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COMPENDIUM

# Other Topic Case Studies from the USAID Applying Science to Strengthen and Improve Systems Project, 2016-2017

APRIL 2020

This compendium of previously published case studies related to other health care services was prepared by University Research Co., LLC (URC) for review by the United States Agency for International Development (USAID) through the USAID Applying Science to Strengthen and Improve Systems (ASSIST) Project. The USAID ASSIST Project is made possible by the generous support of the American people through USAID.



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## CASE STUDY

# Improving malaria case management at Khunyangu Sub-County Hospital, Kenya

### Summary

Khunyangu Sub-County Hospital formed a work improvement team (WIT) in May 2014 to improve malaria case management. They reviewed their data to look for gaps for the first time and quickly saw they had high rates of presumptive treatment for malaria, with more than half of patients receiving artemisinin-based combination therapies (ACTs) without confirmation of malaria. The WIT developed a number of changes to test, including conducting continuing medical education sessions at the facility, displaying job aids, extending laboratory hours, informing clients of changes in procedure, and reordering patient flow. Through these efforts, 58.8% of their yearly supply of ACTs has been saved as a result of rational use, which provide approximately 10 months of additional ACTs to the facility. As a result, there have been no stock-outs of anti-malarials, despite erratic supplies.

### Background

Khunyangu Sub-County Hospital in Busia County, Western Kenya provides preventive and curative services through outpatient and inpatient departments. The USAID Applying Science to Strengthen and Improve Systems project (ASSIST), with funding from the President's Malaria Initiative (PMI), began supporting quality improvement to improve malaria case management in Busia County in May 2014. Khunyangu Sub-County Hospital is a high malaria case load facility and was selected, along with four other facilities, for initial implementation of malaria quality improvement within the county. ASSIST is currently implementing malaria quality improvement activities in 25 facilities across three counties in Kenya.

The hospital formed a WIT in May 2014 following trainings from ASSIST on quality improvement and malaria case management. The WIT included the clinician in charge of the out-patient department, the facility Pharmacist, Laboratory Technologist, a nurse, and the head of the records department. They reviewed their data to look for gaps for the first time and quickly saw they had high rates of presumptive treatment for malaria with more than half of patients receiving ACTs without confirmation of malaria. Of 6,683 cases diagnosed clinically, only 4,306 were confirmed through laboratory testing. They also knew they experienced stock-outs of ACTs as a result of irrational use. The WIT conducted a fishbone analysis to determine root causes of these challenges and developed changes to test in order to reduce discrepancies between confirmed malaria cases and prescribing of ACTs.

### Implementation

The County and Sub-County formed a malaria technical working group (TWG) at each level comprised of the County Malaria Coordinator, County Medical Lab Technologist, County Pharmacist, County Clinical Officer and sub-county health managers to spearhead the implementation of the national policy on malaria. The members of the WIT at Khunyangu Sub-County Hospital not only oversee their departments

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at the hospital, but also supervise other sub-county facilities. The WIT knew they faced a knowledge gap among clinicians who presumptively prescribed ACTs. The hospital already held regular continuing medical education (CME) sessions, so the WIT decided their first change would be to add CMEs on the national guidelines for malaria case management. This change was designed to ensure that providers follow the national guidelines and test all patients presenting with fever for malaria and not treat presumptively. In the past, staff would typically wait until they were called by the ministry to attend trainings. Through CMEs held at the hospital, different WIT members began covering the various aspects of malaria case management in weekly sessions, emphasizing the necessity of sending patients for confirmatory testing at the laboratory. WIT members also began conducting on-the-job training to refresh skills and support staff and provided job aids in clinical rooms.

They began to see improvements with increases in patients receiving tests, but discrepancies remained. In August 2014, there were 472 clinical case and 393 cases were confirmed, but they saw in the registers that 985 ACTs had been dispensed. The WIT realized that the problem was that some personnel were buying ACTs to take home to people who were sick at home or in the community and that not all patients were being recorded in the registers. They added all of the pharmacy staff to the WIT and changed hospital operations to only allow technical staff to dispense treatment adhering to a strict drug dispensing policy.

Another challenge the WIT encountered was that the laboratory closed at 4pm, while patients would still be coming. The Laboratory In-Charge agreed to extend the hours to 6pm. Also at the laboratory, they had frequent shortages of reagents. They discussed this with the Superintendent and began reordering supplies in advance of using them up instead of waiting until they were gone.

In Kenya, ACTs are provided at health facilities free of charge but patients do have to pay for laboratory testing. Because of this, the WIT found that if they told patients to go to the cashier before the laboratory, patients were more likely to leave without getting the test done. Thus, the WIT changed the patient flow to go to the cashier at the end of their visit. For patients who cannot pay for the testing, there is a Social Worker at the hospital to help them sign up for fee waivers.

After improving dispensing of ACTs, the WIT faced a new challenge. Patients were used to receiving ACTs when presenting with fevers and did not understand the changes. The WIT began discussing the importance of rational use of ACTs during morning health education talks and hung posters in English and Kiswahili informing clients of the change.

## **Results**

Since the WIT began testing changes, trends of ACTs dispensed versus confirmed cases have greatly improved (see **Figure 1**). Roughly 98% of patients receive confirmatory tests now. The WIT attributes this 2% gap to patients who come after laboratory hours and are admitted as in-patients due to high fever. The national guidelines state that in case such as these, providers should treat presumptively. The total number of ACTs dispensed 6 months before the intervention were 12,608 and 5,190 after the intervention. This translates to approximately 58.8% of ACTs saved as a result of rational use which could provide approximately 10 months of additional ACTs to the facility. As a result, there have been no stock-outs of anti-malarials despite erratic supplies.

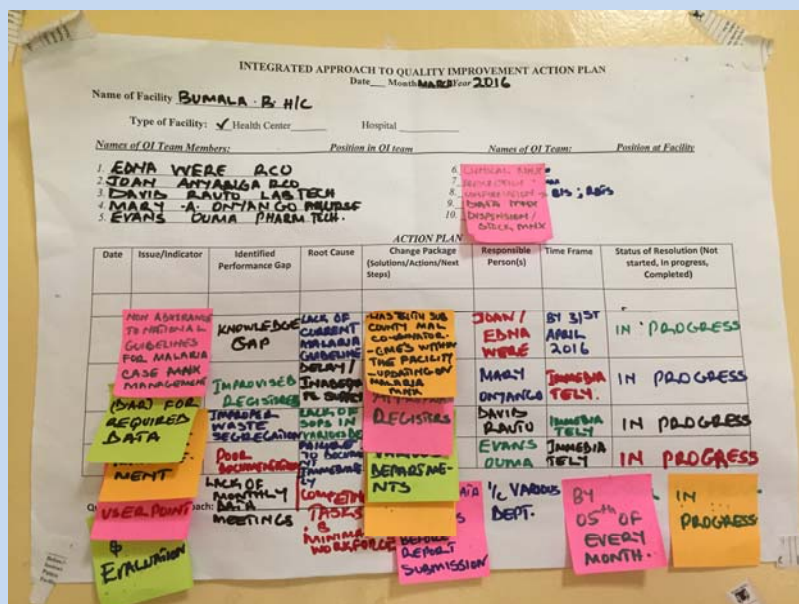
## **Facilitating Factors**

The Khunyangu WIT attributes their success to teamwork and support from the hospital administration. Prior to forming the WIT, each department of the hospital ran independently of each other. "It's hard to approach a colleague from another department and correct them," said the WIT Chair. Having each department represented on the WIT, however, allowed them to synchronize efforts across the hospital system. The support from the hospital administration has been invaluable to the WIT and helped them source funds for reagent supplies, hire more support staff for the Records Department, and purchase fuel for a generator.



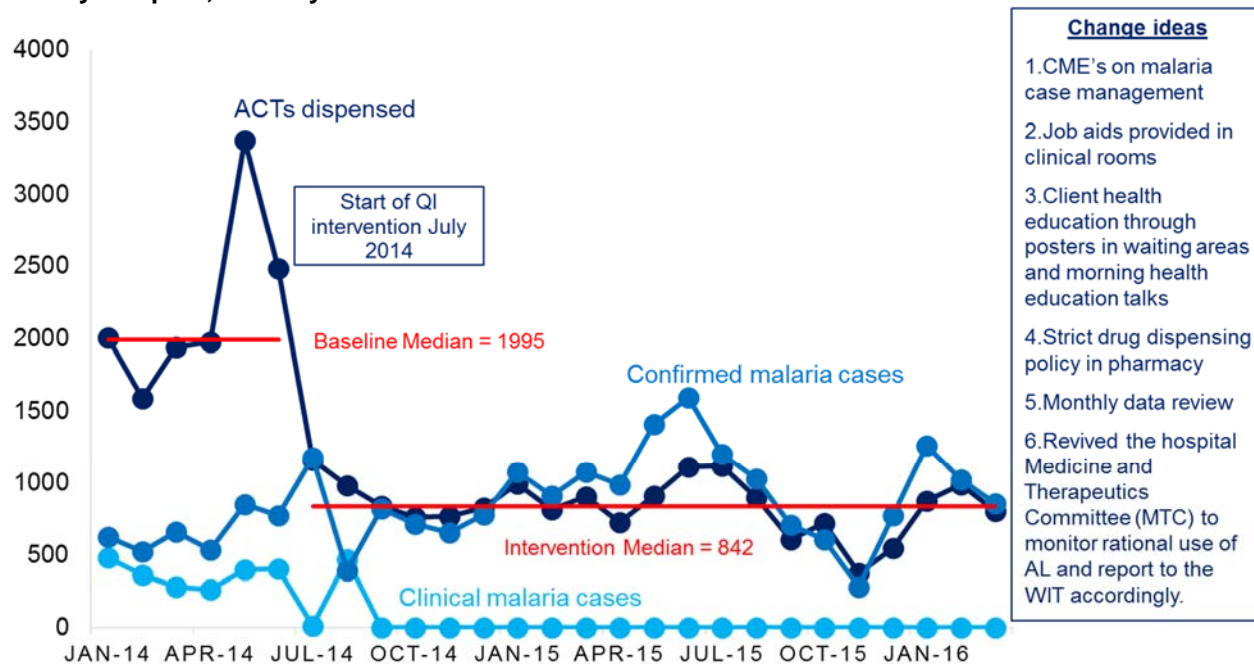
### Box 1. Center of Excellence: Bumala B Health Center

In March 2016, ASSIST and the members of the WIT at Khunyangu Sub-County Hospital began working with the staff at Bumala B Health Center to establish themselves as a Center of Excellence (COE), focusing on improving malaria case management. Bumala B was chosen to serve as a COE because it is a high-volume clinic, it has all the departments to deal with malaria case management (clinical, laboratory, pharmacy, and records), and it has qualified personnel. After initial quality improvement training from ASSIST and supportive supervision from the WIT of Khunyangu Sub-County Hospital, Bumala B established a WIT with the two Clinical Officers, nurse, Laboratory Technician, and Pharmacy Technician. They looked at their clinical processes to see if patients were getting confirmatory tests, if they were receiving their results, and getting the right treatment. They also looked at their registers and pharmacy records to see if they matched. The WIT realized they needed to focus on patient management, documentation, and commodity management and developed an improvement action plan. The first change they made was to have monthly data review meetings and to review the weekly surveillance reports together. Previously, these had been completed and submitted solely by one of the Clinical Officers. Now, they review the reports together and discuss discrepancies they see. This change led to others. They discussed with clinicians the importance of not treating just based on the clinical diagnosis and asked clinicians to stop writing presumptive diagnoses on patient cards and in registers. This is to ensure that the confirmed diagnosis is the only one recorded. They have also established new registers in the laboratory in which they only track malaria tests. This is to make data review faster for the WIT. The WIT also reordered the patient flow. Prior to their improvement efforts, patients would arrive at the facility, visit the register, go to triage and have their vitals taken, go to consultation, then the laboratory, back to consultation for their results, then to the pharmacy for treatment, then a final stop to the register to record their diagnosis and treatment before departing. The WIT found that registers were often incomplete because patients would leave after visiting the pharmacy. Now, patients are entered in the register at registry, where they receive a stamp to signify that their final diagnosis has been recorded before going to the pharmacy. The team still has challenges of inadequate staffing and occasional stock-outs of test kits, but they are positive about the improvement they have achieved. They are eager to continue their efforts, and working with community units to sensitize patients to the benefits of the changes to malaria case management and are planning more changes to test in the coming months.



The Bumala B Health Center's quality improvement action plan. Photo by Kate Fatta, URC.

**Figure 1. ACTs dispensed vs clinical malaria cases vs confirmed malaria cases, Khunyangu Sub-county Hospital, January 2014-March 2016**



**Lessons Learned**

The WIT is very clear that the marked improvement in malaria case management at the facility required a team effort from all departments and hospital leadership. Consistent data reviews are also necessary and teams need to meet frequently to discuss gaps and changes. The WIT also recognizes that staff need to be open to change, embrace the malaria case management guidelines, and stay up to date on technical issues through regular CMEs.

The improvement efforts at Khunyangu Sub-County Hospital were designed to not only improve care at their facility, but also to equip them with skills and understanding of quality improvement for malaria case management so they could establish and coach a Center of Excellence at Bumala B Health Center (see **Box 1** for the Bumala B story).

**Next Steps**

Among patients there remain some negative perceptions of the changes in malaria care at Khunyangu. Patients are disappointed when they do not receive ACTs, and some buy them outside the hospital, despite negative test results. To address this, the WIT is considering a number of changes, including engaging community health volunteers and community health extension workers to spread messages, to tap into community health action days, to tailor their messaging to address patients’ concerns, and to add patient representatives to the WIT.

Encouraged by what they have achieved, the WIT has also spread quality improvement initiatives to other departments within the facility, including the Comprehensive HIV Care Clinic, and is exploring other areas of care they can improve together.



U.S. President's Malaria Initiative

## CASE STUDY

# Improving Commodity Security in 16 Malaria High Case Load Facilities in Busia, Kakamega, and Siaya Counties

### Summary

The USAID Applying Science to Strengthen and Improve Systems project (ASSIST) supports selected high-volume facilities in each sub county in Busia, Kakamega, and Siaya Counties in improving the quality of malaria case management. Sixteen (16) of the 25 facilities were experiencing shortages of artemisinin combined therapy (ACT) and rapid malaria diagnostic kits (m-RDT). To address the gaps in these essential commodities, ASSIST, in collaboration with the Department of Health in the three county governments, formed improvement teams at the counties, sub-counties, and facilities. Root cause analyses were conducted on commodity challenges on the demand side and change ideas were implemented to eliminate commodity insecurity. Employing the Plan-Do-Study-Act (PDSA) cycle; using the WhatsApp platform to track and report commodities; and integrating improvement activities in county, malaria schedule decreased stock outs of ACTs and m-RDTs from a median of 28 days at the start of the project, to less than five days.

### Background

The USAID Applying Science to Strengthen and Improve Systems project (ASSIST), with funding from the President's Malaria Initiative (PMI), began supporting quality improvement (QI) with a focus on improving malaria case management, increasing security of essential malaria commodities (ACTs and m-RDTs), and reporting through the test-treat-track (3T) model in June 2014. The three select counties were Busia, Kakamega, and Siaya Counties whereby 25 high-volume facilities, each drawn from the 25 sub-counties were selected to initiate QI in improving malaria case management. Since October 2016, ASSIST has been supporting implementation of malaria QI activities (both case management and malaria in pregnancy) in 45 facilities across five counties in Kenya.

### Implementation

ASSIST's improvement advisor and malaria consultant, in collaboration with three Department of Health county governments, selected facilities with malaria high case load in each of the 25 sub-counties in June 2014. The laboratory, clinical officer, pharmacist, and sub-county malaria personnel from the selected facilities were then trained in the Kenya Quality Model for Health (KQMH) in August 2014. The trainees formed sub-county Quality Improvement Teams (QITs) in September 2014. However, the teams tabled addressing continuous QI issues. Instead, the QITs settled on quarterly sub-county Continuous Medical Education (CME) sessions and data reviews to help address the gaps in malaria case management. The CMEs were organized on the basis of the 25 centres of excellence that were selected for ASSIST to work directly with; nonetheless, all of the facilities were also involved. This approach would reach 403 facilities in the region with QI CMEs.

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In the same period, the county malaria coordinator formed a malaria technical working group (TWG). The TWG brought together all sub-county malaria coordinators, as well as the county pharmacist, county medical laboratory technologist, county health records officer, and the county director for health on a quarterly basis. The TWG monitored the progress of the QITs, reviewed their reports, and gave recommendations on areas for improvement.

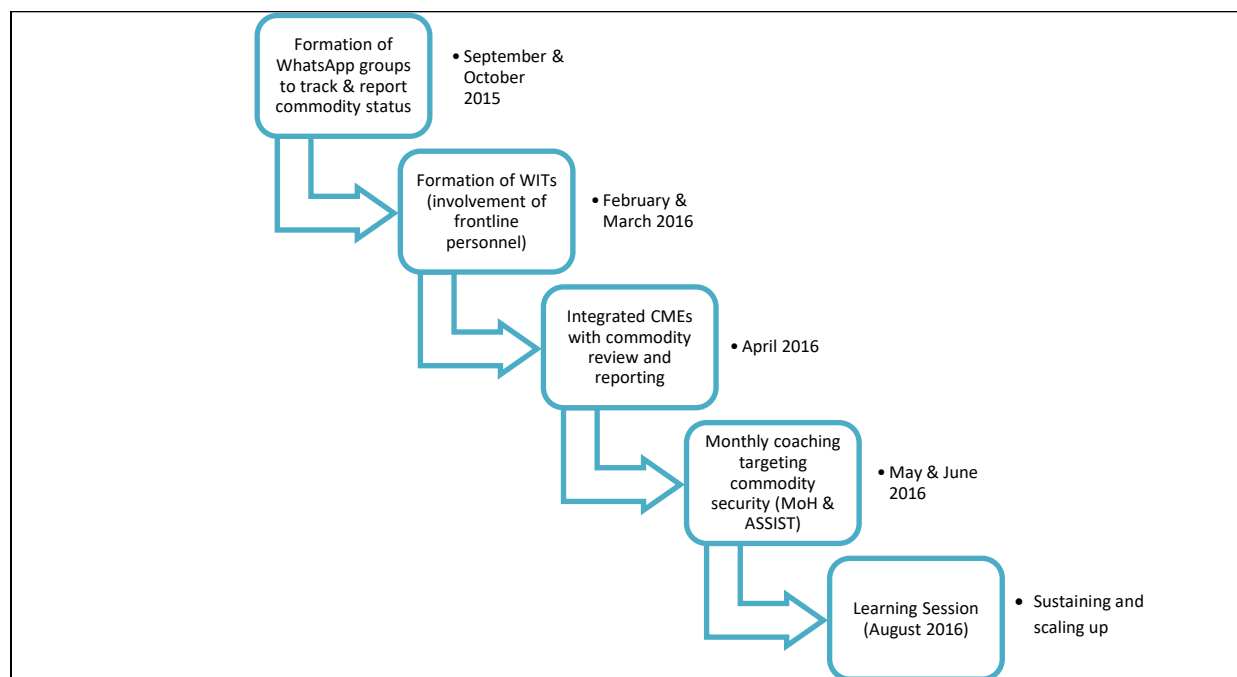
Quarterly CMEs and quarterly TWGs continued for a year. A re-evaluation of case management indicators was done in August 2015 and disparate stock outs of ACTs and m-RDTs were found. In fact, 30% of the facilities had a median of 28 days of stock outs a month of these essential commodities. WhatsApp groups were then formed in each of the counties to track commodity status across the 25 sub-counties in September and October 2015. Members of the group included county and sub-county malaria control coordinators, county pharmacists, county laboratory technologists, as well as county health records information officers. Information regarding commodity status would be sent on the platform every month; including *ad hoc* requests from fellow sub county malaria coordinators to their colleagues, in order to help them mitigate shortages in their sub counties by redistribution. Activity on the WhatsApp platform triggered sub-county- and county-wide redistributions in the three months that followed.

ASSIST performed a sensitization training in QI for the sub-county malaria coordinators, who were then serving as coaches in October and November 2015. The coordinators embarked on reconstituting their QITs and some even formed sub-county-based WhatsApp groups to track their commodities. In December 2016, lead members of all 25 QITs came together for the first QI learning session. It was proposed that coordinators should form work improvement teams (WITs) to further engage front-line health care workers. With the assistance of ASSIST in liaison with the county governments, WITs were formed during sub county and county review meetings convened in February and March 2016 in the counties.

Meanwhile, the review of commodity status was integrated in the quarterly CMEs by April 2016. All 403 facilities that participated in the sub county CMEs would share the ACT and m-RDT status in the CMEs and highlight steps taken to ensure appropriate management of these. Further, the various WITs proposed change ideas such as: testing all suspected malaria cases at night and during weekends; reserving m-RDTs for odd hours when laboratories were closed; and only issuing ACTs to clients with confirmed malaria. Coaching the 25 facilities that were targeting the 3T model commodity security began in June 2016. Out of the 25 facilities, 16 were established to have had long standing challenges with ACTs and m-RDTs, and these are the facilities that ASSIST, in collaboration with the county department for health, closely tracked and supported. Summary of implementation of change ideas is given in **Figure 1**.

The second malaria learning session was done in August 2016 and since then, the teams at the facilities have been working to ensure no more than a 5 day stock out of essential malaria commodities are reported.

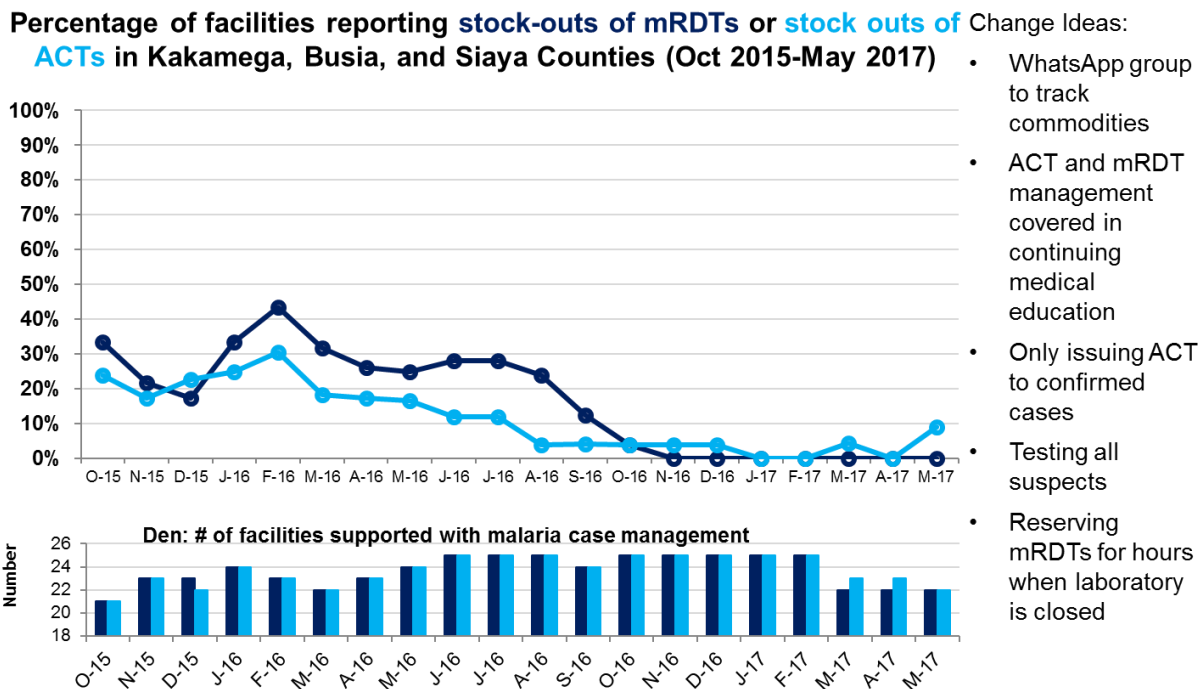
**Figure 1. Stepwise implementation of change ideas in the 16 facilities in Western Kenya**



**Results**

The median stock out days of ACTs and m-RDTs dropped from 28 to less than 5 days between October 2015 and November 2016 (Figure 2).

**Figure 2: Percentage of facilities reporting stock-outs of either RTKs or ALs in Kakamega, Busia, and Siaya Counties (Oct 2015-May 2017)**



### **Lessons Learned**

Working systematically with teams to address demand-related commodity challenges is attributed to the success achieved with improving commodity security in the malaria case management sites that ASSIST has been working in, in Western Kenya.

### **Next Steps**

In January 2017, USAID Kenya – PMI team motivated ASSIST to collaborate with existing PMI partners and county governments in the malaria lake endemic region to highlight and initiate improvement projects that will respond to the region specific challenges in essential malaria commodity security.





U.S. President's Malaria Initiative

## CASE STUDY

# Improving Documentation of Malaria Suspects at Shiamakhubu Health Centre Outpatient Department in Kakamega County

### Summary

During a clinical encounter of a suspected malaria patient in Kenya, it takes the triad of the clinician serving the patient, the morbidity tally sheet, and outpatient register to correctly capture the patient as a malaria suspect. Complete and accurate documentation of suspected malaria enables clinicians and malaria programs to determine testing rates, workload and thus planning and resource allocation. In cases where documentation is incomplete and inaccurate, malaria tests done and documented in the laboratory can be used to identify untallied malaria cases in the outpatient department. Shiamakhubu health centre is one the 12 centres of excellence in Kakamega County. In a bid to ensure that they account for all malaria suspects, they resolved to use their quality improvement team to address this area. Working with a baseline report in April 2016, the team developed countermeasures for the root causes of the problem. Implementation of this work began in May 2016 and through team work, 100% complete and accurate data was reported in August and through October 2016 until there was stock out of tally sheets and health care providers went on strike in November and December 2016.

### Background

Shiamakhubu Health Centre (SHC) was opened in 1975. It is a tier two facility located in Kakamega County, Shinyalu Sub-County, Murhanda Ward. It serves three Sub Locations Namely Itenyi, Mukulusu and Shiswa. It has a catchment population of 11,778. The annual workload is approximately 29,990. SHC offers in-patient and outpatient services. Malaria is the leading outpatient department (OPD) disease.

The USAID Applying Science to Strengthen and Improve Systems project (ASSIST), with funding from the President's Malaria Initiative (PMI), began supporting quality improvement (QI) with a focus on improving malaria case management in Kakamega County in June 2014. SHC is a high malaria case load facility and was selected among 11 other facilities for initial implementation of malaria QI within the county. ASSIST is currently implementing malaria QI activities (both case management and malaria in pregnancy) in 45 facilities across five counties in Kenya.

### Implementation

#### County Background

USAID ASSIST, in collaboration with Kakamega County Department for Health selected facilities with malaria high case load in each of the twelve sub counties in June 2014. Laboratory, clinical officer,

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pharmacist and sub county malaria personnel from the selected facilities were then trained in Kenya Quality Model for Health in August 2014. The trainees formed sub county quality improvement teams (QITs) in September 2014. The QITs then conducted a baseline assessment on malaria case management and pinpointed large disparities in reporting, and adherence to national malaria guidelines. As a priority, the QITs settled on quarterly sub county continuous medical education (CME) sessions and data reviews to help address the gaps in malaria case management. In the same period, the county malaria coordinator formed a malaria technical working group (TWG). The TWG brought together all sub county malaria coordinators, as well as county pharmacist, county medical laboratory technologist, county health records officer, and the county director for health on a quarterly basis. The TWG monitored the progress of the QITs, reviewed their reports and gave recommendations on areas for improvement.

Quarterly CMEs and TWGs continued for a year. A re-evaluation was done in August 2015, and it was established that only three out of the 12 QITs were active. Some members of the QITs had dropped out and most of them did not have improvement charters to help them focus better. Sensitization training in QI was done by ASSIST for the sub county malaria coordinators, who were then serving as coaches in October and November 2015. The teams went back to their sub counties and reconstituted their QITs and selected improvement areas. Malaria case management theme for this team was on improving the test-treat-track (3T) cascade. The first learning session was done in December 2016. In this first learning session, members of the QITs and those proposed to be part of the work improvement teams (WIT) in the selected facilities participated.

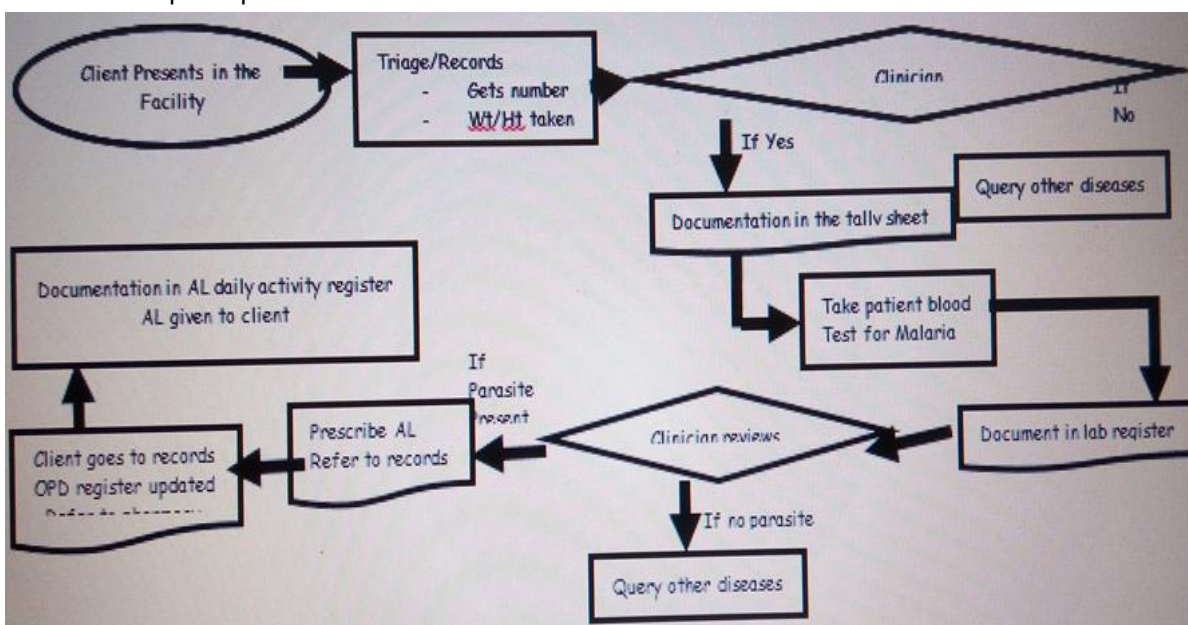


Figure 1. Process Map for OPD services at Shiamakhubu Health Centre

### Shiamakhubu Health Centre

SHC formed their QIT in March 2016. The QIT included the sub county malaria control coordinator, the records officer, laboratory and pharmacy personnel, and an OPD clinician.

In April 2016, the team agreed through consensus, to improve documentation of suspected malaria cases. A review of the records in the department revealed that no client was documented as a malaria suspect in both the morbidity tally sheet and OPD register. In the same month of April 2016, a process map (Figure 1) for OPD services was done but nothing revealing was established and hence nothing was done. Using a fishbone diagram, the team discovered that the lack of standard operating procedures on documenting malaria suspects; few available tally sheets; little understanding of the tally sheets; poor



data storage and poor staff interpersonal qualities as root causes for the problem. As a result, the QIT developed change ideas and prioritized which countermeasures to implement first using the priority-setting matrix (**Table 1**).

**Table 1. Priority-setting matrix used by the team. The highest scoring ideas were the first implemented**

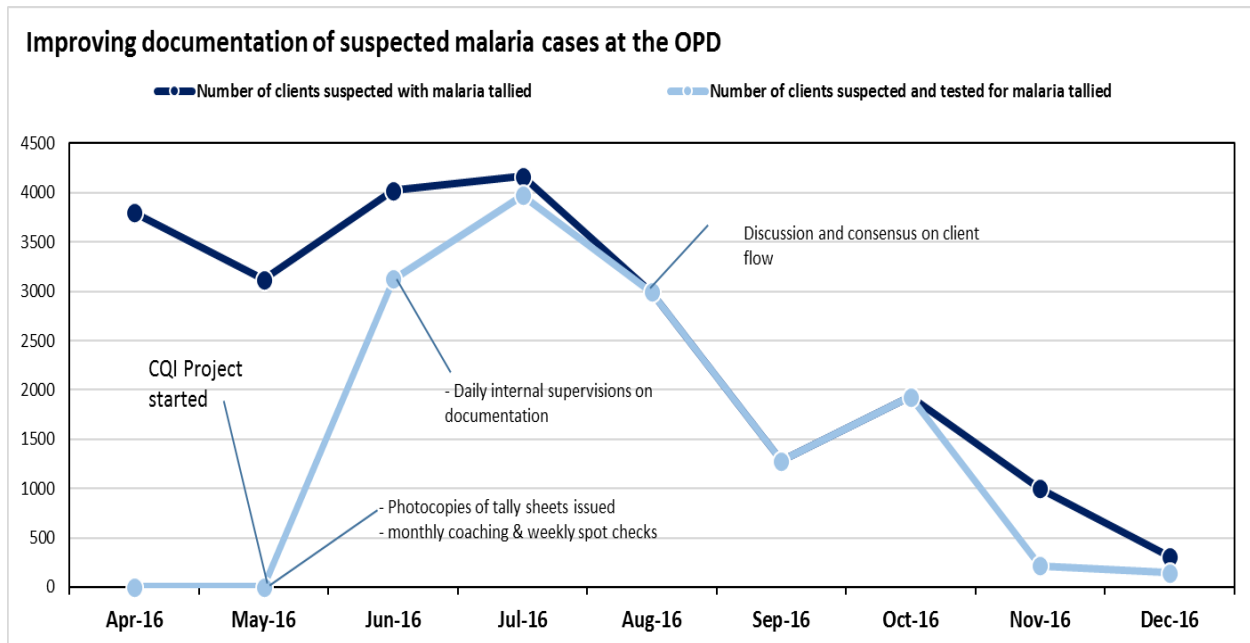
Change Idea	Evidence	Pilot test	Importance	Difficulty	Scaleability	Total
Improve patient flow	4	3	5	3	3	18
Monthly coaching coupled with weekly spot checks	5	5	5	5	3	23
Daily supervision and reviews on use of tally sheets	5	5	5	5	2	22
Provision including issuing photocopies of tally sheets	5	5	5	4	4	23
Attitude change	1	1	4	3	1	10

The team began seeking support from the sub-county health office for provision of photocopies of tally sheets at the OPD. This, combined with monthly support from the sub-county coach and weekly spot checks on documentation in May 2016, led to marked improvement. In June 2016, the team decided to have the OPD clinician conduct daily supervision and reviews on use of tally sheets. Parallel, a discussion on the client flow for enhanced documentation and client follow up with the clinician was done in August 2016 with the support of the ASSIST's project officer and county malaria coordinator.

## **Results**

Since the inception of the QI project in May 2016, the team managed to decrease the proportion of missed malaria suspects tallied at the OPD to the desired of less than 5% since July 2016. Though the team could not get photocopies from the sub county office in November 2016, less than 5% of clients were not tallied at the OPD (**Figure 2**). Accurately tallying suspected malaria cases enables facilities to plan commodities through forecasting (for testing in the lab and ACTs in the pharmacy) and staffing (roll calls and vacations) due to anticipated workloads.

**Figure 2. Number of malaria suspects tallied at the OPD compared to the number of suspected malaria cases tested in the laboratory, Shiamakambhu Health Centre, Kakamega County (Apr 2016-Dec 2016)**



### **Lesson Learned**

The good results of this work have been attributed to team work, and judiciously working through priority countermeasures to address poor documentation at the OPD.

### **Next Steps**

The team is now seeking to spread these change concepts to the rest of the 44 selected malaria facilities supported by ASSIST in Western Kenya.



U.S. President's Malaria Initiative

## CASE STUDY

# Improving Malaria Case Management through Accuracy and Completeness of Data in the District Health Information System (DHIS): Case of Siaya, Busia, and Kakamega Counties

### Summary

Facilities in three high malaria burden counties (Siaya, Busia and Kakamega) formed Work Improvement Teams (WITs) in October 2015 to improve malaria case management data quality and reporting. They reviewed their malaria source documents in comparison with the reported DHIS data and identified gaps. The WITs developed a number of changes to test, which included: data quality audits, data validation, continuing medical education (CME), and on-the-job training on proper documentation. Through these efforts, within 5 months, 50% of their reported data in DHIS was accurate. By May 2017, 95% of facilities in the three counties had complete and accurate malaria data in DHIS.

### Background

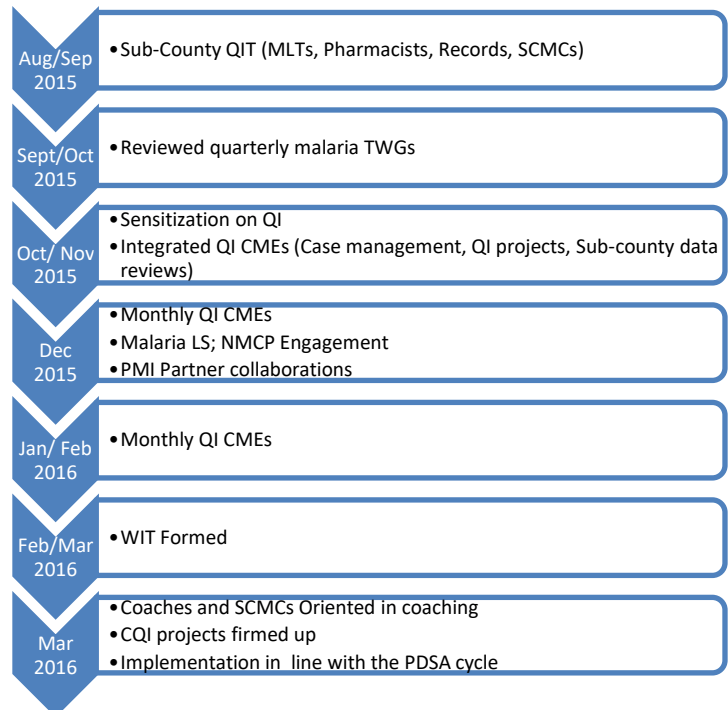
Busia, Siaya, and Kakamega are malaria endemic counties in Kenya surrounding Lake Victoria with a prevalence rate of 27% compared to the national prevalence rate of 8% (National Malaria Indicator Survey 2015).

The USAID Applying Science to Strengthen and Improve Systems project (ASSIST), with funding from the President's Malaria Initiative (PMI), began supporting quality improvement (QI) with a focus on documentation and reporting in the three focus counties in October 2015. ASSIST is currently implementing malaria QI activities in 45 facilities across five counties in Kenya, two of which are focused on malaria in pregnancy.

### Implementation

In August and September 2015, it was identified by the ASSIST QI advisor and monitoring and evaluation (M&E) team that the counties did not have sub-county QI teams despite having been trained on the Kenya Quality Model for Health (KQMH) in June 2014 (Figure 1). The KQMH stipulates in its dimensions on leadership that at every health level there should be a functional QI team. In this regard, sub-county teams were

Figure 1: Timeline of QI work



### June 2017

This case study was authored by Lindah Chebet, Maero Lutta, and Nicholas Sewe of University Research Co., LLC (URC) and produced for review by the United States Agency for International Development (USAID) by the USAID Applying Science to Strengthen and Improve Systems (ASSIST) Project, funded by the American people through USAID's Bureau for Global Health, Office of Health Systems. The project is managed by URC under the terms of Cooperative Agreement Number AID-OAA-A-12-00101. URC's global partners for USAID ASSIST include: EnCompass LLC; FHI 360; Harvard T.H. Chan School of Public Health; HEALTHQUAL International; Initiatives Inc.; Institute for Healthcare Improvement; Johns Hopkins Center for Communication Programs; and WI-HER, LLC. For more information on the work of the USAID ASSIST Project, please visit [www.usaidassist.org](http://www.usaidassist.org) or write [assist-info@urc-chs.com](mailto:assist-info@urc-chs.com).

formed in conjecture with the facility based work improvement teams (WITs) (which were functional and running in some facilities after the training in June 2014) in an attempt to mainstream QI at facility, sub-county, and county levels. However, most of the teams formed were dormant due to national and county teams being hesitant to buy in to the QI work. In October 2015 teams were re-sensitized on QI and new teams were formed where needed. Following QI trainings from ASSIST on malaria case management, the WITs were formed between January and February 2016 at the facilities were formed and included: the nursing officer in charge of the departments, clinician in charge of the out-patient departments, the facility pharmacists, laboratory technologist, and health record departments. The WITs were supported by QI coaches who in most incidences are clinicians within the facilities.

In order to identify gaps, the teams together with their QI coaches and ASSIST QI Officers, reviewed their data on completeness and accuracy of data reported on DHIS. They realised that their data was inaccurate and not in tandem with DHIS data.

The WIT conducted a fishbone analysis to determine root causes of these gaps and developed changes to test to improve documentation and reporting on malaria case management. They decided their first change would be to have the data persons clean all the data as well as have the Sub-County Health Records Information Officer (SCHRIO) provide on-the-job training and mentorship to the health records staff in the facility on malaria case management documentation and reporting. They provided mentorship on timely, accurate and complete data reporting as well as weekly data review and cleaning in both the DHIS and the source documents (Figure 2).

**Figure 2: Snapshot of validated data in Matungu Sub-County Hospital, Kakamega County**

Months	Under 5				Over 5			
	Suspected		Confirmed		Suspected		Confirmed	
	Source Document	DHIS	Source Document	DHIS	Source Document	DHIS	Source Document	DHIS
<b>Dec-16</b>	512	561	258	189	630	651	193	193
<b>Jan-17</b>	1017	1612	456	432	1210	1210	320	348

Quarterly data validation was identified as a key component of the change ideas that would assist in the improvement process. This was done by comparing facility based reported data with validated data and source documents with data reported on DHIS. The team also developed a cascade template that would be used to ensure and monitor if all data was accurately completely and timely filled.

On a weekly basis, the teams sat down together to assess their data, clean it, and use this data for decision making. They looked at the documentation tools such as the tally sheets used to calculate the number of patients who were malaria suspects and those with confirmed malaria. In their weekly reviews teams began to see improvements. For instance, when reporting stock of malaria commodities (rapid test kits, AL medicine) most facilities would not accurately fill the data on DHIS. When it came to receiving M-RTKs and AL from Kenya Medical Supply Authority (KEMSA), based on data indicated in the DHIS, most facilities would experience stock outs before the end of the month. After the data cleaning, data validation, mentorship, coaching and formation of QI teams, there was a shift in this indicator and facilities reduced the frequency of stock outs of AL and m-RTKs.

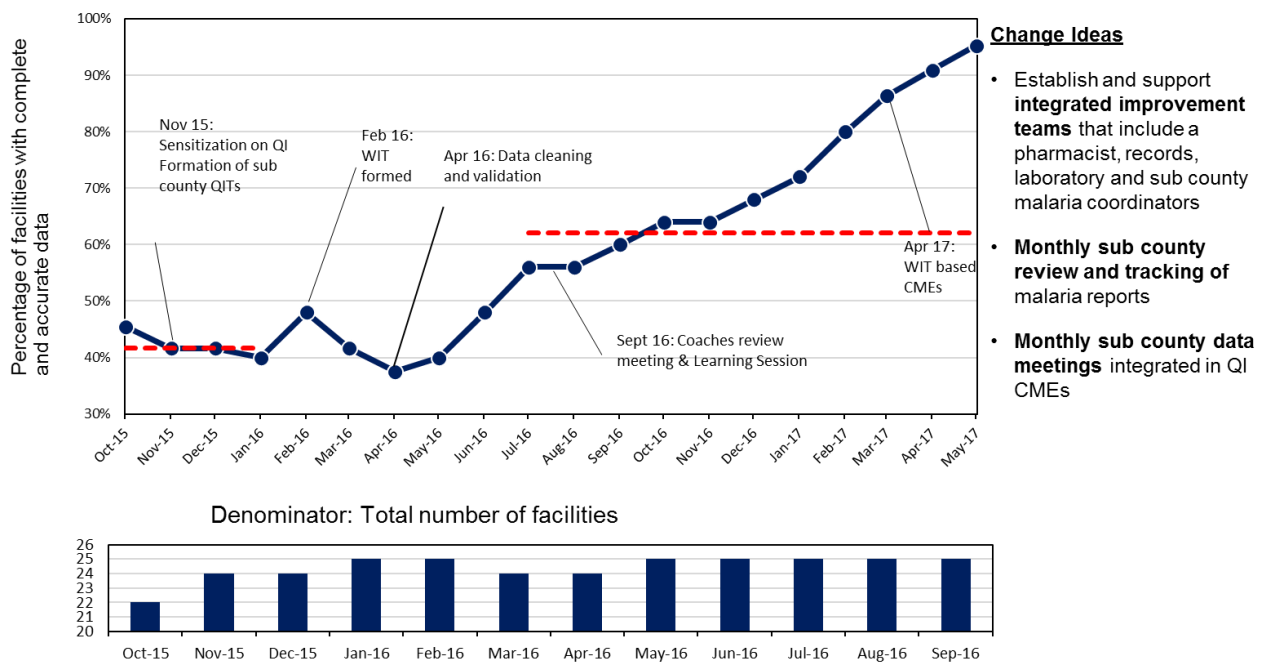
## **Results**

Since the WIT began their continuous validation processes, the percentage of accurately and completely filled data in the DHIS has greatly improved (see **Figure 3**). By May 2017, 95% of facilities in the three counties had complete and accurate malaria data in DHIS.

Facilities previously reported cases in which patients were treated on AL yet they had not been tested for malaria. When further investigated with the PMI team, it was discovered that there were various causes that led to this and the main one was the lack of m-RTKs or electricity to conduct microscopy (for the facilities that owned a microscope). When probed further it came to the attention of the PMI team that stocks of commodities were distributed based on the malaria cases reported in the DHIS meaning a facility cannot receive more m-RTKs or ALs if the reported malaria cases are low.

The improvement on data reporting has therefore not only improved accuracy and completeness of data in the DHIS, but has reduced stock-outs of key commodities because KEMSA is now basing supply distribution on accurate needs. This improves facilities' ability to follow the key malaria case management dimensions: Test-Treat-Track (3T) model as stipulated by the National Malaria Control Programme, Ministry of Health, and the World Health Organization (WHO).

**Figure 3: Facilities with complete and accurate malaria data in DHIS in 3 malaria case management Counties (Oct 2015-May 2017)**



### **Facilitating Factors**

The counties attribute their success to the PMI, county health management teams; facility leads, especially departmental leads who form the QI teams and WITs; and above all the Health Records department.

### **Lessons Learned**

- Continuous shared and peer learning sessions between QI team is core to QI.
- County governments are generally receptive to QI initiatives as they are viewed from a cost effectiveness perspective. For instance, when you look at the cost in poor documentation of

malaria RTKs and ALs stock, it results in over stocking of drugs which is expensive for the county.

- Enhanced partner coordination through county technical working groups (TWG) is a useful approach for implementation of QI approaches. The county malaria coordinator formed a malaria TWG. The TWG brought together all sub county malaria coordinators, county pharmacist, county medical laboratory technologist, county health records officer, and the county director for health on a quarterly basis. The TWG monitored the progress of the QI teams, reviewed their reports, and gave recommendations on areas for improvement. This led to accountability and even one language when reporting to PMI on these counties.
- Increasing data demand and information use. Counties now realise the importance of accurate and complete data reporting, namely that it leads to quality decision making for instance in procurement of drugs, nets and other malaria case management initiatives. This is among the most important factors leading to QI.

### **Next Steps**

Encouraged by what they have achieved, the CHMT, QI teams and WITs are exploring other ways to strengthen accurate, timely and completely recorded/reported data in the DHIS.



U.S. President's Malaria Initiative

## CASE STUDY

# Improving Quantification of Parasitaemia on Confirmed Malaria Blood Smears at Matungu Sub County in Kakamega County

### Summary

The USAID Applying Science to Strengthen and Improve Systems project (ASSIST) has been supporting quality improvement (QI) with a focus on improving malaria case management in Kakamega County since June 2014. In February 2016, Matungu Sub County Hospital (MSCH) formed a work improvement team with the goal of improving malaria testing of suspected malaria cases through quality improvement. Rapid improvement was achieved with this initial work that they began looking for new areas to work on. In August 2016, laboratory personnel were trained in expert microscopic examination of blood slides for malaria parasites. MSCH laboratory team was required to report blood slides of confirmed cases in terms of the number of parasites observed. Two months passed by without the team having begun quantifying malaria parasites on confirmed blood smears. The coach working with the ASSIST's Project Officer picked this as an improvement theme, and at the end of September 2016 conducted process mapping for malaria testing, and root cause analysis for failure to quantify parasitaemia. Countermeasures were identified and small tests of change initiated in October 2016 to help the team improve. In the preceding four months, quantification of malaria parasites on blood smears confirmed to have malaria increased tremendously from zero to greater than 90%, and the team has since sustained this performance.

### Background

Matungu Sub County Hospital (MSCH) is one of 12 malaria case management centers of excellence in quality improvement in Kakamega County. It serves a catchment population of about 50,000 people. The facility offers both curative and preventive services. Malaria is the leading cause of morbidity and mortality in this facility. Approximately 2,800 clients are tested for malaria and its positivity rate is about 25%. In August 2016, laboratory personnel in MSCH were trained in expert microscopic examination of blood slides for malaria parasites by Malaria Care in conjunction with the Ministry of Health (MoH). The MSCH laboratory team was required to report blood slides of confirmed cases in terms of the number of parasites observed. Two months passed by without the team having begun quantifying malaria parasites on confirmed blood smears.

The USAID Applying Science to Strengthen and Improve Systems project (ASSIST), with funding from the President's Malaria Initiative (PMI), began supporting quality improvement (QI) with a focus on improving malaria case management in Kakamega County in June 2014. MSCH is a high malaria case load facility and was selected among 11 other facilities, for initial implementation of malaria QI within the county. ASSIST is currently implementing malaria QI activities (both case management and malaria in pregnancy) in 45 facilities across five counties in Kenya.

### MAY 2017

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## **Implementation**

### *County Background*

ASSIST, in collaboration with Kakamega County Department for Health selected facilities with high malaria case load in each of the 12 sub counties in June 2014. A laboratory, clinical officer, pharmacist, and sub county malaria personnel from the selected facilities were then trained in Kenya Quality Model for Health in August 2014. The trainees formed sub county quality improvement teams (QITs) in September 2014. The QITs then conducted a baseline assessment on malaria case management and pinpointed large disparities in reporting, and adherence to national malaria guidelines. As a priority, the QITs settled on quarterly sub county continuous medical education (CME) sessions and data reviews to help address the gaps in malaria case management. In the same period, the county malaria coordinator formed a malaria technical working group (TWG). The TWG brought together all sub county malaria coordinators, as well as the county pharmacist, county medical laboratory technologist, county health records officer, and the county director for health on a quarterly basis. The TWG monitored the progress of the QITs, reviewed their reports, and gave recommendations on areas for improvement.

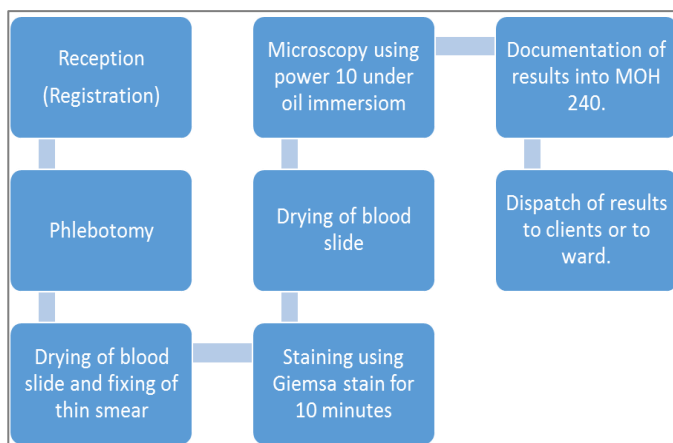
Quarterly CMEs and TWGs continued for a year. A re-evaluation was done in August 2015, and it was established that only three out of the 12 QITs were active. Some members of the QITs had dropped out, and most of them did not have improvement charters to help them focus better. Sensitization training in QI was done for the sub county malaria coordinators, who were then serving as coaches in October and November 2015. The teams went back to their sub counties and reconstituted their QITs and selected improvement areas. The malaria case management theme for this team was on improving the Test-Treat-Track (3T) cascade. The first learning session was done in December 2016. In this first learning session, members of the QITs and those proposed to be part of the work improvement teams (WIT) in the selected facilities participated.

### *Matungu Sub County Hospital (MSCH)*

Matungu was one of the three active QITs. It was found that this was because all the QIT members were from MSCH whereas the inactive QITs were comprised of sub-county level officials who did not have enough contact with the facilities in order to drive improvement activities. In February 2016, a WIT for malaria case management was formed at the out-patient department in the hospital. The team conducted their first root cause analysis and put in place change ideas to further improve the 3T model in March 2016, after a coaching meeting done regionally. By forming an improvement team comprising front-line personnel phenomenally improved results of the 3T cascade, so much that by June 2016 the facility was considering new improvement areas. This improvement was shared at the second learning session for malaria case management held in August 2016.

In August 2016, laboratory personnel were offered a chance to train in expert microscopic examination of blood slides for malaria parasites. Nonetheless, two months passed by without the laboratory having begun quantifying malaria parasites on confirmed blood smears. The coach working with ASSIST's Project Officer picked this as an improvement theme, and at the end of September 2016 the WIT with the support of their coach conducted process mapping

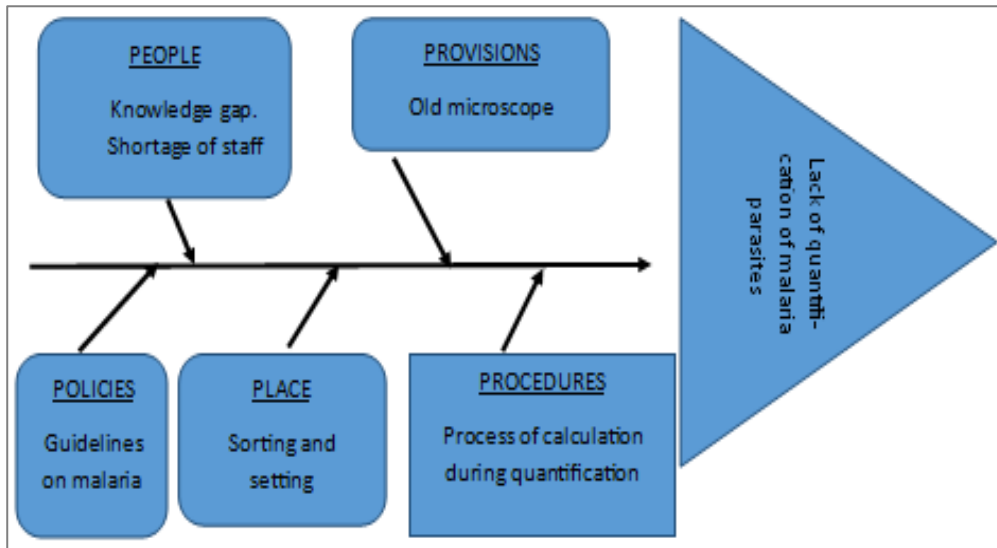
**Figure 1: The WIT's process map**





(Figure 1) for malaria testing, and root cause analysis using the fish bone diagram (Figure 2) was done for failure to quantify parasitaemia.

**Figure 2: The WIT’s fish bone diagram**



A simplified tree and matrix table (Table 1) was used to establish countermeasures. The small tests of change were initiated by the WIT in October 2016 to help the team improve.

**Table 1. Simplified Tree and Matrix Table used by the team**

Problem / Issue	Root Cause	Counter-measure
Use of plus system instead of quantification in reporting positive malaria cases.	Knowledge gap on quantification and interpretation of results.	<ul style="list-style-type: none"> <li>• Training of laboratory staff on quantification.</li> <li>• OJT for those not trained.</li> <li>• CME on interpretation of results.</li> </ul>
	Old Microscope	<ul style="list-style-type: none"> <li>• Procure a better microscope.</li> </ul>
	Sorting and setting	<ul style="list-style-type: none"> <li>• CME on 5s (Work Environment Improvement)</li> <li>• Lab to do sorting and setting of their work environment.</li> </ul>
	WHO Guidelines on Malaria parasite reporting	<ul style="list-style-type: none"> <li>• Provide the malaria guidelines in laboratory</li> </ul>
	Workload and staff shortage	<ul style="list-style-type: none"> <li>• Forward to hospital QI team and management for action.</li> </ul>

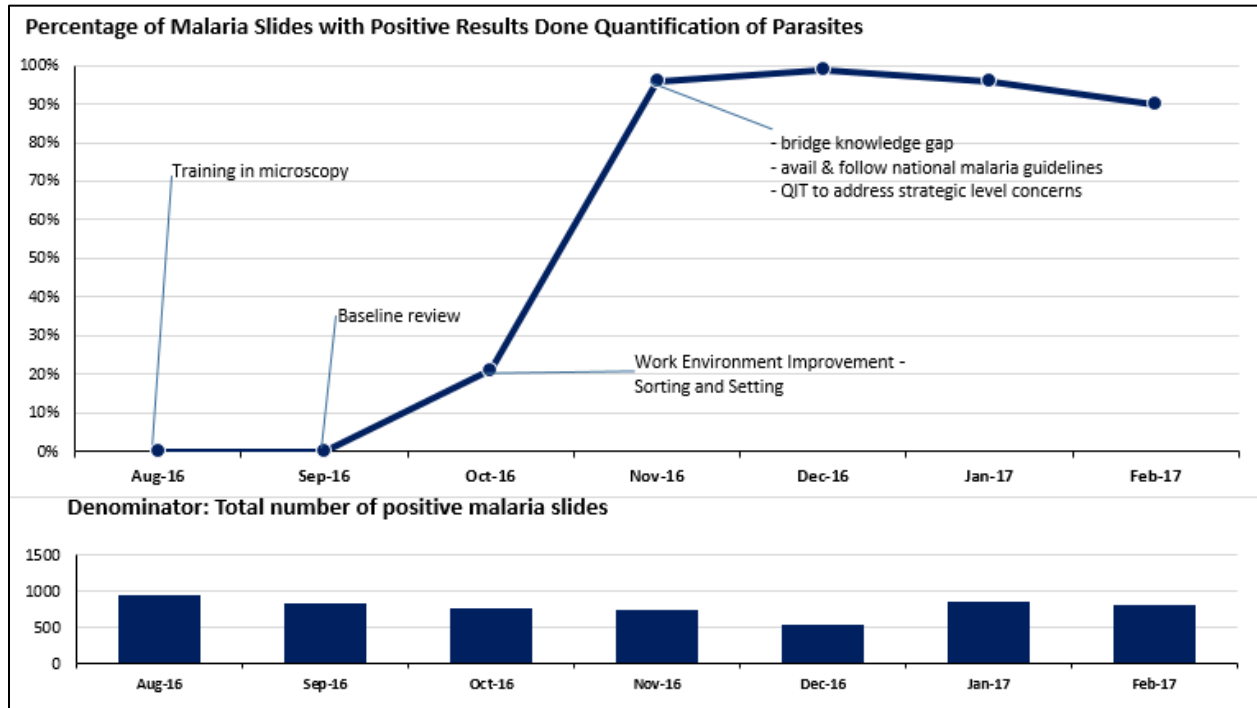
Sorting and setting was done in October 2016 to improve the work environment in the laboratory. Copies of the WHO guidelines on malaria parasite reporting were downloaded online by the coach who shared the soft copy with the laboratory staff in November 2016. During their departmental meeting in the same month, the unit in-charge agreed to harmonize work schedules for the department to ensure balanced allocation of duties at peak and off-peak hours and days in the calendar.

This work was shared in the third case management learning session in March 2017.

## Results

Since the team in the laboratory began testing the changes, the proportion of slides confirmed with malaria have increased astronomically and remained above 90% (see **Figure 3**).

**Figure 2. Percentage of malaria slides with positive results return with parasitaemia quantified**



## Lesson Learned

The team at MSCH attribute their improvement to a functional team and their commitment to tackle countermeasures within their capacities. They acknowledge the value of working on areas with easily achievable gains. The WIT strived to address root-causes and factors within their scope, other than wait for the health managers and county government to address strategic level issues such as staff posting.

## Next Steps

Laboratory personnel at MSCH are looking at engaging more with the QIT to help address strategic level countermeasures such staff shortages and postings, even as they continue working on simpler improvements. Utilizing the QIT should then enable them achieve 100% quantification of malaria parasites for all confirmed blood smears.



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## CASE STUDY

# Khunyangu Sub County Hospital Spread Rational Use of ACTs at Bumala B, in Western Kenya

### Summary

Khunyangu Sub-County Hospital is one of the seven high volume hospitals in Busia County, in Western Kenya. It started implementing quality improvement (QI) in June 2014 when the USAID Applying Science to Strengthen and Improve Systems (ASSIST) project introduced its work in Busia County. The hospital experienced Artemisinin Combination Therapy (ACT) stock outs due to irrational dispensing of Artemether-Lumefantrine (ALs). There were no stocks of ACTs in March 2014 prompting a sub county redistribution in April 2014. In May 2014, ACTs issued were three times more than the number of confirmed cases. ASSIST introduced QI in the facility and the county in June 2014. Employing a range of QI tools and techniques, the facility was able to eliminate irrationally issued ACTs, translating to approximately 7 months of ACTs saved by January 2015. In the months that followed, the team embarked on ensuring good commodity practices with available ACT dose bands securing their stocks further. They began involving other facilities in the sub-county during sub-county continuous medical education (CME) sessions, Bumala B being one of them. In February 2016, the coach at Khunyangu selected a coach in Bumala B and a Work Improvement Team (WIT). The coach from Khunyangu helped the WIT at Bumala B implement the changes they had tried in Khunyangu to help secure their ACT and follow through on the test-treat-track (3T) model. ACT doses issued in Bumala B have since dropped from a median of 126% to 100%. Bumala B continues rationally using ACTs.

### Background

Khunyangu Sub-County Hospital is one of seven high volume hospitals in Busia County, Western Kenya, with average outpatient attendance of 2,263 patients monthly. Average confirmed malaria cases among children is 540, 434 among adults, and 8 among pregnant women monthly. This improvement work involved the County, Sub-County Malaria Coordinators, USAID Applying Science to Strengthen and Improve Systems (ASSIST) project malaria QI advisor, ASSIST regional QI project officer and facility Work Improvement Team (WIT) comprising of hospital pharmacist, lab technologist, clinician in charge, nurses in out-patient department, and community representative. The hospital experienced Artemisinin Combination Therapy (ACT) stock outs due to irrational dispensing of Artemether-Lumefantrine (ALs). In May 2014, ACTs issued were three times more than the number of confirmed cases. This also created an avenue for loses of ACTs to imaginary clients as well as unconfirmed cases of malaria. There was staff resistance in accepting Malaria policy among staff.

Bumala B is a health centre in the same, Butula, sub-county with Khunyangu. It has a catchment population of 17,627. Monthly average out-patient department (OPD) workload is 2,870. Each month, between 500 and 1,000 cases of malaria are seen among all patients seen including pregnant women and under-fives.

### Implementation

Khunyangu experienced stock outs of ACTs in March 2014 prompting an ACT mop up in the sub-county and redistribution at the sub county hospital in April 2014. In May 2014, ACTs issued were three times more than the number of confirmed cases. ASSIST introduced QI in the facility and the

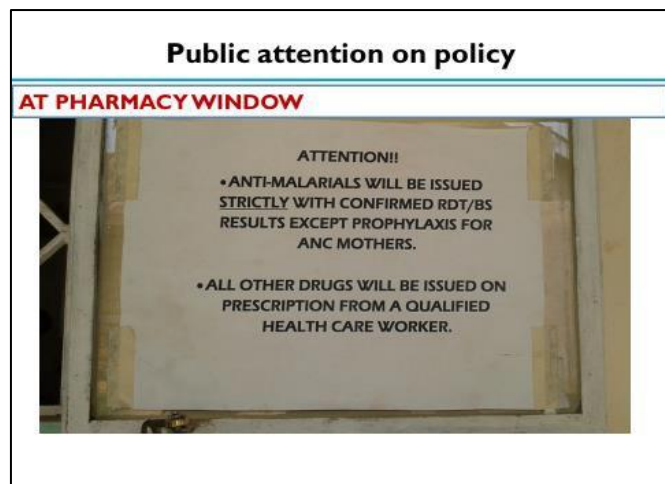
#### JUNE 2017

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county in June 2014. A quality improvement team (QIT) was formed in the same month of June 2014. The QIT comprised hospital pharmacist, lab technologist, clinician in charge, nurses in OPD, and community representative. During their first QIT meeting, the team conducted their first root cause analysis and determined that ACT losses were due to clinician treating malaria suspects for malaria clinically without a confirmatory laboratory test, in the same vein, the pharmacists were issuing ACTs to all patients prescribed the drug by the clinician without cross-checking if they were confirmed with malaria. Certain medical colleagues and family members of staff, were said to be walking in to the pharmacy and requesting ACT doses for their alleged malaria like symptoms. The flow of clients allowed suspected malaria cases from other facilities to directly access the pharmacy on entering the facility.

Employing the tree and matrix diagram to prioritize change ideas, the coach, then the hospital pharmacist, called for a meeting and sensitized the clinicians at the OPD on the 3T strategy. Clinicians also agreed to screen patients from other facilities requiring ACTs to consult with them first in the new client flow at the OPD. The pharmacy department also held a meeting and resolved not to issue any ACT unless a client had a confirmed malaria diagnosis. A notice (**Figure 1**) was put outside the pharmacy door and serving window informing clients about ACTs being issued to only confirmed cases. The lead pharmacist offered to establish a corner in the dispensing cupboard to hold ACTs for colleagues and or family members of staff said to 'walk in' and demand ACT doses. This first set of change ideas that were tested resulted in a phenomenal drop in the ACTs dispensed in the months that followed.

A QI training was conducted to the QIT members by ASSIST in August 2014. The QIT began meeting fortnightly. Meeting cycles followed that the first meeting done in the month focused on discussing progress of their improvement changes and work plan, while the second one, done before fifth of the new month, discussed malaria reports and indicators. The community health worker provided health education on malaria case management, and on the expected client flow.



**Figure 1. Notice on antimalarial on the pharmacy window at Khunyangu**

In December 2014, ASSIST, in liaison with the county, introduced monthly county level TWG meetings to discuss malaria 3T model and commodity status. At the same time, quarterly malaria case management continuing medical education (CMEs) began at the facility to increase knowledge and skills on identification, diagnosis, management, and reporting of malaria cases. The QIT reverted to having their meetings monthly, in view of the additional support and improvements in the ACT doses. However, around May 2015, Busia County experienced serious procurement challenges with the Kenya Medical Supplies Agency (KEMSA), and the network that would deliver commodities including essential antimalarial collapsed. County malaria office refocused their efforts in attempting to salvage the looming commodity insecurity. Consequently, the TWGs and CMEs collapsed. The regional project officer from ASSIST reinitiated the monthly TWGs in October 2015 and restructured the CMEs to sub county based. More facilities were thus reached with malaria case management CMEs. Data QI sessions were introduced in the malaria CMEs, in November 2015 following the second QI sensitization. All participating facilities were required to table and discuss their malaria data, explain inaccuracies and highlight the steps they were going to take to improve it. It was at this point that Bumala B was first engaged by Khunyangu.

In December 2015, the first malaria learning session was held and Khunyangungu show-cased their improvement work to the rest of QIT representatives from Busia, Kakamega and Siaya participating. Bumala B did not take part in the first learning session. However, ASSIST called on the representatives to form WITs in their facilities to fast track improvement work. Instead, Khunyangungu spotted an opportunity to spread the changes they had so far tested and were working for them (Table 1). In February 2016, the coach at Khunyangungu selected a

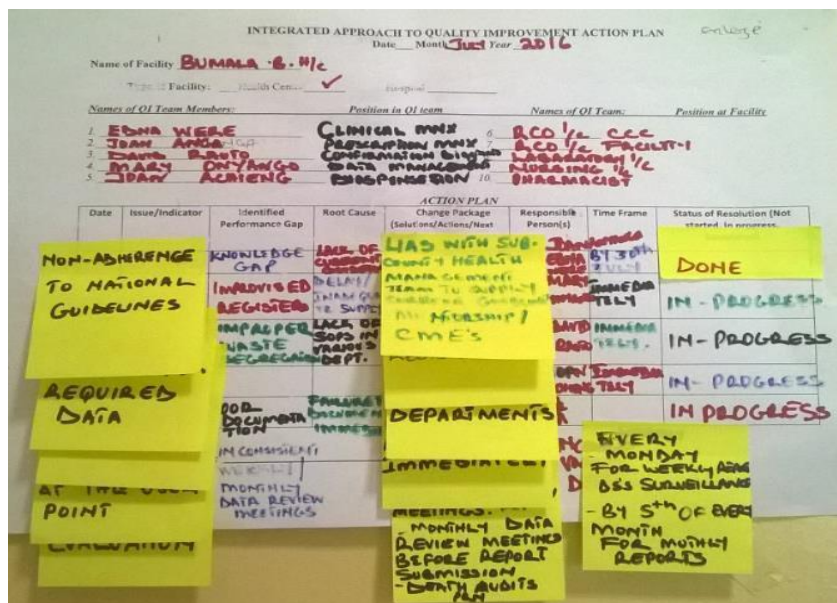


Figure 2. Second QI work plan for Bumala B in July 2016

coach in Bumala B and the two formed a WIT. The coach from Khunyangungu with the support of ASSIST provided on-job training for the new coach at Bumala B in March 2016. The two coaches working together with the new WIT formed a work plan to help secure ACTs and ensure Bumala B follows through on the 3T model. Subsequent work plans have since been formed by the WIT on a quarterly basis (Figure 2).

Bumala B has since realized a drop in ACTs dispensed. They have participated in subsequent malaria learning sessions, August 2016 and May 2017.

Table 1. Aim and Change Idea table tested by Khunyangungu and Implemented by Bumala B

Aim	Change Idea
Improving malaria diagnosis among suspected cases	<ul style="list-style-type: none"> <li>- Several CMEs conducted on national malaria case management guidelines</li> <li>- Education of clients on malaria case management policy, through posters in waiting areas and morning health education talks</li> <li>- Redesigning of outpatient client flow</li> <li>- Provision of malaria rapid test kits (RTKs) in OPD, for use when the laboratory was too busy or lab reagents were out of stock</li> </ul>
Improving ACT dispensing practices	<ul style="list-style-type: none"> <li>- Job aids on malaria case management provided in clinical rooms</li> <li>- AL strictly issued to confirmed cases in pharmacy with follow up of antimalarial prescriptions with no evidence of diagnosis with concerned clinician</li> <li>- Hospital Medicine and Therapeutics Committee revived to monitor rational use of AL</li> </ul>
Improving medical documentation in patient and facility record tools	<ul style="list-style-type: none"> <li>- Monthly data review to compare cases registered as febrile illness in the outpatient department register, malaria tests conducted in the lab daily activity log, RTK Daily activity register and malaria commodities daily activity register</li> </ul>

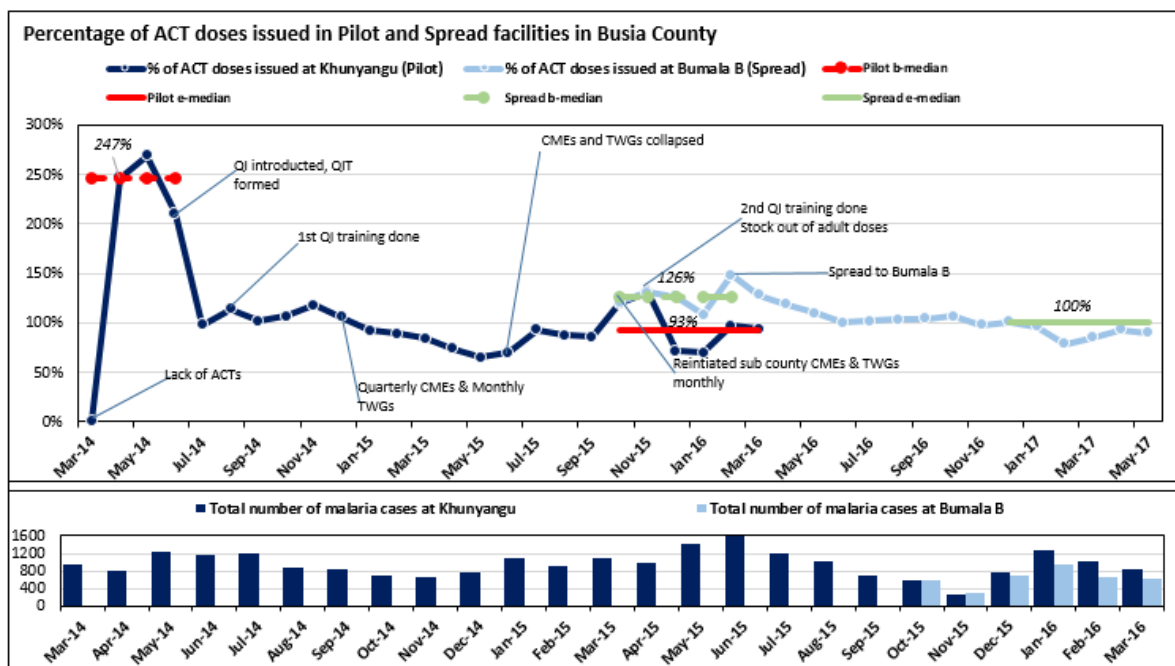


Both teams collected data on a monthly basis and plotted on a run chart during the implementation periods with ASSIST (Figure 3).

### Results

By employing QI concepts, the ACT dispensed dropped from a median of 247% to 93% in Khunyangung between March 2014 and March 2016; while, that of Bumala B from 126% to 100%.

**Figure 3. Improvement Run Chart on Percentage of ACT doses issued over Malaria Cases (Mar 2014-May 2017)**



The facility has not presumably treated suspected malaria cases clinically for Khunyangung since September 2014 and Bumala B since October 2015. Total number of ACTs dispensed 6 months before and after the intervention were 11,444 and 5,355 respectively at Khunyangung translating to 53.2% of ACTs saved as a result of rational use providing approximately 7 months of additional ACTs to the facility. Similarly, no stock outs of ACTs have been experienced by the two facilities since they started took up improvement work.

### Lesson Learned

Dedicated leadership, which sets clear improvement priorities, early identification of QI champions, motivated and strong improvement teams coupled with regular data collection and performance review and shared learning increase the potential for improvement as well as for spreading and scaling up quality improvement work.

### Next Steps

Health facilities (such as the malaria lake endemic in Western Kenya) that have sustained improvement in their work for at least six month, should feel comfortable spreading and scaling up QI in other facilities within their reach, and possibly far and beyond by transcending change concepts established from their cycles of small tests of change.



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## CASE STUDY

# Improving the diagnosis of severe malaria in children under five at Balaka and Mchinji district hospitals in Malawi

### Summary

With support from the President's Malaria Initiative through the United States Agency for International Development (USAID), the USAID ASSIST Project helped teams in Balaka and Mchinji district hospitals in Malawi improve on the quality of diagnosis of severe malaria for children under five years. By introducing reminders, just-in-time training, task re-allocation, and other process changes, teams significantly improved the proportion of suspected severe malaria cases among children under-five years of age tested with microscopy: the Balaka District Hospital team improved from a baseline of 14% in March 2016 to 87% in March 2017, and the Mchinji District Hospital team improved from a baseline of 33% in June 2016 to 91% in March 2017.

### Background

In January 2016, with support from the President's Malaria Initiative, the USAID Applying Science to Strengthen and Improve Systems (ASSIST) Project began a small-scale improvement activity with the Ministry of Health (MoH) and its National Malaria Control Program (NMCP) to improve the diagnosis and case management of children under the age of five and pregnant women with febrile illnesses, including malaria. The work was targeted at 14 health care facilities in two of Malawi's 28 districts: Balaka and Mchinji. Health workers from the 14 facilities and the District Health Office participated in a two-day training on quality improvement (QI) methods and tools (February 22-23, 2016 in Balaka and March 12-13, 2016 in Mchinji).

Following the training, each participating facility was supported by ASSIST to form a multi-disciplinary QI team that would serve as a catalyst for identifying the problems that affect the general quality of care of febrile patients, analyzing the problems, and developing change ideas to test to address the problems. Over the course of a year, the 14 QI teams addressed a number of issues, such as the appropriate use of malaria rapid diagnostic test (mRDTs) in children with signs of moderate febrile illness and the use of other tests for young children with signs of severe malaria. This case study describes the work of the QI teams at Balaka and Mchinji district hospitals in addressing the problem of low microscopy rate in confirming severe malaria, to ensure that patients receive appropriate treatment. Balaka District Hospital is located in the Southern Region of Malawi and functions as the referral care center for the entire district, with a total population of 409,420, of whom approximately 70,000 are children under five. Mchinji District Hospital is located in the Central Region of Malawi and has a total population of 511,792, of whom 87,000 are children under five. In both districts, malaria is a leading cause of morbidity among young children.

### Identifying and understanding the problem

The NMCP and WHO treatment guidelines recommend that the definitive diagnosis for all patients suspected of severe malaria should be confirmed with microscopic examination of blood smears for asexual malaria parasites. A rapid assessment carried out by ASSIST in January 2016 revealed that, although microscopy services were available, only a small proportion of children under five years of age

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with suspected malaria had microscopic examination to confirm the diagnosis of severe malaria: in Balaka, only 14% of children under five with suspected severe malaria had microscopy performed, and in Mchinji, 33% of children under five with suspected severe malaria did. The rest never had a blood smear for microscopic examination for malaria parasite count as recommended by NMCP (NMCP, 2013). Interestingly, it was observed that all the suspected severe malaria cases in the under five children were correctly initiated on treatment with intravenous or intramuscular (IM/IV) artesunate without delay at both district hospitals as per NMCP guidelines. However, instead of making a thick blood smear for immediate malaria parasite count, they were using mRDT as the gold standard test. None of the patients who were referred from health centers with a positive mRDT test had a microscopy test at the district hospital. Pediatric patients stayed in the children's ward up to the time of discharge without any microscopy test done. These gaps in performance to standards occurred even though both hospitals had microscopy services, reasonably good levels of drugs and commodities for malaria, and health workers trained in the national malaria treatment guidelines.

These findings led the QI teams at both district hospitals to explore the root causes of low microscopy rates in children under the age of five with suspected severe malaria. The QI teams found that clinicians were ordering mRDTs for suspected cases of severe malaria instead of blood smears for malaria parasites (MPS) as per guidelines because they wanted a quicker way of having malaria test results.

Moreover, those few samples that were collected were delayed in the ward and were poorly collected, causing the laboratory to reject them. In the ward, there was no responsible health worker assigned to follow up on the samples and collection of results from the laboratory. There were also delays in processing the samples in the laboratory. The laboratory technicians did not prioritize processing and reading blood smears, prompting clinicians and nurses to use mRDTs or no diagnostic testing as alternatives. Often when two samples were ordered (i.e., hemoglobin and MPS), the laboratory prioritized the hemoglobin test because they considered the hemoglobin test as an emergency, unlike malaria parasites.

### **Testing change ideas**

Data showed that treatment for suspected severe malaria in under five children with IM/IV artesunate at the two district hospitals in the in-patient setting was started without delay as per NMCP guidelines. However, the blood smears for microscopy test were not requested as per treatment guidelines, although the services were available at the district hospitals. The quality improvement teams from the two district hospitals wanted to ensure that every suspected under five child with severe malaria should have a microscopy test as per national guidelines when the microscopy services were available. After analyzing the underlying causes of low performance of microscopy among suspected severe malaria in children under five (U5), the QI teams tested several change ideas to improve the definitive diagnosis of suspected cases of malaria by microscopy and initiate appropriate treatment (see **Table 1**).

**Table 1. Change ideas tested by the QI teams at Balaka and Mchinji district hospitals**

Objective	Change ideas
Improving the quality of blood smear samples	<ul style="list-style-type: none"> <li>The last Monday of every month the laboratory personnel demonstrated the proper sample collection for blood smears to health workers during the morning report meeting in order for the health workers to collect good samples and reduce rejection rate [<i>tested at Balaka and Mchinji</i>]</li> </ul>
Improving sample/results flow from the children's ward to the laboratory	<ul style="list-style-type: none"> <li>The QI team leader made task allocations for health workers in the children's ward to deliver samples to the laboratory and collect the results immediately [<i>tested at Balaka and Mchinji</i>]</li> <li>The laboratory in-charge posted a note in the laboratory to process samples first that are labelled 'severe malaria' [<i>tested at Mchinji</i>]</li> </ul>
Improving on data documentation	<ul style="list-style-type: none"> <li>The results of the blood smears should be documented in the laboratory with the full name (First and surname) as in the patient file in the ward [<i>tested at Balaka and Mchinji</i>]</li> <li>The laboratory forms containing the blood smear results should be attached to the patient file in the ward [<i>tested at Balaka and Mchinji</i>]</li> </ul>



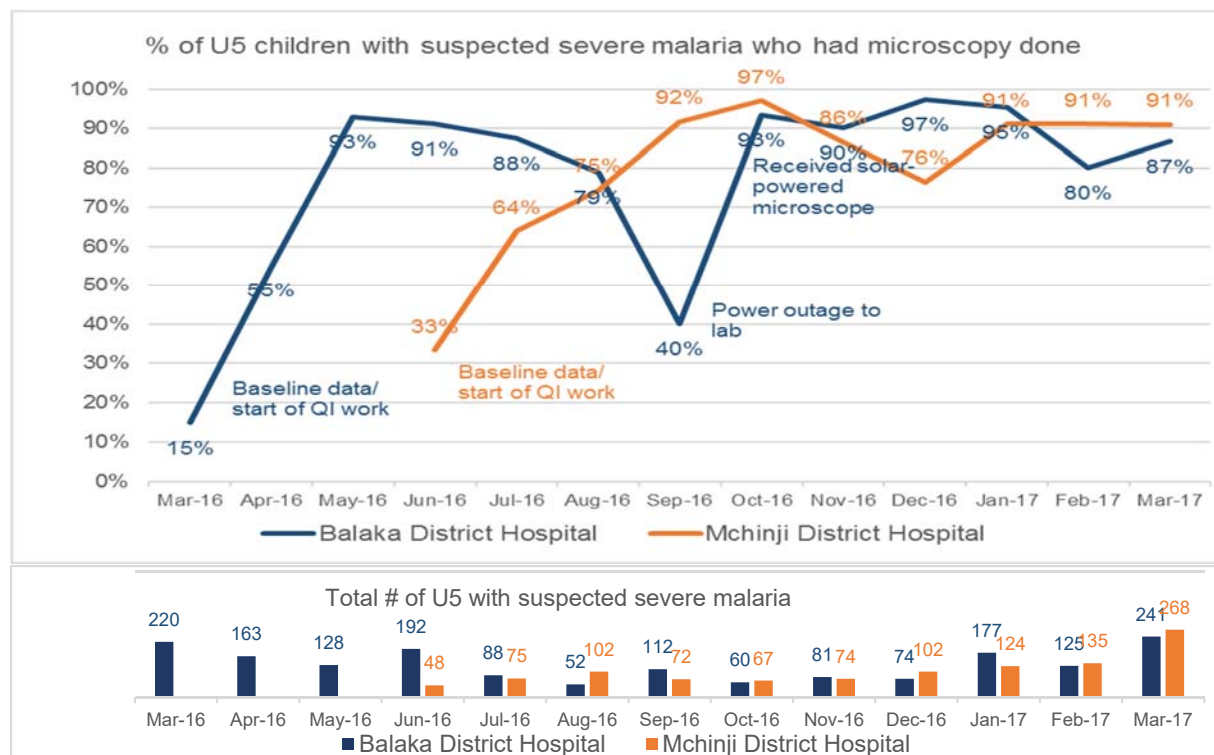
## Support given to the QI teams by ASSIST and the NMCP

The teams received on-site monthly coaching visits. During the visits, ASSIST staff and NMCP officers: 1) Reviewed action points from the previous meeting to see that the teams were on course, 2) reviewed with the team the progress of the improvement work, and 3) reviewed and cross checked the consistency of the data being collected. These visits were very motivating to the QI teams and instilled a desire to do more to improve health services. ASSIST also facilitated quarterly learning sessions where team representatives presented their improvement aims, the change ideas they were testing, the results they were observing, and the challenges they were facing, so all teams could learn about successful change ideas. In this way, the change ideas that yielded positive improvement results at one facility could also improve the conduct of microscopy on suspected cases of malaria at the other sister facility.

## Results

The goal for the improvement aim was to improve the performance of microscopy test for malaria parasite count to suspected severe malaria cases in the under five children as part of the immediate measures in the management of severe malaria in the in-patient setting when the microscopy services were available. As a result of the efforts of the improvement teams, both district hospitals made large gains in performing microscopic diagnosis of malaria in children under five years with suspected severe malaria. As shown in **Figure 1**, Balaka District Hospital increased the proportion of under-five severe malaria cases receiving microscopy from 15% at baseline in March 2016 to 87% in March 2017, and Mchinji District Hospital improved from 33% at baseline in June 2016 to 91% in March 2017. There was a significant drop at Balaka District Hospital due to a power outage in the laboratory in September 2016, when only 40% of the samples were processed and read. Intermittent power supply also affected the processing and reading of blood smears at Mchinji District Hospital in the months of November and December 2016 where 86% and 76% of the samples were processed and read, respectively.

**Figure 1: The percent of suspected severe malaria in children under the age of five who at least had a microscopy test during admission and a 12-hour follow-up test during in-patient setting at Balaka and Mchinji district hospitals**



## **Discussion**

The case study shows that simple QI approaches achieve results when health workers systematically apply them in their daily work. In addition to increasing the performance of microscopy to confirm the diagnosis of severe malaria in children under five, the work also led to improvement in the quality of documentation and data at the two hospitals. It was observed in both hospitals that all case files (100%) for children on whom a test was conducted had the laboratory result forms attached to the individual patient file, which was not previously the case. In addition, all blood smear results had the corresponding results clearly documented in the laboratory register. The improvements documented in the performance of microscopy resulted from several steps in the care process being performed well: health workers adhered to the treatment guidelines; samples were well collected; and the results were processed in a timely way and transferred to individual patient files to enable proper case management. Clinicians also acted on microscopy results, making comments on test results in the patient file during the ward rounds and requesting 12-hour follow-up tests on all patients, regardless of whether the patient had a positive or negative test on admission, as part of monitoring of treatment.

In addition, the two hospital teams found that they had achieved greater coordination and sharing of tasks amongst the QI team members, thereby improving efficiency in the management of severe cases of malaria. The Balaka and Mchinji QI teams developed schedules and tasks for every QI member to follow to ensure that there were no gaps in who was performing a particular task.

Improvement is not without challenges. For example, in the months of August and September 2016, there was persistent low or no power to the Balaka District Hospital laboratory, and a similar problem at Mchinji District Hospital in December 2016. As a result, the laboratory technicians could not process and read all samples, and there was a drop in the rate of microscopy performed for suspected severe malaria cases. Interestingly, the QI team at Balaka, analyzed their data and presented their results to the MoH Zonal Office in Zomba. Following the discussion with MoH Zonal leadership, the hospital laboratory received a solar-powered microscope for use in times of power outage. This demonstrates the power of using evidence to lobby for assistance. The Balaka District Hospital staff said that if they hadn't had data to show to the MoH, they probably would not have received the equipment as timely as it happened. In February 2017, the improvement team observed a significant drop in microscopy testing from 95% to 80% of children with suspected severe malaria. During the review of medical records, the team noticed that some clinicians still continued to manage referred children based on their mRDT results. The team presented this issue at a clinical morning meeting and continued to use reminders about the importance of conducting blood smears, as required by NMCP's treatment guidelines. As result, the proportion of children tested with microscopy rose to 87% in the subsequent month.

## **Recommendations from Balaka and Mchinji district hospitals for sustaining results**

- Ensure that microscopy results from all suspected severe malaria cases are well documented in the laboratory register and the result slip firmly attached to the patient file (no loose result slips).
- Have a duty roster on each day for one member to be responsible for collecting all the samples from the children's ward and taking them to the laboratory for analysis and for getting the results to attach to the patients' files.
- One day a month, have the microscopists appraise the nurses and all health workers responsible for collecting blood smears on the quality of the samples. The same session may also be helpful to new staff joining the facilities to learn new skills in collecting blood smear samples.
- Finally, for a facility to perform effectively and efficiently in the care of febrile illness, there should be a quality improvement team to act as a platform through which to improve the overall care of patients.

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## CASE STUDY

# Integrating Gender and Gender-based Violence in Medical and Nursing Curricula in Nicaraguan Universities

### Summary

In Nicaragua, the USAID ASSIST Project supports the application of continuous quality improvement to integrate HIV prevention and treatment topics in the medical and nursing training programs in nine universities. Baseline data clearly revealed strong sentiments of discrimination and stigma towards people living with HIV (PLHIV) and sexual diversity among both students and faculty. To address this, the project worked with faculty to integrate training on HIV prevention, stigma, discrimination, sexual diversity, and gender-based violence (GBV) in epidemiology and health research classes, drawing on national laws promoting equal rights and non-discrimination. ASSIST hypothesized that by engaging medical and nursing students in discussions around human rights and respect for sexual diversity based on national legal protections, efforts to reduce stigma, discrimination, and GBV would be more effective. After receiving training and technical assistance, 96 faculty from seven universities have developed capabilities to teach and promote gender equity in the university and detect and respond appropriately to students experiencing GBV. These faculty are now addressing these gender- and HIV-related topics in classes for Nicaragua's next generation of health care providers, contributing to the national HIV response in new and sustainable ways.

### Background

During 2014-2016, the USAID ASSIST Project worked with nine universities in Nicaragua to integrate HIV-related topics into the medical and nursing curricula in order to ensure that physicians and nurses graduating from these institutions would have a solid foundation in HIV prevention and care. Nicaragua has a concentrated HIV epidemic which disproportionately affects people with sexual diversity, raising both gender and human rights issues since exclusion and social inequality persist based on sexual orientation and/or gender identity.

Universities and higher education institutions in Nicaragua are committed to promoting equal opportunities between men and women in their internal operational regulations and in society, consistent with national laws.<sup>1</sup> Consequently, institutions providing higher education are interested in promoting gender equality in all of their operations and programs and in incorporating a gender perspective to assess the implications for women and men of any activity.

Anthropologist Gayle Rubin defines the sex-gender system as "the set of rules by which a society transforms biological sexuality into products of human activity, and in which these transformed human needs are satisfied."<sup>2</sup> The sex-gender system is one of the fundamental pillars of patriarchal society,

<sup>1</sup> Especially Law 648 "Law on equal rights and opportunities" and Law 779 "Comprehensive Law against violence towards women and amendments to Law No. 641 or Criminal Code."

<sup>2</sup> Rubin, Gayle. El tráfico de mujeres: notas sobre la "economía política" del sexo. Nueva Antropología, vol. VIII, núm. November 30th 1986. pages. 95-145. Mexico: Asociación Nueva Antropología A. C. México; 1986 [access on June 10th 2014]. Available at: <http://www.juridicas.unam.mx/publica/librev/rev/nuant/cont/30/cnt/cnt7.pdf>

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which is a society structured around a set of practices, values, and norms that legitimize the unequal power relations and methods of male dominance and female subordination, as is found in Nicaragua. It is important to recognize that gender identities are constructed and vary over time, depending on the space in which a person develops. The particular way in which gender is expressed in each person depends on factors such as their socio-economic class; their racial or ethnic identity, age, profession, religion and taste; and their personal experiences regarding family, social traditions, and national laws.

Gender equality includes basic human dignity and the right to equality and non-discrimination, and is necessary to achieve sustainable economic and social development. In Nicaragua, despite important legal protections, exclusion and social inequality persist on the grounds of sexual orientation and/or gender identity.

Through an initial knowledge, attitudes, and practice survey, strong sentiments of discrimination and stigma directed towards PLHIV and sexual diversity were identified among students and faculty at the participating universities. To address this issue, the ASSIST team developed and implemented a series of interventions to help change attitudes among teachers and students. They introduced a new paradigm to enable students and faculty to understand and reflect on linkages between HIV prevention, stigma, discrimination, sexual diversity, GBV, and person-centered care for PLHIV. The team hypothesized that by teaching students to identify the direct link between social determinants and issues such as GBV towards PLHIV, universities' efforts to reduce stigma, discrimination, and GBV—while promoting human rights and respect for sexual diversity—would be more effective.

### **Integrating gender and GBV topics in medical and nursing programs**

The baseline survey uncovered a number of knowledge gaps among teachers related to gender. Survey results showed that most of the teaching staff did not clearly understand concepts such as sex, gender, the gender-sex system, sexuality, sexual identity, sexual diversity, sexual orientation, and gender identity. Teachers did not know how to discuss or address gender issues in the University community. Teaching staff persistently stigmatized and discriminated against people of sexual diversity and the lesbian, bisexual, gay, transgender, and intersex (LGBTI) community. Most teachers were not aware of the magnitude of GBV affecting children, adolescents, and women, nor were they familiar with standards and protocols for GBV prevention and care for survivors of GBV. At the university level, the survey found that universities do not monitor the risks of GBV and human trafficking that students (especially young women originally from remote areas) face. Finally, there was almost total ignorance of the legal framework for gender equality and prevention of GBV (e.g., national laws and international treaties).

In response to the range of knowledge gaps and harmful practices identified in the baseline survey, the ASSIST team worked to engage teachers in knowledge transfer about the legal and regulatory framework of gender and GBV. Specifically, ASSIST staff:

- Designed a training module on gender and GBV<sup>3</sup> to strengthen capacity in health human resources training institutions. The module was designed based on the USAID Gender Equality and Female Empowerment policy and national laws, and has two parts. Ten classroom hours cover what gender is and its relation to development; gender analyses to identify and understand gender gaps at individual,



Professors of Medicine from UNAN Leon and UCAN universities during a training. *Photo by Ivonne Gomez, URC.*

<sup>3</sup> The *Módulo sobre género, violencia basada en género y trata de personas, dirigido al personal de las ONG y las instituciones formadoras de recursos humanos de la salud* is available at: <https://www.usaidassist.org/resources/m%C3%B3dulo-sobre-g%C3%A9nero-violencia-basada-en-g%C3%A9nero-y-trata-de-personas-dirigido-al-personal-de>.

familial, and community levels; and tips and challenges to mainstream gender and the empowerment of women. Another 10 classroom hours cover the magnitude and frequency of GBV in Nicaragua, as well as risk factors, institutional roles, and resources for addressing it. The module introduced new methodologies to teach gender and GBV (e.g., participatory discussions, case studies, testimonials, film-forums). It also included group work on GBV towards vulnerable populations and people of sexual diversity in Nicaragua, including analyzing magnitude and frequency. In addition, the standards and protocols for GBV prevention and care for survivors of GBV, particularly children, adolescents, and women, were introduced.

- Organized training workshops utilizing this training module to build the capacity of medical and nursing faculty to deliver the same content to students during their university courses.
- Promoted inclusion of gender and GBV in the nursing and medicine curricula by including relevant content.
- Incorporate gender and GBV questions in surveys on Knowledge, Attitudes, and Practices (KAP) for medicine and nursing students.
- Designed informational and educational materials on legal aspects and resolutions, which were distributed to teachers and students.
- Developed competencies among "Guide Teachers" who actively promote gender equality and establish mechanisms to identify and report GBV in a timely manner.
- Supported communication activities to motivate teachers and students to change attitudes, promoting gender equality. These included:
  - Teachers and students working on a campaign against stigma and discrimination towards people of sexual diversity and the LGBTI community, which included creating murals and banners on respect for the human rights of people of sexual diversity, with students and teachers actively working together.
  - 5-minute reflections in the syllabus during the first hour of class to motivate the promotion of gender equality and respect for the rights of PLHIV and the LGBTI community.
  - Analyzing situations that support or hinder actions to drive gender equality.
  - Including gender as a research topic for students.

### **Challenges**

During implementation, the team faced some difficulties. It was clear that teachers did not have more than four hours for training; therefore, methodologies had to be adapted to this timeframe. Additionally, only teachers participated in training activities; students were not able to be included. Another limitation was that few universities and majors formally contain one or more classes with gender-related topics; when gender is not included in study plans, the topic will only be presented according to the teacher's interest.

### **Results**

ASSIST developed competencies in 96 teachers (25 male, 71 female) to teach these subjects at seven universities. Learning was assessed during training workshops through pre- and post-tests. Results showed changes in ownership and clarification of concepts related to gender (see **Table 1**). In addition, the training enabled collective reflection from experiences on the intrapersonal and interpersonal dimensions of gender and its relation with development. It also enabled identification of the main gender gaps and challenges for addressing gender inequality in the actions taken by universities as human resources training entities that work closely with the community.

<b>Table 1: Improvements in knowledge and attitudes following gender and GBV training</b>			
<b>University</b>	<b>Initial Score (%)</b>	<b>Final Score (%)</b>	<b>Increase (% points)</b>
BICU	58	98	40
UCAN	78	91	13
UNAN León	78	96	18
UNAN Managua	75	93	18
POLISAL	61	87	26
UNICA	63	84	21
UPOLI	67	91	24
<b>Global</b>	<b>70</b>	<b>92</b>	<b>22</b>



These teachers made the commitment to face various situations that threaten gender equality in their environment in a reflective and transformative way and in the actions they take with students. Since the trainings, teachers have developed competencies to identify cases of GBV and gender discrimination, they understand the process to report these cases, and they guide students to follow the proper process. This is especially relevant at state universities in student dormitories. At times, students in these dorms are stalked by people offering them night jobs to take care of “patients,” but then they are sexually harassed. Upon becoming aware of this situation, the teaching team has implemented the following mechanisms:

- Report any proposals for “home patient” care to Guide Teachers
- If it is deemed as a real case, documenting the name of the patient, family members, exact address, phone numbers, etc.
- Provide care in groups or pairs, never alone
- Share the process of filing a complaint for harassment or GBV and phone numbers to report suspect cases to corresponding authorities with students

The main impact at the university level is guaranteeing respect for human rights of the LGBTI population. Teachers who used to discriminate against students for expressing their gender identity report that they have experienced attitudinal changes towards these students. For example, one teacher at UNAN Leon stated that teachers now have more acceptance and respect towards students who openly express their gender identity and they try to protect them when other students discriminate them against. There are now more spaces open for participation of LGBTI people at the universities, with greater presence in student activities (e.g., film-forums, educational fairs, cultural activities).

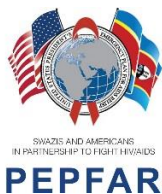
### **Lessons learned**

This work has yielded important lessons that others can benefit from. First, addressing gender and GBV requires continuous work to contribute to structural change at the individual and institutional levels to help overcome inequality and discrimination. We found that developing methodologies and content using legal aspects and national statistics to raise awareness among teachers on the importance of such topics was critical to facilitate teaching on gender-related topics. Drafting educational materials on ministry resolutions and laws around gender and GBV to facilitate sharing these topics among students and teachers complements these efforts.

In addition, group activities and dynamic, reflective learning methodologies based on the principles of adult education must be used to facilitate analysis and understanding of gender-related topics. In addition, gender integration cannot be limited to one training activity; it must be a continuous process during student training and be designed and implemented with all those involved—men, women, students and teachers. Delivering the content in short sessions helped increase teachers’ participation; developing online training modules is also a good option so that the greatest number of teachers can participate. Finally, discussion of gender includes analysis of diverse identities, the role women have played throughout history, and GBV. All of these elements contribute to training future professionals by giving them skills to address diverse forms of discrimination that exist in society and transmitting values of equality, equity, and respect for different gender identities and other differences existing in the university community.

The gender and GBV module has been incorporated into an interactive, DVD-based Teaching Package on HIV that ASSIST developed for university faculty and students. The Teaching Package includes clearly defined learning objectives and competencies that it seeks to develop in teachers and future health professionals on gender, sexual diversity, and GBV, and provides tools for learning assessment and support materials for teaching, including technical notes and visual aids.

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## CASE STUDY

### The impact of quality improvement projects on TB treatment outcomes in Piggs Peak Hospital, Swaziland

#### Summary

TB is the most common opportunistic infection for people living with HIV in Swaziland. A problem of unfavorable treatment outcomes identified in Piggs Peak Hospital was addressed through training and implementation of quality improvement projects with support from the USAID ASSIST Project. The TB Unit in Piggs Peak introduced changes to several care process which contributed to ART uptake increasing to 85%, reduction of patients lost to follow-up, and reduction of cases not bacteriologically confirmed to 3%. TB patient treatment success rates increased from 80% in 2011 to 86% in 2013, suggesting that the improvement projects had positive results on patient outcomes.

#### Background

TB is the most common opportunistic infection for people living with HIV in Swaziland. Although HIV testing is offered to all TB patients, the HIV testing and counseling uptake remains below 90%. Moreover, although HIV-infected patients are referred for CD4 count tests, the results are not always recorded in the TB register. Initiation on ART is still inconsistent and not a priority in TB diagnostic units. These factors result in delayed initiation of co-infected TB patients on ART and are probably one of the reasons for the high mortality rates among TB patients, even before patients complete the intensive phase of treatment.

Located in the Hhohho Region, the Piggs Peak Government Hospital had issues with unfavorable treatment outcomes and decided to introduce quality improvement approaches with support from the USAID ASSIST Project.

The Piggs Peak TB Unit aimed to reduce clinically diagnosed cases to less than 5%, increase ART uptake among co-infected patients to 80%, and reduce loss to follow-up rates to less than 5%, ultimately improving treatment outcomes. The facility implemented quality improvement projects (QIPs) in 2012 which were planned to be completed by December 2013.

#### Starting the Improvement Effort

With support from USAID ASSIST, the Piggs Peak staff took steps to introduce a number of changes to improve TB patient treatment. First, hospital and TB Unit staff were trained on quality improvement methodologies and the use of documentation tools to track improvement indicators. In addition, staff were encouraged to display annotated run charts and storyboards in order motivate the staff. After the QI training, there was consistent mentoring and support supervision of the TB focal persons by the Project Improvement Advisor, the TB Programme Regional Coordinator, and the Strategic Information Officer. With the support of the TB Program Regional Coordinator and USAID ASSIST, the facility QI team identified a number of issues within the TB patient management system.

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The TB Unit introduced the following changes to address unfavorable treatment outcomes:

1. Strengthened documentation through a daily review of laboratory results, treatment outcome results in the treatment cards, and the TB register of bacteriologically confirmed cases
2. With the introduction of the nurse-led ART initiation in Swaziland, nurses within the TB clinic were identified and trained on the provision of ART to enable integration and timely initiation of ART to avoid preventable deaths among TB/HIV co-infected patients before completing TB treatment
3. Introduced the GeneXpert Machine and ensured close collaboration with the hospital laboratory to support a quick turnaround of laboratory results
4. Engaged hospital management to assign a medical officer to examine TB patients on completion of treatment
5. Improved patient follow-up and adherence through assigning a vehicle for patient follow-up and support in the community; this facilitated the outreach clinic team to provide medical review and refills for patients unable to travel to the health facility from the communities
6. Established collaborative learning and sharing sessions which included a multi-disciplinary team review and unit-based reviews with QI teams to provide feedback, which helped the Piggs Peak QI team reflect on its performance, identify gaps and ineffective changes in a timely way, and implement corrective actions

## **Results**

Data were collected for patients enrolled on TB treatment between January and December 2012. Data on treatment outcomes were routinely collected into a QI team documentation journal to monitor trends over time. The key variables collected were treatment outcomes (cured, completed, died, lost to follow-up, or defaulted and treatment failure). Data were entered and analyzed in Microsoft Excel, which calculated treatment outcomes.

At the end of the QIPs, the TB Unit staff found that their changes yielded improvements, and they wanted to sustain effective changes as standard practices for improving patient treatment outcomes. The treatment success rates showed improvement over time from 80% in 2011 to 86% in 2013, achieving the WHO recommendation of 85%. The cure rates ranged from 70% to 76%. This showed that most patients were bacteriologically confirmed and cured at the end of treatment. The loss to follow-up rate remained at 0% during the period of evaluation.

## **Lessons Learned**

Through the introduction of QI methods, the TB Unit found that successfully implementing and sustaining better performance led to improved treatment outcomes. They found it is also important to ensure that the majority of the patients enrolled on treatment are bacteriologically confirmed and that smear follow up is done for good treatment outcomes. To improve certain quality performance indicators, facility staff must ensure that cure rates are higher than treatment completion rates. Finally, a motivated and committed staff was vital to initiate improvement efforts and sustain good TB-HIV treatment performance.

The views expressed in this case study are those of the authors and do not necessarily represent the views of the U. S. Government or USAID.





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