



# Improving care for syphilis and malaria among pregnant women

## Tested changes and guidance from East Central Uganda

**APRIL 2018**

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This change package for improving care for syphilis and malaria among pregnant women was prepared by University Research Co., LLC (URC) under the United States Agency for International Development (USAID) Applying Science to Strengthen and Improve Systems (ASSIST) Project. The work was funded by USAID's Bureau for Global Health, Office of Maternal and Child Health and Nutrition. This document was authored by Anjali Chowfla, Tamar Chitashvili, Connie Namajji, Jorge Hermida, Esther Karamagi, and Silvia Holschneider of URC. It was developed as part of a larger activity to improve the quality of integrated antenatal care delivery and the quality of integrated care for preeclampsia/eclampsia activities in Uganda implemented by the USAID ASSIST Project, which is made possible by the generous support of the American people through USAID.



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### DISCLAIMER

The contents of this change package reflect the work carried out by the University Research Co., LLC (URC) and do not necessarily reflect the views of the United States Agency for International Development (USAID) or the United States Government.

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## Acronyms

ANC	Antenatal care
ASSIST	USAID Applying Science to Strengthen and Improve Systems Project
DOT	Directly observed therapy
GA	Gestational age
HC	Health center
HMIS	Health management information system
IM	Intra-muscular
IPT	Intermittent preventive treatment
IPT-SP	Intermittent preventive treatment (of malaria) using Fansidar (SP)
ITN	Insecticide-treated mosquito net
MCH	Maternal and child health
MOH	Ministry of Health
NMS	National Medical Stores
OPD	Outpatient department
PDSA	Plan-do-study-act
QI	Quality improvement
RDT	Rapid diagnostic test
RPR	Rapid plasma reagin test
RRH	Regional Referral Hospital
SP	Sulfadoxine-pyrimethamine
USAID	United States Agency for International Development
VDRL	Venereal Disease Research Laboratory
WHO	World Health Organization

## Glossary of terms

**Antenatal care:** A planned program of medical care offered to pregnant women by a skilled birth attendant from the time of conception to delivery aimed at ensuring a safe and satisfying pregnancy and birth outcomes.

**Change concept:** A category of change ideas or solutions that are similar and have a common underlying thought pattern.

**Change idea:** A specific intervention that a health facility quality improvement team has tested.

**Change package:** An organized summary of strategies and interventions that have been tested and proven to improve care in a given context.

**Improvement collaborative:** A collection of quality improvement teams that work independently to address a common challenge, but are periodically brought together to share and learn from one another, so that emerging best practices are easily and rapidly spread at scale.

**Plan-do-study-act (PDSA) cycle:** A structure for an efficient trial-and-learning methodology used to test different change ideas and learn from them. It begins with a plan and ends with action according to the learning gained from the plan, do, and study phases of the cycle. In most cases, multiple PDSAs are needed to develop successful change ideas.

## I. BACKGROUND AND CONTEXT

Syphilis in pregnancy has contributed to over 300,000 stillbirths and fetal and neonatal deaths worldwide, while putting an additional 215,000 neonates at risk of low birth weight, prematurity, and other syphilis related complications (WHO 2012). These deaths and complications could have been prevented through screening and treatment with a single dose of penicillin before the third trimester of pregnancy. In Uganda, approximately 6.4% of pregnant women attending antenatal care (ANC) are infected with syphilis but only 14.1% of women who attend ANC are tested for the disease during their first visit (WHO 2015).

Malaria is a major public health problem and an indirect cause of maternal mortality. Malaria infection in pregnancy carries serious risks for pregnant women, fetuses and newborns, including anemia; severe malaria; spontaneous abortion; stillbirth; prematurity; neonatal mortality; low birthweight; and maternal death. A study conducted in southwestern Uganda showed that malaria in pregnancy was the most common indirect cause of maternal mortality, accounting for 8.92% maternal deaths (Ngonzi et al. 2016). As overall malaria prevalence in the country declines, adverse consequences will likely increase in pregnant women as a result of delayed acquisition of immunity due to reduced exposure. In addition, addressing malaria in pregnancy is key to malaria elimination efforts as the placenta can be a reservoir of infection.

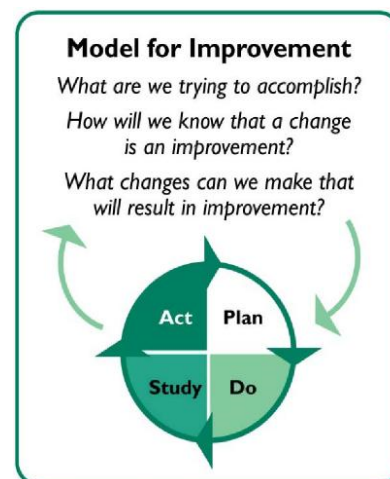
From June 2015 through March 2017 the USAID Applying Science to Strengthen and Improve Systems (ASSIST) Project implemented an improvement activity in a “slice” of the health care system in Jinja, Uganda to improve the quality of primary antenatal care services through implementing an integrated package of ANC best practices. This included early detection and case management of the most common obstetric conditions as well as frequent infections in pregnancy such as syphilis and malaria. ASSIST implemented the activity in 10 randomly selected facilities, across all levels of the health system, within the catchment area of the Jinja Regional Referral Hospital which included: Buwenge General Hospital, Buwenge health center (HC) IV, Budondo HC IV, Mpumudde HC IV, Lukolo HC III, Kakaire HC III, Magamaga HC III, Butagaya HC III, and Budima HC III.

This activity generated important learning about effective models for improving delivery of quality care for syphilis and malaria during pregnancy including prevention, early detection, and treatment. The changes implemented by quality improvement (QI) teams that are discussed in this document demonstrate effective ways to overcome commonly found gaps in a low-resource environment, improve the quality of antenatal care for pregnant women, and reduce maternal and newborn mortality.

### Improvement approach

In September 2015, USAID ASSIST conducted a baseline assessment in 19 health facilities in the Jinja District, which included the 10 intervention facilities and nine additional facilities randomly selected to serve as a control group. Following the baseline assessment, performance gaps were identified at each level of the health system, ranging from inputs and processes of care to technical competence. The most frequent deficiencies in essential inputs for malaria and syphilis care were the lack of availability of laboratory testing supplies and medicine for treatment while gaps in processes of care included a lack of adherence to testing protocols, poor documentation, and failure to properly interpret test results. Based on these findings, improvement activities began in March 2016, utilizing an approach guided by the Model for Improvement that uses rapid, iterative plan-do-study-act (PDSA) cycles to test and learn from changes to care processes (**Figure 1**).

**Figure 1. Model for Improvement**



ASSIST provided support for the following activities:

- **Setting up and orienting QI teams:** Care providers in the maternal and child health (MCH) clinics were oriented on improvement approaches and how QI could be integrated into maternal and child health care. ASSIST staff then worked with each facility to set up a functional multidisciplinary team, review malaria and syphilis care processes and clinic flow, identify gaps in care, and demonstrate how to use indicators to monitor improvement.
- **Trainings:** ASSIST conducted refresher trainings on clinical knowledge and critical skills for syphilis and malaria care as well as methods and tools for quality improvement during learning sessions, at the end of which QI teams developed specific action plans for implementing their initial PDSA cycles, which included improvement aims, selected indicators, change ideas and implementation strategies.
- **Peer-to-peer learning sessions:** Three peer-to-peer learning sessions were conducted by ASSIST in November-December 2015, April 2016, and October 2016. Health workers from all 10 implementing facilities were brought together for three days to share their work, experience, results obtained and challenges faced. The facility QI teams selected members on a rotational basis to attend these learning sessions. Lower-level health facilities usually had three staff attend, while higher level facilities were represented by five to eight staff per facility. Learning sessions offered facility staff an opportunity to learn from successful changes in other facilities and provided a means for rapid sharing of results in improving syphilis and malaria care delivery.
- **Monthly onsite coaching visits:** Through monthly onsite visits by a team of coaches from ASSIST and the MOH at the national, regional, and district levels, facility teams were coached on improving processes of malaria and syphilis care and the use of monitoring indicators to review performance and identify areas for further improvement. Once the capacity of QI teams to monitor performance was built, a data collection tool was shared with teams to record data collected on all the key process indicators from the ANC register and maternity register. Coaches then validated the data during onsite visits, and areas of discrepancy were rectified.

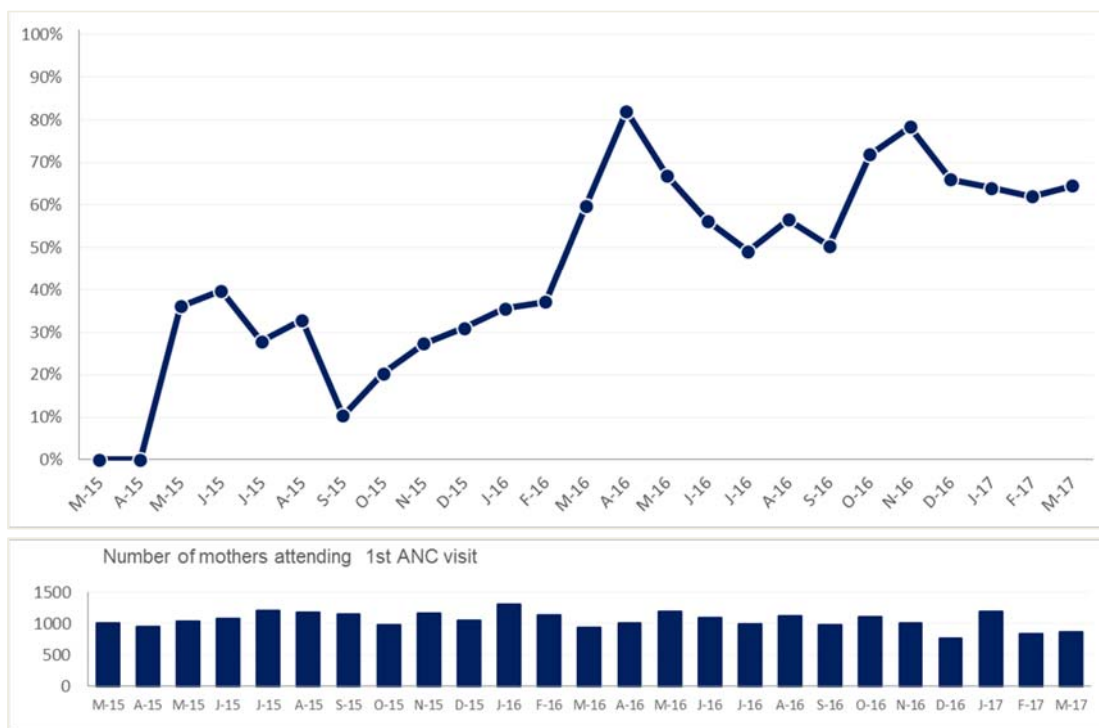
## Results

Provision of malaria prophylaxis improved significantly across all 10 facilities with the percentage of mothers who received intermittent preventive treatment (IPT) 2 between 28-36 weeks' gestation increasing to an average of 68% in the last three months of data collection from a baseline average of 24%. A significant increase in the percentage of cases of malaria diagnosed and treated during ANC visits was also observed in all 10 intervention facilities, from 1% during baseline to a high of 9% in January 2016. While this percentage dropped to 4% during the end line assessment, the magnitude of cases correctly diagnosed and treated during ANC remained consistently higher than initial values before the start of the improvement effort.

The percentage of mothers screened for syphilis using a rapid test during the first ANC visit increased from 33% during baseline to an average of 65% during the end line assessment (**Figure 2**). Likewise, the percentage of mothers who were found positive for syphilis during the first ANC visit and who were correctly treated also increased significantly to 88% at end line, from 0% at baseline.



**Figure 2. Percentage of pregnant women screened for syphilis using rapid test during first ANC visit in 10 facilities, Jinja District, Uganda (Mar 2015 -Mar 2017)**



## Developing the change package

In March 2017, after a year of implementation, a harvest meeting was held to identify effective changes to syphilis and malaria care and make recommendations for spread to other facilities. Participants from each of the 10 health facilities, including key staff involved in the implementation of PDSA cycles and those critical to antenatal care provision in the antenatal clinics and laboratories, were invited to attend.

The sessions were organized so that each facility was given an opportunity to share challenges, effective changes, details of implementation and results in small group discussions at a health sub-district level. Contents of the discussions were then compiled and presented before a plenary by a representative of the group. In total, three presentations were made. Poster placards were also developed describing the changes and results obtained for each of the main processes of malaria and syphilis care that teams worked on. Posters were then grouped into the themes that were being addressed, and the change ideas were documented. The changes shared in this package are a compilation of the measures taken by facility QI teams to close the gaps in malaria and syphilis care during pregnancy that they identified in their facilities.

## Use of the change package

This change package is intended to provide other quality improvement teams that are seeking to improve screening, diagnosis, and management for syphilis and malaria during antenatal care with successful change ideas to consider. Teams should not necessarily replicate these change ideas but should adapt them to suit their contexts.

We recommend that teams begin by collecting data on detection, diagnosis, and management of frequent locally occurring pregnancy infections, such as syphilis and malaria, from the health management information system (HMIS) patient tracking tools to assess current performance and gaps in care. Once teams have collected this data, meetings should be held to analyze factors affecting care and to brainstorm possible solutions. Teams should use the data collected to prioritize gaps in care to address, assessing their overall impact on health outcomes, the feasibility of the brainstormed solutions as well as their cost-effectiveness, likelihood of acceptance, and equity. Teams should refer to this change package to understand change ideas that worked to address

particular gaps in syphilis and malaria care and should use it as a guide for testing and implementation of changes.

In addition to the change ideas included in this document, we recommend that teams make an effort to ensure an adequate stock of essential supplies and equipment and focus on strengthening the following areas to support improvements in antenatal care:

- Documentation
- Team work
- Analyzing care processes and prioritizing areas for improvement
- Communicating with patients

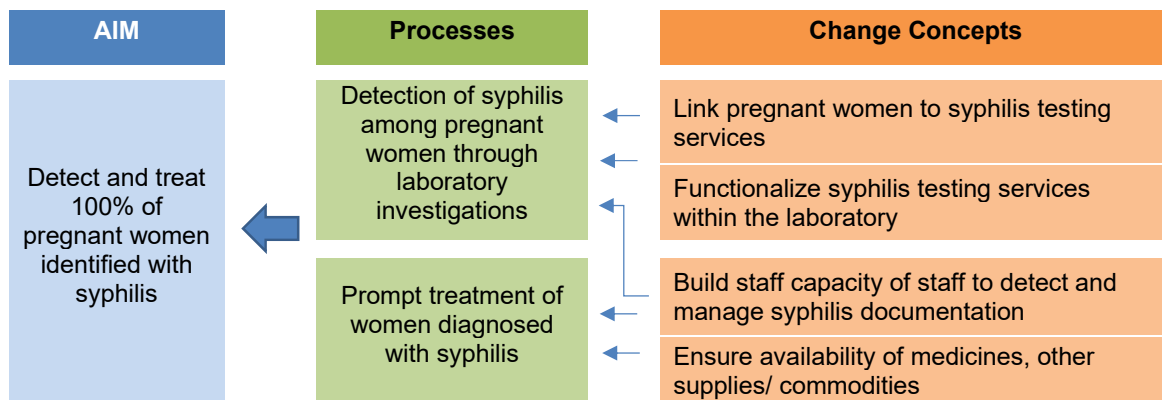
The following sections cover change ideas for improving syphilis and malaria care during pregnancy. Each section briefly describes the importance of improvement in care processes, the gaps that quality improvement teams aimed to address, and then provides an overview of the tested changes by improvement aim/change concept. Key change ideas that the teams felt were important due to the results they yielded, gaps in services that they addressed, affordability, ease of implementation, and scalability are then described in detail in text boxes in each section. For a comprehensive list of all change ideas tested with notes on the specific steps to implement the change please refer to the appendices. The tables in the appendices provide details on the specific gap addressed by each change idea to allow new teams to identify change ideas that respond to specific barriers to improving syphilis and malaria management during antenatal care that they have identified in their facilities. Wherever possible, the change ideas in each table are ordered in the sequence in which QI teams tested them.

## II. IMPROVING SYPHILIS CARE DURING PREGNANCY

Syphilis screening and treatment are an essential part of antenatal care services and if done sufficiently early in pregnancy are the core interventions in the control of congenital syphilis. Syphilis testing is part of the basic package of antenatal care services recommended by the Uganda MOH's goal-oriented care guidelines and are an indicator of quality antenatal care. Prompt treatment of pregnant women with syphilis with a single dose of long acting penicillin before 24 weeks of pregnancy can prevent transmission of the infection to the fetus.

With the support of ASSIST, facility QI teams set out to ensure that 100% of all pregnant women attending antenatal care were screened for syphilis and that all women presenting with positive test results were correctly treated according to Ministry of Health guidelines. Teams tested changes to improve screening for syphilis among pregnant women attending their first ANC visit and treatment of women diagnosed with syphilis through a series of PDSA cycles. **Figure 3** shows some of the processes and change concepts that the teams proposed to work on.

**Figure 3. Driver diagram on improving detection and treatment of syphilis**



### Improvement Aim I: Improve early detection of syphilis among pregnant women attending antenatal care

Early testing and treatment can effectively prevent adverse pregnancy outcomes related to syphilis. Testing all pregnant women for syphilis is part of the basic ANC package recommended by the World

Health Organization (WHO) and the Uganda MOH's goal-oriented care guidelines. To eliminate mother-to-child transmission of syphilis, the WHO recommends that countries test at least 95% of pregnant women for syphilis during their first ANC visit. Yet during the baseline assessment conducted by ASSIST, only 33% of women attending antenatal care in the 10 intervention facilities were screened for syphilis using a rapid diagnostic test.

Facility teams worked on improving early detection of syphilis among pregnant women attending antenatal care by emphasizing mandatory syphilis testing for pregnant women attending their first ANC visit through:

- Linking pregnant women to the laboratory for routine testing
- Increasing access to laboratory investigative services through establishing a testing area/ "mini-lab" with supplies and skilled personnel within the outpatient department (OPD) ward/ANC clinic
- Building the capacity of health workers to screen for and manage syphilis

### **A. Change Concept 1: Linking pregnant women attending first ANC visit to routine testing for syphilis**

To improve linkage of pregnant women attending their first ANC visit to the laboratory for routine testing, including syphilis screening, teams tested and implemented the following change idea:

**Change idea:** Assign staff to link pregnant women attending their first ANC visit to laboratory services.

**Gap addressed:** Pregnant women attending their first ANC visit are not sent for syphilis testing at the point of triage.

**Change implementation:**

- Assign staff to identify each pregnant woman attending her first ANC visit at point of triage.
- Write a request for the laboratory investigations required including syphilis testing.
- Hand laboratory request to the pregnant woman and ask her to return it to the staff at the triage desk once the results are ready.
- Send pregnant woman for testing at the main lab or "mini-lab" in the MCH department/ANC clinic.

**Results:** This change was implemented successfully at five HC IIIs. At Kakaire HC III, a reminder about sending first ANC pregnant women to the laboratory for syphilis testing was written and placed at the triage desk. Staff were also routinely reminded about the importance of routine syphilis testing for pregnant women during QI team meetings.

### **B. Change Concept 2: Improving accessibility to functional laboratory services for syphilis testing**

QI teams tested six change ideas to improve accessibility to functional laboratory services for syphilis testing: emphasizing mandatory syphilis testing for pregnant women attending their first ANC visit; introducing syphilis testing as an integral function of the "mini-lab" in the MCH department/ANC clinic; coordinating with laboratory personnel to increase requisition of syphilis test reagents/kits; redistributing syphilis rapid plasma regain (RPR) test kits from facilities with sufficient stock to those experiencing stock-outs; lobbying for syphilis rapid test kits from implementing partners; and introducing other testing methods for syphilis such as VDRL. For more details on these change ideas please see **Appendix I**.

**Change idea:** Emphasize mandatory syphilis testing for pregnant women attending their first ANC visit.

**Gap being addressed:** In Jinja RRH, the laboratory at the outpatient clinic was unable to conduct a range of laboratory investigations and at the ANC clinic blood was only drawn for HIV testing making it difficult for staff to incorporate syphilis testing. In addition, RPR kits were not stationed within the OPD laboratory.

**Change implementation:**

- A meeting was held with the laboratory supervisor to request syphilis testing be incorporated as one of the routine tests for pregnant women during their first ANC visit.
- A laboratory staff from the main laboratory was sent to the lab within the OPD/ANC clinic to obtain one blood sample from each pregnant woman of which one half was sent for HIV testing within the minilab and the other half to the main laboratory to screen for syphilis.

**Results:** This change was tested by the Jinja RRH where the proportion of first ANC women tested for syphilis increased from 0% (0/403) in September 2016 to 52% (201/386) in November 2016.

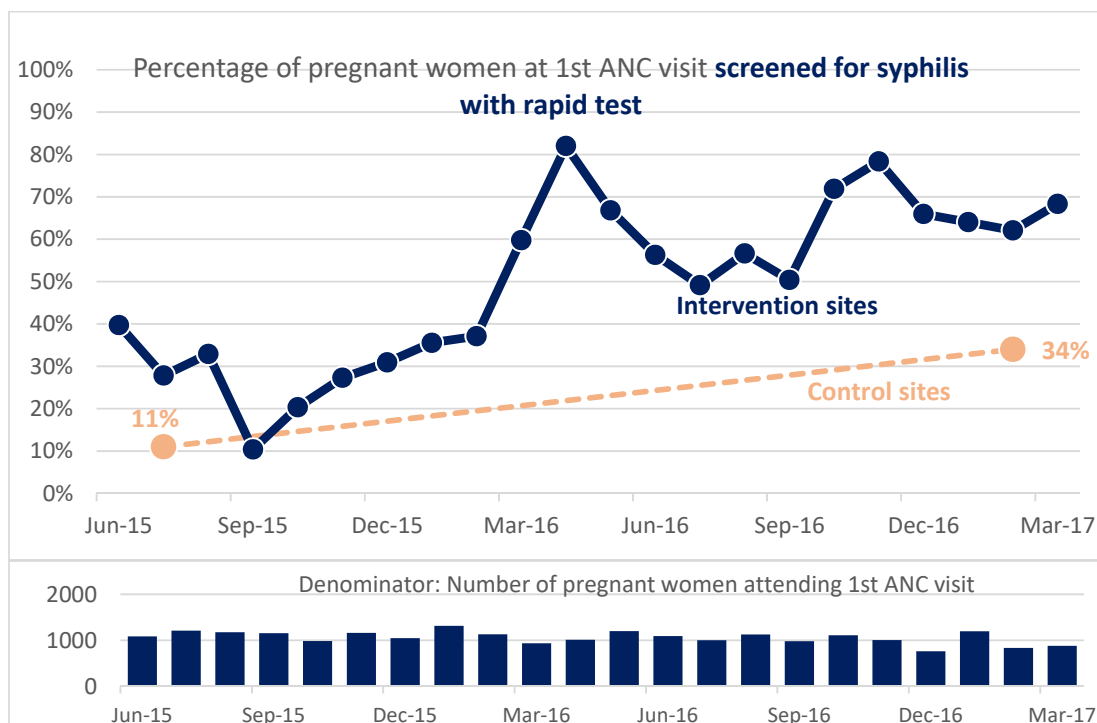
Jinja RRH initially experienced challenges with this change idea because the laboratory delayed sending syphilis test results back to midwives in the ANC clinic, with results sometimes not available until the following day. To address this, the QI team and head of the laboratory agreed to have lab staff assigned to the ANC clinic each week to carry out the tests onsite. Volunteers/ students were assigned to pick up results from the lab and bring them back to the ANC clinic during the course of the day.

### **C. Change Concept 3: Building staff capacity to screen for and detect syphilis**

To improve screening and detection of syphilis, QI teams tested and implemented a system of regular mentoring for clinic staff on the use of a syphilis rapid test kit as well as on the interpretation of the syphilis test results. These change ideas were designed to address the incomplete/inaccurate use of rapid diagnostic tests, incomplete/inaccurate reading of results, and poor documentation of test results. More details on these change ideas can be found in **Appendix I**.

As a result of the abovementioned changes, the percentage of pregnant women screened for syphilis using a rapid test during the first ANC visit increased significantly ( $p < .0001$ ) from 33% during baseline (June-Aug 2015) to an average of 65% (Jan-March 2017) during the end line assessment, an increase of nine percentage points overall when compared to the control group. Similar improvement was documented by routine monitoring (**Figure 4**).

**Figure 4. Increase in pregnant women screened for syphilis at 10 sites, Jinja District, Uganda (Mar 2015-Mar 2017)**



In addition to improved screening, intervention facilities were able to dramatically improve syphilis diagnosis during pregnancy (from 2.6 to 11 pregnant women per 1000) from baseline (June-August 2015) to end line (Jan-March 2017) while Syphilis diagnosis improved only from one to five pregnant women per 1000) one to five pregnant women per 1000 during the same period in control facilities.

### **Improvement Aim II: Improve timely and appropriate management of women diagnosed with syphilis**

Syphilis infects between 1-16% of antenatal care clients in over 55 countries worldwide (WHO, 2015). Untreated syphilis in pregnancy leads to adverse outcomes in more than half of women with active disease, often resulting in stillbirth. The baseline assessment of ANC registers in the 10 intervention facilities showed low rates of treatment administered to the few pregnant women who were diagnosed with syphilis. Furthermore, for those pregnant women who tested positive, antenatal registers did not indicate any follow up on the syphilis status of their partners or spouses. Treatment that was administered often did not follow current national guidelines for management of syphilis. Many clients missed follow-up appointments because they did not have transport to the facilities.

To ensure prompt management of pregnant women who were identified with syphilis, staff were brought up to date with Ministry of Health guidelines and teams worked on ensuring a regular supply of essential medicines and other supplies for managing syphilis.

#### **A. Change Concept 1: Capacity building for health workers on treatment for syphilis**

To improve the capacity of health workers to appropriately treat women diagnosed with syphilis per the national guidelines, teams tested and implemented the following change ideas: regular mentoring of staff on data quality control for the ANC registers and on following the national guidelines for treatment of syphilis. More information on these change ideas can be found in **Appendix II**.

**Change idea:** Train and mentor staff on the treatment for syphilis.

**Gap being addressed:** Health workers do not follow the national treatment guidelines on management of syphilis.

**Change implementation:**

- Coaches obtained copies of the national guidelines on management of syphilis in pregnancy.
- Staff in the antenatal clinic were trained on syphilis care including: signs and symptoms, methods of diagnosis, and effects during pregnancy on both the mother and fetus.
- The treatment options for syphilis according to the stage of the disease were then discussed.
- The team identified a staff member to lead syphilis care for pregnant women at the health facility, to supervise the screening/ testing process of pregnant women attending their first ANC visit, and review the registers to ascertain whether pregnant women identified as positive for syphilis were promptly managed with Benzathine Penicillin. By appointing someone to lead these processes, facilities created continuity in the knowledge and care of pregnant women and their spouses.
- A summary on the treatment algorithms was written out and pinned on the walls of the dispensing area to be used as a reference guide by health care workers.
- Pregnant women diagnosed with syphilis and treated were counseled on bringing their spouses for treatment to prevent further spread of the disease.

**Results:** Through this change, the proportion of pregnant women tested positive for syphilis and received prompt evidence-based treatment increased from 0% (0/3) in June 2015 to 100% (9/9) in March 2017 in 10 intervention facilities.

## **B. Change Concept 2: Ensure availability of medicines at the ANC clinic**

QI teams tested two change ideas to ensure availability of medicines to treat syphilis at the ANC clinic: assigning staff to ensure that the stock of Benzathine benzylpenicillin is managed and updated regularly and is available in the ANC clinic and redistributing drug supplies from highly stocked facilities to those experiencing shortages. For further information on these change ideas, please see **Appendix II**.

**Change idea:** Ensure availability of Benzathine benzylpenicillin (IM) in the antenatal care clinics for the treatment of syphilis.

**Gap being addressed:** Long waiting times at the treatment areas of the main outpatient departments.

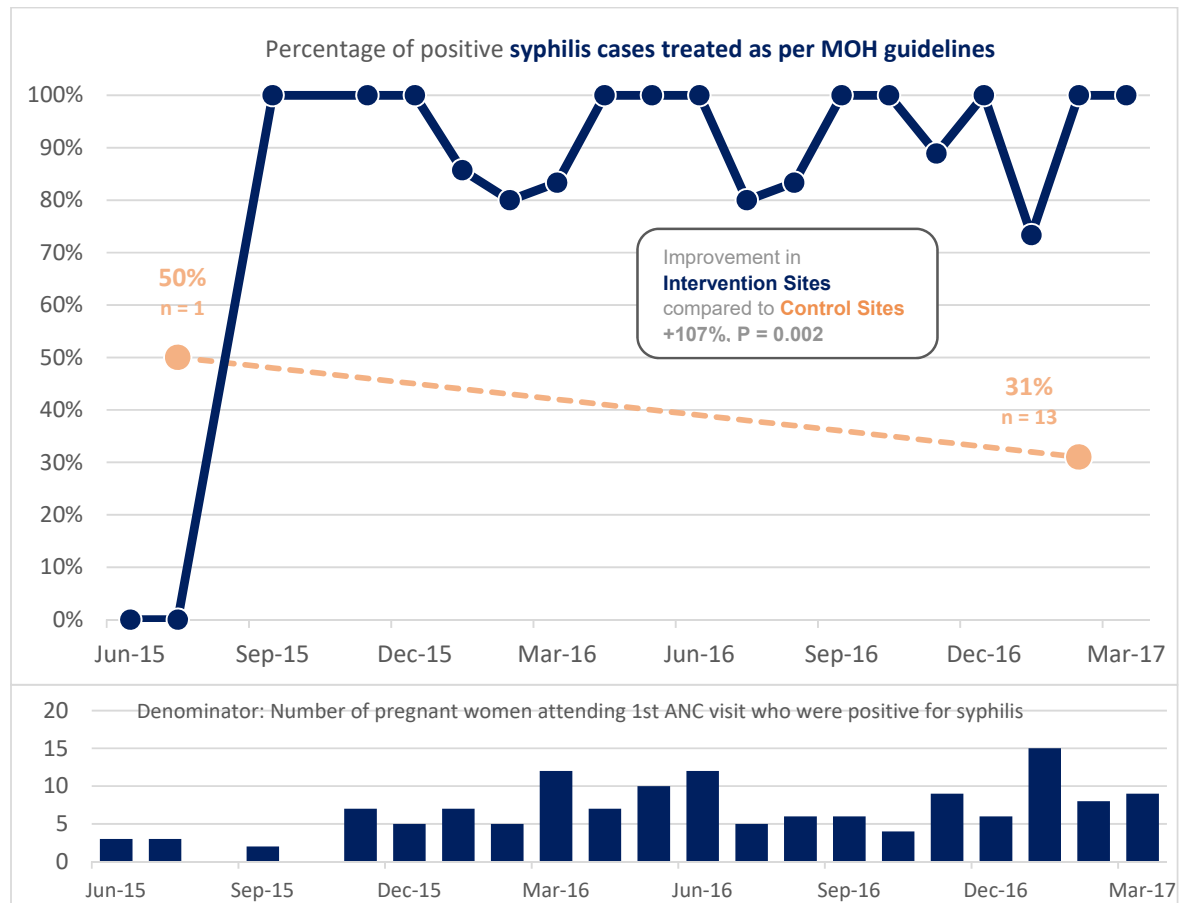
**Change implementation:**

- Held a meeting with the head of the outpatient department and the stores.
- Requested to have a stock of Benzathine benzylpenicillin (IM) placed within the antenatal clinic to eliminate the need for clients to wait, often for long stretches of time, at the general outpatient treatment area.
- Staff were oriented on placing orders for the drugs and other supplies from the main store and how to balance the dispensing log.
- Staff placed orders of Benzathine benzylpenicillin (IM). The drug was received and stored within the mini-store of the ANC clinic.
- Staff were informed about the availability of Benzathine benzylpenicillin within the ANC mini store.

**Results:** Benzathine benzylpenicillin (IM) was eventually included as one of the routine drugs to be ordered from the facility main store once its stock was low in all 10 facilities.

As the results of the changes, the percentage of mothers in the intervention facilities who were found positive for syphilis during the first ANC visit and who were correctly treated also increased significantly ( $p=0.002$ ) to 88% (Jan-March 2017) at end line from 0% at baseline (June – Aug 2015). A decline was noted at the control facilities (31% at end line compared to 50% at baseline) during the same period (**Figure 5**). As noted above, change ideas to improve treatment of syphilis included assigning staff to ensure that Benzathine benzylpenicillin (IM) was requisitioned regularly; redistributing drug stocks between facilities; mentoring staff on correct treatment for syphilis in pregnancy; and ensuring that drugs for syphilis treatment were available at the ANC clinic.

**Figure 5. Improvement in the percentage of women positive for syphilis treated per MoH guidelines in 10 facilities in Jinja District, Uganda (Jun 2015 - Mar 2017)**



### III. IMPROVING MALARIA CARE DURING PREGNANCY

Strengthening -prevention, diagnosis and management of malaria in pregnancy is a key strategy for achieving and sustaining prompt diagnosis and treatment of 90% of malaria case in Uganda by 2018.

For prevention purposes, along with long-lasting insecticide-treated bed nets (LLINs), WHO recommends IPTp-SP at each scheduled ANC visit as early as possible from the second trimester where malaria transmission is moderate to high or where the malaria transmission has been reduced but not enough data to determine whether to stop IPTp-SP. Also recommended is directly observed therapy (DOT) of three SP tablets each containing 500 mg of sulfadoxine and 25 mg of pyrimethamine, until the time of delivery, with each dose given at least 1 month apart. Along with preventive measures, prompt diagnosis and effective treatment of malaria infections is recommended.

The baseline assessment carried out in the Jinja District revealed significant gaps in preventive and diagnosis practices of malaria care. Specifically:

- Most pregnant women attended their first ANC visit after the first trimester.
- LLINs were typically distributed at the first ANC visit.
- Women did not understand the importance of taking sulfadoxine-pyrimethamine (SP) to prevent malaria and its complications.
- Both the first and second doses of IPT were given outside of the recommended gestational ages of the goal-oriented focused ANC guidelines and, most of the times, were delayed; treatment was not typically directly observed by a health care worker.
- Most malaria cases in pregnancy were not clinically diagnosed.



Therefore, QI teams focused efforts to improve malaria care during pregnancy on the following areas:

- Prevention of malaria among pregnant women through use of ITNs and routine administration of IPTp-SP.
- Correct diagnosis of malaria among women presenting with fevers/ other symptoms of malaria.
- Prompt treatment of diagnosed malaria in pregnancy.

### **Improvement Aim 1: Ensure pregnant women are using malaria prevention measures**

During onsite visits, QI teams and coaches discussed the importance of strengthening the following areas of IPT treatment, in addition to ensuring that two doses were given to all pregnant women:

- Observing IPT swallowing
- Improving the timing of IPT doses to align with the goal-oriented focused ANC guidelines

QI teams tested four change ideas to improve uptake of malaria preventative measures among pregnant women attending ANC: including malaria prevention as a topic during ANC health education topics; providing ITNs to women who have experienced repeated episodes of malaria during pregnancy; scheduling ANC appointments for pregnant women according to their gestational age; and implementing observed swallowing of IPTp-SP. More information on these change ideas can be found in **Appendix III**.

**Change idea:** Observing IPTp-SP of malaria among pregnant women.

**Gap addressed:**

- Pregnant women were not observed to ensure that they swallowed their IPTp-SP dose.
- Facilities lacked water vessels.

**Change implementation:**

- Lobby for water vessel and cups to use for swallowing IPTp-SP.
- Identify place for water vessel and IPTp-SP dispensing in ANC clinic.
- Counsel pregnant women on the importance of swallowing the dose of IPTp-SP while at the health facility.

**On the clinic day:**

- After health care workers conduct clinical review of the pregnant women and prescribes IPTp-SP send women to the dispensing area in the ANC clinic.
- Review mother-held notes/ANC card and identify pregnant women who have IPTp-SP prescribed.
- Request that pregnant women draw water from the water vessel into a cup.
- Give the dose of IPTp-SP to the pregnant women and have her swallow it in the presence of a midwife.
- Inform pregnant women of her return date and counsel her on what will occur during her follow-up visit.

**Results:** This was change idea was initially introduced at Mpumudde HC IV and later successfully spread to the remaining nine health facilities.

**Change idea:** Improving timing of Intermittent Preventive Treatment (IPT) of malaria with Fansidar (SP) at Budima HC III

**Gap addressed:** In April 2016, the third implementation phase of improving malaria in pregnancy was introduced. Coverage of IPT1 and 2 at Budima HC III was good, however record reviews showed that most women were receiving IPT2 much later than 28-36 weeks of gestation. The facility QI team identified the following gaps in relation to IPT timing: IPT2 was given and not documented leading to poor IPT data quality (completeness and accuracy); women were attending their first ANC visit late (after the first trimester) leading to late administration of the second IPT dose; appointments were scheduled erratically; and mothers were not aware of what to expect at the next visit.

**Change implementation:**

The QI team tested the following changes to improve the timing of IPT:

- Return dates were given to women according to their gestational age (GA). Women due for IPT2 were scheduled to return between 28-36 weeks GA.
- A session on the importance of attending scheduled appointments was included as part of the regular health education topics conducted during ANC visits.
- Staff were trained on estimating gestational age using a calendar.
- Other support staff were trained on proper documentation of patient information within the register.
- New staff were mentored on the procedures of the ANC clinic including appointment scheduling according to gestational age.
- Facility staff worked with community structures, such as the Village Health Team (VHT), to identify and track pregnant women within the community and link them to ANC at the appropriate times.

**Results:** Some improvement in the timing of IPT2 was noted. However, some mothers still continued receiving IPT2 beyond 36 weeks due to late first ANC attendance. The facility MCH in charge called for a meeting in which they agreed to work with community structures, such as the VHT, to identify and track pregnant women within the community, link them to ANC at the appropriate times, and sensitize them on the importance of keeping appointments and attending ANC early and regularly. This change was initially tested in one village and then later expanded to another village.

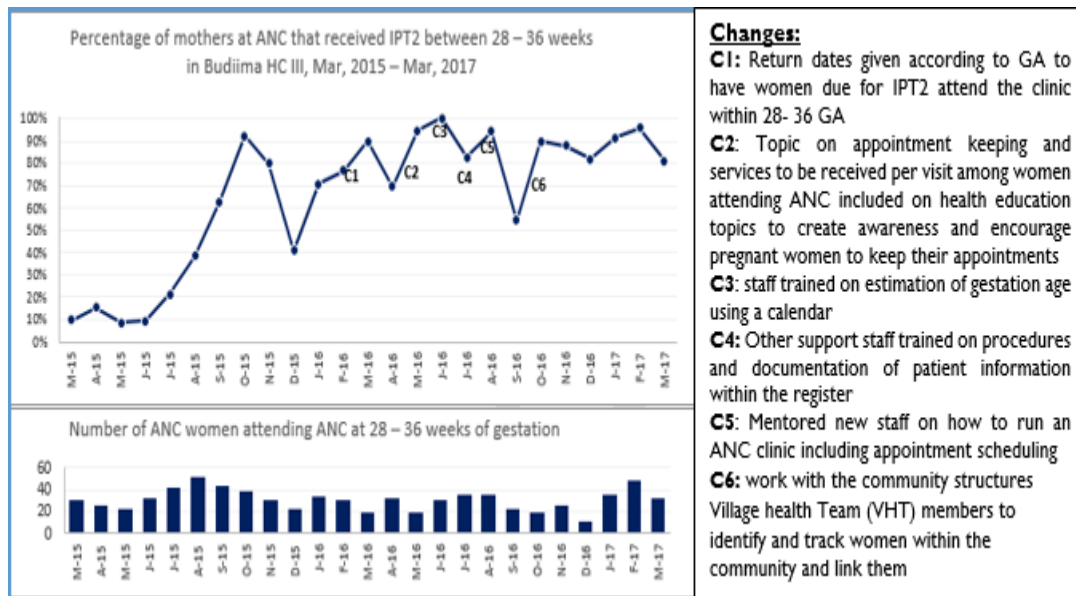
During the course of testing and implementing these change ideas, the Ministry of Health began piloting a change to IPT guidelines in Jinja District, introducing more than two IPTp-SP doses during pregnancy. Based on the new recommendations, facilities were instructed to:

- Begin IPT at 13 weeks
- Provide monthly IPT for the remaining five months

As a result of this change in guidelines, the facility began experiencing stock outs of SP due to increased utilization, resulting in a subsequent decline in the proportion of pregnant women due for IPT1 and IPT2 who received SP. To combat this, ASSIST supported the QI team to increase stocks of SP, improve documentation of gestational age, and counsel women based on recommended preventive treatment of malaria during pregnancy. The facility was also encouraged to introduce observed swallowing of SP to ensure uptake.

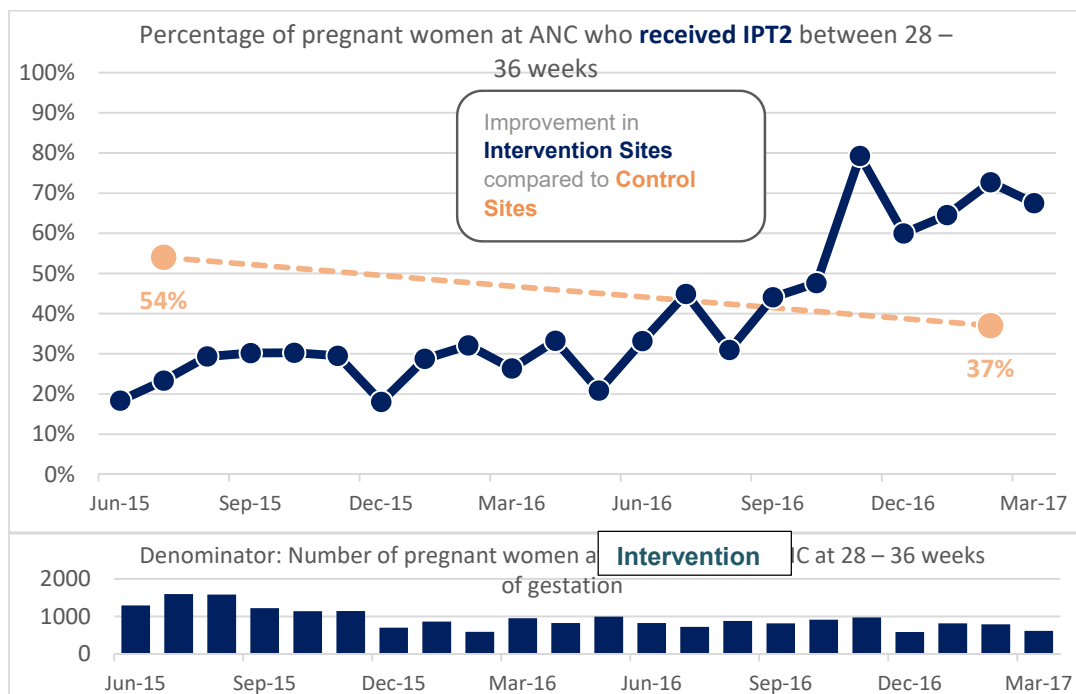
**Figure 6** describes changes implemented and over 60% improvement achieved in IPTp-SP during pregnancy Budima HC III.

**Figure 6. Improvement in the percentage of women receiving IPT2 between 28-36 weeks in Budiima HC III, Jinja District, Uganda (Mar 2015-Mar 2017)**



Similar improvements were achieved in the remaining intervention facilities. As the result of the abovementioned changes, provision of malaria prophylaxis improved significantly ( $p < 0.0001$ ) in all 10 project supported facilities with the percentage of mothers who received at least two doses of IPTpSP between 28-36 weeks' gestation increasing to an average of 68% in the last three months of data collection from a baseline (June-August, 2015) average of 24%, a 61-percentage point overall increase when taking into account the performance of the control facilities during the same period. In intervention facilities, this accounted to improved IPTp-SP treatment from 18% (June) to 67% (March 2017) (Figure 7).

**Figure 7. Improvement in timing of IPT2 in 10 facilities, Jinja District, Uganda (Mar 2015-Mar 2017)**

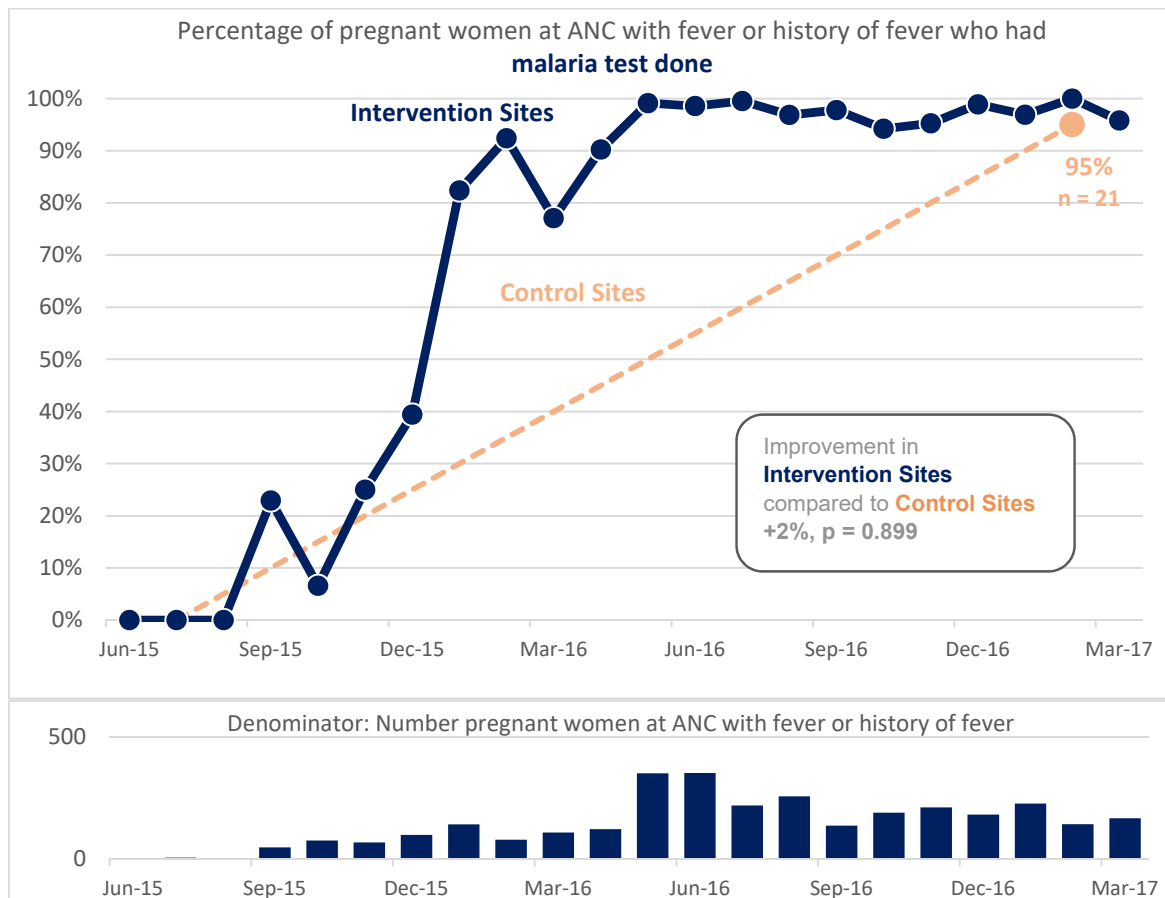


## Improvement Aim 2: Identify and correctly diagnose malaria among pregnant women

Correctly diagnosing malaria enables health workers to prescribe and administer the correct treatment as per national guidelines. This requires putting findings from history taking, examinations and results from laboratory investigations together and making an accurate conclusion on a diagnosis. QI teams tested five change ideas to address gaps in identifying and correctly diagnosing malaria: strengthening history taking to include questions about fevers and other symptoms suggestive of malaria; allocating space within the ANC register to document fever; linking all pregnant women presenting with fever to laboratory investigative services; introducing malaria testing using RDTs within the ANC clinic; and mentoring staff on the importance of documenting malaria diagnoses within the ANC register. More information on these change ideas can be found in Appendix IV.

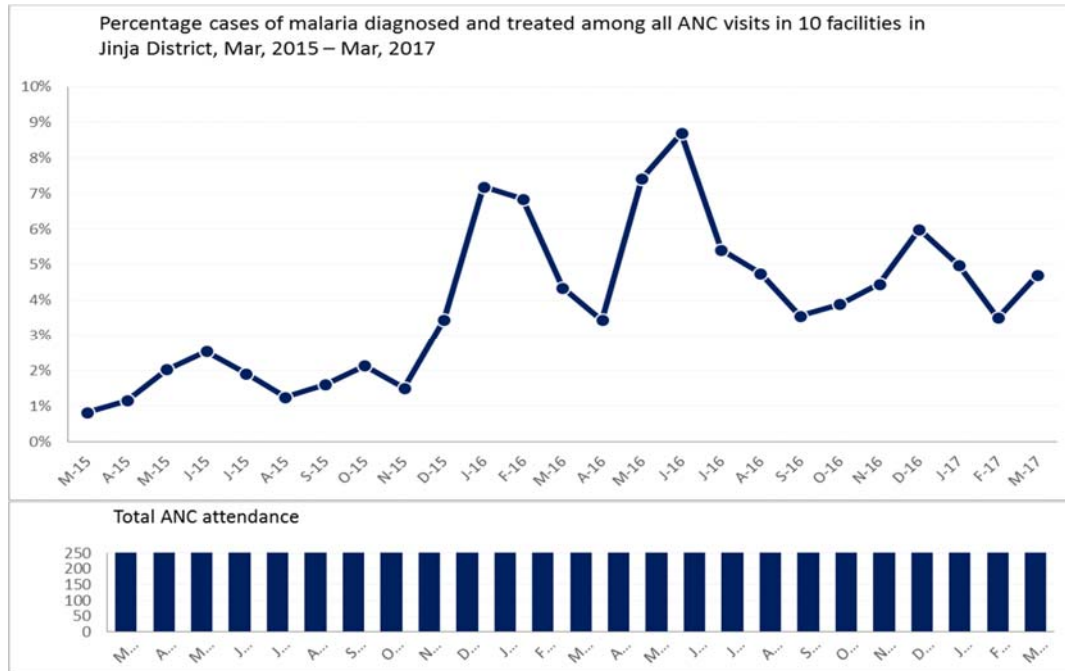
Routine monitoring of the malaria diagnosis during the pregnancy shows dramatic improvement of malaria testing using RDTs both in intervention (from 0% to 96.5%) and control facilities (from 0%-95%) during the June 2015-March 2017. Prospective controlled assessment of medical documentation revealed that attributable improvement to intervention at the end line was not significant in intervention facilities (+2%,  $p=0.899$ ) compared to control facilities and the baseline. The dramatic improvement in RDT testing was, most likely, achieved by improved availability of malaria rapid diagnostic test kits in both intervention and control facilities since Fall 2015 (**Figure 8**).

**Figure 8. Percentage of pregnant women at ANC with fever or history of fever who had malaria test done in 10 facilities, Jinja District, Uganda (Mar 2015-Mar 2017)**



However, a significant increase ( $p<0.0001$ ) in the percentage of cases of malaria diagnosed and treated during ANC visits was observed in all 10 intervention facilities, from 1% during baseline to a high of 9% in January 2016 (**Figure 9**). This percentage dropped to 4% during the end line assessment (January – March 2017) and has not changed at all from the baseline 2% value in control facilities. In absolute figures, this accounted to an average of over 200 pregnant women diagnosed and treated for malaria in intervention facilities per month compared to control facilities.

**Figure 9. Percentage of malaria cases diagnosed and treated among all pregnant women during ANC visits in 10 facilities, Jinja District, Uganda (Mar 2015-Mar 2017)**



### Improvement Aim 3: Correctly treat all pregnant women diagnosed with malaria

QI teams tested the following changes to ensure prompt management of pregnant women diagnosed with malaria: building staff capacity on malaria treatment guidelines according to the severity of the disease and gestational age of the fetus and introducing dispensing of antimalarial drugs from within the ANC clinic.

**Figure 10** shows routine monitoring of the pregnant women at ANC visit with a positive malaria test who received evidence-based treatment for Malaria per MoH guidelines. While the proportion has only changed by 10% (89% (16/18) to 99% (334/336) from baseline (June-Aug 2015) to end line (Jan-March 2017), the absolute number of women treated per guidelines, as well as pregnant women with positive malaria test (denominator in **Figure 10**) has been increased from average of 18 women to over 300 women in intervention facilities. In control facilities, there were no data available on pregnant women with positive malaria test at the baseline (0), while during last three months of the end line (Jan-March 2017), there were only 14 pregnant women with a positive malaria RDT identified and treated for malaria during pregnancies in the control facilities, out of which 13 women (93%) were treated correctly. Even though due to unavailability of data, we cannot claim statistical significance in improving malaria treatment in intervention facilities, the study clearly shows that at least 10 times more pregnant women were treated for malaria during pregnancy per month in intervention facilities at the end line compared to baseline and the control sites.

**Change idea:** Train and mentor staff on the treatment of malaria in pregnancy in 10 intervention facilities of Jinja District, Uganda

**Gap addressed:** Health workers do not follow the national treatment guidelines on management of malaria in pregnancy.

**Change implementation:**

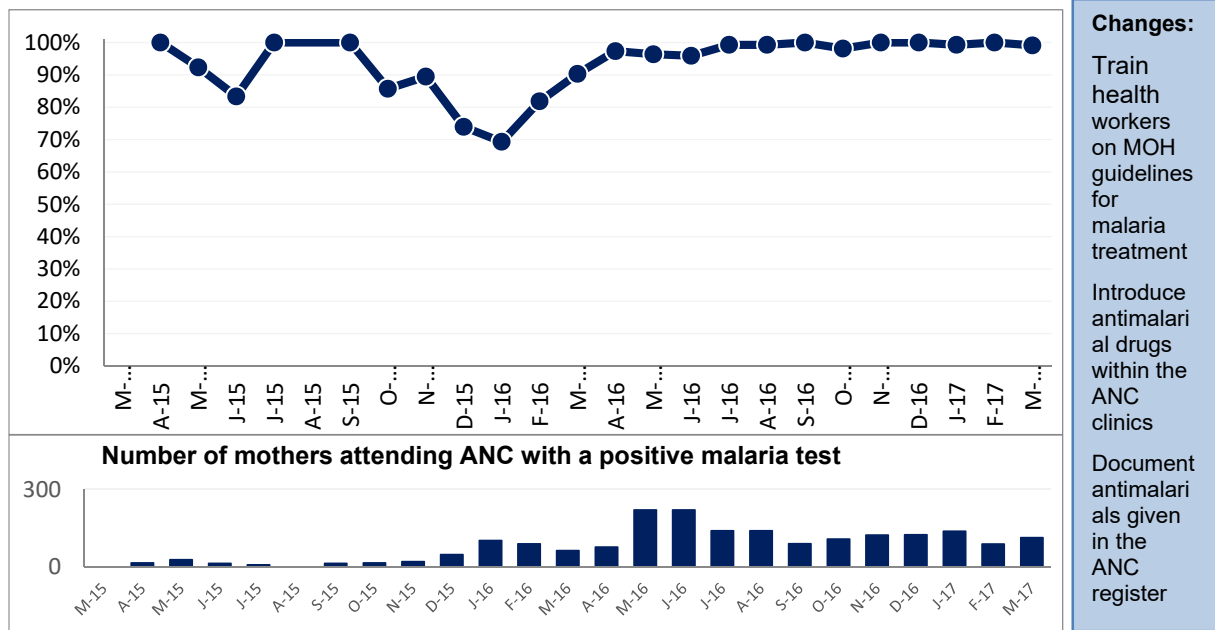
- MCH department in-charge obtained copies of the national guidelines on management of malaria and made note of details on malaria in pregnancy.
- Staff in the antenatal clinic were trained on malaria care including signs and symptoms, methods of diagnosis, and effects during pregnancy and on the fetus.
- The treatment options of malaria in pregnancy according to gestational age of the pregnancy were clarified including reconstitution guidelines for treatment options where applicable.
- A job aid on management of malaria in pregnancy summarizing treatment algorithms was developed and pinned onto the walls within the dispensing area to be used as a reference guide by health care workers.
- This change was coupled with dispensing of antimalarial drugs in the MCH department.

Women treated for malaria were also counseled on adherence to malaria preventive measures that included:

- Sleeping under ITN
- Swallowing of SP under the IPT guidelines
- Clearing their environment of breeding places for mosquitoes

**Results:** Through this change, the proportion of pregnant women diagnosed with and correctly treated for malaria increased from a 90% (56/62) baseline value in March 2016 to 99% (111/112) in March 2017.

**Figure 10. Percentage of pregnant women at ANC with a positive malaria test who received malaria treatment as per MOH guidelines, 10 facilities, Jinja District, Uganda (Mar 2015 – Mar 2017)**



## IV. RECOMMENDATIONS

Before using this change package, health facilities should collect data on indicators related to syphilis and malaria care to assess baseline performance and the quality of antenatal care being provided. To summarize and add to the change ideas described above and in the appendices, it is recommended that teams focus on the following areas to improve service delivery and ensure that improvements are sustained:

### **Establishing team work**

To achieve improvements in service delivery, health workers must collaborate with other key departments. Health care workers are encouraged to form QI teams that include representation from all areas of the facility involved in care provision. The team should meet regularly and use data to guide prioritization of improvement areas, PDSA cycles, and eventual implementation of successful change ideas.

### **Improving documentation**

Health workers should ensure that patient information within the National HMIS tools is complete and accurate. The facility should set up a mechanism to regularly review the tools and ascertain data quality. Staff should regularly be taken through the job aids on the use of the maternal health registers to refresh knowledge.

### **Analyzing process of care and prioritizing gaps to be addressed**

Once gaps in compliance with evidence based maternal care practices and standards are identified, the team should carry out a problem analysis and prioritize what needs to be improved first. After gaps have been prioritized, facility teams can use this change package to identify change ideas that have been successful in addressing those specific areas.

### **Engaging patients in service delivery**

Health workers should regularly communicate health information with clients and emphasize their role in improving service delivery. Knowledgeable clients can remind health workers about important elements of care and will more easily adhere to client-led evidence based interventions such as appointment keeping, consistent use of ITNs, compliance with iron supplements, and early attendance of ANC.

### **Ensuring adequate stock of essential supplies and commodities**

By improving ordering of essential drugs and commodities using the average monthly consumption to forecast need and monitoring utilization of stock cards, facilities will be able to ensure consistent supplies of necessary inputs needed to provide high quality antenatal care. HMIS data should also be used to guide forecasts. Requisitions should be reviewed by the team to ensure that the planned requisition caters for any changes in consumption occurring at the health facility.

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## APPENDICES

Change ideas are organized by change concept and, within the tables, in the order in which they were tested by the QI teams.

### Appendix I: Tested changes to improve screening and detection of syphilis among pregnant women

<b>Change Concept 1: Linking pregnant women attending their first ANC visit to routine syphilis testing</b>		
<b>Change ideas tested /implemented</b>	<b>Reason for change</b>	<b>How the change was tested/implemented</b>
Assign staff to link pregnant women attending their first ANC visit to laboratory services	Pregnant women attending their first ANC visit are not sent for syphilis testing at the point of triage.	<ul style="list-style-type: none"> <li>Assign staff to identify each pregnant woman attending her first ANC visit at point of triage.</li> <li>Write a request for the laboratory investigations required including syphilis testing.</li> <li>Hand laboratory request to the woman and ask her to return it to the staff at the triage desk once the results are ready.</li> <li>Send the pregnant woman for testing in the main lab or minilab at the ANC clinic.</li> </ul>

<b>Change Concept 2: Improving early detection of syphilis among pregnant women through increasing accessibility to functional laboratory services for syphilis testing</b>		
<b>Change ideas tested /implemented</b>	<b>Reason for change</b>	<b>How the change was tested/implemented</b>
Incorporate syphilis testing as a mandatory test for 1 <sup>st</sup> ANC pregnant women	Syphilis testing not a mandatory test for 1 <sup>st</sup> ANC pregnant women	<ul style="list-style-type: none"> <li>Identify each pregnant woman coming for first ANC visit at point of triage.</li> <li>Write a request for the investigations to be conducted including syphilis testing.</li> <li>Send pregnant woman for testing in the main lab/ minilab at the ANC clinic.</li> </ul>
Introduce syphilis testing as an integral step of the minilab in the MCH department	Main laboratory not accessible every day of the week	<ul style="list-style-type: none"> <li>Build capacity of the staff in the ANC clinic to test for syphilis using the RPR kits.</li> <li>Lobby to have syphilis testing and test kits allocated to the ANC clinic.</li> <li>Introduce syphilis testing within "minilab" in the MCH department.</li> <li>Allocate and place syphilis test kits on the testing desk where HIV test kits are placed to have both tests (HIV and syphilis) done concurrently within MCH department.</li> <li>Allocate the syphilis testing task to the staff carrying out HIV testing within the ANC clinic.</li> </ul>
Coordinate with the laboratory personnel to increase requisitions for syphilis test reagents/ kits		<ul style="list-style-type: none"> <li>Hold a meeting with the laboratory team and share that the utilization of the syphilis testing reagents/ kits will increase because of the new improvement aim of ensuring that all pregnant women attending 1<sup>st</sup> ANC get tested for syphilis.</li> <li>Assign a MCH staff person to be part of the laboratory requisition team.</li> </ul>



<b>Change Concept 2: Improving early detection of syphilis among pregnant women through increasing accessibility to functional laboratory services for syphilis testing</b>		
<b>Change ideas tested /implemented</b>	<b>Reason for change</b>	<b>How the change was tested/implemented</b>
Redistribute syphilis RPR test kits	Inconsistent availability of syphilis rapid test kits	<ul style="list-style-type: none"> <li>Engage the health sub-district drug and commodity distributors in assessing the availability of supplies within the sub-district.</li> <li>Share with them issues regarding stock level of essential supplies and request that they identify facilities with plenty of kits or those with supplies with a short expiry window and redistribute them.</li> </ul>
Lobby for syphilis rapid kits from implementing partners		<ul style="list-style-type: none"> <li>Identify relevant implementing partners.</li> <li>Hold a meeting with them, share the performance of the facility including challenges with stock outs of essential supplies.</li> <li>Lobby for support in procuring syphilis rapid test kits/ supplies.</li> </ul>
Introduce other testing methods for syphilis	Stock-outs of RPR kits	<ul style="list-style-type: none"> <li>Engage the laboratory personnel in a meeting and share the stock levels of RPR tests kits.</li> <li>When the RPR kits sticks are completely out of stock, get the laboratory personnel to test for syphilis using alternative tests like the VDRL.</li> </ul>

<b>Change Concept 3: Improving early detection of syphilis among pregnant women through building capacity of health workers</b>		
<b>Change ideas tested /implemented</b>	<b>Reason for change</b>	<b>How the change was tested/implemented</b>
Regular mentoring of staff on the timing and the use of a rapid syphilis test kit	Incomplete and inaccurate recording of syphilis test results (test codes recorded in register are inaccurate/missing)	<ul style="list-style-type: none"> <li>Identify and assign staff to mentor others in documenting patient information within the ANC registers.</li> <li>On a regular basis, assigned staff reviews the register to identify gaps.</li> <li>Mentor staff on how to update the register with reference to the job aid included on the first page of the register.</li> </ul>
	Health workers were unaware of the timing of syphilis testing	<ul style="list-style-type: none"> <li>Orient staff on the focused ANC guidelines emphasizing the basic tests to be carried out for a pregnant woman at various ANC visits.</li> <li>Emphasize syphilis testing as one of the tests to be carried out at the first ANC visit</li> <li>Write out and pin the focused ANC guidelines in a visible place for reference by health workers.</li> </ul>

**Appendix II: Tested changes to ensure prompt management of pregnant women diagnosed with syphilis**

<b>Change Concept 1: Improving timely and appropriate management of pregnant women diagnosed with syphilis through building capacity of health workers to treat syphilis</b>		
<b>Change ideas tested /implemented</b>	<b>Reason for change</b>	<b>How the change was tested/implemented</b>
Regular mentoring of staff on data quality in the ANC registers	<ul style="list-style-type: none"> <li>• Lack of a diagnosis of syphilis written within the diagnosis column.</li> <li>• No evidence of medication for syphilis treatment documented against the entries of women with positive syphilis test.</li> <li>• Wrong test result codes written in the registers.</li> </ul>	<ul style="list-style-type: none"> <li>• Identify and assign staff to mentor others in documenting patient information within the ANC registers</li> <li>• On a regular basis, assigned staff reviews the register to identify gaps and particular staff that are not well versed with register use</li> <li>• Assigned staff mentors other staff on use of the ANC longitudinal register emphasizing the job aid included in the register. Assigned staff clarifies:               <ul style="list-style-type: none"> <li>- Where to document syphilis test results</li> <li>- The codes to be used when updating the register</li> </ul> </li> </ul>
Train and mentor staff on the treatment for syphilis among pregnant women	Health workers do not follow the national treatment guidelines on management of syphilis among pregnant women.	<ul style="list-style-type: none"> <li>• Coaches obtained copies of the national guidelines on management of syphilis in pregnancy.</li> <li>• Staff in the antenatal clinic were trained on syphilis care including: signs and symptoms, methods of diagnosis, and its effects during pregnancy on both the mother and fetus.</li> <li>• The treatment options for syphilis according to the stage of the disease were then discussed.</li> <li>• The team identified a staff member to lead syphilis care for pregnant women at the health facility. Specifically tasked the staff member to supervise the screening/ testing process of pregnant women attending their first ANC visit, and review the registers to ascertain whether women identified as positive for syphilis were promptly managed with Benzathine benzylpenicillin (IM).</li> <li>• A summary on the treatment algorithm was written out and pinned on the walls in the dispensing area to be used as a reference guide by the health care workers.</li> <li>• Women diagnosed with syphilis and treated were counseled on bringing their spouses for treatment to prevent further spread of the disease.</li> </ul>

**Change Concept 2: Improving timely and appropriate management of pregnant women diagnosed with syphilis through ensuring availability of medicines and other supplies in the ANC clinic**

<b>Change ideas tested /implemented</b>	<b>Reason for change</b>	<b>How the change was tested/implemented</b>
Assign staff to ensure that Benzathine benzylpenicillin (IM) is requisitioned regularly	Stock-outs of Benzathine benzylpenicillin (IM) at the mini-store in the ANC ward	<ul style="list-style-type: none"> <li>Assign staff to monitor utilization of Benzathine benzylpenicillin (IM) and oversee the requisition for Benzathine benzylpenicillin (IM) once the stock level in the mini-store in the ANC ward is low.</li> </ul>
Drug redistribution from highly stocked to less stocked health facilities	Stock-outs of medicines at the health facility.	<ul style="list-style-type: none"> <li>Engage the district drug distributors to support the re-distribution of Benzathine benzylpenicillin from highly stocked centers to centers with no stock/ limited stock.</li> </ul>

### Appendix III: Tested changes to improve prevention of malaria among pregnant women attending ANC clinics

Change ideas to improve prevention of malaria among pregnant women attending antenatal care clinics		
Change ideas tested /implemented	Reason for change	How the change was tested/implemented
Include malaria prevention among the health education topics	Malaria prevention only partially covered during ANC health education sessions	<ul style="list-style-type: none"> <li>Assign staff to oversee the health education sessions and topics on an ongoing basis.</li> <li>On a daily basis, assign staff to discuss malaria prevention during health education session.</li> <li>Identified staff person gives a comprehensive talk on malaria prevention that encompasses prevention at home, use of ITNs, IPT, and prompt treatment of malaria.</li> </ul>
Give ITNs to pregnant women with repeated episodes of malaria during pregnancy	ITNs only given to pregnant women attending their first ANC visit. Pregnant women presenting with repeated episodes of malaria at the subsequent visits were not being considered for ITNs, even if they hadn't received an ITN at the previous visit. This was due to a stock out of ITNs or the fact that they had been referred in after their first ANC visit.	<ul style="list-style-type: none"> <li>Identify pregnant women with repeated episodes of malaria.</li> <li>Counsel women on effects of malaria during pregnancy and different methods to prevent malaria.</li> <li>Ascertain whether an ITN is being used by the pregnant woman and reasons for non-use/ status of the net in use currently.</li> <li>If pregnant woman has no ITN or has a net in poor condition (e.g., net has many holes), give her a new ITN and document that this was done in the ANC register, mother's held book and the ITN distribution registry.</li> <li>Counsel mother on the importance of sleeping under an ITN.</li> </ul> <p>This change idea is dependent on the availability of ITNs at the health facility and in the district.</p>
Appointment scheduling for pregnant women according to their gestational age	Appointments were scheduled haphazardly and mothers were not aware of what to expect at the next visit	<ul style="list-style-type: none"> <li>Mentor staff on focused ANC guidelines, how to estimate gestational age and schedule appointments according to the gestational age.</li> <li>Create a job aid on the goal-oriented focused ANC guidelines.</li> </ul> <p>At the ANC appointment:</p> <ul style="list-style-type: none"> <li>Estimate pregnant woman's gestational age using a gestation wheel/ calendar.</li> <li>Refer to the goal-oriented focused ANC guidelines to identify the gestational age range when the pregnant woman is return for a follow-up visit.</li> <li>Schedule a return date appropriate for her gestational age depending on the MCH ANC schedules.</li> <li>Document scheduled follow up ANC visit within the pregnant woman's ANC card.</li> <li>Inform pregnant woman of her return date and what services to expect during that appointment.</li> <li>Dispense IPT-SP for the pregnant woman if she is due for a dose.</li> </ul>

**Appendix IV: Tested changes to ensure correct diagnosis of malaria among pregnant women presenting with fevers/ other symptoms of malaria**

<b>Change ideas to improve diagnosis of malaria among pregnant women attending the antenatal care clinics</b>		
<b>Change ideas tested /implemented</b>	<b>Reason for change</b>	<b>How the change was tested/implemented</b>
Identify pregnant women with fevers/ other symptoms of malaria	Pregnant women are not routinely asked whether they have/have had a fever or other symptoms of malaria during history taking.	<ul style="list-style-type: none"> <li>• During history taking ask about fever or presence of other symptoms of malaria.</li> <li>• Identify pregnant women with fever or symptoms suggestive of malaria.</li> </ul>
Document fevers as a symptom in the ANC register	Instances of fever in pregnant women attending ANC are not recorded in the ANC register	<ul style="list-style-type: none"> <li>• Hold a meeting to identify space in the existing ANC register to document fevers.</li> <li>• Allocate this space to document fever or any other symptoms of malaria.</li> <li>• Mentor staff on what needs to be documented in the allocated space of the register and how it should be done.</li> </ul>
<b>Investigate all documented cases of fever by implementing the change ideas below:</b>		
Link all pregnant women presenting with fever to laboratory investigative services	Malaria is not commonly clinically diagnosed	<ul style="list-style-type: none"> <li>• Write a request for laboratory investigations and have pregnant woman proceed to the laboratory / testing area</li> <li>• Have malaria RDT or blood slide examination done.</li> </ul>
Introduce malaria testing services using RDTs in the ANC clinic to improve efficiency of lab services offered	Long waiting times at the laboratory/ laboratory sometimes not accessible to patients	<ul style="list-style-type: none"> <li>• Integrate RDTs for testing malaria as part of the laboratory kits in the ANC clinic.</li> <li>• Train staff on how to use RDTs to test for malaria and interpret results.</li> </ul>
Write malaria diagnosis within diagnosis column of the ANC register	Malaria diagnosis not made/recorded for some women despite anti-malarials being prescribed	<ul style="list-style-type: none"> <li>• Mentor staff on use of the ANC register including data quality (completeness and accuracy) of patient information.</li> <li>• Document results from the laboratory in the ANC register.</li> <li>• If results are positive for malaria parasites document malaria as the diagnosis and classify the disease where possible.</li> </ul>

**Appendix V: Tested changes to ensure prompt management of pregnant women diagnosed with malaria**

<b>Change ideas to improve prompt management of malaria among pregnant women attending the antenatal care clinics</b>		
<b>Change ideas tested /implemented</b>	<b>Reason for change</b>	<b>How the change was tested/implemented</b>
Build staff capacity on malaria treatment guidelines in regard to disease severity and gestational age	Health workers were not following the national treatment guidelines on management of malaria in pregnancy	<ul style="list-style-type: none"> <li>• Have MCH departments in-charge obtain copies of the national guidelines on management of malaria and highlight details on malaria in pregnancy.</li> <li>• Train staff in the antenatal clinic on malaria treatment guidelines including signs and symptoms, methods of diagnosis, and effects during pregnancy and on the fetus.</li> <li>• Clarify treatment options for malaria in pregnancy according to severity and gestational age of the pregnancy.</li> <li>• Create a job aid for treatment of malaria in pregnancy by summarizing treatment algorithms and pin it on the walls in the dispensing area to be used as a reference guide by health care workers.</li> </ul>
Introduce dispensing of antimalarial drugs from within the ANC clinic	Pregnant women were sent to the general dispensing area for anti-malarial drugs where there are often long lines	<ul style="list-style-type: none"> <li>• Hold a meeting with the facility in charge and request to have antimalarial drugs available in the ANC clinic.</li> <li>• Obtain a book to document daily ANC antimalarial consumption.</li> <li>• Include antimalarials on the medicines tray in the ANC clinic.</li> <li>• On a monthly basis, refill the stock of antimalarials in the ANC clinic</li> </ul>