, Mali, Mozambique, Tanzania, and Uganda.[1] The purpose of the policy review was to increase our understanding of each country's MIP guidance for health workers and to find any inconsistencies that may exist between WHO and country guidance as well as between RH programs and malaria programs at the country level. The report of the national-level MIP policies and guidance review recommends specific actions at the country level for removing inconsistencies and complements the HMIS review presented in this report.

The malaria strategic plan was developed based on the 5 year Health Sector Strategic Plan II Uganda (2005/06-2009/10). Specific malaria prevention and control targets set to be achieved included:

- Increase the proportion of pregnant women who have completed IPTp2 from 33% to 85%.
- Increase the proportion of households having at least one long-lasting insecticide-treated bed net (LLIN) from 15% to 85%.
- Increase the proportion of households having at least two LLINs from 10% to 60%.
- Increase proportion of under-fives having slept under LLIN the previous night to 85%.
- Increase proportion of pregnant women having slept under LLIN the previous night to 85%.
- Increase number of districts covered by indoor residual spraying (IRS) (i.e., regular high quality spraying of at least 85% of structures) from 0 to 40.
- Increase the proportion of children under five getting correct treatment according to national treatment guidelines within 24 hours of onset of symptoms from 55% to 85%.
- Reduce the case fatality rate among malaria in-patients under five years from 3% to 2%.

Methods

DESK REVIEW

Through MCHIP field offices, country HMIS forms were collected. A content analysis was done on these forms to determine what was being monitored and reported related to MIP. Next, in each country, a review of national policies, strategies, and guidelines with MIP M&E-related information as well as technical reports, publications, and web materials related to MIP was conducted. The documents examined for this review include:

- Uganda DHS 2011
- Malaria Indicator Survey (MIS) 2009
- PMI Malaria Operational Plan (MOP) FY13 (for background on United States Government priorities for MIP)
- M&E Plan for Health Sector Strategic and Investment Plan (HSSIP) 2010/11–2014/15
- National Malaria Control Program (NMCP) M&E Plan 2008–2010 (A later version of the NMCP M&E plan was located [for 2007-2012], but this was not used for this review as it was in draft form and did not have key elements clearly articulated as the 2008-10 plan did; see http://health.go.ug/mcp/National%20Malaria%20M&E%20Plan%20Uganda%20DRAFT.pdf.)

[1] Gomez, Patricia, Aimee Dickerson, and Elaine Roman. 2012. *Review of National-Level Malaria in Pregnancy Documents in Five PMI Focus Countries*. Baltimore, MD: Jhpiego Corporation. http://www.mchip.net/sites/default/files/mchipfiles/MIP%20in%20Five%20African%20Countries.pdf.

- MOH National Annual Statistical Abstract 2010 and 2012 (national report)
- Uganda AHSPR 2013
- NMCP annual report (national report)
- National Malaria Prevention and Control Strategic Plan 2005-2010
- HSSIP Report
- HMIS tools:
  - HMIS Health Unit Procedure Manual 2010 (includes reporting tools)
  - HMIS Health Sub-district (HSD)/District Procedure Manual 2010 (includes reporting tools)
  - Antenatal Care (ANC) card (Mother's health passport 2012)
  - Integrated ANC register (HMIS Form 071)
  - Health Unit Outpatient Monthly Report (Form 105)
  - Outpatient register (Form 031)
  - Outpatient tally sheet (Form 091A)

KEY INFORMANT INTERVIEWS

The findings of the desk review were used to tailor interviews that were conducted in each country. In-country interviews were conducted with key stakeholders at national, district, and facility levels. At each level, efforts were made to glean the perspective from three key areas: malaria, reproductive health, and HMIS. At the national level, interviews were held with staff from malaria control programs, RH units, and HMIS, as well as with malaria partners including PMI; WHO; The Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund); and nongovernmental organizations (NGOs) funded to support the MOH in strengthening malaria programs. In addition to the national level, the information shared here is from two facilities and two districts, and it is not representative of the entire country. The districts included in this review were purposively selected because one had significant support from a malaria NGO partner and the other one did not. Also, to be able to visit two sites during the time available for this scope of work, the sites selected were also close to Kampala. A list of interviewees is in Annex 1 and questions are in Annex 2.

Findings

HEALTH MANAGEMENT INFORMATION SYSTEM STRUCTURE AND FUNCTION

The HMIS is managed by the MOH Resource Center at the national level. DHIS2 is used nationally, with paper forms being used at the facility level and entered into the electronic district health information system, second version (DHIS2) at the district or HSD level. At the district/HSD level, there is an HMIS focal point person, and at the facility level, there is a records assistant that supports data collection and completion of reports. DHIS2 has the advantage of data entry by facility, an improvement over earlier versions of DHIS that only availed data in aggregate. The system also includes mTrac (operating in all districts and health facilities as of June 2013 [AHSPR 2013]), supported through MOH collaboration with United Nations Children's Fund (UNICEF), WHO, and the Department for International Development (DFID); mTrac consists of weekly data collection via mobile phone by community health workers on issues of

epidemic concern. Regarding malaria, mTrac reports all malaria cases (not by age, sex, or pregnancy status), data on stock-outs of rapid diagnostic tests (RDTs) and artemisinin-based combination therapy, and number of maternal deaths (not by cause). There is a gap in the data collected in that the number of malaria cases is not disaggregated by pregnancy status. As of September 2013, everyone had been trained in mTrac at the district level, and most districts had done rollout trainings, except 27 districts. At that time, there was about 58% report completion.

The implementation of DHIS2 has the potential to increase data visibility, quality, and use. At the time of the review, however, a consistent observation across national and district levels was that a limited number of people had access to the system. For example, at the district level, the DHO has view privileges, the biostatistician has access, but the malaria and RH people do not have access. At the national level, M&E staff has DHIS2 access, but program staff, both from the NMCP and the RH unit, do not. International partners can also request access to view the data for the specific technical interventions and geographic areas they support.

The HMIS was being revised in the fall of 2013 when this review was being conducted. The MOH MIP focal point person requested a summary of suggested changes to be proposed in the HMIS revision. While the indicators were considered to be important, the expansion of monitoring to include IPT3 and IPT4 was not considered critical because the guidelines had not yet been updated. See Annex 3, Section 2 for the data elements recommended for inclusion in the HMIS.

At the district level, there were some interesting suggestions regarding the HMIS, including one district official advocating for health care worker input on HMIS tools to make them more user-friendly to providers. Review and input from providers could include suggestions related to MIP data elements, which are used to construct MIP indicators.

At the facility level, it was noted that there was an insufficient supply of registers and reports. Without sufficient data collection and reporting tools, MIP services that are provided go unrecorded and reported.

MALARIA IN PREGNANCY INDICATORS IN NATIONAL PLANS, HEALTH MANAGEMENT INFORMATION SYSTEM REGISTERS, AND REPORTS

Summary of M&E Plan

To understand whether M&E and MIP are included in key policy documents, the NMCP strategy and NMCP M&E plan were reviewed. The NMCP strategy has two objectives focused on MIP. For each of these objectives, the NMCP M&E Plan has measurable indicators and means of verification. The objectives, indicators, and means of verification are outlined in Table 2.

Table 2. Key MIP Indicators Related to NMCP MIP Objectives

MIP OBJECTIVE	INDICATOR	MEANS OF VERIFICATION
Objective 8: Increase coverage with at least 2 doses of IPTp among pregnant women who attend ANC services.	Proportion of pregnant women attending ANC services receiving 2 doses of IPT. Proportion of women who have received 2 or more doses of IPTp during their last pregnancy in the last 2 years.	HMIS Household survey
Objective 9: Increase the proportion of ANC clinics distributing LLINs to pregnant women at first visit.	Proportion of pregnant women having slept under an ITN the previous night.	Household survey

In addition to these indicators, the NMCP M&E Plan provides guidance to all partners to monitor the performance of the NMCP. All MIP indicators in this document are summarized in Table 3.

Table 3. MIP Indicators Key Policy Documents

INDICATOR	DOCUMENTS	MEANS OF VERIFICATION	COMMENTS
Proportion of pregnant women provided with an LLIN	NMCP M&E Plan	ITN database	Numerator: Number of pregnant women provided with an LLIN Denominator: Total number of pregnant women in a catchment population
Proportion of pregnant women who slept under an LLIN the previous night	NMCP M&E Plan	Representative, household surveys (DHS, MIS, Artemisinin-based combination therapy Watch Study)	Numerator: Number of pregnant women who slept under an LLIN the previous night Denominator: Total number of pregnant women surveyed
Proportion of pregnant women who slept under an ITN the previous night	NMCP M&E Plan	Household survey	—
Proportion of pregnant women who slept under an LLIN the previous night or in a house protected by IRS	NMCP M&E Plan	DHS, MIS	Numerator: Number of pregnant women who slept under an LLIN the previous night plus those that did not sleep under an LLIN but slept in houses protected by IRS Denominator: Total number of pregnant women surveyed
Proportion of women who have received 2 or more doses of IPTp during their last pregnancy in the last 2 years	NMCP M&E Plan	DHS, MIS	Numerator: Total number of pregnant women receiving 2 or more doses of IPTp through antenatal clinic visits, in the last 2 years Denominator: Total number of women who were pregnant in the previous two years
Proportion of health facilities with no stock-outs of recommended drug for IPT during the last 1 month	NMCP M&E Plan	HMIS	Numerator: Number of health facilities that offer ANC services with no stock-outs of recommended drug for IPT during the last 1 month Denominator: Total number of health facilities that offer ANC services reporting or surveyed
Percentage of health facilities without stock-outs of any of the 6 tracer medicines in previous 3 months (first line antimalarials, Depo-Provera, SP, measles vaccine, ORS, CTX)	HSSIP Annual Report	Annual drug availability survey	Definition not provided

INDICATOR	DOCUMENTS	MEANS OF VERIFICATION	COMMENTS
Number of pregnant women who received LLINs	NMCP M&E Plan	ITN Database NGO Reports	–
Number of pregnant women receiving IPT (1, 2 or 3 dose)	NMCP M&E Plan	HMIS	Total number of pregnant women receiving IPTp (1, 2, or 3 dose) through antenatal clinic visits, listed separately for IPT1, IPT2, IPT3
Number of SP doses distributed to ANC clinics	NMCP M&E Plan	HMIS	Total number of SP doses distributed to ANC clinics
Number of ANC health workers trained in IPTp	NMCP M&E Plan	HMIS, Training reports	Total number of ANC health workers trained in IPTp
Number of malaria in pregnancy cases at outpatient department (OPD)	NMCP M&E Plan	HMIS	Definition not given
Number of inpatient malaria in pregnancy cases	NMCP M&E Plan	HMIS	Definition not given
Proportion of women attending ANC services receiving 2 doses of IPT	NMCP M&E Plan	HMIS	Definition not given
ANC attendance	NMCP M&E Plan	HMIS	Definition not given

Sources of malaria data described in the NMCP M&E Plan include the HMIS, community medicine distribution registers, Integrated Disease Surveillance and Response system, Sentinel Site Surveillance system and the Demographic Surveillance Sites and population-based surveys such as the DHS, MIS, other household surveys, Service Provision Assessment surveys, ITN Monitoring System, Malaria Composite Database. Given that the scope of this activity is focused on HMIS, data from other sources was not explored, although there were some recommendations related to the SSS system (see Annex 3, section 2).

M&E of MIP through the HMIS focuses primarily on IPTp2, distribution of LLINs, and SP stock-outs, while data on case management for pregnant women are generally lacking. Although data are generated on number of MIP cases diagnosed in OPD and inpatient department (IPD), there is not a clear definition of these indicators, and no specific plan for analysis of these data. Also, as shown in Table 3, ANC attendance and the proportion of women attending ANC services receiving two doses of IPTp are included in the HMIS, but a specific definition for these indicators is not provided in guidance documents.

Table 4 shows a summary of the data elements captured in HMIS tools.

Table 4. Data Captured in HMIS Tools

UGANDA	IPTP1	IPTP2	IPTP3	ITN GIVEN	ASKED IF SLEPT UNDER ITN	DIAGNOSIS RDT	DIAGNOSIS MICROSCOPY	TREATMENT
ANC client card (Mother's Health Passport)	IPT being noted as 1, 2, ND (not due) or C (complete). Instructions include "Second IPT dose should be given at least 4 weeks after the first dose. All HIV positive pregnant mothers should receive a third dose of IPT 4 weeks after the second dose and before 36 weeks, those taking CTX should not take IPT."			No	Yes (Net use)	No	No	Open field for Notes/Treatments
ANC register	Yes	Yes	No	Yes	No	Diagnosis field available, malaria is included in instructions. Method of diagnosis not specified (RDT/microscopy).		Treatment field available.
OPD Register (HMIS Form 031)	IPTp doses not noted. There are fields for age, sex, diagnosis, and treatment, but pregnancy status is not denoted.							
Health Unit Outpatient Monthly Report (HMIS Form 105)	Yes	Yes	No	Yes	No	Number of RDTs and number of microscopy reported but not disaggregated by pregnancy status.		–
Health Unit Inpatient Monthly Report (HMIS Form 108)	This report summarizes number of admission and number of deaths caused by MIP. It is not clear how the diagnosis was made or what treatment, if any, was provided.							
HSD/District Monthly Report	Yes	Yes	No	Yes	No	There is a field for malaria and MIP reported		No

RDT: Rapid diagnostic test.

As noted in Table 4, data are currently captured and reported on IPT1, IPT2 and whether ANC clients reported that they slept under an ITN. There are data on MIP reported but it is not clear if these data refer to how the diagnosis was made, or what, if any, treatment was provided in these cases. There are no data specific to testing or test results for diagnosis either through RDT or microscopy for pregnant women. In one district, the annual figure for number of MIP diagnoses was more than 3,500. For management of malaria requiring inpatient admission, during site visits we requested to review the maternity register and inpatients registers because the Inpatient Form (Form 108), Section 6 on Number of Admissions and Deaths by Diagnosis, item #36 under Maternal and Perinatal Diseases is listed as MIP. Unfortunately, during our visits there were no registers used to report in these service delivery areas. This deficiency seems to be a systemic issue that extends beyond MIP but certainly impacts MIP monitoring if women with malaria seen in the maternity ward or other inpatient ward are not being reported.

While visiting health facilities and districts, however, it was found that in HMIS Form 105, Section 1.3 Outpatient Diagnoses, Sub-section 1.3.3 Maternal and Perinatal Conditions, there is

an item #40 listed under MIP. From these forms, it is not clear how the diagnosis was made, and what, if any, treatment was provided in these cases.

In one district, it was noted that reporting on services provided by the private sector is limited and given the high utilization of private sector health care in Uganda, including for MIP prevention and treatment, this limited reporting may be contributing to the lack of data on IPT, LLIN distribution, and MIP admissions and diagnoses. This is a persistent problem that the MOH has been working on. One district-level official interviewed during this review recommended to link with the private sector to build capacity for use of registers and reports and to link managers in the private sector to MIP data management. Finally, it was also noted that data availability is inhibited by a lack of a system to transport HMIS reports that include MIP data from the facility level to districts. One district suggested considering an incentive for transport to bring data/reports, at least reimbursing the cost of the trip between the facility and the district office.

Additional ANC indicators relevant to MIP are shown in Table 5.

Table 5. Other ANC Indicators Relevant to Control of MIP

DOES THE FORMAT HAVE A PLACE TO RECORD THE FOLLOWING:	ANC REGISTER	MOTHER'S HEALTH PASSPORT	HMIS FORM
Completion instructions included	Yes	No	Yes
ANC visit #	Recorded	Recorded	Total number of ANC visits in health facility, number of ANC 1 visits and number of ANC 4 visits recorded
Gestation of pregnancy at visit (in weeks)	Recorded	Recorded	Not recorded
Iron/folate given	Recorded as given iron and folate separately	Recorded as given iron and folate separately	Recorded # of iron and folate given together
Hemoglobin, packed cell volume recorded	Not recorded	Hemoglobin level recorded	Not recorded
HIV testing done—Pregnant woman	Recorded	Recorded	Not recorded
Prevention of mother-to-child transmission—On CTX preventive therapy (prevention of opportunistic infections)	Blank field for remarks	CTX listed with blank space next to it. Section on reminders from health worker include that HIV-positive women who take CTX should not take IPTp.	Recorded

DATA FLOW AND REPORTING PROCESS

Data are collected through ANC on IPTp1, IPTp2, and LLIN distribution. ANC providers are responsible for primary documentation in the paper ANC register. Data on severe malaria during pregnancy should be gathered from the inpatient ward or the maternity ward, but as noted above this was not observed during this review. One issue that may contribute to this problem is the lack of standardization as to where care will be provided for pregnant women with malaria. One official interviewed at the national level noted that it is important for the country to provide guidance on location of treatment and documentation required for management of severe malaria, including pregnancy status. A records assistant is responsible for compiling monthly reports to send to the HSD/ district. At the HSD/district level, data are entered into the DHIS electronic platform by an HMIS focal point person/ biostatistician where it is then available for review across the district and at the national level.

Data from both public and private sector is compiled into an AHSPR. About half of Ugandans rely on the private sector for health services[2]. As noted in the AHSPR 2013, the MOH faced major challenges in getting complete data from the private sector for various reasons including lack of HMIS tools in place in private service delivery settings, lack of capacity of private sector providers to use HMIS tools, and inadequate feedback on reported data. The report also noted that there was a lack of appreciation of the need to report, reports that are completed but not transmitted, and lack of human resources, equipment, and infrastructure to report adequately. AHSPR 2013 noted that the private sector only reported 2% of ANC4 visits and implied that this figure was under-reported because only 222 of 514 private for-profit facilities reported, and approximately 40% of the Uganda population used the private sector for health services. There are an additional 801 private not-for-profit facilities that were not represented in these data.

MALARIA IN PREGNANCY DATA QUALITY

It is difficult to have a systematic data flow when the patient flow is not clearly defined, and the lack of defined patient flow is affecting the quality of MIP data because data collection is not standardized. Key informants interviewed during this review expressed a need to develop a protocol for where pregnant women with malaria are treated.

Across MOH units and among malaria partners, the impression from the interviews is that MIP data from the HMIS are not reliable. Some of the reasons cited at the national level include:

- Registers are not well utilized because of lack of orientation to the use of registers. Orientation is provided from the district level, and this orientation is not occurring as it should.
- Data are inaccurate: There are issues with recording and compiling data, and often, at the time of submission of reports, there is a rush and estimates are made.
- Data are incomplete: Not all health facilities and/or districts reporting data. At times, there are facilities that have not reported for 2–4 months.
- Some districts where the Malaria Consortium/Stop Malaria Project (Johns Hopkins University Center for Communication Programs) have oriented workers, the documentation is better. Stop Malaria Project has helped ensure there are HMIS tools nationally by supporting reproduction costs.
- Through the Global Fund, there is a quarterly data quality assessment (DQA) done with the Resource Center and NMCP on malaria indicators. Districts are selected based on where data are problematic. Higher volume facilities are prioritized because of patient load. Other facilities are selected by DHIS2. According to key informant interviews, IPT data are not showing extreme variation, and although there are some gaps in MIP data and reporting, they are less glaring than other data. The Resource Center checks data when there is extreme variation, and it is the program responsibility to explore data quality more deeply.

From the district perspective, data quality is a concern. Both districts included in this review had conducted data verification exercises. While one district found over-reporting (more IPTp1 and IPTp2 reported in DHIS2 than in the facility registers), the other found under-reporting of IPTp1 and IPTp2. Both districts observed that the busy service delivery environment limits the completion of the HMIS tools. Health care workers delay transcribing data into the registers and reports and when the report deadline is looming, either not all the services provided have been entered into the register or the report is completed with estimated figures—this practice can lead

[2] The Uganda 2012 Bureau of Statistics Annual Statistical Abstract notes that, "In 2010/11, there were 34.9 million OPD visits as compared to 36.8 million visits in 2009/10 in government and private not-for-profit (PNFP) health units.

to both under- and over-reporting. Timeliness was less of an issue generally in these two districts. The records assistant at the facility is responsible for compiling reports. The coordination between the records assistant and the service delivery providers is lacking, making it difficult for the records assistant to clarify any questions or to get complete data in some cases.

At the facility level, it was noted that often providers are so busy delivering care that they create small tally sheets with ANC client lists, IPTp dose received, and whether LLIN was provided, that they plan to later enter into the registers. Providers expressed that because of high demand of services, the completion of the register can be done later, but often the data from the tally sheets do not get transcribed to the register and subsequently get left out of the monthly facility report.

USE OF MALARIA IN PREGNANCY DATA

At the national level, it is not common to see graphs on MIP indicators. Although the M&E staff seconded to NMCP through The Global Fund have DHIS2 access, DHIS2 privileges had not been provided for the MIP focal point person (who sits in the RH unit) at the time of the review. At the district level, there were some graphs with malaria data (under-five and over-five malaria), but there were no graphs with MIP-specific data. Data use was reportedly fairly systematic in one district, where quarterly data review meetings were held with mandatory attendance by in-charges, records assistants, head of department, and the biostatistician/analyst. Examples of use of MIP data were limited to one—facilities are able to mobilize overstock of IPTp drugs from one facility to another. Given the limited access to DHIS2, it is not surprising that data use is limited. Data literacy may also be a barrier in its use.

In one of the districts visited, data analysis skills were apparent, and a computer was used to demonstrate graphs with trends in data. It is positive that these skills are being developed at the district level, and there was concern about how to develop this capacity at the facility level.

STOCK MANAGEMENT

Availability of SP and the general management of medications appears to be strong. In both districts, there is not a problem with stock-outs of SP, including in public facilities and private not-for profit facilities. These facilities receive stock as any public health facility does, as part of the district. Both districts reported successful support from Securing Uganda Rights, an NGO that supports management of stock, including redistribution of overstock. They have built the capacity of health care workers to manage stock. In one district, there are five medicine supervisors, and they have a motorcycle to follow up the management of medications, including redistribution of overstock. MOH approved this movement of medicines, and medicines may be moved from government facilities to private not-for-profit facilities as well. LLIN management has not been as streamlined, and in one district there were stock-outs of LLINs.

Discussion

STRENGTHS AND OPPORTUNITIES

Uganda is currently reviewing its MIP policy and making revisions based on the new WHO policy recommendation for IPTp. The MIP M&E review comes at an opportune time as it gives Uganda better insight to the landscape of MIP M&E monitoring. The authors of this report hope that the findings and recommendations will be taken into account as Uganda moves forward with efforts to accelerate MIP programming and improve data monitoring and use.

Generally there is information about IPTp1, IPTp2, LLIN distribution, and SP stock being collected at the facility level and reported up the system.

DHIS2 is a useful system that supports data collection and reporting on MIP indicators (among others) and the MOH Resource Center, as the manager of the HMIS, is well-structured and empowered to complete the rollout of mTrac and to continue to support DHIS2 use at the district level.

Taking advantage of the impending HMIS review that was happening September–December 2013, a list of revisions and definitions of indicators were created for consideration when updating the HMIS (see Annex 3), and these were shared with the MOH.

WEAKNESSES

Although timeliness of HMIS reports, which include MIP data, is good, there are issues with the quality of the content of reports, and there are some activities at the district level starting to take place that should be built upon. See Recommendations for further discussion regarding these issues.

Pregnant women with malaria may present to the OPD or to the ANC clinic, and, if admitted, they may go to the maternity ward or the medical ward. It is challenging to ensure that data on these women is captured in OPD and IPD reports. Furthermore, OPD and IPD reports include MIP, but it is not clear if this data element is reporting on number of cases (and if so, how the diagnosis is confirmed) or if this is on MIP cases treated.

In the policy arena, the MIP guidelines need to be updated; case management is included but needs to be updated.

Training guidelines for in-service training have been updated but not for pre-service education.

RECOMMENDATIONS

Policy

There is a need for a clear policy of where case management of pregnant women with malaria will be done and how this care should be reported. Furthermore, existing M&E guidance should provide clear definitions for indicators that are not currently defined, including ANC attendance and proportion of women attending ANC receiving two doses of IPTp, among others. The data element "MIP" should be defined so that it is clear what it is referring to: is it cases diagnosed or cases treated? Also, it would be useful to note the method of diagnosis (see Annex 3 for additional details).

Coordination

It is essential that access to DHIS data are expanded to ensure existing malaria and RH staff at each level of the health system can view and export data for use to assess program quality and to inform program refinement. It is critical that the national MIP focal point person (who sits in the RH unit) has access to MIP data.

There may be opportunities to learn from work being done with performance-based initiatives with support from Strengthening Decentralization and Sustainability. Stakeholders state that reporting is streamlined for data that are reviewed as part of the performance-based initiative program (MIP indicators not specifically mentioned). Malaria control may benefit from an effort by malaria partners to review the indicators included and consider integration of MIP indicators and expansion of this program geographically.

The current efforts to increase coordination between NMCP and RH units for MIP are being revitalized. Key priorities for discussion in these groups should be to update policy, clinical and training guidelines, and content to reflect the recent evidence for MIP prevention.

Capacity development

Strengthening the capacity of the NMCP and RH units to conduct a DQA can contribute to overall improvements in data quality.

At the district level, district-to-district mentoring and support may facilitate adoption of successful approaches to improve M&E practices.

Strengthen HMIS

Improve quality of data already being routinely collected. Further guidance is required to standardize reporting of MIP in outpatient and inpatient reports as it is not clearly understood what these data represent or if they are consistent across reports.

In addition, there are current practices that could be built upon and could be done more routinely that can contribute to improved data quality, including what one district has already instituted—mandatory district meetings to review data and make decisions, as well as district mandating of facility procedures for data review, verification, and approval by unit leads and in-charges before reports are sent to the district level. There are also opportunities to strengthen data quality by increasing the collaboration between records assistants and providers to complete daily and monthly reports and to build capacity of records assistants in data review and analysis. MIP data collection and reporting would benefit from these activities. Another suggestion for consideration is to bring DHIS2 electronic data entry, reporting, and analysis to the facility level so that facility staff become primary users not only through data entry but analysis and use.

Integrate three or more doses of IPTp and case management indicators into the routine HMIS reports. It is suggested to add doses three and four for IPTp, to include malaria testing and test results along with the method (clinical, RDT, microscopy), and to build pregnancy status into existing registers and reports, including the SSS system, to strengthen monitoring of the quality of care. The MOH was approached regarding monitoring of IPTp beyond the fourth dose. There was not consensus about that, and they expressed a more urgent priority to improve IPTp2 coverage and phase in doses three and four.

Key to strengthening HMIS data quality is to integrate MIP data from the private sector. This will require a joint effort with other programs and commitment to support activities to improve private sector reporting, along with MIP-specific modules for training private sector providers on MIP data elements, indicators, reports, DQA, and use of MIP data for program refinement.

To review these findings, vet these recommendations, and mobilize resources to act upon them, it is recommended that country-level stakeholders, under the leadership of the NMCP and Maternal and Child Health, and including WHO, PMI, UNICEF and implementing partners, discuss the findings and stated recommendations of this report and identify and prioritize steps for moving forward.

Annex 1. List of Key Stakeholders Interviewed

LIST OF STAKEHOLDER INTERVIEWS

NAME	ROLE/TITLE	ORGANIZATION (LEVEL)
Miriam Namugeere	RH Unit, MIP Point Person	MOH (national level)
Jane Nabakooza	National Malaria Control Program	MOH (national level)
Dr. Meyers	NMCP M&E Manager	MOH (national level)
Dr. Mukooyo Edward	Assistant Commissioner Health Services	Resource Center (national level)
Carol Kyozira	Resource Center	MOH Resource Center
Dr. Sam Gudoi	Senior Technical Advisor	Stop Malaria Project
Bright Asiimwe	Deputy Chief of Party and M&E Manager	Stop Malaria Project
Wondimagegnehu Alemu	WHO Representative	WHO
Charles Katureebe	Malaria Advisor	WHO
Olive	RH Advisor	WHO
Matthius Kasule	Malaria Advisor	Global Fund
Dr. Elly K Tumushabe	District Health Officer	Mukono district
Mulindo Isaiah	District Malaria Focal Point Person	Mukono district
Ivan Mwesigwa	Biostatistician	Mukono district
Dr. Kayondo Simon Peter	Medical Officer	Mukono local government
Peter Dyogo	District Health Officer	Jinja district
Baayenda Gilbert	Malaria Focal Point Person	Jinja district
Takoba Proscovia	RH Focal Point Person	Jinja district
Kubaiza Rahma	M&E Focal Point Person	Jinja district
Gerald Ssekito	MCHIP Country Director	MCHIP
Patrick Insingoma	MCHIP	MCHIP
Kassahun Belay	Malaria Technical Advisor	PMI
BK Kapella	Senior Malaria Technical Advisor	PMI

Mukono District RH Focal Point Person unavailable, at another meeting/training.

Annex 2. Interview Questions

Facility Level (Antenatal Care and Outpatient Department)

1. ANC: Explore the following questions regarding prevention, case management and related data flow, quality, and use:
   a. Are you giving three doses of IPTp? How are the three doses of IPTp recorded?
   b. How is the tally for each of the three doses of IPTp done and reported?
   c. What happens when a pregnant woman looks like she has malaria? (Tested, diagnosed and treated in ANC, referred to OPD or some combination thereof?)
   d. How is the tally of malaria tests, diagnoses done and reported?
   e. There does not appear to be a monthly ANC facility summary report, but rather these data are reported in the OPD monthly summary report (Form 105)- is this correct? Are there any issues when trying to get all the data into a single OPD report?
   f. What do you do with the data (get at use; probe if it is graphed, or compared against an expected number of pregnant women in the catchment area, quality explored)
   g. Are the data generally of low, medium, or high quality for:
      i. IPTp1
      ii. IPTp2
      iii. Third dose of IPT (IPTp3)
      iv. Malaria diagnosis
      v. Malaria treatment
   h. Where do the data for the field "MIP" come from? Where is malaria detection among pregnant women happening? How is it reflected in the reporting forms?
   i. There is a field in the OPD report for diagnosis of MIP. Is this frequently reported on? Is it possible that malaria in pregnant women is reported in malaria field? Where are data gathered from for this report?
   j. Any mobile data reporting, use, or feedback?

2. OPD: Review patient flow and related flow of data for diagnosis and treatment of malaria. Explore the following questions regarding prevention and case management and related data flow:
   a. What happens when a pregnant woman looks like she has malaria? (Tested, diagnosed and treated in ANC, referred to OPD or some combination thereof?)
   b. How is malaria testing and treatment in pregnant women recorded in the register? Does it get reported as malaria or MIP?
   c. There does not appear to be a monthly ANC facility summary report, but rather these data are reported in the OPD monthly summary report (Form 105)- is this correct? Are there any issues when trying to get all the data into a single OPD report?
   d. What do you do with the data (get at use; probe if it is graphed, or compared against expected number of pregnant women in catchment area, quality explored)
   e. Are the data generally of low, medium or high quality for:
      i. Malaria diagnosis
      ii. Malaria treatment
   f. Where do the data for the field "MIP" come from? Where is malaria detection among pregnant women happening? How is it reflected in the reporting forms?
   g. There is a field in OPD report for diagnosis of MIP. Is this frequently reported on? Is it possible that malaria in pregnant women is reported in malaria field? Where are data gathered from for this report?
   h. Any mobile data reporting, use, or feedback?

Health Sub-District, District, and National Level interviews

1. What are some ways MIP data are used currently? Do you feel there are any data missing to really show program performance?
   a. Any movement toward documenting IPTp3 through the HMIS?
   b. Any movement toward documenting in HMIS treatment for pregnant women with malaria?
   c. HMIS Manual 2010 for the HSD/district includes a section on revision of graphs and use of data. Do you see MIP data graphed in health facilities or districts or at the national level?
   d. The OPD monthly report includes SP and first-line malaria drug in tracer drugs section as an HSSIP indicator. In the HSD/district guidance, it excludes SP. The 2010 annual report included IPTp2 coverage and SP stock-out. Is SP still included in this indicator (percentage of facilities without any stock-outs of first-line antimalaria drug, measles vaccine, ORS, and CTX).
   e. IPTp2 is listed as an indicator in the HSSIP M&E plan, and HMIS is the data source (% of pregnant women who have completed IPTp2). But IPTp2 not in the HSD/district HMIS guidance in the table of HSS indicators. Is it routinely reported, and is it part of the HSS report?
   f. HSD/district report of inpatient diagnoses and deaths include malaria and MIP fields. How are these fields used? How do the data look? Does anyone use the data at this time? Any concerns about the quality of the data?
   g. The OPD report includes the number of RDTs and number of microscopy tests, but it is not connected to a client/how she was diagnosed. Is this important?
   h. The HSSIP cites major weaknesses in HMIS. Have there been any efforts specific to MIP to improve HMIS?
   i. Data quality audit, rapid DQAs, and DQA and adjustment are described in the HSS Implementation Plan. Have MIP indicators been a part of DQA and adjustment, rapid DQA or DQA efforts?
   j. Regarding packaging and dissemination of MIP data, what are the current activities to package or plans to do so?
   k. Explore confidence in the quality of data.

President's Malaria Initiative

1. General presentation of current situation on M&E for MIP and their priorities.
   a. PMI MOP FY13 notes that the percentage of pregnant women receiving two doses of IPTp is expected to increase to 85% by the end of 2015. What is the status now in 2013?
   b. MOP FY13 notes that PMI will support data collection, analysis, and use at the health facility, district, and national levels. Any lessons learned from this? Any implications from sentinel sites/reference centers?
   c. Any movement toward documenting IPTp3?
   d. Any movement toward documenting treatment?

Maternal and Child Health Integrated Program staff

1. DHIS2- data gathered from the health facility on form 105- consolidated from all areas in the health facility- then sent to the district. Usually, the health facility does not maintain a copy so it will need to look at these at the district/HSD level. Data are sent on a paper form then entered either at the HSD or district level. The advantage of the DHIS2 over DHIS1 is that it allows for viewing data at the health facility level and not only at the district/HSD level.
   a. The system for reporting stock-outs from the health facility to the district to the national level (mTrac) includes a feedback loop. Recently, there was some testing with questions being sent out to get answers.
   b. Weekly malaria surveillance reports are sent via mobile phone; reports on all malaria cases are not disaggregated by age/sex/pregnancy status.

Ministry of Health Resource Center

1. Explore plans/activities underway for HMIS revision, timeline, and strategy for providing input jointly with Miriam (RH MIP point person).
   a. Explore how widely DHIS2 is implemented and MIP data are tracked.
   b. Sense of data quality/confidence in the data.
   c. DQAs generally and related to MIP: What has been done, what plans are there?
   d. Explore data quality self-assessment tool, DQA, rapid DQA, and DQA and adjustment.
   e. The Health Metrics Network assessment and work plan 2008–2010: Priorities and activities to date. Is there an updated work plan?
   f. Explore implementation of mTrac: currently used for sending information on stock-outs. Is SP tracked through this system? How widely is mTrac implemented?
   g. Any other mobile data reporting, use, or feedback?

Annex 3. Uganda: Opportunities to Contribute to the Health Management Information System Revision to Strengthen Monitoring and Evaluation of Malaria in Pregnancy

CONTENTS

INTRODUCTION

MCHIP conducted a review of M&E of MIP in six countries. As this review was being conducted in Uganda, the HMIS was being updated. The Reproductive Health Unit and the NMCP requested MCHIP input on changes to be made to the HMIS. This is a summary of these recommendations.

Key interventions to prevent, diagnose, and treat malaria among pregnant women contribute to reductions in maternal mortality and advance achievement toward Millennium Development Goal 5.

SECTION 1. PRIORITY SUGGESTIONS

AREA	DESCRIPTION
Overall HMIS review	Get input from primary users (health care providers and records assistants) to explore how their use of the tools may be improved
HMIS Procedure Manual	Provide explicit guidance to increase collaboration between records assistant and health care providers. Suggest that records assistant review data with each ward/unit in-charge weekly and collect it. And that each unit in-charge be required to sign off on the data being summarized in the weekly and monthly reports.
Contribution of CTX to malaria prevention in pregnant women	At the district and national levels, analyze proportion of pregnant women that get CTX in addition to percentage that receive IPTp.
Integrate key diagnoses into ANC, maternity registers, and OPD and IPD reports	Create codes for MIP diagnosis, for example: 1a= MIP-blood serum (BS)+ 1b=MIP-RDT+ See additional detail in Section 2 table.
Strengthen monitoring of MIP at sentinel sites	See detail in Section 2 table.
Add tracking of IPTp3 and fourth dose of IPT (IPTp4).	National guidelines being revised, and HMIS should reflect this change.

SECTION 2. SUMMARY TABLE OF RECOMMENDATIONS BY HEALTH MANAGEMENT INFORMATION SYSTEM TOOL

TOOL/FORM	CHANGE	JUSTIFICATION
ANC register	Format IPT column to include 1 2 3 4 C ND	IPT3 and IPT4 being included in national policy to help achieve Millennium Development Goal 5, HMIS needs to be able to capture it.
	On inside front cover of ANC register, add instructions for noting IPT 3, IPT4 in addition to existing codes.	
	Create codes for key diagnoses during ANC, for example: 1a = MIP-BS+ 1b = MIP-RDT+ 2 = High blood pressure in pregnancy 3 = Antepartum hemorrhage 4 = Premature labor	HMIS should track whether malaria diagnosis was confirmed through RDT or BS.
	Create codes for key treatments provided during ANC, for example: 1 = Artemether-lumefantrine 2 = Quinine 3 = CTX Etc.	
OPD monthly report (Form 105)	In Section 2, Maternal and Child Health, add IPTp3 and IPTp4.	
	In Section 1.3.3. Maternal and Perinatal Conditions integrate newly coded diagnoses, for example: 1a = MIP-BS+ 1b = MIP-RDT+ 2 = Pre-eclampsia/high blood pressure in pregnancy 3 = Antepartum hemorrhage 4 = Premature labor	
	In Section 1.3.3. Maternal and Perinatal Conditions integrate newly coded treatments, for example: 1a = Artemether-lumefantrine 1b = Quinine 1c = CTX 2 = Magnesium sulfate 3 = Etc.	
Maternity register (Form 072)	For Complications/Risk Factors, code common complications including MIP, for example: 1 = Premature labor 2 = Postpartum hemorrhage 3 = Pre-eclampsia/eclampsia 4 = Obstructed labor 5 = Sepsis 6 = Malaria in pregnancy	
IPD monthly report	Summarize Complications/Risk factors by code, for example: 1 = Premature labor 2 = Postpartum hemorrhage 3 = Pre-eclampsia/eclampsia 4 = Obstructed labor 5 = Sepsis 6 = Malaria in pregnancy	

TOOL/FORM	CHANGE	JUSTIFICATION
	Summarize treatments, for example: 1 = Antenatal corticosteroids 2a = Uterotonic 2b = Bimanual uterine compression 3 = Magnesium sulfate 4 = Cesarean section 5a = Dilation and Curettage 5b = Antibiotics 6a = Artemether-lumefantrine 6b = Quinine	
HMIS procedure manual guidance	ANC register: Provide guidance on addition of third and fourth dose of IPTp as well as new codes to be noted in ANC register, maternity register, OPD monthly summary and IPD monthly summary for diagnoses and treatments	
DHIS2	Integrate the new variables into DHIS2 (IPTp3, IPTp4; new codes for diagnoses; new codes for treatments both from OPD and IPD monthly summaries)	
mTrac	Consider integrating IPTp1-4 and CTX into weekly report	
Surveillance site monitoring	Integrate tracking specific to malaria in pregnant women % pregnant women with fever % pregnant women with fever tested for malaria % pregnant women with fever tested for malaria that have confirmed malaria (tested positive for malaria) % pregnant women with confirmed malaria diagnoses treated	Surveillance site monitoring provides an opportunity to assess adherence to clinical protocols

SECTION 3. ILLUSTRATIVE EXAMPLE OF NEW CODES IN A REGISTER

IPT	DIAGNOSIS	TREATMENT
1 2 3 4 C ND	1a 1b 2 3 4	1 2 3 4 5 6

Instructions to include wording such as, “Circle all that apply and tally each code.”

SECTION 4. PROPOSED MALARIA IN PREGNANCY INDICATOR DEFINITIONS AND DATA SOURCES

NO.	INDICATOR	NUMERATOR	DENOMINATOR	DATA SOURCE(S)/COMMENTS
1.	Percentage pregnant women receiving 1 ANC visit	Number ANC 1 visits	Estimated number of pregnant women in catchment area population	N: OPD monthly summary (Form 105) D: Estimate of number of pregnant women in catchment area
2.	Percentage pregnant women receiving 4 ANC visits	Number ANC 4 visits	Estimated number of pregnant women in catchment area population	N: OPD monthly summary (Form 105) D: Estimate of number of pregnant women in catchment area
3.	Percentage of ANC clients getting IPT1	Number of ANC clients receiving IPT1	Number of ANC 1 visits	OPD monthly summary (Form 105)
4.	Percentage of ANC clients getting IPT2	Number of ANC clients receiving IPT2	Number of ANC 1 visits	OPD monthly summary (Form 105)
5.	Percentage of ANC clients getting IPT3	Number of ANC clients receiving IPT3	Number of ANC 1 visits	OPD monthly summary (Form 105) and ANC register needs updating

NO.	INDICATOR	NUMERATOR	DENOMINATOR	DATA SOURCE(S)/COMMENTS
6.	Percentage of ANC clients getting IPT4	Number of ANC clients receiving IPT4	Number of ANC 1 visits	OPD monthly summary (Form 105) and ANC register needs updating
7.	Percentage of ANC clients that receive a LLIN	Number of ANC clients that received an LLIN	Number of ANC 1 visits	OPD monthly summary (Form 105)
8.	Percentage of ANC clients presenting with fever	Number of ANC clients presenting with fever	Number of ANC 1 visits	Surveillance system patient record needs updating to capture pregnancy status (primary), and needs report to feed into to go up the system.
9.	Percentage of ANC clients with fever tested for malaria	Number of ANC clients with fever tested for malaria	Number of ANC 1 visits	N: sentinel site surveillance Patient Record- needs to be updated to capture pregnancy status/MIP D: OPD monthly summary (Form 105)
10.	Percentage of ANC clients with a confirmed malaria diagnosis	Number of ANC clients with malaria in pregnancy diagnosis	Number of ANC visits (all)	N: OPD and IPD updated forms- tally MIP code D: OPD monthly summary (Form 105)
11.	Percentage of ANC clients treated for malaria	Number of ANC clients with malaria treatment (Sum codes artemether-lumefantrine and quinine from ANC register)	Number of ANC clients who tested positive for malaria	OPD monthly summary (Form 105)
Number Indicators				
1.	Number ANC 1 visits	Number ANC 1 visits	N/A	OPD monthly summary (Form 105)
2.	Number ANC 4 visits	Number ANC 4 visits	N/A	OPD monthly summary (Form 105)
3.	Number of pregnant women diagnosed with malaria	Number of MIP diagnoses reported	N/A	OPD and IPD reports MIP diagnosis field (in Section 1.3.3, line 40 in OPD report- Form 105)
4.	Number of pregnant women treated for malaria	Number of ANC clients with malaria treatment (Sum codes artemether-lumefantrine and quinine from ANC register)	N/A	Pull from new tools where treatments are reported in OPD and IPD monthly summary forms (sum the artemether-lumefantrine, quinine, CTX and IV quinine fields)