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Zambia: Disparities between Reported Confirmed Malaria Cases and Artemisinin-based Combination Therapy Uptake in Selected Districts



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Zambia: Disparities between Reported Confirmed Malaria Cases and Artemisinin-based Combination Therapy Uptake in Selected Districts

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Abstract
The Zambian Ministry of Health (MOH) and Ministry of Community Development Mother and Child Health (MCDMCH), through the National Malaria Control Program (NMCP), are working to ensure high-quality, safe, and efficacious malaria control prevention and treatment services in Zambia. The malaria disease burden and the resulting mortality can be reduced by ensuring an uninterrupted supply of malaria commodities and by strengthening systems for commodity management and malaria case management practices.

Providing malaria commodities—artemisinin-based combination therapy (ACTs) and others—depends on the quality of information reported to the central level about issued commodities during a specified time. ACTs dispensed should be the same as the confirmed malaria case data captured in the health management information system (HMIS). However, a desk review analysis showed that between October 1, 2012, and September 30, 2013, ACT issues were much higher than the reported malaria cases in various districts across the country. This report investigates that discrepancy.

Cover photo: A pharmacist at Chiyabi Rural Health Centre, Sinazongwe, Zambia, prepares his stock of Coartem. Gareth Bentley 2013.

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Acronyms

ACT	artemisinin-based combination therapy
CDE	classified daily employee
CHW	community health worker
EMLIP	Essential Medicines Logistics Improvement Program
HIA1	health information aggregate form 1
HMIS	health management information system
iCCM	integrated Community Case Management
MCDMCH	Ministry of Community Development Mother and Child Health
MOH	Ministry of Health
OPD	outpatient department
NMCP	National Malaria Control Program
PMI	President's Malaria Initiative
RDT	rapid diagnostic test
REMMS	Report for Essential Medicines and Medical Supplies
SCC	stock control card
SDP	service delivery point
SRCT	Spearman Rank Correlation Test
USAID	U.S. Agency for International Development
ZISSP	Zambia Integrated Systems Strengthening Program

1.0 Background

The Zambian Ministry of Health (MOH) and Ministry of Community Development Mother and Child Health (MCDMCH), through the National Malaria Control Program (NMCP), envision high-quality, safe, and efficacious malaria control prevention and treatment services in Zambia. The aim of their coordinated effort is to reduce the malaria disease burden and the resulting mortality by ensuring an uninterrupted supply of malaria commodities and by strengthening systems for commodity management and malaria case management practices.

Since 2004, the national first line antimalarial treatment has been artemether/lumefantrine (trade name is Coartem), a fixed-dose artemisinin-based combination therapy (ACT). From 2010 to 2012, the reported fever prevalence among children was lower, and the malaria parasite prevalence was 14.9 percent for children less than five years. This represents a slight decrease in both measures since 2010 and a general trend in decreasing the national malaria burden since 2006.[1] In 2013, the reported overall confirmed malaria cases in the country was 4,598,846.[2]

Providing malaria commodities—ACTs, rapid diagnostic tests (RDTs), quinine, and long-lasting insecticide-treated bed nets (LLINs)—depends on the information reported to the central level about issued commodities during a specified period of time. Therefore, it is expected that, based on the set MOH guidelines, the number of ACT courses dispensed should be the same as the confirmed malaria case data captured in the health management information system (HMIS). However, a desk review analysis showed that between October 1, 2012, and September 30, 2013 (see table 1). ACT issues were much higher than the reported malaria cases in various districts across the country.

Table 1. Data on Total Population, Confirmed Malaria Cases, and ACT Issues: October 1, 2012–September 30, 2013

2013 Population	Confirmed Malaria Cases	ACT Issues Data
14,223,531	4,892,813	12,544,846

To establish why ACT issues were much higher than reported malaria cases, a joint evaluation field visit was undertaken by the PMI funded USAID | DELIVER PROJECT and the Zambia Integrated Systems Strengthening Program (ZISSP).

[1] Zambia National Malaria Indicator Survey 2012

[2] Zambia National Malaria Indicator Survey 2012

2.0 Evaluation Design

2.1 Objective

The main objective of the evaluation was to determine why there were such notable differences between the reported confirmed malaria cases and ACT issues in selected districts supported by the USAID | DELIVER PROJECT and ZISSP projects.

2.2 Methodology

Selection of the facilities: A convenience sampling technique was to select facilities for the data collection visits. The sampling had three stages.

First, to select the districts for the evaluation, the USAID | DELIVER PROJECT provided preliminary data from 27 districts that were participating in the Essential Medicines Logistics Improvement Program (EMLIP). The data showed districts with reported imbalance between the number of reported malaria cases and the number of ACTs issued between 2012 and 2013.

The second stage narrowed the selection of districts to those where both projects had a presence. Five districts across three provinces—Central, Southern, and Western—were selected for the field data collection exercise.

From five districts—Gwembe, Kalomo, Lukulu, Mkushi, and Serenje—two additional parameters were considered when selecting the facilities: (1) facilities that participated in EMLIP and had a high number of health staff trained and mentored by ZISSP in malaria case management and integrated Community Case Management (iCCM) and (2) facilities that received support from both projects between 2011 and 2013.

This sampling process resulted in the selection of 19 facilities for the evaluation:

- Central province (nine facilities across two districts)
- Southern province (six facilities in two districts)
- Western province (four facilities in one district)
- Visited two more facilities in the Western province, but they were not part of the original sample.

Data Collection Process: Monitoring the flow of drugs in and out of service delivery points (SDPs) was a crucial piece of information required for the study. To assess this information, the evaluation team collected logistics data to determine what, if any, correlation existed between stock control card (SCC) and Request for Essential Medicines and Medical Supplies (REMMS) data at facilities for two key malaria medical commodities: Coartem and RDTs. SCC data represent the amount of stock that goes through the storeroom of the facility. REMMS reports opening balance, quantity received, issues from storeroom to dispensing area, losses or adjustments, as well as days stocked out at the facility. Issues on the SCCs and REMMs should be the same.

Standard data collection tools were developed to collect data from facility registers and/or electronic information systems. The tools were designed to collect logistics data on ACTs and

RDTs transactions in 2012 and 2013—primarily commodities received on the SCC and issued on the SCC, and what was reported on the REMMS.

Additionally, interview guides were developed to survey a variety of health cadres at the district-, health facility-, and community-levels involved with managing malaria commodities at each facility.

Logistics component data analysis: Microsoft Excel and Stata 11 were used to analyze data collected from the facilities for 2012 and 2013. After data from the 19 facilities were entered into Excel, the team used Stata 11 to aggregate and analyze it.

To measure the correlation between SCCs and REMMS data at facilities, the analysis used Spearman Rank Correlation Test (SRCT) to produce correlation coefficients. SRCT was used for this analysis—instead of other correlation measures, such as Pearson Correlation Coefficient or Kendall's tau. SRCT is a robust measure, meaning it can handle outliers, and because it is a ranked test, it can handle non-parametric and skewed data. The data were first examined as a whole and then stratified by commodity (Coartem compared to RDTs), province (Central compared to Southern), and facility type (hospital compared to health center).

In addition to SRCT, scatter plots were created to graphically illustrate the correlations. As with the SRCT, data were stratified by commodity, province, and facility type.

2.3 Logistics Analysis Component Limitations

1. EMLIP had been deployed since 2011, but in a phased approach. Therefore, in some facilities, EMLIP was relatively new. This implies that some facilities did not have much experience with the system and, therefore, data quality was an issue; these issues resulted in less data collected than planned.
    - All observations from the four facilities in the Western province were dropped because of insufficient or missing data.
    - All 2012 observations, from all 19 facilities, were dropped because of insufficient or missing data.
    - Only 14 facilities, with 12 observations (one for each month in 2013), remained in the sample. However, due to data quality issues, some observations were also dropped from the sample.
2. As a result of the relatively small sample sizes, it was necessary to widen the confidence intervals from 95 percent to 90 percent.
3. The sampling process used stringent criteria for excluding facilities; a random sample of facilities could not be selected. Therefore, all results are descriptive and cannot be extrapolated beyond the facilities under study.

3.0 Results: Logistics Component

3.1 Degree of Correlation between SCC and REMMS Data

To measure the extent to which SCCs and REMMS data correlated, under a variety of circumstances, the SRCT was used to produce correlation coefficients. The coefficients produced by this type of analysis can range from -1 to 1. Values closer to -1 or 1 have higher correlations, but values closer to 0 have lower correlations. Generally, a correlation of between 0 and 0.19 is considered very weak, 0.2–0.39 is considered weak, 0.4–0.59 is considered moderate, 0.6–0.79 is considered strong, and 0.8–1.0 is considered very strong.[3]

A SRCT was run to assess the relationship (r) between SCCs and REMMS at all 17 facilities for malaria RDTs and Coartem (see table 2). (N) represents the total number of observations recorded at each disaggregation level. Each facility could theoretically record up to 12 observations per year, one for each month, for each of the following logistics data lines: RDT REMMS, RDT SCC, Coartem REMMS, and Coartem SCC. All data were collected between August 17 and 23, 2014. This section analyzed a total of 17 SDPs. Ten facilities from Central province and seven in Southern province were analyzed. This analysis used 90 percent confidence intervals (see section 2.3 Limitations, above).

Table 2. SRCT Analysis Results

Overall	n	r	90% Confidence Intervals		P-value
Overall rapid diagnostic tests	**164**	**0.7673**	**0.708**	**0.816**	**0.0000**
RDTs at hospitals	57	0.8375	0.757	0.893	0.0000
RDTs at health centers	107	0.7650	0.698	0.824	0.0000
Overall Coartem	**179**	**0.7500**	**0.691**	**0.799**	**0.0000**
Coartem at hospitals	72	0.7463	0.645	0.822	0.0000
Coartem at health centers	107	0.7757	0.703	0.832	0.0000

Central Province	n	r	90% Confidence Intervals		P-value
Overall rapid diagnostic tests	**119**	**0.8530**	**0.806**	**0.890**	**0.0000**
RDTs in hospitals	36	0.8936	0.819	0.939	0.0000
RDTs in health centers	83	0.8345	0.769	0.882	0.0000
Overall Coartem	**96**	**0.7647**	**0.684**	**0.827**	**0.0000**
Coartem in hospitals	36	0.9157	0.855	0.952	0.0000
Coartem in health centers	60	0.6257	0.475	0.741	0.0000

[3] These ranges are fluid. There is no standardized scale because the interpretation of results is subjective and situational.

Southern Province	n	r	90% Confidence Intervals		P-value
Overall rapid diagnostic tests	**45**	**0.4329**	**0.207**	**0.615**	**0.0030**
RDTs in hospitals	21	0.5258	0.194	0.75	0.0144
RDTs in health centers	24	0.3943	0.058	0.65	0.0566
Overall Coartem	**83**	**0.3236**	**0.151**	**0.477**	**0.0028**
Coartem in hospitals	36	0.1563	-0.128	0.417	0.3625
Coartem in health centers	47	0.4111	0.187	0.595	0.0041

3.2 SRCT Results for All Sampled Health Facilities in Central and Southern Provinces

Across all 17 health facilities, there was a strong positive relationship between the two measures—SCCs and REMMS—for RDTs (r = .7673, 90% CI [.708, .816], n = 164, p <.0000). A SRCT was run at all included facilities for Coartem; it also showed a strong positive relationship (r = .75, 90% CI [.691, .799], n = 179, p <.0000).

When stratified by health facility type (hospital versus health center), the SRCT showed a very strong positive relationship for RDTs at hospitals (r = .8375, 90% CI [.757, .893], n = 57, p <.0000) and a strong positive relationship for RDTs at health centers (r = .7650, 90% CI [.698, .824], n = 107, p <.0000). The same analysis was conducted for Coartem, which showed a strong positive relationship for hospitals (r = .7464, 90% CI [.645, .822], n = 72, p <.0000) and a strong relationship at health centers (r = .7757, 90% CI [.703, 832], n = 107, p <.0000).

These relationships are depicted in figures 1–6.

Scatter Plots: Stock Control Card vx. Request for Essential Medicines and Medical Supplies in the *Overall Sample*

Figure 1. Overall RDT SCC and REMMS data correlation in Central and Southern Province

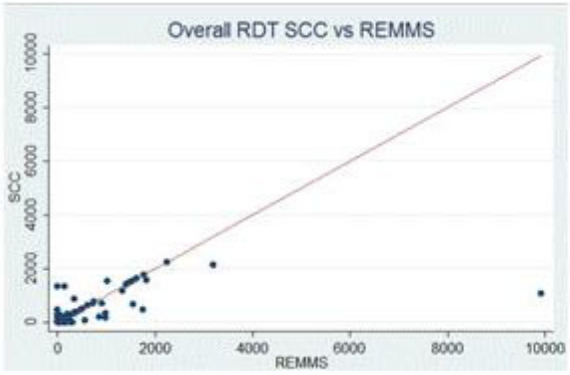


Figure 2. RDTs in all Hospitals (Central and Southern Province)

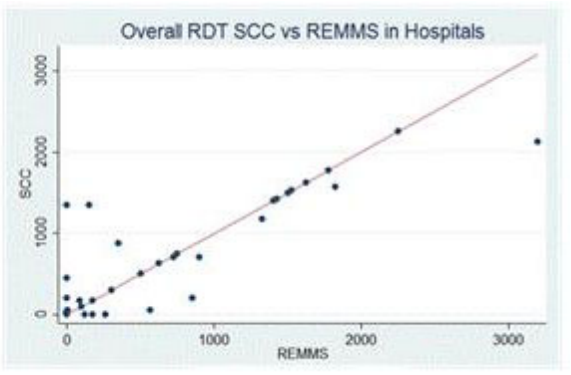


Figure 3. RDTs in all HC's (Central and Southern Province)

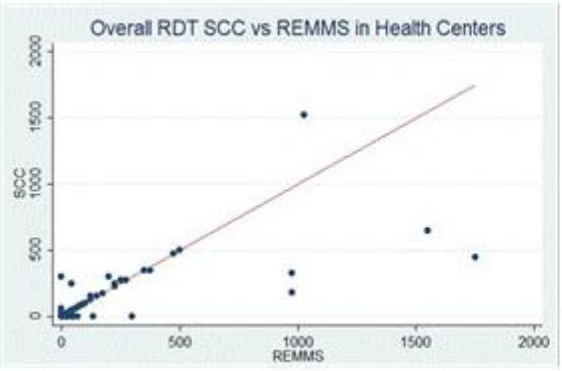


Figure 4. Overall Coartem SCC and REMMS data correlation in Central and Southern Province

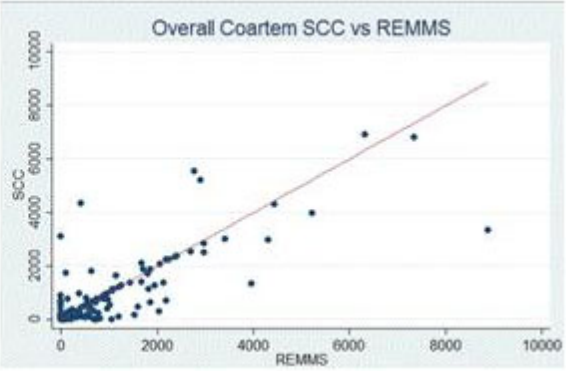


Figure 5. Coartem in all Hospitals (Central and Southern Province)

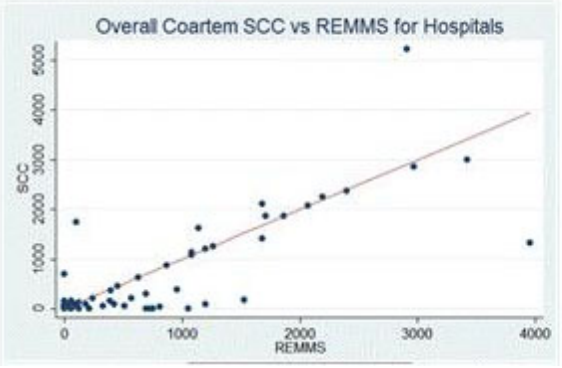
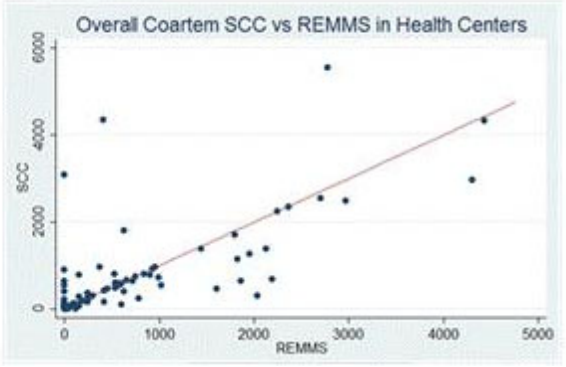


Figure 6. Coartem in all HC's (Central and Southern Province)



3.3 SRCT Results for Sampled Health Facilities in Central Province

In all 10 sampled health facilities in Central province, the correlation between SCC and REMMS data for RDTs were very strong and positive (r = .8530, 90% CI [.806, .890], n = 119, p< .0000). The correlation between Central province SCC and REMMS data for Coartem were strong and positive (r = .7647, 90% CI [.684, .827], n = 96, p <.0000).

Stratifying by health facility, the relationship between SCC and REMMS for RDTs in hospitals showed a very strong positive relationship (r = .8936, 90% CI [.819, .939], n = 36, p <.0000). A strong positive relationship was also detected for RDTs at health centers in Central province (r = .8345, 90% CI [.769, .882], n = 83, p <.0000). Coartem in Central province hospitals had an extremely strong positive relationship (r = .9157, 90% CI [.855, .952], n = 36, p <.0000). However a moderate-to-strong positive relationship was shown for Coartem SCCs and REMMS in Central province health centers (r = .6257, 90% CI [.475, 741], n = 60, p <.0000).

These relationships are depicted in figures 7–12.

3.4 SRCT Results for Sampled Health Facilities in Southern Province

In all seven sampled health facilities in Southern province, the correlation between SCC and REMMS data for RDTs was moderate and positive (r = .4329, 90% CI [.207, .615], n = 45, p< .0030). The correlation between Southern province SCC and REMMS data for Coartem was weak and positive (r = .3236, 90% CI [.151, .477], n = 83, p <.0028).

In Southern province, SCC and REMMS data for RDTs in hospitals showed a weak positive relationship (r = .5258, 90% CI [.194, .750], n = 21, p = .0144). Although the relationship could, technically, be moderate, the confidence intervals were so wide that a true picture of the relationship could not be determined with great confidence. RDTs in health centers and Coartem in hospitals both produced statistically insignificant relationships (r = .3943, 90% CI [.058, .650], n = 24, p = .0566), (r = .1563, 90% CI [-.0128, .417], n = 36, p = .325, respectively). SCCs and REMMS for Coartem in Southern province health centers technically showed a moderate positive relationship, although the confidence intervals are too broad to say this with any certainty (r = .4111, 90% CI [.187, .595], n = 47, p = .0041).

These relationships are depicted in figures 7–18.

Scatter Plots: Stock Control Card vs. Request for Essential Medicines and Medical Supplies in the Central Province *Overall Sample*

Figure 7. All RDT SCC and REMMS Data Correlation Central Province

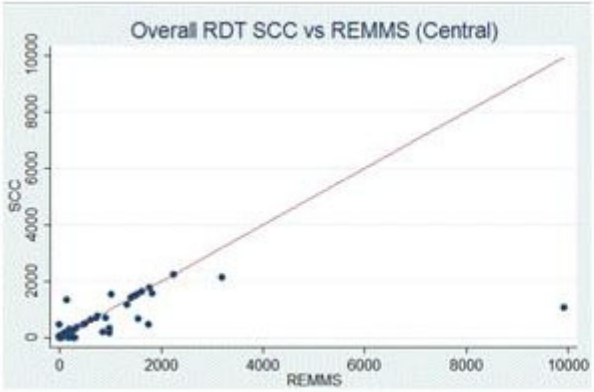


Figure 8. RDT's in Central Province Hospitals

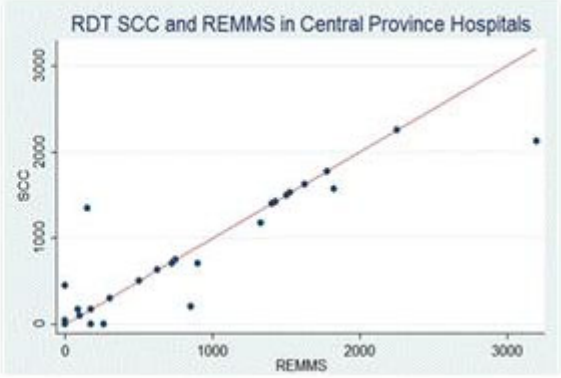


Figure 9. RDT's in Central Province Health Centres

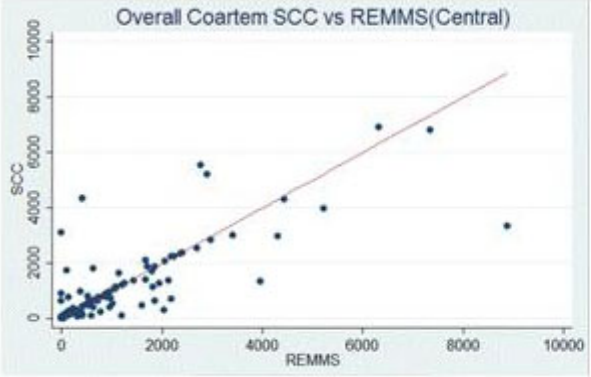


Figure 10. All Coartem SCC and REMMS Data Correlation in Central Province

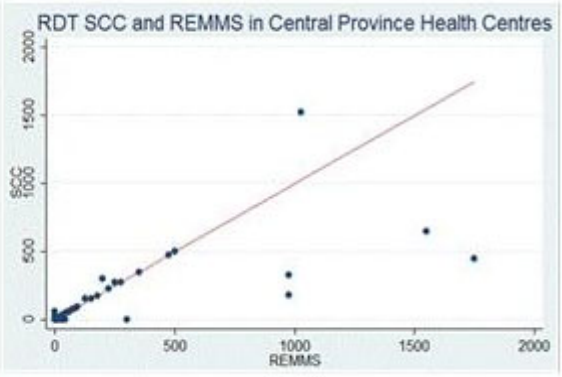


Figure 11. Coartem in Central Province Hospitals

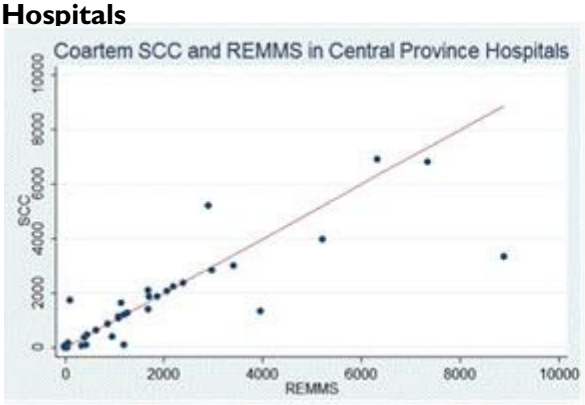
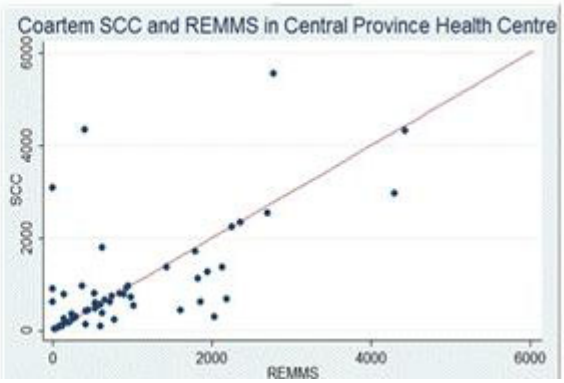


Figure 12. Coartem in Central Province Health Centres



Scatter Plots: Stock Control Card vs. Request for Essential Medicines and Medical Supplies in the Central Province *Overall Sample*

Figure 13. All RDT SCC and REMMS data correlation in Southern Province

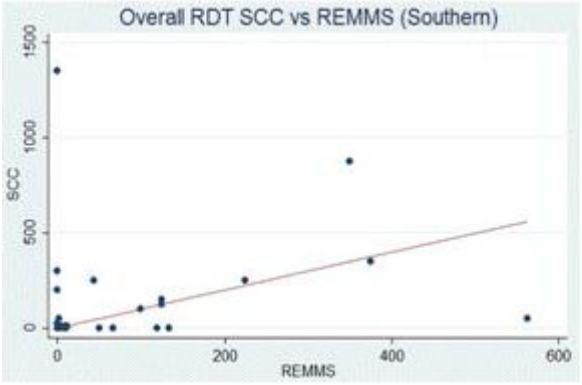


Figure 14. RDT's in Southern Province Hospitals

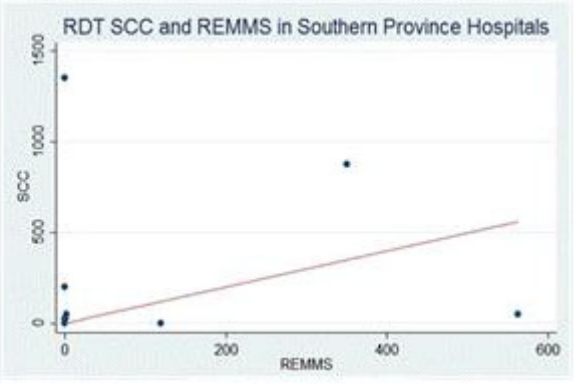


Figure 15. RDT's in Southern Province Health Centres

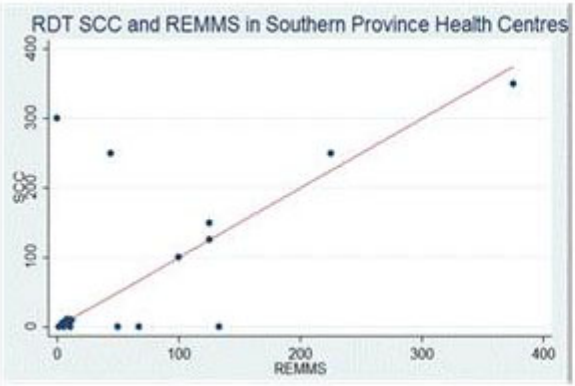


Figure 16. All Coartem SCC and REMMS data correlation in Southern Province

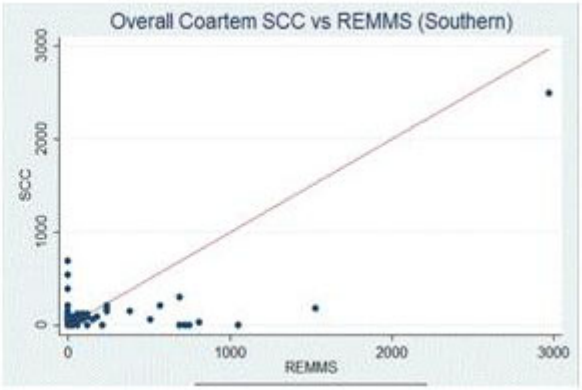


Figure 17. Coartem in Southern Province Hospitals

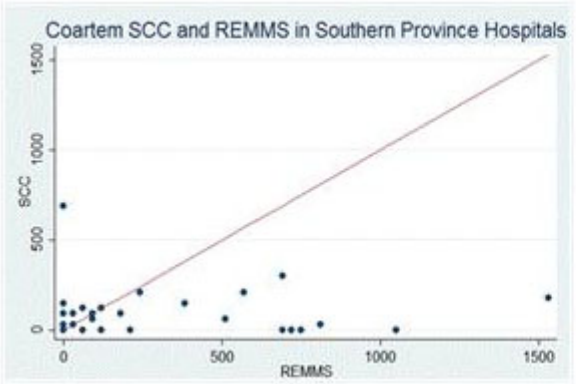
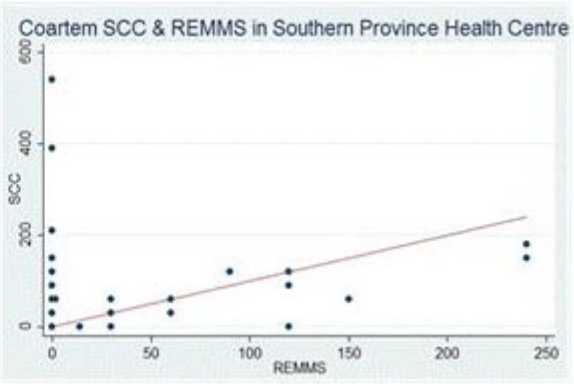


Figure 18. Coartem in Southern Province Health Centres



4.0 Results: Management of Malaria

4.1 Characteristics of Interview Respondents

At the 25 facilities visited for the assessment, 34 out of 46 respondents interviewed were facility-health staff and community volunteers involved in day-to-day malaria-related activities. The remaining 12 respondents were based in the District Community Medical Office: six district medical officers and six district pharmacists. A wide range of health cadres were interviewed, including 11 clinical officers, 15 nurses and midwives, 9 medical officers, 6 pharmacy technologists, and 5 community volunteers.

For the positions currently occupied by the respondents, the majority of the cadres interviewed (30.4 percent) were facility in-charges, while 26 percent worked at the DCMO and 10.9 percent were community volunteers who worked at the facility. Across all cadres of respondents, the median number of years worked at the facility was seven years: ranging from six months to 19 years (see table 3).

Table 3. Background Characteristics of Respondents

Background	n	Percentage (%)
Gender		
Male	26	56.5
Female	20	43.5
Type of Cadre	**46**	**100**
Medical officer	9	19.6
Medical licentiate	1	2.2
Clinical officer	11	23.9
Registered/enrolled midwife	5	10.8
Registered/enrolled nurse	10	21.7
Pharmacy technologist	6	13
Community volunteer	5	10.9
Position	**47**	**100**
District medical officer	6	13
District pharmacist	6	13
Facility in-charge	14	30.4
Clinician	10	21.7
Nurse in-charge	5	10.9
Community volunteer	5	10.9
Years Worked at the Facility	**46**	**100**
< 1 year	14	30.4
1–2 years	9	19.6
3–4 years	6	13
5+ years	17	37

Background	n	Percentage (%)
Total	46	100

4.2 Type of Malaria Services Provided at Facilities

All 25 facilities visited provided malaria diagnostic services using RDTs and they treated uncomplicated malaria. Twenty-three of the 25 facilities (92 percent) provided pre-referral for severe malaria treatment; 14 facilities (56 percent) also used microscopic diagnosis of malaria; and 13 facilities treated severe malaria cases (see table 4).

Table 4. Type of Malaria-Related Services Provided

Type of Malaria Services Provided	Number of Facilities Providing Different Malaria Services (%)
Clinical diagnosis	25 (100)
RDT	25 (100)
Uncomplicated malaria treatment	25 (100)
Pre-referral severe malaria treatment	23 (92)
Microscopic testing	14 (56)
Severe malaria treatment	13 (52)

At all the facilities visited, clinical staff confirmed that they clinically diagnosed malaria without doing any confirmation testing; notably, if they had an overwhelming workload, especially during peak season for clients presenting with fever and when RDTs were in short supply or stocked out.

4.3 Malaria Management by Health Cadre

At the time of the assessment, 262 staff in 25 health facilities were involved in managing malaria (an average of 10 staff were involved in malaria case management, per facility). Out of the total 270 health staff using RDTs to diagnose malaria (as opposed to microscopic testing), most were nurses (58.4 percent), followed by classified daily employees (CDEs) (19.1 percent), clinical officers (9.2 percent), and pharmacy technologists (8.4 percent). See table 5.

The assessment showed that out of 127 health staff involved in prescribing for and treating malaria, nurses (40.9 percent) were the most common health cadre providing this service; followed by clinical officers (21.3 percent) and CDEs (12.6 percent). Of the 81 health staff reported to be involved in dispensing antimalarial drugs, nurses were the majority (66.1 percent), followed by CDEs (33.9 percent). Similarly, nurses (38.9 percent) and CDEs (28.8 percent) were the cadres most involved in malaria stock management.

Table 5. Providers Providing Malaria Services

Type of Cadre	Microscopic Testing	Rapid Diagnostic Testing	Prescribing and Treatment	Dispensing Antimalarials	Malaria Stock Management
	% (n)	% (n)	% (n)	% (n)	% (n)
Medical officer	0.0	3.4 (9)	6.3 (8)	0.0	0.0
Medical licentiate	0.0	0.7 (2)	2.4 (3)	0.0	0.0
Clinical officer	0.0	9.2 (24)	21.3 (27)	5.4 (3)	3.4 (2)
Midwife	0.0	1.1 (3)	11.0 (14)	5.4 (3)	5.1 (3)
Nurse	0.0	58.4 (153)	40.9 (52)	66.1 (37)	38.9 (23)
Pharmacy technologist	85% (17)	8.4 (22)	0.0	21.4 (12)	13.5 (8)
EHT	0.0	2.7 (7)	5.5 (7)	12.5 (7)	10.2 (6)
CDE	15% (3)	19.1 (50)	12.6 (16)	33.9 (19)	(17)

4.4 Community Volunteers Working in Malaria Management

Considering the human resource for health staffing shortages and the vision to bring more health services into the community, there is a strong advocacy for involving community volunteers in the treatment and management of malaria. The facility in-charges were asked if they worked with any community members to manage malaria. At the 25 facilities visited, 19 facilities (76 percent) had community volunteers working in the communities and involved in administering RDTs and treating community members suspected of having malaria. The 19 facilities had a total of 158 community volunteers, with 40 percent of facilities having 1–5 volunteers (see table 6).

Table 6. Range in Numbers of Community Volunteers Involved in the Management of Malaria at 19 Health Facilities

# of Community Volunteers	# of Health Facilities	Percentage (%)
1 to 5	8	40
6 to 10	6	35
Above 10	5	25
Total	19	100

The level of involvement in specific malaria-related services among community volunteers varied across the 19 facilities (see table 7).

Table 7. Malaria-Related Services Offered by Community Volunteers

Type of Service Offered by Community Volunteers	Number of Facilities	
	n	Percentage (%)
Clinical diagnosis	11	57.8
Diagnosis with RDTs	19	100
Prescription of ACT	15	78.9

Among the 158 community volunteers, 64 (41 percent) had reportedly received a training in iCCM. All 19 health facilities reported that community volunteers offer malaria RDTs in the community. In 11 facilities, community volunteers also offered clinical diagnosis of malaria. In 15 facilities (78.9 percent), community volunteers in the community are reportedly involved in treating malaria cases with ACTs. However, only 14 facilities (73.6 percent) reported that they receive monthly reports on malaria case management from community volunteers.

The facility in-charges were asked about the challenges that facilities face when working with community volunteers to manage malaria cases (*see box 1 for some responses*). Fourteen facilities noted that some community volunteers fail to follow malaria treatment guidelines and, if the patient had a fever, they give ACTs even when the RDT test is negative.

Box 1
Challenges faced with community volunteers

- Even when the client is negative with RDT test, they still give ACTs.
- Sometimes we run out of stock for RDTs and community volunteers have to give ACT without testing.
- Some communities have not accepted these volunteers and they tend to have very little trust in them.
- Community volunteers are not motivated because of the lack of incentives.

To address some of the challenges with community volunteers, facilities give volunteers the necessary support and guidance in managing malaria cases in the community. This support includes providing malaria treatment guidelines, holding regular meetings with them at the facility to review standard operating procedures, and encouraging them to refer patients to the facility if they are uncertain about the diagnosis or treatment of malaria. (*See box 2 for some responses.*)

Box 2
Solutions to the challenges faced with community volunteers

- We provide guidelines on the treatment and management of malaria.
- We wait until we receive enough stock of RDTs from the Medical Stores Limited (MSL).
- We involve community volunteers in trainings and on site supervision.
- We advise them to refer cases to the health facility when they run out of RDTs.
- We hold meetings with them to encourage them and whenever possible we give them some monetary incentive.

4.5 Challenges Faced Related to Malaria Case Management

Based on responses with interviewees, 80 percent of the 25 facilities had a copy of the malaria case management guidelines. However, this could only be verified by physically inspecting the document at 11 facilities (44 percent). Nine facilities (36 percent) reported that they had a copy of the guidelines, but they could not locate the document. Five facilities (20 percent) reported not having a copy of malaria case management guidelines (see table 8).

Table 8. Availability of Malaria Case Management Guidelines

Availability of Malaria Case Management Guidelines		
	n	**Percentage (%)**
Yes, verified	11	44
Yes, but not verified	9	36
No	5	20
Total	**25**	**100**

Respondents stated that they faced challenges with regard to malaria case management (see table 9). Fourteen respondents (41.2 percent) stated that they have a challenge with malaria diagnosis; 11 (32.4 percent) had challenges with ACT stock management, and 10 (29.4 percent) had challenges with malaria treatment.

Table 9. Number of Providers Facing Challenges Related to Malaria Case Management

Type of Service	n	Percentage (%)
Malaria diagnosis	14	41.2
Malaria confirmation	9	26.5
Malaria treatment	10	29.4
Prescription of antimalarials	5	14.7
ACT stock management	11	32.4

Twenty-two of the 34 healthcare workers and community volunteers (64.7 percent) stated that they had treated unconfirmed malaria cases with ACTs at their facilities. (*See box 3 for reasons for treating unconfirmed cases of malaria.*) This usually happens when the patient presents with malaria symptoms, but the RDT result is negative; or when RDTs and reagents for microscopy are stocked out. Of note, 11 facilities (44 percent) reported that they experienced a stockout in the two years prior to the assessment.

Box 3
Reasons for the discrepancy between ACT consumption and reported confirmed malaria cases

- Sometimes we are very overwhelmed with a lot of clients during the peak season such that recording of RDT results becomes a challenge. As such, we tend to under-report the cases of confirmed malaria.
- Some clinicians have a tendency of giving ACT even when the RDT result is negative, as long as the patient has a fever.
- I think this can be attributed to the high number of untrained staff who are left to handle cases of malaria.
- This could be due to poor documentation of both clinical and confirmed malaria cases. Sometimes confirmed malaria cases are treated as clinical cases and vice versa.
- We give ACTs when the patient displays symptoms, such as a high fever, even when the RDT result is negative.
- There are some strains of malaria parasites that cannot be detected by the RDT test, so when the patient has the symptoms, we are forced to give ACTs.
- We are forced to give ACTs if the patient comes back to the facility several times complaining about fever and other malaria symptoms.
- Some clients themselves demand to be given ACTs even when the RDT test is negative.
- Such a situation happens when we have a stockout of RDTs. It means we can only give ACTs based on clinical symptoms of malaria.
- When we run out of RDTs, we just treat suspected malaria cases based on clinical symptoms.

4.6 Perception of ACT Consumption Disparities

Of the 34 health workers and community volunteers interviewed (53 percent), 18 said they did not know about the discrepancies between ACT consumption and confirmed cases of malaria. Slightly less than 50 percent of the health workers and community volunteers (16 of 34, or 47 percent) knew about the disparities. Health workers and community volunteers generally agreed that the discrepancies can be attributable to the periods when they had a stockout of RDTs and treated all suspected cases of malaria clinically. The other reasons stated were poor documentation of malaria data because of the staff's work overload and the tendency of some clinicians to presumptively diagnose malaria.

4.7 Data Management Practices

The assessment established that different cadres of health facility staff are involved in compiling and reporting of HMIS data (see table 10). This was the responsibility for a range of cadres—from the registered/enrolled nurse to the CDEs. The data is initially captured in the place where the patient is treated. This information is then relayed to the data office, if present, then the respective facility for compilation and onward submission to the district.

The data clearly shows that multiple people at the facility capture the HMIS data because different staff at a facility complete the register for malaria diagnosis, provide malaria treatment, and prepare the HMIS report. In some instances, the facility in-charge indicated that they do not have dedicated staff to compile HMIS data.

Table 10. Staff Preparing the HMIS Reports

	n	Percentage (%)
Registered/enrolled nurse	7	28
Facility in-charge	3	12
Information officer	4	16
CDE	9	36
EHT	4	16
No dedicated staff	4	16

Out of the 19 facilities working with community volunteers, 16 facilities (84 percent) capture malaria data from the community into the HMIS report, but three facilities (16 percent) reported that they do not capture malaria data from community volunteers into their HMIS report; they claimed the community volunteers use mobile phones to submit directly. (The system specifies that community health worker (CHWs) should submit malaria data through the health facility.)

Of the facilities that reported (21 of 25), 84 percent stated that clinical and confirmed malaria cases are captured and reported separately. However, the documentation of clinical and confirmed cases of malaria were very different across all facilities. Less than half the facilities (12 of 25) had a verifiable ACT dispensary register at the outpatient department (OPD) (see table 11). An additional three facilities (12 percent) stated they had one but were unable to locate it. The remaining 10 facilities (40 percent) indicated that they did not have an ACT dispensary register at the OPD.

Table 11. Availability of Dispensary Register for ACTs at the OPD

Availability of Dispensary Register for ACTs at the OPD		
	n	Percentage (%)
Yes, verified	12	48
Yes, but not verified	3	12
No	10	40
Total	**25**	**100**

Different data collection forms and methods were used across facilities. Each facility had its own way of differentiating between clinical and confirmed malaria data (*see box 4*).

Box 4
Reported ways that clinical and confirmed malaria cases are captured by different facilities

- We indicate in the remark column of the OPD register whether it is clinical malaria by putting 'NR' or confirmed malaria by putting 'R'.
- For clinical malaria we just record in the OPD register, but for confirmed cases we record in the RDT register.
- We only capture confirmed cases of malaria.
- We have a separate register where we have separate columns for clinical and confirmed malaria cases.
- We use the tally sheet which has provision for clinical and confirmed malaria.

To assess the consistency level between the different sources of malaria data at the facility, two additional facilities in Mongu district of Western province were selected for this assessment; data were compared from the OPD register and the submitted health information aggregation form 1

(HIA1) reports. The team focused on February data, which is within the malaria peak period; and October, which is low peak period.

- Facility #1 was not using tally sheets and did not have a separate RDT register. Confirmed malaria cases, as well as prescriptions for ACT, were recorded in the OPD register.
- Facility #2 was using the RDT register to record confirmed malaria cases, but the facility staff could not locate the register when the assessment team asked for it. Further, HIA1 reports for February 2013 and October 2012 were missing.

As shown in table 12, there were huge discrepancies between data reported on the HIA1 form and the OPD register. For example, facility #1 reported 263 malaria cases that were treated with ACTs, while the OPD register showed 328 cases—a discrepancy of 65 cases. It was also observed that only 32 confirmed cases of malaria were reported on the HIA1 form, while the total cases of malaria being treated with ACTs were 263 on the HIA1 form and 328 in the OPD register. This indicates that most cases of malaria are treated clinically.

Table 12. Comparison of Malaria Data from OPD Register and HIA 1 Reports in Two Selected Facilities

		Facility 1			Facility 2		
Month	**Type of Data**	**OPD Register**	**HIA1 Report**	**Discrepancy**	**OPD Register**	**HIA1 Report**	**Discrepancy**
Feb. 2013	Clinical malaria	328	303	25	362	No report	--
	Confirmed malaria	0	32	32	0	No report	--
	Treated with ACT	328	263	65	342	No report	--
Oct. 2013	Clinical malaria	75	0	75	154	62	92
	Confirmed malaria	--	7	7	0	62	62
	Treated with ACT	8	7	1	154	--	--
Feb. 2012	Clinical malaria	163	0	163	174	--	--
	Confirmed malaria	--	140	140	47	52	5
	Treated with ACT	163	140	23	54	--	--
Oct. 2012	Clinical malaria	69	0	69	152	No report	--
	Confirmed malaria	--	69	0	--	No report	--
	Treated with ACT	69	69	0	152	No report	--
-- indicates missing data							

5.0 Discussion

This analysis shows that SCC and REMMS data are often different in both hospitals and health centers. The implication is that there are data quality issues if staff are unable to transpose data from one form to the other correctly. The resulting errors are compounded as other data are reported to the central level, which may be the case in the HMIS.

This data shows that certain facilities have gaps in the logistics systems; it must be determined why facilities are performing this way. One possible explanation is a gap in the logistics systems training. If this is the case, expanded formal training, as well as on-the-job training, can now be directed at facilities in need.

RDTs in Southern province health centers and Coartem in Southern province hospitals produced statistically insignificant values ($p = .0566$, $p = .3625$, respectively). Confidence intervals for Coartem in Southern province hospitals actually approached zero, indicating that the relationship between SCC and REMMS data are extremely weak; theoretically, SCC and REMMS do not have a relationship.

5.1 Malaria Case Management

The goal of the assessment, which was done in a sample of health facilities in Zambia, was to understand if the management of malaria cases could explain the discrepancies between the low confirmed malaria cases and the high ACT uptake. The findings from this assessment suggests a number of issues that, invariably, have a negative effect on malaria case management, including the presumptive treatment of malaria, based only on clinical symptoms; shortage of skilled staff; inadequate monitoring of community volunteers; and poor data management.

Presumptive treatment: The study showed that the treatment of malaria based on clinical diagnosis was common in the facilities visited. Almost two-thirds (64.7 percent) of health workers stated that they have treated unconfirmed cases of malaria with antimalarial drugs when the patient has malaria-like symptoms, but the RDT result was negative; when the facility was stocked out of RDTs or reagents for microscopy tests; and when the patient demanded to be given antimalarial drugs because they were certain they had malaria despite a negative RDT test result. It is, therefore, evident from the findings that there is a common perception among health workers and the community that all cases of fever, weakness, nausea, vomiting, headache, etc.—which may also be symptoms of other diseases—are malaria.

Shortage of skilled staff: Almost all the health facilities relied on CDEs, who are unskilled health providers, to provide health services, including malaria-related services. This task-shifting was more common in health centers when compared to hospitals. CDEs comprise 15 percent of all staff involved in malaria testing using a microscope, 19 percent of all staff involved in malaria testing using RDTs, 13 percent of all staff involved with treating malaria, 34 percent of all staff dispensing antimalarials, and 29 percent of all staff managing malaria stock.

The assessment also shows that most health workers (excluding CDEs) in the facilities visited had not received any training in treating malaria. Only 35.8 percent of staff had been trained in malaria testing, 52.7 percent had been trained in the treatment of malaria, and 62 percent had been trained in malaria stock management. Furthermore, less than half the facilities (44 percent) had an available copy of the guidelines on malaria case management. It is assumed that the lack of training and poor access to guidelines has had a negative impact on health workers adherence

to malaria case management procedures—leading to misdiagnosis of malaria, irrational use of ACTs, and missed treatment of ailments from factors other than the malaria parasite.

Monitoring community volunteers: Approximately 158 community volunteers were actively managing malaria cases in communities surrounding the 19 facilities; only 64 percent had been trained in malaria case management. It was observed that it is still a challenge to closely supervise these volunteers to ensure they adhere to standard treatment guidelines. Furthermore, community volunteers did not follow standards for accountability and stock management of antimalarial drugs and RDTs. Six facilities did not include malaria data from community volunteers in the HMIS report because the community volunteers did not submit reports to the facility. This was exacerbated by the facility staffs' increased workload; they have limited time to incorporate data from community volunteers into the facility reports.

Poor data management: The lack of a standardized capturing format for clinical and confirmed cases of malaria, RDTs, and antimalarial drug dispensary was also a major contributing factor to the discrepancies in data. Both clinical and confirmed malaria cases were recorded in the same logbook. Some facilities relied on the OPD register, and each facility had its own way to differentiate between clinical and confirmed malaria within the OPD register. Determination of confirmed malaria cases relied on the RDT register results. Four facilities reported that they also relied on tally sheets that are provided for both clinical and confirmed malaria. The tally sheets, however, are supposed to be completed using data from the registers, but the registers are incomplete and imprecise; this means information on the tally sheets will be inaccurate because of poor data quality.

The register used for RDTs was in a hardcover book and was not uniform across all facilities visited. Most facilities did not have a system to monitor the dispensing of antimalarial drugs at the OPD. Only 48 percent of the facilities visited had a dispensary register for ACTs at the OPD.

Without standardized registers to capture malaria-related data, coupled with overwhelmed facility staff and reliance on CDEs to manage data at the facilities, it was expected that malaria data would have disparities between the different registers at the facility level and the HMIS reports. In addition, some of the health providers felt that the discrepancies between ACT consumption and reported cases of confirmed malaria cases was largely attributable to the poor capturing of malaria data. A detailed assessment of malaria data in two facilities revealed significant disparities between data in the OPD register and that in the HIA1 report. This suggests a strong possibility of serious under-reporting and duplication of malaria data in these facilities. As a result, facility reports on clinical and confirmed malaria, as well as the use of antimalarials, may not give a thorough picture of what was happening on the ground.

For most facilities visited, health workers do not meet to review and harmonize the data and to review the HMIS report. Only seven facilities out of 25 reported that they meet to discuss the indicators after the HMIS report is prepared. In most cases, one staff is responsible for preparing and submitting the HMIS report. As a result, most health workers said they were unaware of issues relating to malaria data. As such, only 47 percent of health workers knew about the discrepancies between ACT consumption and the number of reported malaria cases. Health workers thought these discrepancies were due to stockouts of RDTs—when all suspected malaria cases were treated clinically—poor documentation of malaria cases, and the tendency of most health workers to ignore the RDT results.

6.0 Conclusions and Recommendations

6.1 Conclusions

The exercise noted the following five reasons for the disparities between reported confirmed malaria cases and the issuing of ACTs:

1. Presumptive treatment of malaria based on clinical symptoms
2. Shortage of skilled staff
3. Inadequate monitoring of community volunteers
4. Poor data management
5. Lack of standardized capturing format for clinical and confirmed cases of malaria.

These factors contribute to the quality of data reported centrally. Therefore, the data discrepancies at the central level may not actually reflect what is happening with actual malaria case management practices.

6.2 Recommendations

Most of the factors are not new and are common in the healthcare system in the country. The NMCP can reduce the challenges by deliberately addressing some concerns. For instance, they could standardize the tools for capturing data on malaria and step-up trainings in iCCM to help improve the data that is reported centrally.

A similar evaluation designed on a larger scale with a randomized sampling scheme could help clarify why malaria diagnoses and ACT prescription are so different. It is recommended that more extensive studies be conducted for a larger number of randomly selected health facilities across the country. These studies would increase sample size and would allow for using 95 percent CIs instead of 90 percent CIs to increase the reliability of the results.

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