
# Assessment to Determine the Factors that Contribute to the Observed Disparity between Recorded Malaria Cases and First-Line Artemisinin-Based Combination Therapy Consumption in Zimbabwe

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# Abbreviations and Acronyms

| | |
|---|---|
| **ACR** | AutoDRV Commodity Receipt |
| **ACT** | Artemisinin-based Combination Therapy |
| **AMC** | Average Monthly Consumption |
| **ART** | Antiretroviral therapies |
| **CBHW** | Community-based Health Workers |
| **CM** | Case Management |
| **DHE** | District Health Executive |
| **DHEQ** | District Health Executive Questionnaire |
| **DHIS2** | District Health Information System, Version 2 |
| **DHOQ** | District Health Information Officer Questionnaire |
| **DPM** | District Pharmacy Manager |
| **DPMQ** | District Pharmacy Manager Questionnaire |
| **DPS** | Directorate of Pharmacy Services |
| **DTTU** | Delivery Team Top Up |
| **FGDQ** | Focus Group Discussion Questionnaire |
| **FLAF** | Facility Losses and Adjustment form |
| **FOF** | Facility Order Form |
| **FPCF** | Facility Physical Count Form |
| **FSOF** | Facility Stock Out Form |
| **HFQ** | Health Facility Questionnaire |
| **HIOs** | Health Information Officers |
| **HMIS** | Health Management Information System |
| **HMISF** | HMIS Data collection Form |
| **IMNCI** | Integrated Management of Neonatal and Childhood Illnesses |
| **LMIS** | Logistics Management Information System |
| **MOHCC** | Ministry of Health and Child Care |
| **NatPharm** | National Pharmaceutical Company |
| **NMCP** | National Malaria Control Programme |
| **OPD** | Outpatient Department |
| **PHCP** | Primary Health Care Package |
| **PHE** | Provincial Health Executive |

| | |
|---|---|
| **PHEQ** | Provincial Health Executive Questionnaire |
| **PMI** | President's Malaria Initiative |
| **RDNS** | Rapid Diseases Notification System |
| **TB** | Tuberculosis |
| **VHW** | Village Health Worker |
| **VHWRF** | Village Health Worker Return Form |
| **VHWQ** | Village Health Worker Questionnaire |
| **ZADS** | Zimbabwe Antiretroviral Distribution System |
| **ZAPIM** | Zimbabwe Assistance Program in Malaria |
| **ZAPS** | Zimbabwe Assisted Pull System |
| **ZIPS** | Zimbabwe Informed Push System |

# Acknowledgements

We would like to express our deepest appreciation to all those who participated in this survey. Special gratitude is given to the data collectors and supervisors who played key roles in the identification and recruitment of key informants, conducting the interviews as well as reviewing key source documents. The data collectors were drawn from Community Health Nurses, District Pharmacy Managers, Provincial and District Health Information Officers, with the supervisors being national-level staff from various partner organizations. The partners included National Malaria Control Program (NMCP), the Zimbabwe Assistance Program in Malaria (ZAPIM), Chemonics, Clinton Health Access Initiative (CHAI), President's Malaria Initiative (PMI), Ministry of Health and Child Care (MOHCC) Department of Pharmacy Services (DPS), and MOHCC National Health Information System. The willingness of the key informants, from the national level down to the community level, to participate in this survey is always cherished. We are also highly indebted to the NMCP; the offices of the Provincial Medical Directors of Manicaland, Mashonaland Central and Mashonaland East; the District Medical Officers for Buhera, Goromonzi, Mazowe, Murehwa, Mutare and Mt Darwin; and the President's Malaria Initiative (PMI), for their immense contribution in the design and implementation of the survey. Most importantly, we would like to acknowledge the financial support from PMI.

# Executive Summary

Over the past 20 years, Zimbabwe has experienced dramatic reductions in the burden of malaria. The commitment of Zimbabwe's Ministry of Health and Child Care (MOHCC), expressed through its Vision and Mission Statement (2016), and the coordination among its departments and supporting partners have been critical to this progress. Two key MOHCC entities that have been instrumental in the realization of this achievement are the National Malaria Control Program (NMCP) and the Directorate of Pharmacy Services (DPS). The NMCP provides leadership in the control of malaria activities that has led to more recent successes resulting from a combination of efforts (e.g., use of long-lasting insecticidal nets, indoor residual spraying, malaria case management training and supervision, and timely treatment seeking). Based on these recent successes, the country is now committed to malaria elimination.

The MOHCC and NMCP have demonstrated their commitment to malaria elimination through the implementation of key policies, including the introduction of artemisinin-based combination therapy (ACT) as the first-line treatment for uncomplicated malaria in 2006. Other policies include the roll-out of parasitological confirmation before treatment in 2008, and the deployment of malaria rapid diagnostic tests (RDT) as the main tool for diagnosis. The NMCP rolled out this policy in all facilities in 2009 and to the community in 2014.

Malaria incidence in Zimbabwe has dropped from 136/1000 population in 2000 to 29/1000 population in 2016. The NMCP has set a goal to reduce this incidence to 5/1,000 persons by 2020. Achieving this goal requires the consolidation of programmatic strengths and efficiencies, as well as improving the processes for collection and use of routine health management data for decision-making. Analysis of historical data in 2014 showed that, in the face of progressively fewer cases, ACT consumption was generally constant. This prompted the NMCP to conduct a rapid assessment, with support from the Clinton Health Access Initiative (CHAI), to determine the cause of the ACT consumption disparity. Despite the findings and recommendations made following this limited-in-scope assessment, the disparity ratio continued to increase, and the wide disparity between recorded malaria cases and first-line ACTs consumed has persisted.

The NMCP and partners thus mandated this follow-on assessment, which considered the approach, findings, and recommendations of the 2014 rapid assessment, but expanded the scope and scale to produce results that are more representative and conclusive. The objectives of this 2017 assessment were to determine and characterize the factors contributing to the observed disparities between reported malaria cases and first line ACTs consumed; assess data quality, processes and tools for malaria cases and commodities' management; and evaluate the practices of central, district, and facility-level staff and Village Health Workers (VHWs) involved in malaria control.

## Methodology

The assessment team performed a desk review of Health Management Information System (HMIS) and Logistic Management Information System (LMIS) data to extract national, provincial, district, and health facility level data from the DHIS2 (HMIS) and LMIS for calendar years 2014-2016. Disparity ratios (i.e., simple ratios between cases and consumption) were then calculated for all facilities from three provinces with relatively high burdens of malaria. These ratios informed the selection of health facilities from these provinces for inclusion in the survey. For the survey and primary data collection, the assessment team selected a six month period (i.e., October 1, 2016 – March 31, 2017).

The team implemented a multi-stage sampling technique selecting two districts from each province, with a number of health facilities randomly selected from each district. The number of health facilities selected per district was proportionate to the number of health facilities in each district. In addition, the

team purposively selected all the district hospitals from the six districts (one per district) bringing the total of health facilities selected for the study to 72. For each selected rural health center or clinic with VHWs participating in malaria testing and treatment, the team randomly selected five VHWs in consultation with the District Nursing Officer or Nurse-in-Charge, for interviews and assessment of their records. Semi-structured questionnaires and interview guides were used to collect qualitative data from key informants, including the following: selected VHWs; pharmacy staff; nurses; doctors; and Health Information Officers (HIOs) at health facilities; District Health Executive (DHE) members; and Provincial Heath Executive (PHE) members.

A three-day training of 15 data collectors selected from the chosen districts preceded fieldwork. The training was held in Mazowe, Mashonaland Central Province and focused on pretesting and revision of the tools. Data collection lasted five days (July 24 - July 28, 2017). The MOHCC Permanent Secretary granted written permission to conduct the assessment, and the study complied with high ethical standards involving human participants. The team did not interview or interact with any patients during the course of this assessment. The data analysis and writing team comprised partner representatives and subject experts who helped to ensure appropriate interpretation of the data and the results within the proper context.

# Key Findings

## Respondent Characteristics and Malaria Burden

Three-fifths (61%) of respondents at the health facility level were Primary Care Nurse cadres, while 33 percent were registered General Nurses, Matrons, or Sisters-in-Charge. The remainder of the respondents (6%) represented Nurse Aides. Sixty-five percent of facilities had VHWs that tested and treated malaria in the community, and 35 percent had VHWs that tested only and referred patients. This ratio reflects the ongoing prioritization of trainings offered to VHWs in high-burden districts. In keeping with broader malaria epidemiology in Zimbabwe, Mutare District in Manicaland recorded the highest number of cases in the sample over the period of study, accounting for half of total cases seen.

## Magnitude and Awareness of the Case-Consumption Disparity by Geographic and Service Location

Overall, in the observed facilities, assessment results indicated that on average 3.06 presentations of ACTs were administered as malaria treatment for each confirmed case reported, and there were 3.11 times more RDTs used than there were suspected malaria cases. This ratio is similar to and follows the historic disparity trend over the past three years in Zimbabwe. There is a greater disparity at the community level (6.48) compared to the facility level (1.99). The community level disparity is obtained when ACTs issued to VHWs is compared to confirmed cases reported by VHWs. However, the disparity "disappears" on comparing the exact number of confirmed cases and ACTs consumed at the VHW level, further emphasizing the need to strengthen the tracking of the actual consumption of ACTs at community level instead of using ACTs issued to VHWs as a proxy for consumption. . Lack of proper accounting for actual consumption at VHWs, returned stock and expiries at VHWs and failure to have monthly VHW Return forms from all VHWs contribute to this disparity. In the Community-Based Health Worker (CBHW)/RDT Medicine Register, it is possible to match each malaria case seen at the community level to the number of ACT presentations administered. However, there is no provision for capturing this specific detail in the HMIS data reported to the district level. There was generally a high level of awareness of the disparity between cases and consumption at the administrative/central level (92%), which was not the case at facility and community levels where awareness of any case-consumption disparity was much lower (29% and 18%, respectively). This can be partially explained by little or no access to LMIS data by the lower levels of care. Increased awareness of the disparity problem at lower levels is a first step to addressing the observed disparity at those levels and can be coupled with other system strengthening and malaria program improvement efforts.

## Causes of Case-Consumption Disparity

All respondent cadres stated that poor recording practices are a major contributory cause of any observed disparity between cases and consumption. In addition to these causes, higher-level administrative staff opine that other causes include cutting and combining ACT presentations, poor knowledge of documentation tools, heavy workload, and RDT stock outs were issues. Facility and community level staff felt that the contributing issues related to disparities included substandard dispensing practices, cutting and combination of ACT presentations, and heavy workload. LMIS assumes that one ACT presentation is used to treat a case of malaria. However, cutting and combining of presentations is common. Cadres at either level did not identify pilferage as a significant cause.

## Adequacy of Data and Tools

Study findings indicate that the dichotomous data management systems – HMIS and LMIS – where cases are tracked on the former, and commodities logistics and consumption monitored on the latter, represent parallel systems which are often asynchronous and pose difficulties for smooth comparison of cases and ACT consumption. The dichotomous systems are more unconnected at lower levels where staff have very little or no interaction with LMIS data. Findings show that where tools are available, health workers and VHWs generally complete key sections of data collection forms and registers. However, there are wide differences in values of key malaria indicators as revealed through data quality and accuracy testing at facility and lower levels.

## Logistics Systems and Ordering Practices

All stock issued to VHWs is considered consumed in LMIS when portions of it remain in the community at the time of delivery of additional stock. There are also gaps and inconsistencies with the tracking of commodities at the VHW/community level (e.g., 64% of the facilities report conducting physical counts, but only 1 in 47 reports considering the VHW/community data during the ordering process). Although VHWs fill in VHW Return Forms on a monthly basis, not all VHWs bring the forms to the health facilities on time and every month. There are often some missing forms leading to incomplete data. This leads to likely overestimations of malaria commodities consumed at facilities that failed to account for stock remaining unused at VHWs level. Although the records in CBHW/RDT Medicines Registers include stock used by VHWs and remaining stock on a monthly basis, this information is not reported into LMIS or on the consolidated facility monthly VHW Return Form. Findings also indicate that contrary to the *a priori* hypothesis, adjustments and transfers (in or out) are the predominant logistic actions that contribute to the overall case-consumption disparities (i.e. an over-estimation of consumption in most cases) at the facility stock management level. This contribution is greater than for expiries or losses.

From the key informant interviews, pilferage does not appear to be a significant contributor to the observed case consumption disparity. The assessment had no objective way of assessing this but instead relied on the perceptions of the key informants.

# Recommendations

The Directorate of Pharmacy Services (DPS) and partners should consider implementing the following recommendations to improve the malaria specific LMIS issues and data generated from the system:

- Review and improve the ordering system for malaria products nationwide and the process of tracking of VHWs stock, which should include tracking of actual stock consumed and remaining stock in the community. Quantification and supply of ACTs should consider the epidemic profile of malaria in the country and various districts to ensure availability of all presentations in the

right quantities to minimize cutting and combining of presentations. Health facilities should enhance the supervisory/oversight link with the VHWs.

- Improve data quality in the Zimbabwe Assisted Pull System (ZAPS) by strengthening the use of available data tools to ensure accurate reporting of consumption and other logistic parameters, and appropriate-level training of staff on the ZAPS Standard operating Procedures (SOPs), stock management trainings, and mentoring at facility level. An electronic LMIS will improve tracking of medications and linking to electronic patient data will allow for a more accurate representation of actual consumption.
- Implement an evaluation of ZAPS to isolate and quantify the challenges and issues that need to be addressed. In the medium to long term, strengthen the logistic system to improve tracking and management of commodities and ensure the availability of standard data collection tools, while implementing shorter-term interventions (e.g., trainings on existing tools) to improve recording and dispensing practices.

The NMCP and partners should consider implementing the following recommendations to address the disparity between cases and ACTs consumption.

- Institutionalize the comparison of case data and logistics data at supervisory and health facility level. Include these in support and supervision tools, monitoring, and data quality assessments at district and provincial level. Increase the capacity for malaria data aggregation, analysis, and use at lower levels. This could help increase awareness of the disparity problem at lower levels.
- Review the number and content of different malaria data collection tools at facility and community level to rationalize and streamline the processes and reduce workload associated with filling in multiple forms that collect similar information.
- Improve the interoperability of LMIS and DHIS2 through an integration mechanism or a platform to compare the data sets to improve data quality monitoring by all users and to better align data flow and processes (e.g., a platform such as MS Access or similar that brings together LMIS and DHIS2 data for analysis prompting a deeper look at possible contributing problems)

# 1. INTRODUCTION

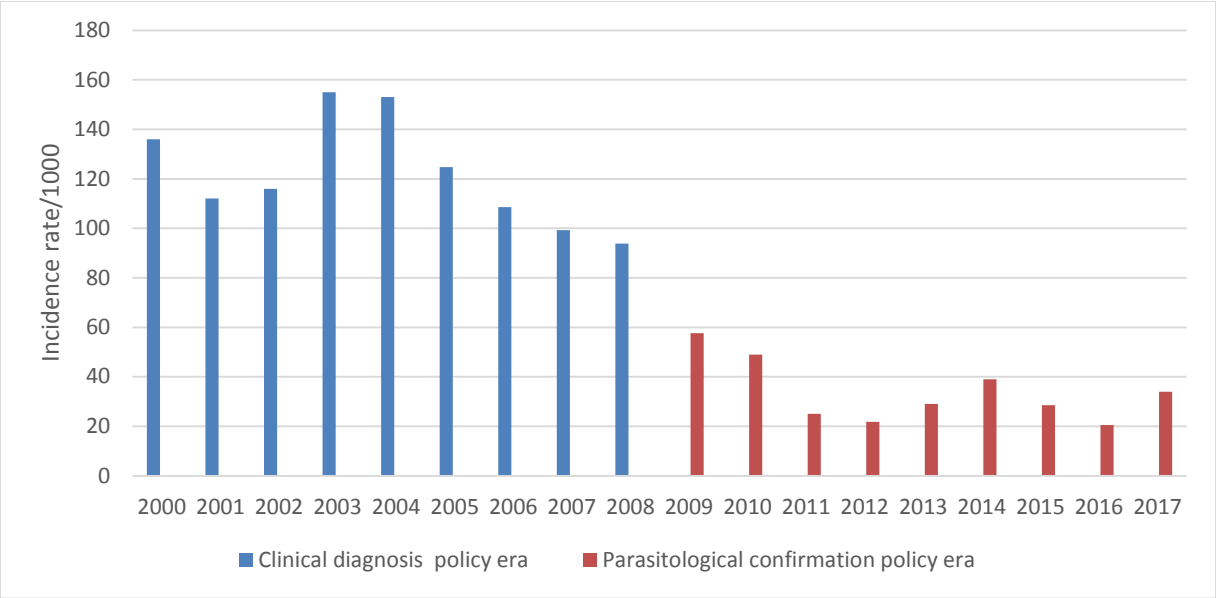
## 1.1 BACKGROUND

The primary mandate of the Zimbabwe Ministry of Health and Child Care (MOHCC) is to provide the highest possible level of health and quality of life for all its citizens (Zimbabwe MOHCC Vision and Mission Statement, 2016). Zimbabwe works toward achieving this directive by coordinating with various MOHCC departmental and supporting partners. The National Malaria Control Program (NMCP) and the Directorate of Pharmacy Services (DPS) are particularly critical entities for the prevention and control of malaria. The NMCP provides leadership in controlling malaria and is tasked with coordinating the implementation of all malaria control activities. The aim of the DPS is to provide available resources for high quality medicines and medical supplies that are safe, effective, accessible, and affordable. The country also has a robust national policy which ensures rational use of the medicines and medical supplies from the Essential Medicines List for Zimbabwe and related pharmaceutical guidance. Additionally, the Zimbabwe's parastatal National Pharmaceutical Company (NatPharm) is responsible for the procurement, storage, and distribution of commodities. Finally, the MOHCC, central, provincial, district, and mission hospitals, rural health centers, and Village Health Workers (VHWs) provide diagnosis and care for malaria patients, document cases, and participate in the ordering and management of malaria commodities.

Zimbabwe introduced artemisinin-based combination therapy (ACT) as the first-line treatment for uncomplicated malaria in 2006 and achieved a full roll-out of the policy in 2007. In 2009, a policy to use ACTs for parasitologically-confirmed cases was developed, with malaria rapid diagnostic tests (RDTs) deployed as the main tool for diagnosis in all facilities. The roll-out of RDTs for use by VHWs at the community level occurred in 2014 and has continued to be scaled up over recent years. The policy requiring parasitological confirmation before treatment contributed to improvements in the identification and recording of malaria cases and was among the factors associated with a drop of malaria incidence from 94 per 1,000 population in 2008 to 58 per 1,000 per population in 2009. The national incidence of malaria has continued to drop since 2009. This decline is partly attributed to increased, consistent support for and implementation of programs to boost malaria prevention and treatment (e.g., use of long-lasting insecticide-treated nets, indoor residual spraying, malaria case management training and supervision, and encouragement of timely treatment seeking for suspected malaria by Zimbabweans).

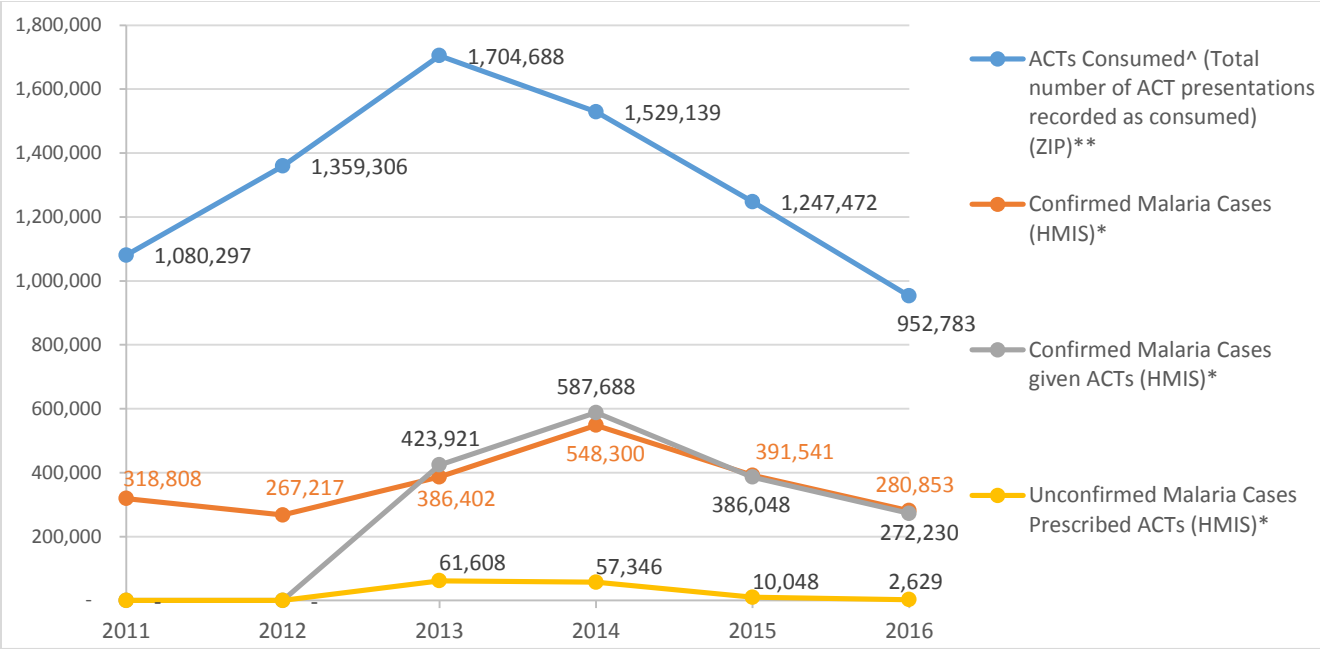
Because of the multi-faceted approach employed by the NMCP, there have been successful gains in malaria prevention and control as evidenced in Figure 1 below, which illustrates the changes in malaria incidence in Zimbabwe from 2000 to 2017.

**FIGURE 1: MALARIA INCIDENCE TREND IN ZIMBABWE, 2000-2017**



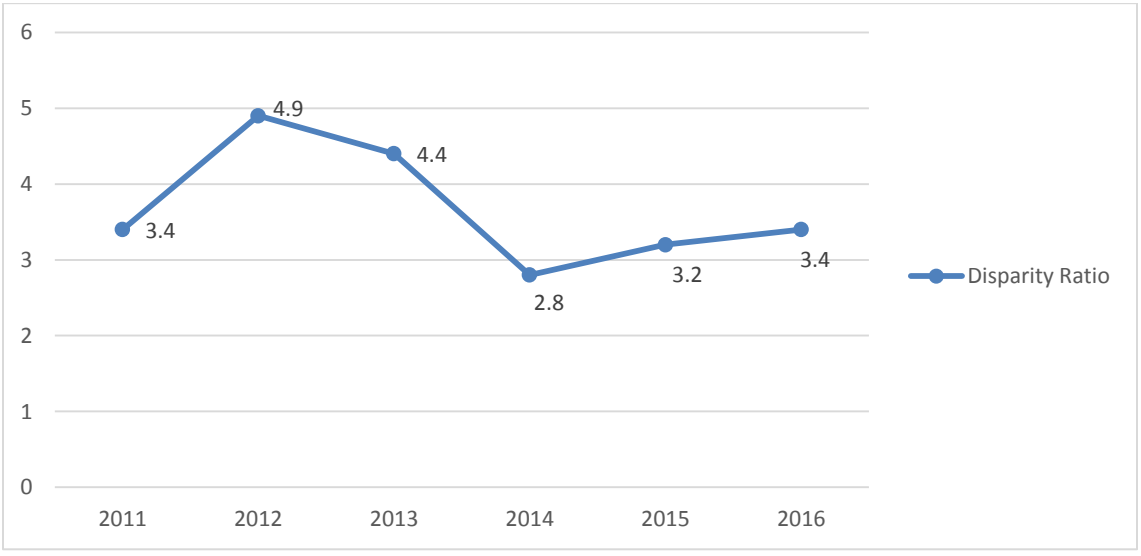

Historical data shows that there has been a wide disparity in recorded malaria cases and consumption of ACTs (Figure 2), with an average ACT consumption-malaria case ratio of 3.6:1 from 2011 to 2016. Despite the reporting of progressively fewer cases and decreased overall ACT consumption in more recent years, this disparity ratio increased from 2014 to 2016 (Figure 3).

**FIGURE 2: CONFIRMED MALARIA CASES AND ACTS CONSUMED IN ZIMBABWE, 2011- 2016**




**Sources:**
*Health Management Information System (HMIS): the nationwide data system that records cases of disease and health conditions.
** Zimbabwe Informed Push System (ZIPS) is the nationwide, assisted push system that distributed commodities to health facilities.
^ACTs consumed according to ZIPS/ZAPS is a calculated figure that takes into account physical count, loses and adjustments and days of stock out.

**FIGURE 3: ACTS CONSUMED VS. CONFIRMED MALARIA CASES, 2011-2016**




Zimbabwe began collecting malaria medicines consumption data in 2009 using the ZIPS reports. The MOHCC also uses other systems to record, aggregate, report and order health commodities at health facilities, including malaria commodities (e.g., the emergency order system which allows facilities to order commodities outside the quarterly NatPharm delivery rounds). NMCP and malaria partners have

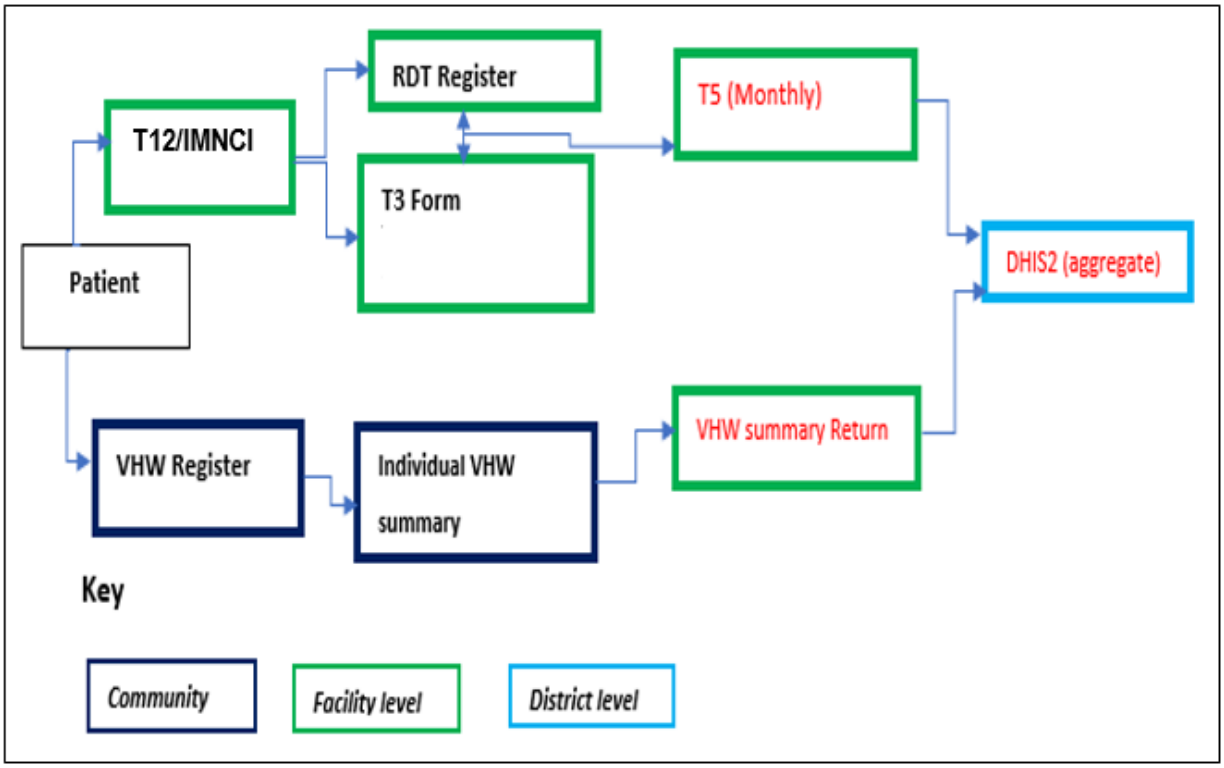
previously used a morbidity based quantification forecast for procurement decision-making before consumption based forecast when ZIP was rolled out. When Community-based Health Workers (CBHWs) started testing and treating malaria in 2014, new components of the commodity logistics system were introduced so that the VHW commodity data could be integrated into the larger MOHCC system.

### 1.1.1 Health Management Information System

The HMIS houses malaria disease surveillance data nationwide. Under this system, MOHCC/NMCP uses a series of standardized forms and registers, including the 'T series' or 'Task' forms and registers, to collect and aggregate various malaria data elements from the national health system. Facility staff at health facility level and VHWs at community level are required to record data on the designated forms and registers. At health facilities, the MOHCC requires staff to use outpatient department (OPD) registers (T12 and Integrated Management of Neonatal and Childhood illnesses (IMNCI) Registers) to record patient symptoms, tests, diagnoses, and treatments. Facilities also have improvised RDT Registers, which facility staff use to record malaria tests administered and test results. In some instances, staff also record treatment in the RDT register although this is not a policy requirement. Information from OPD and RDT registers is tallied on a Tally Sheet (T3) which indicates the number of patients with each particular diagnosis, suspected malaria, and confirmed malaria cases. The information is then consolidated on a monthly basis onto the T5 Return Form for each facility. The facility-level consolidated T5 Return Form is sent to the district monthly for entry into the District Health Information System, Version 2 (DHIS2) database by the District Health Information Officer. The DHIS2 is an integral part of the HMIS (Figure 4).

All VHWs offering malaria treatment also have RDT/Medicines Registers in which they enter all patients tested for malaria and indicate the results and treatment for the confirmed cases. At the end of each month, each VHW fills in a VHW Malaria Return Form with the numbers of suspected malaria cases (all tested cases), confirmed malaria cases, and the treatments given. Each VHW returns the form to their affiliated health facility or rural health center. At the rural health center, all the VHW Malaria Return Forms are aggregated onto the facility VHW Return Form on a monthly basis and this is forwarded to the district for entry into the DHIS2 Database.

**FIGURE 4: FLOW OF MALARIA DATA IN THE ZIMBABWE HMIS SYSTEM**




### 1.1.2 LOGISTIC MANAGEMENT INFORMATION SYSTEM

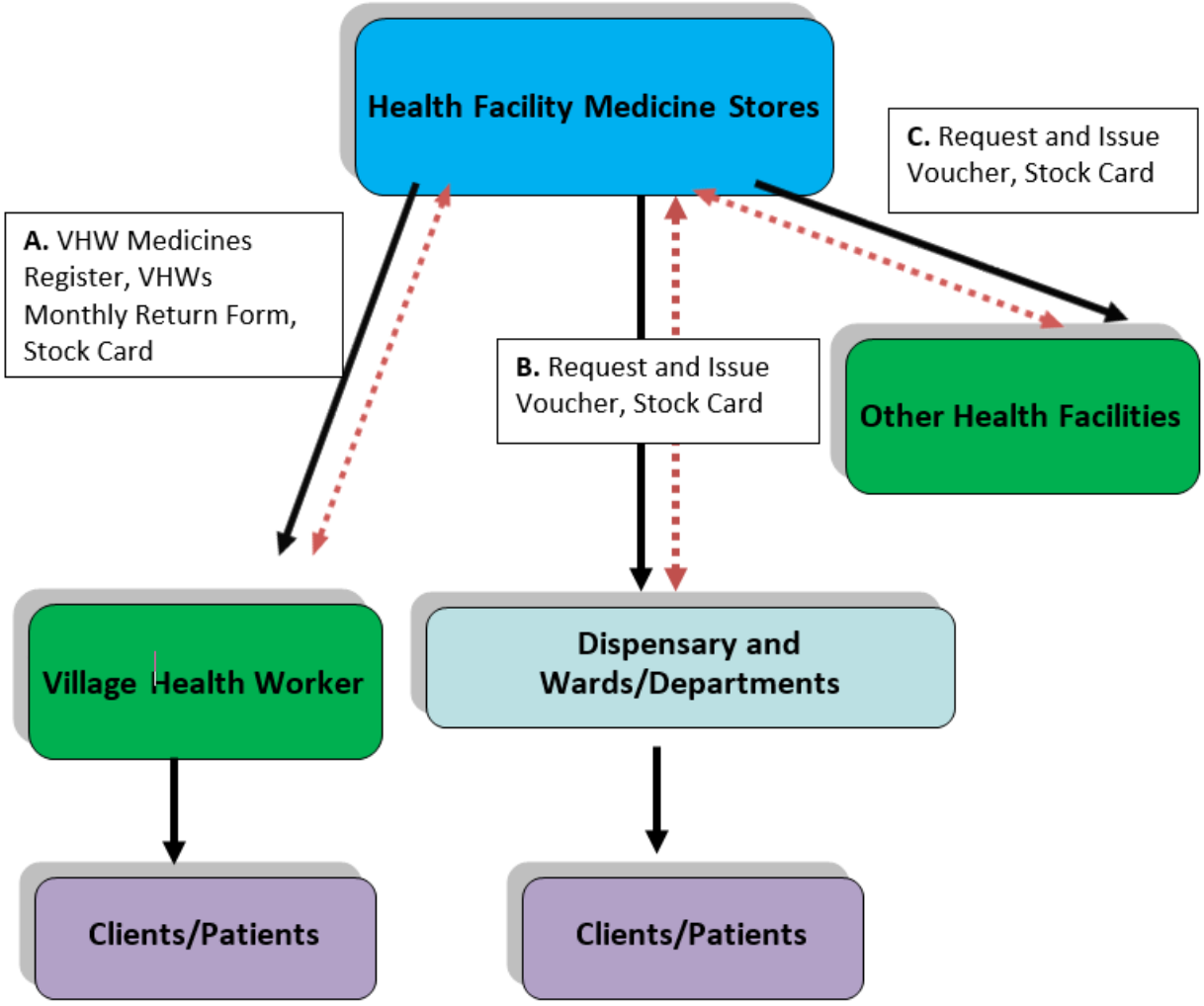
The Logistics Management Information System (LMIS) manages the data related to commodity stock status and need, including malaria commodities. The LMIS, together with the HMIS, should provide the Zimbabwe MOHCC/NMCP with a complete picture of malaria cases and commodities over time and in all areas of the country. The health facility-level processes of importance to this assessment are illustrated within the LMIS flow diagram (Figure 5).

It is important to note that the LMIS collects data on commodities issued at the health facility level as a proxy for commodity consumption. LMIS data shows the quantity of each presentation of ACTs presumably consumed for each patient's treatment course. LMIS assumes that each malaria case uses one presentation of ACTs. However, there are issues that complicate the matching of consumed ACT courses to malaria cases and, depending on the type of ACT presentation actually used to treat the patient, the presumed consumption data may not match the malaria case data. For example, when a malaria treatment presentation is used due to unavailability of another (i.e., if four strips of 1x6 Coartem® are dispensed instead of one 4x6 presentation) the LMIS data collectors will record four strips of 1x6 as reflected on the stock card. However, these four strips of 1x6 may have been used for only one adult patient and not four children. Thus, the necessary reconciliation of ACT presentations used for each patient cannot be done in LMIS which creates an apparent mismatch and disparity.

The consumption data as defined and calculated under the LMIS assumes the following are true:

- All storerooms stocks are counted when teams collect data. This includes pharmacy storerooms, dispensaries, wards or any departments where stocks are kept.
- Expiries are accounted for and discounted in the calculation of consumption.
- Stock transfer-out and transfer-in are recorded appropriately.
- Stocked-out days are approximated from stock cards and calculated by facility staff accurately.
- Stocks issued to VHWs are considered consumed.

**FIGURE 5: FLOW OF MEDICINE INFORMATION AND COMMODITIES AT HEALTH FACILITY LEVEL IN ZIMBABWE**




**Note**: Black line indicates flow of products and dotted line flow of information

### 1.1.3 From Zimbabwe Informed Push System to Zimbabwe Assisted Pull System

The ZIPS was one of four parallel systems used to manage Zimbabwe's health sector supply chain system. It was based on a rolling warehouse concept that used an informed push mechanism, distributing malaria commodities, tuberculosis (TB) commodities, and 26 selected essential medicines and medical supplies to approximately 1,600 service delivery points quarterly. ZIPS was piloted in 2009 and quickly rolled out. It allowed, for the first time, collection of data on consumption, stock on hand, and losses and adjustments for malaria commodities. For the selected essential medicines and supplies, pharmacy cadre used patient attendance data to determine how many Primary Health Care Package (PHCP) kits to leave at the facility.

The MOHCC Directorate of Pharmacy Services (DPS), in conjunction with NatPharm, provided leadership to the ZIPS, including spearheading the annual national quantification process and mid-year updates. However, the need to integrate the multiple supply chain systems and add a more active role

for health facilities led to the Zimbabwe Assisted Pull System (ZAPS), which included the management of all health commodities under a harmonized system of assisted ordering to create cost-efficiency without sacrificing data availability and maintaining the low stock out rates realized under ZIPS. Rollout of ZAPS began in 2014 and is now essentially complete. The system is built on the technology and lessons learned from the ZIPS and other systems, while removing the limitations on the number of products that the system can manage by integrating the transport, warehousing, and management information systems.

ZAPS places the responsibility of picking, packing and delivery of commodities on the NatPharm team. Health facilities are responsible for stock management and ordering of commodities assisted by the District Pharmacy Manager (DPM).

For malaria commodities, the DPM would gather information from the stock card and physical counts of stock available to calculate the consumption and available stock and top up as necessary to leave a maximum of six months of stock at the facility. The DPM, with assistance from the health facility staff, conducts a physical count of all malaria commodities stock at the facility. This includes pharmacy storerooms, dispensaries, wards, or any departments where stocks are kept. From the stock cards, expiries, stock transfers in and out, issues to VHWs, damages to commodities, and days of stock outs are considered in the calculations.

Using data from ZAPS, the quantification of malaria commodities is still integrated with other program commodities such as TB, HIV/AIDS, medicines for opportunistic infections, and other essential medicines and medical supplies. The DPS leads an annual quantification process, including a semi-annual update, in consultation with the NMCP. The MOHCC and partners participate and provide input to the quantification exercise.

### 1.1.4 Malaria Case and ACT Consumption Rapid Assessment in 2014

An NMCP team and partners, supported by the Clinton Health Access Initiative (CHAI), performed a rapid assessment in 2014 that sought to determine the causes of disparities between recorded malaria cases and ACT consumption noted at that time. It is important to note that this rapid assessment was limited in scope and that the facility sample size was small.

The rapid assessment identified some of the possible causes of the disparities including: combining and splitting ACTs presentations; inaccurate tallying of cases and inconsistencies, especially during outbreaks or situations of increased cases. The assessment also outlined other causes, including: poor documentation; lack of a proper RDTs registers; late submission of the VHW reports; and subsequent lack of inclusion of VHW data for both confirmed cases and ACTs dispensed on the submitted monthly T5 Form. The rapid assessment report noted that in one district, when ACTs were supplied to VHWs for their stocks to treat parasitological-confirmed malaria patients, they were then classified as consumed. The district facilities did not account for their linked-VHW consumption and cases, forming an inaccurate picture of malaria cases and ACTs consumed. The rapid assessment report also noted that increased consumption of ACTs may have been due to stock outs of RDTs in some of the areas, since fever cases may have been treated presumptively without parasitological diagnoses. The practice of dispensing to presumed malaria cases was, however, not found to be widespread.

Recommendations from the assessment highlighted the need to improve data quality in both HMIS and LMIS (ZIPS). The President's Malaria Initiative (PMI) supported the response to some of the study recommendations by sponsoring commodity distribution data quality workshops for pharmacy personnel held in both the northern and southern regions of Zimbabwe. The workshop participants designed and shared action plans to improve data quality. A system for recording and aggregating VHWs data onto monthly return forms was also developed and the data is now available in DHIS2. Many of the recommendations have not been fulfilled due to various reasons, including funding challenges.

## 1.2 Assessment Objectives

MOHCC and partners have determined that the wide disparity between malaria cases recorded and first-line ACT medicines consumed persists, despite some actions taken to address the situation following the 2014 rapid assessment. As a result, the MOHCC and partners conducted a follow-on assessment in 2017, which considered the approach, findings, and recommendations of the 2014 rapid assessment, but expanded the scope and scale to produce results and recommendations that are more representative and conclusive. The objectives of the 2017 assessment were as follows:

### 1.2.1 Primary Objectives

a. Determine the factors that contribute to the observed disparities recorded between the first-line ACT consumption and reported malaria cases.

b. Determine and describe the magnitude, temporal trends, and geographical distribution of observed disparities between first-line ACT consumption and reported malaria cases from 2014-2016.

c. Recommend actions to address the various contributing factors identified.

### 1.2.2 Secondary Objectives

a. Verify the accuracy of data reported by facilities within HMIS and LMIS.

b. Assess the adequacy and reliability of the current data collection tools for malaria case and commodity data needs within the HMIS and LMIS.

c. Evaluate:

   i. Practices of health facility staff and VHWs for recording and reporting of malaria case and ACTs consumption data.

   ii. Practices of district pharmacy managers for determining order quantities.

   iii. Practices of central level LMIS staff for aggregation and reporting logistics data.

d. Describe the treatment and recording practices at facilities and VHWs in specific scenarios, namely:

   i. During malaria outbreaks.

   ii. When specific first-line ACT presentations are not in stock.

   iii. When RDTs are not in stock.

# 2. METHODOLOGY

## 2.1 HISTORICAL DATA DESK REVIEW

Prior to this study, at protocol development phase, the study team conducted a desk review of HMIS and LMIS data. Specifically, malaria morbidity and first-line ACT consumption data were extracted from the DHIS2 (HMIS) and LMIS, respectively, for calendar years 2014-2016 for national, provincial, district, and health facility levels. Since it is estimated that 97 percent of all malaria cases are uncomplicated cases which require first-line ACTs[1], the study therefore focused on this medication. The primary data elements included confirmed malaria cases (extracted from T5 forms and VHWs Return Form entries in the DHIS2) and first-line ACT consumption (extracted from medicine distribution reports ZIPS/ZAPS). Disparities in cases and consumption (i.e., simple ratios between these two variables) were then calculated for all facilities, which were then aggregated at the district and provincial levels, as well as across facility types to observe patterns that exist. Patterns from the three relatively high malaria provinces of Manicaland, Mashonaland East, and Mashonaland Central were then compared to national-level findings and informed the selection of health facilities from these provinces to include in the survey.

## 2.2 STUDY DESIGN

### 2.2.1 TIME FRAME

The desk review covered the entire period of 2014 to 2016. However, for the survey and primary data collection, the study team focused on the more recent time frame of October 1, 2016 to March 31, 2017 for health facility and VHW data collection to:

- Ensure a more up-to-date situational assessment given certain changes in LMIS and HMIS operations.
- Ensure better availability of written records for data review.
- Maximize the recall of interviewees for the time period in question.

The time frame for the data collection also considered the timing of increased seasonal transmission of malaria in Zimbabwe. This is the period from December of one year to May of the following year and is also associated with increased malaria morbidity and commodity consumption.

### 2.2.2 SAMPLING FRAME

In Zimbabwe, malaria transmission occurs in 45 of the 62 rural districts with up to 80 percent of the national malaria burden occurring in the three provinces of Manicaland, Mashonaland East, and Mashonaland Central. The study team used a multi-stage sampling technique. The three provinces with the highest malaria burden were purposively selected. The team analyzed LMIS and HMIS data from the provinces following the desk review by district to identify the case-consumption disparity in the districts. The study team selected two districts – one with the largest and another with low calculated ACT-to-case consumption disparity– from each province for a total of six districts. Facility selection was conducted as follows:

[1] Estimates from routine reporting data obtained from HMIS

a. District-level facilities: all the district hospitals from the six districts (one per district) were purposively selected.

b. Clinics: health facilities were randomly selected proportionate to size, defined by the number of health facilities in each district. Based on the total number of health facilities in the districts, a total sample size was calculated and distributed proportionately among the six districts. The required number of health facilities in each district was then randomly selected, giving each facility an equal chance of selection. All facilities including government, church affiliated, private and local council-run facilities were included in the sampling frame.

For each selected rural health center or clinic, five VHWs were randomly selected in consultation with the District Nursing Officer or Nurse-in-Charge for interviews and assessment of their records. Where available, one School Health Master was selected among the five VHWs.

### 2.2.3 Data Collection

The study team designed data collection tools to collect information for the key data points as explained under HIMS and LMIS sections above. The following data elements were tracked and reviewed at the primary data collection and aggregation level:

- Number of suspected/unconfirmed malaria cases (T5, VHWs Return Form and OPD registers).
- Number of confirmed malaria cases (T5, VHWs Return Form and OPD registers).
- Number of tested cases (T5, VHWs Return Form and OPD registers).
- ACTs given to confirmed cases (T5, VHWs Return Form and OPD registers).
- Number of ACT presentations issued (ZIPS/ZAPS).
- Number of RDT tests issued (ZIPS/ZAPS).
- Adjustment data for ZIPS/ZAPS (Stock Card, Summary Sheet at Facility, ZIPS/ZAPS dataset).
- ACTs and RDTs issued to facilities and VHWs (Stock Card).

The information from the primary and data aggregation levels for facilities and VHWs were then compared with the LMIS and DHIS2 systems data for the facilities for the same time periods to determine reliability, completeness, and accuracy. The study team used semi-structured questionnaires and interview guides to collect qualitative data from key informants, including: selected VHWs, pharmacy staff, nurses, doctors and Health Information Officers (HIOs) at health facilities; District Health Executive (DHE) members; and Provincial Heath Executive (PHE) members These tools were field tested and then improved prior to use.

A sample of each data collection tool is included in Appendix 3. They include:

1. The Provincial Health Executive Questionnaire (PHEQ).
2. The District Health Executive Questionnaire (DHEQ).
3. The District Pharmacy Manager Questionnaire (DPMQ).
4. The Central level LMIS Focus Group Discussion Questionnaire (FGDQ).
5. The District Health Information Officer Questionnaire (DHOQ).
6. The Health Facility Questionnaire (HFQ).
7. The Village Health Worker Questionnaire (VHWQ).
8. The HMIS Data Collection Form (HMISF).
9. The Village Health Worker Return Form (VHWRF).
10. The Facility Physical Count Form (FPCF).

11. The Facility Stock Out Form (FSOF).
12. The Facility Losses Adjustment Form (FLAF).

The following primary data sources were reviewed for malaria data:

- OPD registers (T12 and IMNCI). T12 register is a register of all cases seen in OPDs at facilities. The IMNCI register is used to record all cases of children aged below 5 years seen as outpatients at facilities and by VHWs.
- T5 Return Forms. These are used by facilities to report the total cases seen by heath facilities by diagnosis and treatments given on a monthly basis. For malaria, the form reports all suspected cases, cases tested, confirmed cases and cases given ACTs.
- T3 Tally Sheets. Health workers at facilities are expected to tally by diagnosis all cases they see in OPD.
- RDT Registers. These record and track the use of RDT kits by indicating names of patients tested and the result of the test.
- CBHW RDT/Medicines Registers. VHWs use these to record all patients they test for malaria, indicate the results of tests, and indicate the ACTs given by presentation.
- VHW Return Forms (individual VHW Return Forms and aggregated, facility-level VHW Return Forms). Each VWH who tests and treats for malaria submits a return form monthly indicating the numbers of cases suspected, tested, confirmed and given ACTs. At the health facility, the staff aggregates all the data on to the facility VHW Return form, which is sent to the District for reporting in DHIS2.
- Stock Cards. These are records kept at facilities indicating all stock received by the facility, issues to VHWs, transfers in and out, expired, and damaged stock of medicines and commodities.

## 2.3 Training and Field Work

### 2.3.1 Training

The training of 15 data collectors and nine national supervisors took place on July 19–21, 2017 at Mazowe Hotel in Mashonaland Central Province. The data collectors were drawn from Community Health Nurses, District Pharmacy Managers, Provincial and District HIOs, with the supervisors being national-level staff from various partner organizations. The partners included NMCP, the Zimbabwe Assistance Program in Malaria (ZAPIM), Chemonics, CHAI, PMI, MOHCC Department of Pharmacy Services, and MOHCC National Health Information System. The same partners facilitated the training. The training sessions covered the following areas:

- Training objectives and expectations.
- Background of the case-ACT consumption disparity and assessment, including the overview of the protocol.
- Overview of HMIS and LMIS.
- Detailed review of all the data collection tools.
- Roles and responsibilities of the field staff.

The data collection tools were revised during the training and again after the pre-testing exercise. The study team pre-tested the tools in Mazowe District through the PMD's Office. Health facilities, which are near the training venue that were not part of the sampled sites, were selected for the pre-testing exercise.

### 2.3.2 FIELDWORK

Data collection took place from July 24 to July 28, 2017. Seven teams were formed according to members' expertise in HMIS and LMIS. Each team was comprised of four team members (data collectors and national supervisors), and was allocated a district, with the exception of one urban district, Mutare, which had two teams. The national-level staff, comprised of the partners listed above, was not only responsible for supervising the data collectors, but also assisted in data collection. Data were collected using paper-based questionnaires and forms. All team members verified completed interviews in the field on a daily basis, and all data collection forms and questionnaires were submitted to one national team member for storage. A daily checklist was used to record all the interviews conducted. A national-level staff member from each team sent the number of interviews conducted to the NMCP representative via SMS daily.

## 2.4 ETHICAL CONSIDERATIONS

The assessment was programmatic in nature and designed to strengthen monitoring and evaluation activities within the MOHCC/NMCP in liaison with various supporting units and departments. The MOHCC reviewed the protocol for the assessment. It was determined that written permission from the MOHCC Permanent Secretary of Health to conduct the assessment would suffice, hence the assessment team did not seek ethical clearance from Medical Research Council of Zimbabwe. The protocol was also reviewed and approved as a non-research activity by the Deputy Director for the Division of Parasitic Diseases and Malaria and the Associate Director for Science Office within the U.S. Centers for Disease Control and Prevention's Center for Global Health. In addition, the ZAPIM team sought and secured approval by Abt Associates' Institutional Review Board.

No patients were interviewed or interacted with during the course of this assessment. Only health facility staff and VHWs (all over the age of 18) working under the Zimbabwe MOHCC were interviewed to assess their understanding of the malaria case management and data recording practices that they undertake as part of their normal job responsibilities. Their opinions were also elicited on the possible causes of the observed discrepancies. Names of participants were not recorded during data collection, and the study team maintained confidentiality during data collection, collation, and analysis. Confidentiality was also maintained during findings dissemination among the core study team members. Following data entry and collation, forms were retrieved and kept by the MOHCC in a lockable cabinet in a secure environment. Electronic data was entered onto a secure database on a password protected machine, from which the analysis was carried out. Access to the data was restricted to selected members of the investigating team. All information obtained during the course of this survey was used solely for the purposes of assessing the LMIS and HMIS and seeking ways of addressing the observed disparity. No physical, psychological, or other harms to interviewed staff resulted from this assessment.

## 2.5 DATA PROCESSING AND ANALYSIS

### 2.5.1 DATA PROCESSING AND QUALITY ASSURANCE

The study team utilized a variety of complementary quality control measures and checks to ensure that the data and findings were of high quality. Some of the controls include the following:

- **Training**: All participants involved in the survey received comprehensive training to strengthen their capacity in their designated area of focus. All data collectors and supervisors were trained on the data collection tools at one central location, which ensured the sharing of the same information and understanding of the survey objectives, instruments, and expected study output.
- **Field teams supervision**: Supervision was conducted by national-level staff for each field team. The supervision included observing the interviews and reviewing the completed questionnaires and forms.

- **Collaborative data analysis**: Partner representatives and subject experts constituted the data analysis and writing team and were involved in the analysis of findings to ensure data verification and interpretation of the results within the proper context.

### 2.5.2 Data Analysis Plan

The assessment team collaboratively developed a draft data analysis plan during the design/protocol development phase, which was revised following data collection. Changes made to the tools were reflected in the analysis plan after field-testing, and a final, detailed data-analysis plan was developed at the data analysis phase. Appendix 1 shows the detailed data analysis plan that guided every step of data analysis, in-line with the objectives of the assessment.

# 3. RESULTS

## 3.1 SAMPLE CHARACTERISTICS

### 3.1.1 FACILITIES DESCRIPTION

Based on the sampling protocol described above, 72 facilities comprising 61 clinics and 11 hospitals were selected for the study from six districts in three malarious provinces. Table 1 below shows the distribution of facilities selected within each district and province. As the number of clinics in each district were selected proportionate to size (defined by the total number facilities in the district) Manicaland had the highest number of selected facilities (n=30). This correlates well with the relative burden of malaria, which is also highest in the province.

**TABLE 1: DISTRIBUTION OF SAMPLE PROVINCES, DISTRICTS, AND FACILITY TYPES**

| Province | District | Facility type | | Totals | |
|---|---|---|---|---|---|
| | | Clinic | Hospital | | |
| Manicaland | Buhera | 10 | 2 | 12 | 17% |
| | Mutare | 14 | 4 | 18 | 25% |
| Mashonaland Central | Mazowe | 10 | 2 | 12 | 17% |
| | Mt Darwin | 8 | 1 | 9 | 13% |
| Mashonaland East | Goromonzi | 9 | 1 | 10 | 14% |
| | Murewa | 9 | 2 | 11 | 15% |
| Total | | 60 | 11 | 72 | 100% |

### 3.1.2 RESPONDENTS' DESIGNATION

At the facilities, the assessment team interviewed the Facility in-Charges to elicit the most accurate information. Table 2 depicts the designation of each eventual respondent. Three-fifths (61%) of respondents were Primary Care Nurse cadre level, while 32 percent of respondents were registered General Nurses, Matrons, or Sisters-in-Charge.

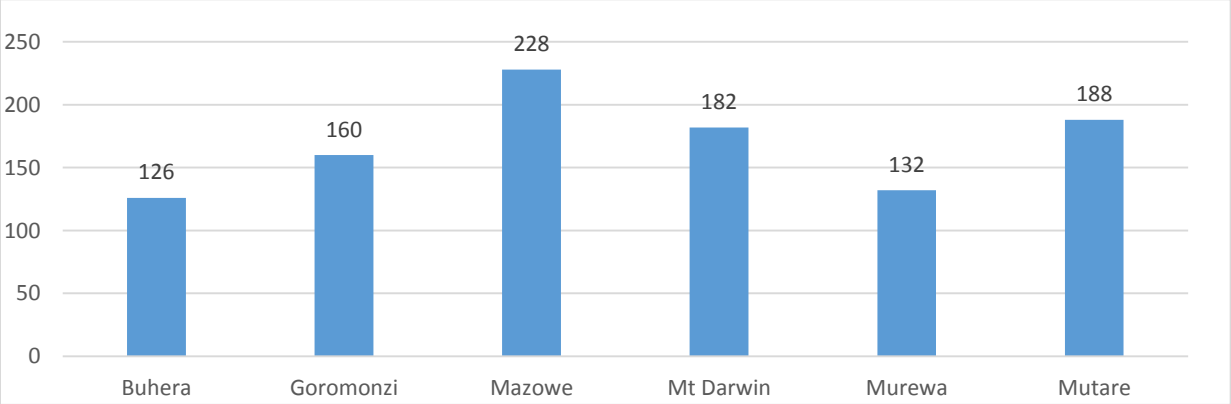
**TABLE 2: DESIGNATION OF RESPONDENTS AT FACILITY**

| Designation | Number | Percent |
|---|---|---|
| Primary Care Nurse (PCN) | 44 | 61.1% |
| Registered General Nurse (RGN), Matron or Sister-in-Charge | 23 | 31.9% |
| Other, predominantly Nurse Aids | 4 | 5.6% |
| Missing | 1 | 1.4% |
| Total | 72 | 100% |

### 3.1.3 Village Health Workers (VHWs) and Malaria Case Management

As reflected by the health facility respondents, the surveyed facilities have 1,016 VHWs attached to them, distributed in the study districts as represented in Figure 6.

**FIGURE 6: VHWS ATTACHED TO STUDY FACILITIES BY DISTRICT**




All facilities in the study had associated VHWs. Forty-five of facilities (65%) had VHWs that tested and treated malaria in the community, and 25 (35%) had VHWs that tested only and referred patients. Health facility respondents also indicated that of all 1,016 attached VHWs, 472 (46%) had received trainings in malaria case management and 172 (17%) test and treat. Table 3 shows the distribution of facilities by district and VHW malaria management functions.

**TABLE 3: DISTRIBUTION OF VHW MALARIA MANAGEMENT FUNCTIONS**

| Province | District | | VHW functions | | Total |
|---|---|---|---|---|---|
| | | | Testing and Treating | Testing only and referring | |
| Manicaland | Buhera | No. of facilities | 9 | 2 | 11 |
| | | **% within District** | **81.8%** | **18.2%** | **100.0%** |
| | Mutare | No. of facilities | 13 | 5 | 18 |
| | | **% within District** | **72.2%** | **27.8%** | **100.0%** |
| Mashonaland Central | Mazowe | No. of facilities | 3 | 9 | 12 |
| | | **% within District** | **25.0%** | **75.0%** | **100.0%** |
| | Mt Darwin | No. of facilities | 9 | 0 | 9 |
| | | **% within District** | **100.0%** | **0.0%** | **100.0%** |
| Mashonaland East | Goromonzi | No. of facilities | 5 | 5 | 10 |
| | | **% within District** | **50.0%** | **50.0%** | **100.0%** |
| | Murewa | No. of facilities | 7 | 4 | 11 |
| | | **% within District** | **63.6%** | **36.4%** | **100.0%** |

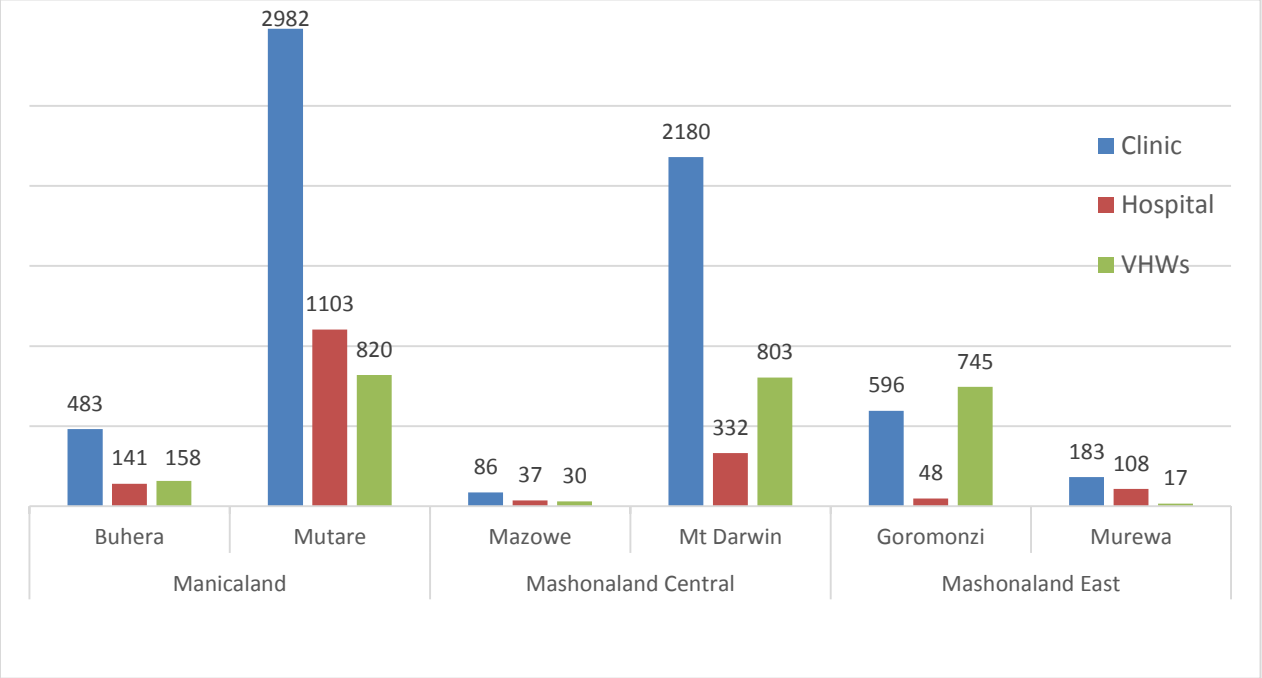
All facilities in the study had VHWs that at least test for malaria. All facilities in Mt. Darwin and 82 percent of facilities in Buhera District had VHWs that test and treat. However, only 25 percent of facilities in Mazowe District have VHWs that test and treat malaria at the community level. As stated in the methodology section above, 209 VHWs across the study districts were eventually interviewed and of these, malaria management case records were extracted directly from 199 of their individual return forms. Analysis of these records showed that VHWs administered ACTs to 87 percent of confirmed cases seen at community level.

## 3.2 Malaria Burden in Study Districts

### 3.2.1 Distribution of Burden in Facilities and Community

As stated above in the methodology section the study's three selected provinces and at least one of the two selected districts per province included in the study are among Zimbabwe's higher-burden (malarious) districts. Figure 7 shows the malaria burden per province, district and facility type as reflected by the total number of confirmed cases over the six month study period from October 2016 to March 2017 (DHIS2).

**FIGURE 7: MALARIA CONFIRMED CASES BY PROVINCE, DISTRICT, FACILITY TYPE, AND COMMUNITY LEVEL (VHWS) OCT 2016- MAR 2017**




Source: Study data as extracted from the HMIS OPD forms (T12 and IMNCI registers) at the facility level

Mutare District in Manicaland accounts for the highest number of cases in the sample over the period of study, accounting for over two-fifths (42%) of total cases seen. Mazowe District accounts for the lowest number of cases. Data shows that in the majority of study districts, more cases were seen at the facility level (clinics and hospitals) than at the community level (except in Goromonzi). Interpretation of this finding should consider that the VHW data and records kept at the facility were incomplete, and in several facilities, entire months of VHW data were unavailable or could not be assessed.

### 3.2.2 Distribution of Malaria Cases by Facility Type

As depicted in Figure 7 above, because there are more clinics than hospitals, overall more cases were seen at the clinics than at the hospitals. However, further facility-level analysis shows that more malaria cases were seen *per* hospital facility than at the clinic level. This emerges when comparing the average number of confirmed malaria cases seen per clinic and per hospital type in the study period, as shown in Table 4 below. At the district level, this pattern is the case across all districts with the exception of Goromonzi, and is particularly evident in Buhera and Murewa, where almost three times the number of malaria cases were seen at the hospitals.

**TABLE 4: AVERAGE NUMBER OF MALARIA CASES SEEN PER FACILITY BY FACILITY TYPE FOR PERIOD UNDER REVIEW**

| Province | District | Facility type | |
|---|---|---|---|
| | | Clinic | Hospital |
| Manicaland | Buhera | 48 | 141 |
| | Mutare | 213 | 276 |
| Mashonaland Central | Mt Darwin | 273 | 332 |
| | Mazowe | 9 | 19 |
| Mashonaland East | Murewa | 20 | 54 |
| | Goromonzi | 66 | 48 |
| | Total | 629 | 870 |

## 3.3 Observed Disparities Between Cases and Consumption

### 3.3.1 Magnitude of Disparity by Geographical and Service Location

The disparity between cases and commodity consumption in sampled facilities over the six month study period was determined by calculating the consumption-to-cases ratio (i.e., paired RDT testing to suspected malaria cases, and paired ACTs consumption to confirmed malaria cases). For this calculation, facility and community aggregates were determined separately from their respective registers and collated. Calculated disparity ratios were also disaggregated along the facility and community levels to give a clearer picture (Table 5). Facility level suspected and confirmed cases were aggregated from HMIS registers, and community-level cases were aggregated from the monthly facility VHW return forms. For ACTs consumption, data on ACTs issued from the drug room to the health facility dispensary and data on ACTs issued by health facilities to VHWs were collated for the facility and community level, respectively. Although subsequently referred to as consumption, it is important to note that the data on issued ACTS are only a proxy for actual consumption. As previously stated section 3.2.1, it is important to re-emphasize that the VHW case data was incomplete; and in several facilities, entire monthly data could not be assessed. For the RDTs-to-suspected cases disparity ratio determination, consumption data was secondarily pulled from the LMIS, given that RDT consumption data was omitted from the facility level stock card data extraction form and was thus not collected.

Tables 5 and 6 below and the corresponding Figures 8 and 9 depict the disparities calculations of suspected and confirmed malaria cases, and the testing by RDTs and ACTs consumption, respectively.

**TABLE 5: CONFIRMED CASES AND ACTS CONSUMPTION DISPARITIES DISAGGREGATED BY FACILITY AND COMMUNITY LEVEL, OCTOBER 1, 2016 TO MARCH 31, 2017**

| District | ACTs Consumed | Confirmed Malaria Cases | Disparity between ACTs Consumed and Confirmed Cases (Ratio) | Disparity at Facility level (Ratio) | Disparity at community/VHW level (Ratio) |
|---|---|---|---|---|---|
| Buhera | 1413 | 782 | 1.81 | 1.87 | 1.56 |
| Mutare | 8857 | 4859 | 1.82 | 1.78 | 2.05 |
| Mazowe | 261 | 153 | 1.71 | 1.63 | 2.00 |
| Mt Darwin | 15720 | 3315 | 4.74 | 1.82 | 13.90 |
| Goromonzi | 5573 | 1389 | 4.01 | 3.25 | 4.67 |
| Murewa | 1143 | 281 | 4.07 | 4.15 | 2.76 |
| **Total** | **32967** | **11652** | **3.06** | **1.99** | **6.48** |

**FIGURE 8: DISPARITY RATIOS, CONFIRMED CASES, ACTS CONSUMPTION BY DISTRICT AND PROVINCE**

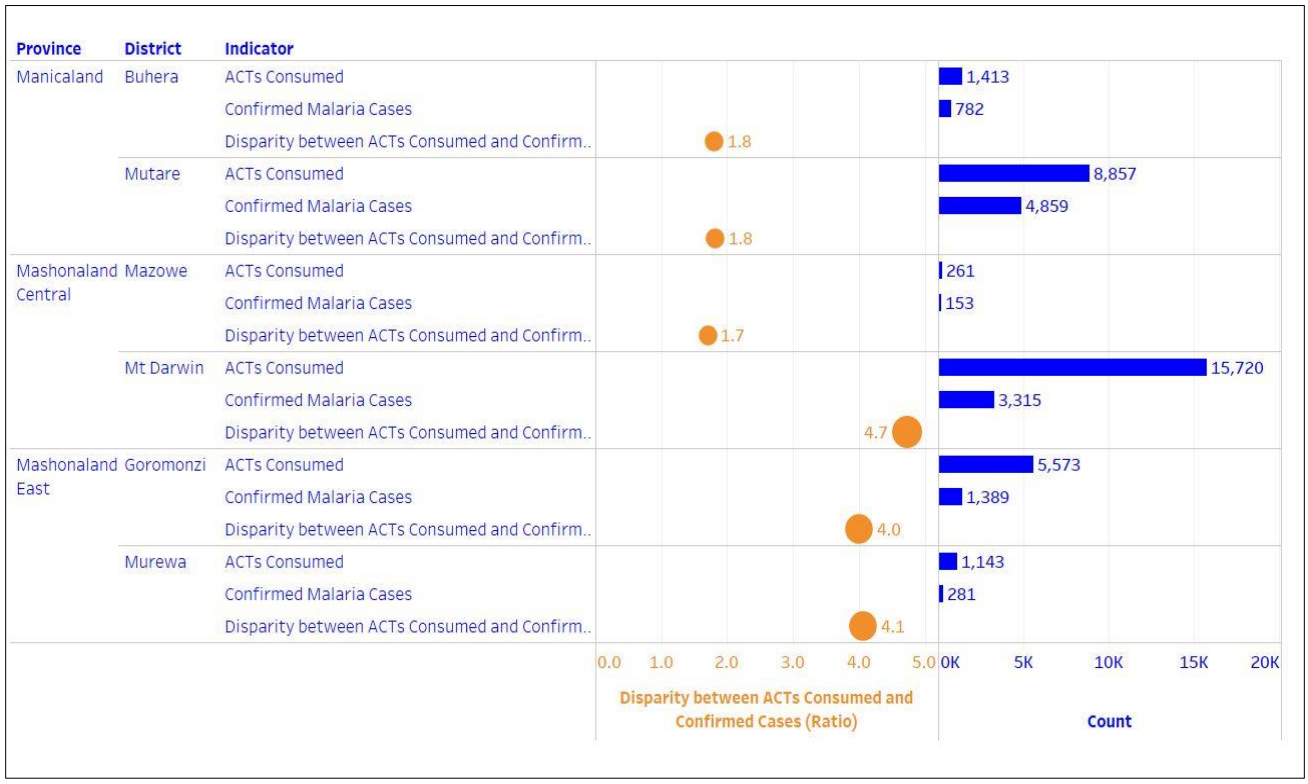
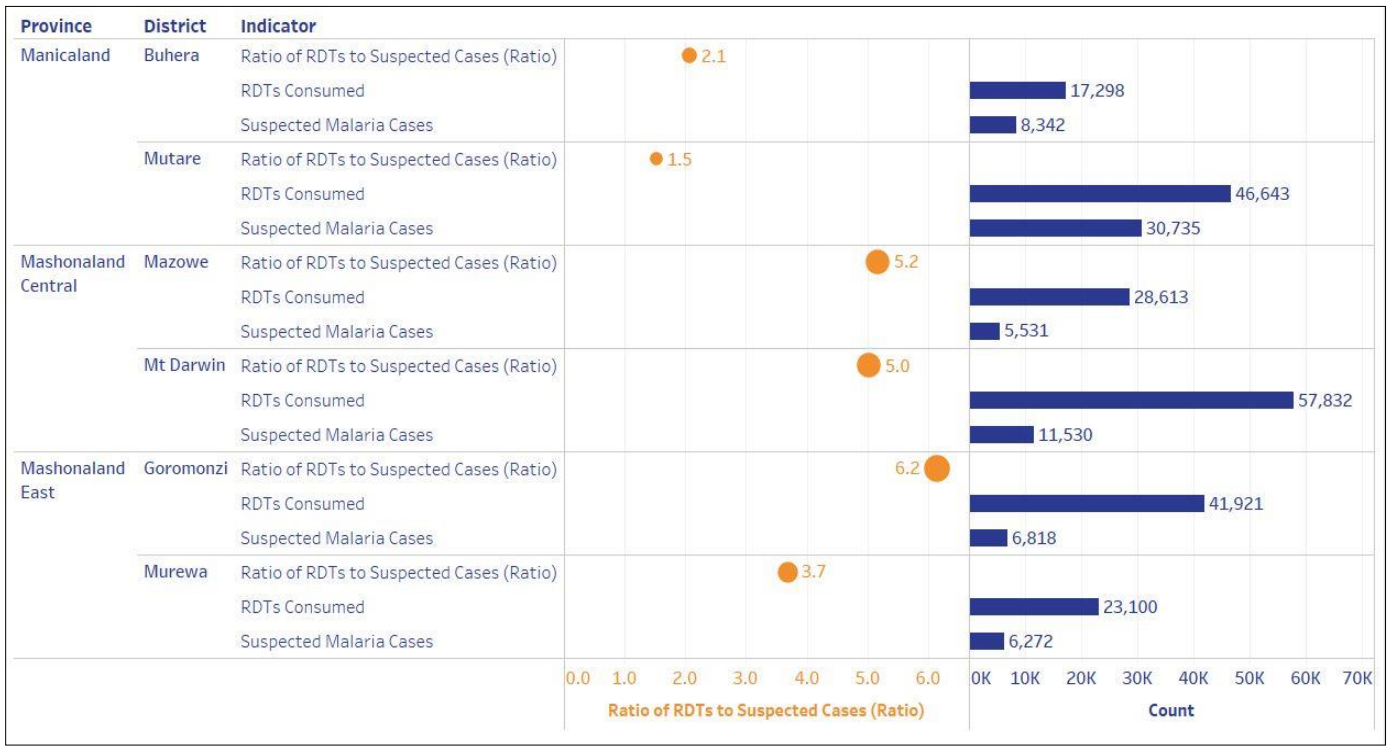


**TABLE 6: SUSPECTED CASES AND RDTS CONSUMPTION DISPARITIES OCTOBER 1, 2016 TO MARCH 31, 2017**

| District | RDTs Consumed | Suspected Malaria Cases | Ratio of RDTs to Suspected Cases (Ratio) |
|---|---|---|---|
| Buhera | 17298 | 8342 | 2.07 |
| Mutare | 46643 | 30735 | 1.52 |
| Mazowe | 28613 | 5531 | 5.17 |
| Mt Darwin | 57832 | 11530 | 5.02 |
| Goromonzi | 41921 | 6818 | 6.15 |
| Murewa | 23100 | 6272 | 3.68 |
| Total | 215407 | 69228 | 3.11 |

**FIGURE 9: DISPARITY RATIOS AND SUSPECTED MALARIA CASES, RDTS CONSUMPTION BY DISTRICT AND PROVINCE**




Overall, the assessment showed that in the observed facilities, 3.06 times more ACTs were consumed for the treatment of malaria than there were confirmed cases reported, and there were 3.11 times more RDTs used than there were suspected malaria cases. When disaggregated by facility and community, we see that there is more disparity for ACT consumption to cases at the community level (6.48), compared to the facility level (1.99).

Although not depicted in the tables and figures above, the data show an average malaria case confirmation rate of 13.6 percent when comparing confirmed to suspected cases across all districts. This means that for every confirmed case of malaria found, about seven suspected cases are screened. Finally,

since the available consumption data was not disaggregated by month, analysis could not be carried out to describe temporal trends over the six month period.

Due to unavailable historical data (i.e., case and consumption data over 39 months from Jan 2014 to March 2017), there was not an analysis of temporal trends or other associated patterns in cases or consumption disparities as originally intended, and as laid out in the primary objective 2 specified above in the Objectives' section. This unavailability of historical, discrete, facility-level primary data did not allow for a comparative analysis of primary data obtained from this survey to determine and note any similar patterns underlying the case consumption disparity hypothesis.

## 3.4 Factors Contributing to Observed Disparities between First-Line ACT Consumption and Reported Malaria Cases

### 3.4.1 Perceptions of Disparities

Table 7 below highlights perceptions about observed disparities between first-line ACT consumption and reported malaria cases among various cadres interviewed in the study. Kindly note that this survey question was open-ended and thus not all categories depicted in the table were mentioned by every respondent.

**TABLE 7: PERCEPTIONS ON AWARENESS OF AND CAUSES OF DISPARITIES IN ACT CONSUMPTION AND MALARIA CASES BY VARIOUS HEALTH WORKER CADRES**

| PERCEPTIONS* | | PHE (3) | DHE (6) | DPM (6) | Health Facility (72) | Community (209) |
|---|---|---|---|---|---|---|
| **Awareness of discrepancy between cases and consumption** | | 100% | 75% | 100% | 29% | 18% |
| **Prior Investigations to determine cause** | | 100% | 20% | 50% | | |
| **Stated Possible Causes for the disparity** | Combining ACT presentations | 100% | 100% | 100% | 4% | 7% |
| | Poor knowledge of tools | 100% | | | | 3% |
| | Poor recording practices | 100% | 100% | 100% | 38% | 67% |
| | Unavailability of dispensing registers | 100% | | | | |
| | RDT stock outs and management | | 100% | 100% | 3% | 3% |
| | Substandard dispensing practices | | | | 8% | 13% |
| | Workload | | 100% | 100% | 4% | 7% |
| | Possible pilferage | 67% | 0% | 17% | | |
| | Significance of possible pilferage | Not very | N/A | Not very | | |

Grey cells indicate that the cause was not a stated perception by the corresponding respondent
Black cells indicate that the question was not posed to the respondent

There was generally a high level of awareness of any disparity or discrepancy between cases and consumption at the administrative levels. Almost all (92%) of the Provincial and District Executives and

Pharmacy Managers were aware of disparities, with 57 percent of them having investigated causes of the disparities in their province/districts.

However, only 29 percent of respondents at the facility level and 18 percent of VHWs at the community level reported being aware of any disparities between cases and consumption.

The likely causes of the disparities, as professed by the administrative staff, include cutting and combining ACT presentations[2], poor recording practices, poor knowledge of data collection tools, workload issues, and RDT stock outs. At the facility and community level, the most commonly perceived cause for discrepancies was poor recording practices (38% and 67%, respectively). Other perceived causes at the facility and community levels included substandard dispensing practices (8% and 13%, respectively), combining ACT presentations (4% and 7%, respectively), workload (4% and 7%, respectively), RDT stock outs and management (3% for both cadres), and poor knowledge of tools (3% of VHWs only).

When asked about pilferage, two out of the three Provincial-level executive representatives interviewed perceived that "there may be some pilferage of ACTs", though they felt it was not very or only somewhat significant. Only 9 percent of district level administrators (DHEs and DPMs) perceived that there may be some pilferage of ACTs and said that it is not very significant.

### 3.4.2 Reasons for Disparities as Stated in Facility Forms

The findings above on perceived causes can be compared to the directly observed, stated causes on the HMIS forms and the LMIS FLAF. Table 8 below shows the various causes of disparities as stated in these forms when each indicator pair is compared. From interviews with the health facility staff, pressure of work or high workloads was the most frequent suggested cause of data discrepancy across the reporting tools at facility level by 30.3 percent of respondents. Other, less commonly suggested causes are shown in Table 8.

**TABLE 8: OCCURRENCE OF STATED CAUSES OF DISPARITIES ACROSS FORMS/REGISTERS**

| **STATED CAUSE** | Pressure/ Workload | Relief staff not versed | Poor recording practices | Not tallying properly | Poor knowledge of tools | Too many registers |
|---|---|---|---|---|---|---|
| **FREQUENCY** | **30.3 %** | **5.8%** | **6.7%** | **4.2%** | **1.7%** | **1.7%** |

Poor recording practices and tallying inconsistencies were also commonly stated causes of disparities, in 6.7 percent and 4.2 percent of accessed records. Other, less common, stated causes were relief staff not conversant with forms (5.8%), too many registers (1.7%), unavailability of registers, poor knowledge of tools (1.7%), and omission of cases (1.9%). These findings overall indicate that human resource for health issues, including a heavy workload and poor knowledge, are perceived to contribute substantially to the disparities observed.

[2] In cases where an indicated ACT presentation was unavailable, for example a pediatric blister/presentation, a health worker could cut and/or combine other presentations to make up the required dosage

## 3.5 VERIFY THE ACCURACY OF DATA REPORTED BY FACILITIES WITHIN HMIS AND LMIS

With respect to malaria case management, and as described in section 1.1.1 and 1.1.2 above, the HMIS tools at the health facilities include 1) the T series forms, which are used to collect and aggregate various data elements, and 2) the RDT Register, which is used to record patient data and diagnostic test results.

The LMIS system tools at health facility include:

- The stock card, which is used for recording commodities issued, receipts, transfers in and out, losses and adjustments, as well as stock outs and expiries.
- Other complementary tools, include the goods receipt vouchers, receiving register, and loan/borrow book, which are used for the purposes of completing the commodities Facility Order Form when requesting for resupply

VHWs use the CBHW RDT/Medicines Register, which tracks malaria patient data, medicines, and RDT consumption and is also used for VHW commodity replenishment. At the end of the month, each VHW is required to complete the VHW Return Form, and submit it to the facility. Data from the individual VHW Return Forms for all VHWs affiliated with a given facility is then aggregated into a facility-level, aggregated VHW Monthly Return Form.

Accuracy was assessed at two levels:

- Comparing values for indicators in source registers (e.g. T12 or Stock Cards) to summary registers (e.g. T5 return form or ACR of FOF), and
- Comparative analysis of the six month October 2016 to March 17 primary data with obtained from historical data from the HMIS (DHIS2) and LMIS over the same six month period.
- Only the first level of assessment could be explored in this analysis. Given the unavailability of historical data of facility-level cases and consumption for analysis, the stated secondary objective 1 was only partially explored.

### 3.5.1 HMIS ACCURACY

To verify the accuracy of data reported by facilities within the HMIS, the values for indicators in source registers (OPD register, for example) was compared to the same entry in the monthly T5 Return Form. The indicators compared included:

a. Total unconfirmed malaria cases between the OPD registers (T12 and IMNCI) and T5 Return Form and total confirmed malaria cases between the OPD registers (T12 and IMNCI) and T5 Return Form.

b. Total confirmed malaria cases given ACTs between the OPD registers (T12 and IMNCI) and T5 Return Form.

The verification was conducted by calculating the sum values of each indicator over the six month period from the source forms and comparing those with the corresponding values on the T5 Return Form, noting the difference. A difference of zero (no difference) is ideal. It should be noted that a positive value in the 'difference between T5 and OPD' columns indicates that there were more malaria cases reported on the T5 Return Form than originally recorded in the source OPD registers (IMNCI or T12). A positive value in "difference between the confirmed cases given ACTs and confirmed cases" indicates more cases given ACTs than the confirmed cases.

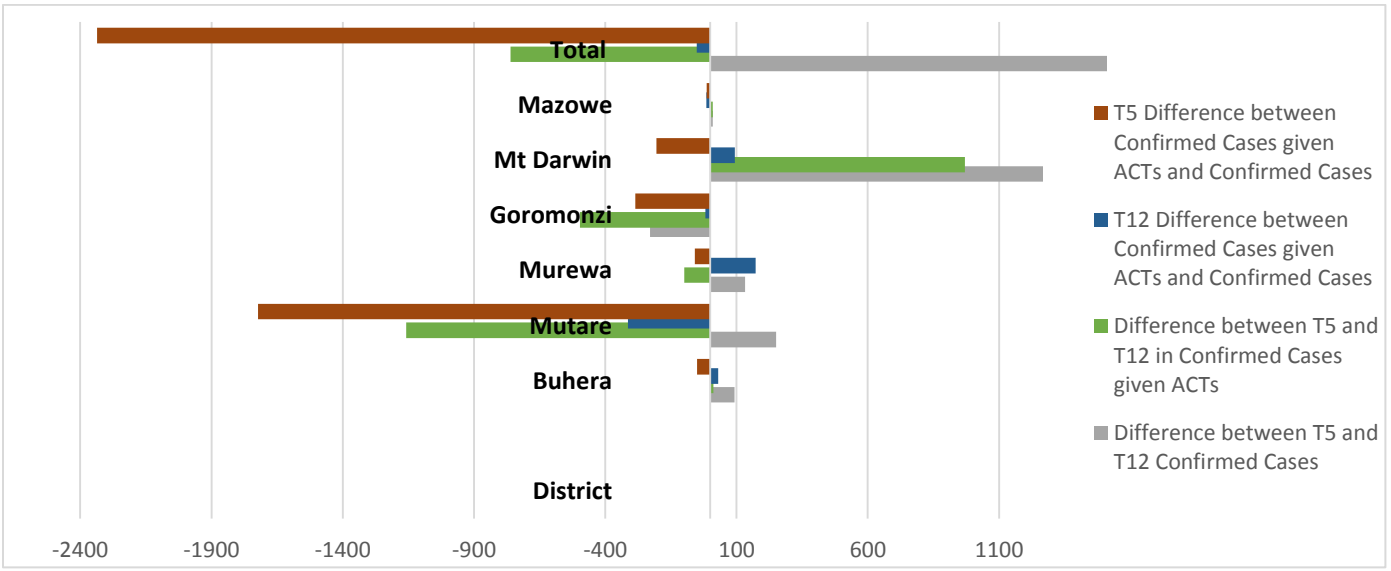
Table 9 below shows the sum of these differences across the 72 facilities per district. Data on confirmed cases and confirmed cases given ACTs from T12 and IMNCI registers and the T5 Return Form is shown in clear columns, while the data on the calculated difference in indicator values between the two registers is shown in shaded columns in the table.

**TABLE 9: DIFFERENCES BETWEEN OPD REGISTERS (T12 AND IMCI) AND T5 RETURN FORM INDICATORS - SUM AND AVERAGE OVER 6 MONTHS, OCT 1, 2016 TO MAR 31, 2017**

| District | OPD registers Confirmed Cases (a) | T5 Confirmed Cases (b) | Difference between T5 and OPD registers Confirmed Cases (c = b – a) | OPD registers Confirmed Cases given ACTs (d) | T5 Confirmed Cases given ACTs (e) | Difference between T5 and OPD Registers in Confirmed Cases given ACTs (f = e – d) | OPD registers Difference between Confirmed Cases given ACTs and Confirmed Cases (g = d – a) | T5 Difference between Confirmed Cases given ACTs and Confirmed Cases (h = e – b) |
|---|---|---|---|---|---|---|---|---|
| | Sum for District | Sum for District | Sum for District | Sum for District | Sum for District | Sum for District | Sum for District | Sum for District |
| **Buhera** | 367 | 459 | **92** | 397 | 409 | **12** | **30** | **-50** |
| **Mutare** | 3650 | 3901 | **251** | 3336 | 2178 | **-1158** | **-314** | **-1723** |
| **Murewa** | 152 | 285 | **133** | 325 | 226 | **-99** | **173** | **-59** |
| **Goromonzi** | 718 | 488 | **-230** | 699 | 203 | **-496** | **-19** | **-285** |
| **Mt Darwin** | 912 | 2180 | **1268** | 1005 | 1975 | **970** | **93** | **-205** |
| **Mazowe** | 109 | 118 | **9** | 94 | 104 | **10** | **-15** | **-14** |
| **Total** | **5908** | 7431 | **1523** | 5856 | 5095 | **-761** | **-52** | **-2336** |

T12= Out-patient department (OPD) registers; T5= Monthly Facility T5 Return Form

**FIGURE 10: DIFFERENCES IN INDICATOR VALUES BETWEEN OPD REGISTERS (T12 AND IMNCI) VERSUS T5 (SUM OF CASES OVER 6 MONTHS OCT '16- MAR '17)**



As outlined in Table 9 and Figure 11 above,

a. There is considerable discordance between the data recorded in the source OPD registers and those reported on the T5 Report Form (and subsequently entered into the DHIS2 system). This discordance is inconsistent in direction and magnitude across the two indicators of interest (i.e., confirmed cases, and confirmed cases given ACTs, suggesting significant issues with data recording and reporting at the facilities surveyed). Overall, there was a tendency to report more confirmed cases on T5 Return Form than those on the OPD registers. This was the case across all districts except Goromonzi. This could be because other sources for T5 Return data that include RDT registers may not have been included in the analysis. Ideally, all cases on the RDT registers should be in the OPD (T12 or IMNCI) registers. This has a net effect of 1,523 more confirmed cases on the T5 Return Form than the OPD register.

b. The number of "confirmed cases given ACTs," as reported on the T5 Return Form and subsequently entered into DHIS2, is used to calculate the ACT consumption-to-confirmed case ratio by comparing this number to the estimated ACTs consumption from the LMIS data. The largest positive difference for "confirmed cases" was seen in Mt. Darwin District, with nearly 240 percent more cases reported on the T5 Return Form than were originally recorded in the OPD registers reviewed. If one assumes that the OPD registers are more accurate (a plausible assumption since they are the source document and filled in daily), then it is likely that substantially more cases than were actually seen at the facility were entered into DHIS2 at the end of the month. This would result in a decrease in the ACTs to case ratio, as the number of cases would be over-reported. The overall trend for the combined district data is consistent with what is seen in Mt. Darwin.

c. Confirmed cases given ACTs on the T5 Return Form were lower across all the districts compared to the number of confirmed cases on the same form. Overall, there were 2,336 less confirmed cases given ACTs on the T5 Return Forms in all the facilities surveyed. Using this value in comparison to the estimated consumption LMIS indicates an increase in ACT consumption-to-confirmed case ratio.

d. Mazowe, Murewa, and Buhera Districts have the lowest differences across the indicators reflecting higher accuracy of data reported. As seen in Table 5, these are also the lowest malaria burden districts.

e. Conversely, Mutare and Mt. Darwin Districts had the highest differences (positively and negatively, respectively) and are the highest burden districts listed in Table 5.

### 3.5.2 LMIS Accuracy

#### *Discrepancies in Stocks Records in Clinics and Hospitals*

As described earlier, data collection teams directly reviewed the logistics/commodities forms (e.g., the Stock Cards and the AutoDRV Commodity Receipt (ACR) at the facility) to complete the FLAF for this assessment. The aim of this exercise was to review the source of adjustment data (i.e., commodity data on transfers in, transfers out, or losses) that facilities used to complete the ACR and Facility Order Form (FOF) to identify any disparities.

The facility staff, assisted by the Pharmacy Manager, is required to record any commodity adjustments using stock cards, issue receipt vouchers, and expired medicines registers. The information is then entered into the AutoDRV computer software, which calculates the commodity order quantities. Table 10 below shows the mean of the differences in stock records of various commodity indicators recorded

in stock cards versus the other LMIS forms for clinics and hospitals. A positive value indicates a higher value on the stock card than the comparator tool. The values in Table 10 indicate the number of ACT presentations.

**TABLE 10: MEAN DIFFERENCES OF LMIS INDICATORS IN ACTS COMMODITY TRACKING FORMS, OCTOBER 2016 TO MARCH 2017**

| Facility Type | Losses<br>*Stock card vs. ACR* | Expired Stock<br>*Stock Card vs. Expired Medicines Register* | Adjustments Transfer In<br>*Stock card vs. FOF* | Adjustments Transfer Out<br>*Stock card vs. FOF* |
|---|---|---|---|---|
| | **Mean difference** | **Mean difference** | **Mean difference** | **Mean difference** |
| **Clinic** | 8.80 | 9.78 | 39.04 | 25.22 |
| **Hospital** | 60.00 | 118.50 | 2456.00 | 6190.00 |

Across all the indicators, there were more ACTs on the stock cards than the comparator tool. There are more disparities in hospital records across the board for all indicators of interest. Overall losses were under reported by 8.8 at the clinic level and 60 at the hospital level on ACR as compared to stock cards. This has the effect of over-estimating consumption therefore increasing ACT-to-case ratio. The effect of more "transfer in" on the stock card than on the FOF is that it underestimates the stock available at health facilities leading to reduction in the ACT-to-case ratio. More "transfer out" on the stock card than on the FOF has the effect of overestimating ACTs used by health providers at the time of ordering stock which increased the ACTs-to-case ratio. The net effect between the transfers in and out is that there are 3,720 more transfers out on stock card than the FOF. Hence, the overall effect of the transfer data is to over-estimate consumption.

Ideally, all expired stock should be entered in the Expired Medicines Register and on the stock card. As such, there should not be any differences between the two. The observed difference is due to inconsistent use of the expired medicines register. From the assessment notes, some facilities did not have these registers in place and only 46 percent recorded expired stock in the expired medicines register. These inconsistencies raise concerns on the accuracy of these records. As discussed under tracking of VHW stock, it was also noted that expired stock from VHWs is not being adequately accounted for at health facilities. Under-estimation of expired medicines has the effect of over-estimating consumption as expired medicines are considered consumed.

### *Differences in Stocks Records Across Districts*

When the sum of the differences in stock records for various commodity indicators is compared, a wide disparity is seen, as illustrated in Table 11 below.

**TABLE 11: SUM OF DIFFERENCES FOR VARIOUS LMIS PARAMETERS BETWEEN ACTS TRACKING FORMS AT SURVEYED FACILITIES, OCTOBER 1, 2016 TO MARCH 31, 2017**

| District | Losses *Stock card vs. ACR* | Expired Stock *Stock Card vs. Expired Medicines Register* | Adjustments Transfer In *Stock card vs. FOF* | Adjustments Transfer Out *Stock card vs. FOF* |
|---|---|---|---|---|
| | Sum | Sum | Sum | Sum |
| Buhera | 30 | -150 | 138 | 454 |
| Mutare | 390 | 536 | 7076 | 18169 |
| Mazowe | 0 | 0 | 90 | 500 |
| Mt. Darwin* | . | . | . | . |
| Goromonzi | 16 | 11 | 980 | 7 |
| Murewa | 24 | 16 | 138 | 20 |
| Total across all districts | 460 | 413 | 8422 | 19150 |

*Data for Mt. Darwin was not available in the analysis dataset

As outlined in Table 11, the widest variations among the surveyed districts across all comparisons occurred in Mutare District and the smallest in Murewa and Goromonzi Districts. A similar pattern appeared to that demonstrated in Table 10 for the facility types, with greater disparities and activity in the adjustment/transfer indicators (in or out), as compared to losses or expiries. This pattern is consistent with the pattern described under Table 10 above revealing that the losses adjustments and transfer (in or out) logistic actions may contribute more substantially to the overall observed disparities in malaria cases versus ACTs consumption – also in the direction of an over-estimation of ACTs consumption compared to cases. This excludes data from Mt. Darwin which was not available.

## 3.6 Adequacy and Reliability of The Current Data Collection Tools for Malaria Case and Commodity Data Needs within the HMIS and LMIS

Interviews with HIOs revealed the following:

- Four out of five HIOs reported consistently receiving VHW Return Forms on a monthly basis from facilities. However, on direct observation, of the 50 facilities in the study that had VHW Return Forms, several of these facilities were missing whole months of VHW return data in their files. So the data reported in DHIS2 could not be adequately verified during the assessment.
- There was no assessment by the HIOs of the completeness of the VHW return data or the proportion of VHWs attached to those facilities that were consistently reporting their malaria case management data. All HIOs reported that they receive T5 (monthly aggregate) forms monthly from the facilities. The facilities do not indicate what proportion of the VHWs contribute to this aggregate data on the monthly return form.
- Four out of five HIOs reported that facilities were summarizing monthly malaria data and consistently filling the relevant information in the T5 Return Form.
- The HIOs believed facility staff were also consistently tallying data in the T3 and that it was the source of the data that goes onto the T5 Return Form. However, facility staff and direct observation of the records by study data collectors did not corroborate this finding. Facility staff reported that they were not consistently filling in the T3 tally form due to work load. Most felt

filling in the tally was redundant as they could get the cases from OPD registers which are the sources for the data.

- From all the HIOs knowledge of reports, all suspected cases on the T5 were equal to tested cases on the T5 implying that all suspected cases were tested.

### 3.6.1 ADEQUACY OF TOOLS FOR CAPTURING THE REQUIRED INFORMATION

Adequacy in this context refers to whether the system and tools contain all of the elements required to sufficiently capture the data elements of interest. The forms commonly received by HIOs are the T5 Return Forms, and VHW Return Forms. The OPD registers (T12 and IMNCI) and T3 form are used at the health facility-level and usually the HIO does not work directly with these.

One-half of the HIOs interviewed reported that the T12 and IMNCI registers were readily available at all facilities and 80 percent of HIO respondents indicated that the T5 Return Forms and VHWs Return Forms were also readily available. Three out of five (60%) HIOs reported that they had the current versions of T5 Return Form and VHW Return Form.

All five (100%) of HIO respondents reported that, at the time of data aggregation, they found all the blocks of the T5 forms that they received were completely filled out.

On direct observation at the facility level, the T12 and IMNCI registers and T5 Return Forms included most of the necessary data elements (see Table 12 below) and completeness of the information in these tools was assessed as follows:

a. RDT test done (OPD) - 87.2 percent of the facilities
b. RDT results (OPD) - 88.7 percent of the facilities
c. Prescribed treatment (OPD) in 89.5 percent of the facilities
d. Suspected cases tested (T5) - 83.7 percent of the facilities
e. Confirmed cases (T5) - 78.3 percent of the facilities
f. Confirmed cases given ACTs (T5) in 68.4 percent of the facilities

**TABLE 12: COLUMNS COMPLETENESS IN OPD AND T5 REGISTERS**

| OPD RDT Test Done | OPD RDT result | OPD Treatment | T5 Suspected Cases tested | T5 confirmed cases | T5 Treatment (confirmed cases given ACTs) |
|---|---|---|---|---|---|
| 87.2% | 88.7% | 89.5% | 83.7% | 78.3% | 68.4% |

The OPD and IMNCI registers in the health facilities visited for this study were mostly improvised so that the information contained therein was not uniform or standardized.

### 3.6.2 RELIABILITY OF THE SYSTEM FOR CAPTURING THE REQUIRED INFORMATION

In assessing reliability of information contained in the forms, the study team considered if the information was completed consistently and completely, all the time across all departments over the period of observation. Table 13 below shows the pattern across the various T series forms.

**TABLE 13: COMPLETENESS IN FILLING AND TALLYING REQUIRED INFORMATION IN FORMS/REGISTERS**

| T3 RDT Result | OPD Treatment | T3 Treatment | T3 RDT Result | T5 RDT Test | T5 RDT Result | T5 Treatment |
|---|---|---|---|---|---|---|
| 76.0% | 87.8% | 71.4% | 72.0% | 90.4% | 96.2% | 95.2% |

Results from Table 13 above indicate that there are high levels of completeness of the information in the forms indicating high reliability levels of the quality of the HMIS data.

## 3.7 Practices of Health Facility Staff in Recording and Reporting Of Malaria Cases and ACTs Consumption

### 3.7.1 Sources used to collect and aggregate malaria data

From the 72 sampled health facilities, 58 (80.6%) reported the use of T12/IMNCI registers, 47 (65.3%) reported the use of T3, and 40 (55.6%) reported the use of RDT registers as sources for malaria data reported on the facility aggregate monthly T5 Return Form. Twenty-one facilities (29.2%) reported the use of only one form as the source for malaria data when completing the T5 Return Form, 26 facilities (36.1%) reporting using two forms, and 24 facilities (33.3%) reported using all three recommended sources. The use of all three forms was highest in Mt. Darwin District where 77.8 percent of facilities reporting the use of all three forms (see Table 14 below).

**TABLE 14: SOURCES OF DATA FOR COMPLETING T5 RETURN FORM MONTHLY MALARIA AGGREGATE FORM BY DISTRICT, OCTOBER 1 2016 – MARCH 31, 2017**

| District | None | One source | Two sources | Three sources | Total |
|---|---|---|---|---|---|
| Buhera | 0 | 2 | 7 | 3 | 12 |
| | 0.0% | 16.7% | 58.3% | 25.0% | 100.0% |
| Mutare | 1 | 8 | 7 | 2 | 18 |
| | 5.6% | 44.4% | 38.9% | 11.1% | 100.0% |
| Mazowe | 0 | 3 | 3 | 6 | 12 |
| | 0.0% | 25.0% | 25.0% | 50.0% | 100.0% |
| Mt Darwin | 0 | 0 | 2 | 7 | 9 |
| | 0.0% | 0.0% | 22.2% | 77.8% | 100.0% |
| Goromonzi | 0 | 4 | 1 | 5 | 10 |
| | 0.0% | 40.0% | 10.0% | 50.0% | 100.0% |
| Murewa | 0 | 4 | 6 | 1 | 11 |
| | 0.0% | 36.4% | 54.5% | 9.1% | 100.0% |
| Total | 1 | 21 | 26 | 24 | 72 |
| | 1.4% | 29.2% | 36.1% | 33.3% | 100.0% |

In instances where one source was used to aggregate malaria data in the T5 Return Form, the most commonly used data source was the OPD register, which was used in 48.2 percent of facilities (see Table 15 below). T3 was the primary source in 16 (28.6%) facilities, and the RDT register was primary source in 13 (23.2%) facilities that used one source.

**TABLE 15: PRIMARY SOURCE FOR COMPLETING FACILITY T5 RETURN FORM WHERE ONE SOURCE WAS USED, OCTOBER 1 2016 – MARCH 31, 2017**

| Single primary data source | Count | % distribution |
|---|---|---|
| **T12/IMNCI** | 27 | 48.2% |
| **T3** | 16 | 28.6% |
| **RDT Register** | 13 | 23.2% |
| **Total** | 56 | 100.0% |

Five facilities indicated that they also used other sources of malaria data for the T5 Return Forms. These other sources included line listings, Rapid Disease Notification System (RDNS) form, VHW forms, VHW registers, and weekly registers.

### 3.7.2 ACTs Given in Facility But Not Recorded as Malaria Cases

Generally, all facilities reported adhering to treatment and reporting guidelines with only five facilities (6.9%) reporting instances of giving ACTs to patients without counting them as cases. These only occurred in recognized circumstances of outbreaks and RDT stock outs. This has the effect of increasing the ACTs-to-cases ratio.

### 3.7.3 Management Practices of Health Facility Nurse During Stock Out Of RDTs

The investigators asked health facility nurses about how they manage malaria suspected cases when they run out of RDT kits (Table 16). Of 44 respondents (N=72) to this question, the most common practice mentioned was referring to other health facilities (40.3%). Other responses include referral for microscopy (12.5%), giving ACTs (6.9%), and not treating (1.4%).

**TABLE 16: FACILITY-LEVEL MANAGEMENT OF SUSPECTED MALARIA PATIENTS DURING RDT STOCK OUT, OCTOBER 1 2016 – MARCH 31, 2017S**

| Responses | Count | % of respondents |
|---|---|---|
| Referred to other facilities | 29 | 40.3% |
| Referred for microscopy | 9 | 12.5% |
| Given ACTs without parasitological confirmation | 5 | 6.9% |
| Not treated | 1 | 1.4% |

### 3.7.4 Recording Practices of Health Facility Nurses During Stock Out Of RDTS

When the study team asked health facility nurses how they recorded malaria suspects during stock outs of RDTs, 43 percent responded that they would record them as suspected malaria cases, 5.6 percent would not record them, and 2.8 percent would record them as confirmed malaria cases. Although

recording suspected cases as confirmed cases and/or proceeding to treating them with ACTs is not a recommended practice, this has the effect of reducing the ACTs-to-cases ratio. This effect does not appear to substantially contribute to any discrepancy between the number of malaria cases and ACT consumption because of the limited scale from the survey and because the overall recognized national picture over the years is that of a high ACTs-to-cases.

### 3.7.5 Practices Related to Ordering and Delivery of ACTs

The study team noted that during stock delivery team visits, physical stock counts are done in available storerooms in 91.7 percent of facilities, dispensary units in 68.1 percent of facilities, and in wards in 18.2 percent of facilities that have wards. Physical counts of commodities kept at the community level were accounted for in only 1 of 47 (2.1%) facilities with VHWs who test and treat malaria. Forty-seven facilities (65.2%) reported conducting physical counts in both the storerooms and dispensary at the time of stock delivery. Incomplete physical counts for stock over-estimates consumption leading to increase ACTs-to-cases ratio.

### 3.7.6 Tracking of stock at VHWs level

Overall, across all districts, 47 percent of all ACT stock at health facilities was issued to VHWs. Among facilities that have VHWs who test and treat malaria in the community (n=45), 63.8 percent reported conducting monthly physical counts of stock at VHWs homesteads. Nearly 79 percent conduct data reconciliations in the CBHW RDT/Medicines Register and issue new stock as necessary. The reconciliation of stock in the CBHW RDT/Medicines Register is not entered into the facility records, hence facilities have no record of how much of the stock issued to VHWs is consumed on a monthly basis and how much remains in the community. Nearly half (48.9%) record returns of usable stock from VHWs (recorded in the VHW Stocks form), and 61.7 percent document expired/unusable stock returned from the VHWs to the facility (Table 17 below). In cases where the returned stock or expired stock from VHWs is not recorded at facilities, consumption of stock at community level is exaggerated and thereby increases the ACTs-to-case ratio.

**TABLE 17: PROCESS OF TRACKING VHW LEVEL STOCK AMONG FACILITIES WITH VHWS WHO TEST AND TREAT MALARIA (N=47), OCTOBER 1 2016 – MARCH 31, 2017**

| Process undertaken | Count (%) |
|---|---|
| Carry out data reconciliations in CBHW RDT/Medicines Register | 37 (78.7%) |
| Conduct monthly physical counts | 30 (63.8%) |
| Document expired/unusable stock returned from the VHWs to the facility | 29 (61.7%) |
| Document return of usable stock from the VHWs to the facility | 23 (48.9%) |

## 3.8 Practices of VHWs in Recording and Reporting Of Malaria Cases and ACTs Consumption

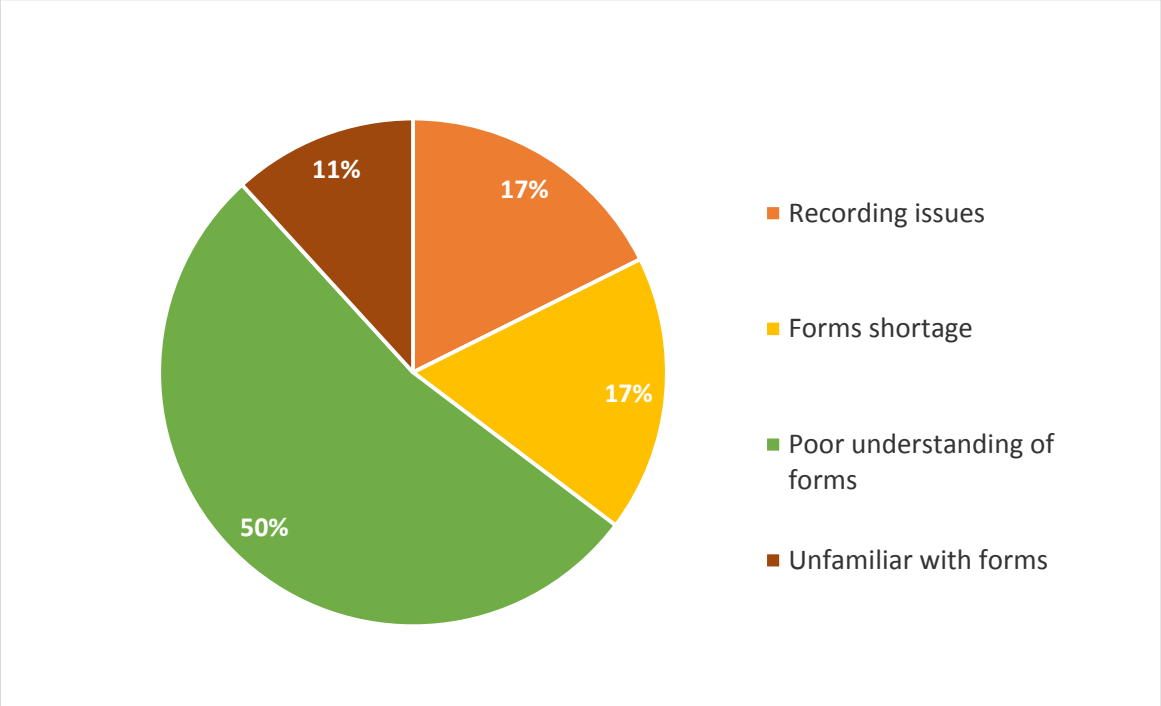
In addition to relying on observed VHW-level findings and conducting interviews from Facility in-Charges, the study team interviewed VHWs attached to the health facilities in the survey to evaluate any recording and reporting practices that could lead to case-consumption discrepancies. The team asked questions to 209 VHWs who test and treat malaria at community level pertaining to their practices in various scenarios. The team asked questions related to the completion of monthly VHW Return Forms

during stock outs of certain ACT presentations, instances where ACTs were dispensed but not recorded or counted as a malaria case, and instances in which ACTs were dispensed to RDT negative cases. The findings are detailed below.

### 3.8.1 Completion of VHW Monthly Return Form

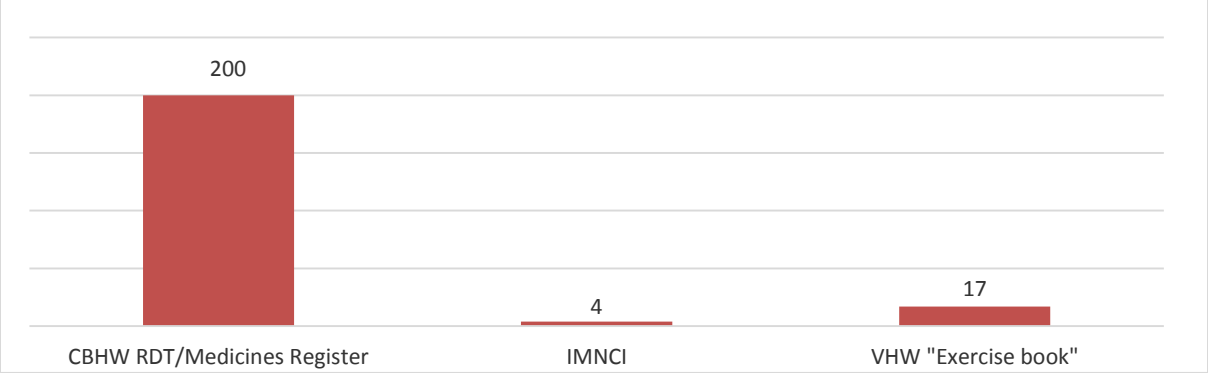
A plausible source of case-consumption variance is the inaccurate completion of the VHW monthly report form, which could lead to misrepresentation of VHW-level data in the national HMIS. Thus, the study team asked VHWs which source of information was used when completing this form and whether or not they faced any challenges when filling out the form. Eighty-nine percent (89%) of VHWs interviewed reported that they had no challenge in completing the VHW Return Form. About eight percent (7.6%) of VHWs reported challenges, including poor understanding or unfamiliarity with the forms, difficulties in recording information on forms, and stationary shortage, as shown in Figure 11 below.

**FIGURE 11: ISSUES VHWS FACE WHEN FILLING MONTHLY VHW RETURN FORM, OCTOBER 1 2016 – MARCH 31, 2017 (N=16)**




When the 209 VHWs interviewed were asked about the source of information used in completing the VHW monthly return form, 200 (95.7%) reported using the CBHW RDT/Medicines register as their source (as is recommended), four (1.9%) reported using the IMNCI register and 17 (8.1%) reported using the VHW "exercise book" (Figure 12).

**FIGURE 12:TYPE OF REGISTER USED BY VHWS TO COMPLETE MONTHLY RETURN FORM**




### 3.8.2 VHW PRACTICES DURING STOCK OUTS OF ANY PRESENTATION OF ACTS

As hypothesized by staff at administrative levels, a contributing cause of the discrepancy between malaria cases and ACTs consumed could be stock outs of ACT presentations, which result in health workers having either to cut or combine ACT presentations to make up the required dose for a patient. For this survey combining of ACT presentations could contribute to the disparity observed over the years. To investigate this possible cause, the study team enquired about dispensing practices among those VHWs who responded 'yes' to ever having stock outs within the study period. Figure 13 below illustrates the responses.

**FIGURE 13: VHW DISPENSING PRACTICES IN THE EVENT OF STOCK OUT OF CERTAIN ACT PRESENTATIONS(N=84), OCTOBER 1, 2016 – MARCH 31, 2017**


### 3.8.3 VHW PRACTICES DURING EXPIRIES OF RDTS OR ANY PRESENTATION OF ACTS

The study team asked VHWs if there are any instances where RDTs or ACTs expired after being issued to them. Out of 203 VHW respondents to this question, 88 (43%) reported that they had experienced expiries, and only 7 percent reported recording those expiries in the RDT/Medicines register. All (100%) of the respondents report that in such instances, they return the products to the health facility. Handling of returned stock by health facilities is described above under tracking of stock at VHWs level.

### 3.8.4 ACTS GIVEN IN THE COMMUNITY TO PATIENTS BUT NOT RECORDED OR COUNTED AS MALARIA CASES

The study team asked VHWs if there were any instances where ACTs were dispensed to patients but not recorded as malaria cases. Out of 209 VHWs, only nine (4.3%) admitted to any instances of this practice. The reasons they cited for dispensing ACTs without recording cases were lack of time (n=1) and during outbreaks (n=1). No reasons were cited by the other seven VHWs who admitted to any instance of such practice.

### 3.8.5 Other VHW practices

#### *Dispensing ACTs to RDT-negative patients*

Only three VHWs (1.4%) admitted to any instances where they dispensed ACTs to RDT negative patients.

#### *Management of suspected cases when RDT kits are out of stock*

VHWs were also asked how they manage suspected cases when they are faced with a stock out of RDT kits. None of the respondents mentioned giving ACTs in such cases. Instead, the vast majority (79%) reported that they refer to another VHW with RDT test kits or to the clinic for testing. In the "Other" category, responses included sourcing kits from another VHW or facility, and recording in "personal diary" or "exercise book".

## 3.9 Practices of District Health Information Officers in Recording and Reporting Of Malaria Cases and ACTs Consumption

To assess District HIO practices in recording and reporting of malaria cases, the study team interviewed five District HIOs to assess if there could be data management and aggregation issues that contribute to the disparities in malaria cases and ACTs consumption. District HIOs were asked which forms they use when aggregating malaria data from facilities at the district level. According to HMIS procedures, the standard practice is that they should use T5, T9/IMMIS, and the VHW Return Form. Table 18 shows the combination of registers used and their frequencies.

**TABLE 18: COMBINATION OF FORMS USED BY DISTRICT HIOS TO AGGREGATE MALARIA DATA FROM FACILITIES**

| Combination of forms used | Frequency |
|---|---|
| T5 and VHW Return Form | 2 |
| T5, T9 and VHW Return Form* | 1 |
| T5, T9, OPD and VHW Return Form | 1 |

*Expected practice based on HMIS procedures

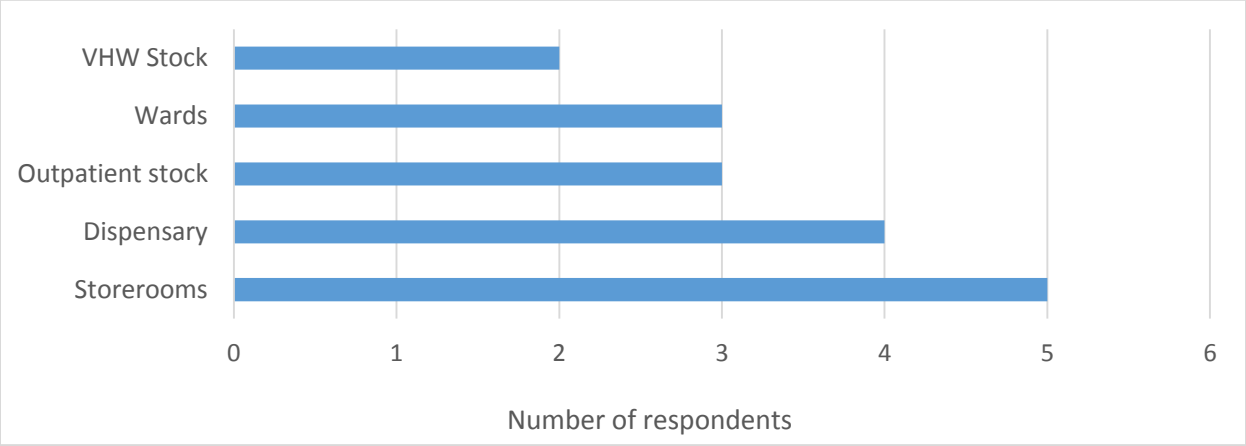
## 3.10 Practices of District and Central Pharmacy Managers in Determining Order Quantities

### 3.10.1 District Pharmacy Manager Practices

The study team investigated the practices of DPMs during ZIPS/ZAPS rounds. The target was to interview one DPM from each of the six districts. The team interviewed five DPMs. Four reported using the physical count and all five reported using stock cards to determine the stock available during ordering. Three indicated that they use both the physical count and stock cards, two use the physical count only, and one DPM uses only the stock card to determine the stock available. The expectation is for DPMs to use both physical count and stock cards and verify any anomalies.

Five respondents answered a question on which sources they include when completing a physical count. Figure 14 below shows the distribution of responses.

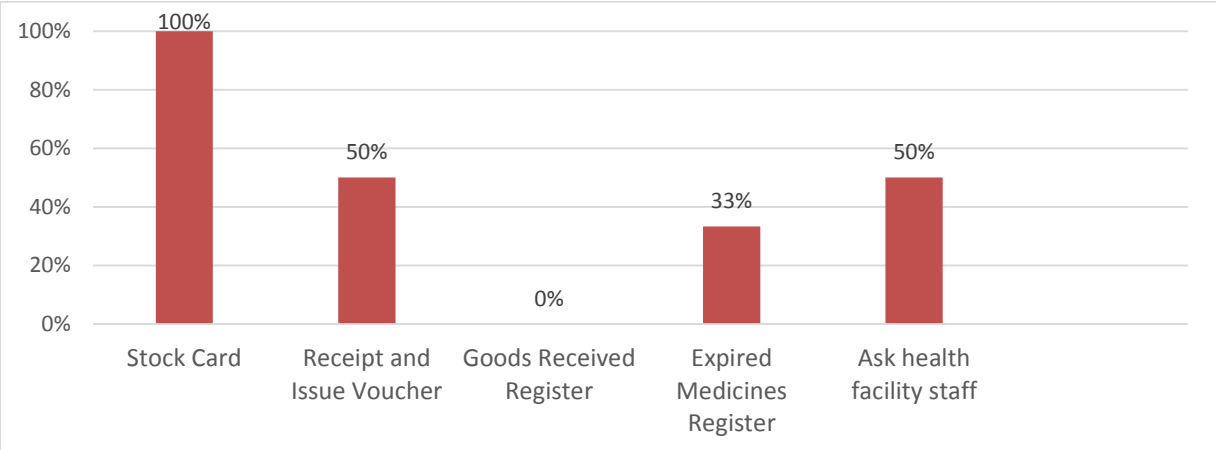
**FIGURE 14: STORAGE AREAS IN FACILITIES CONSIDERED FOR PHYSICAL COUNT BY DISTRICT PHARMACY MANAGERS DURING ZIPS/ZAPS VISITS TO FACILITIES, OCTOBER 1, 2016 – MARCH 31, 2017**




According to the standard operating procedures, physical counts should be conducted in all stock holding points including wards and outpatient's departments for admitting institutions, and where applicable VHW stocks should be considered. All five respondents indicated that they routinely check and have access to all available storerooms when they carry out a physical count. Similarly, all of the DPMs reported involving the facility staff when conducting the physical count and determining losses, adjustments, and order quantities. However, the results above show that of the five respondents, only two consider VHW stock cards and three check wards and outpatient areas. Those who do VHW stocks responded that they base their count on stock cards, not physical counts as VHWs will not be at the facilities most of the time.

Figure 15 below shows the distribution of sources used to account for losses and adjustments by the DPMs.

**FIGURE 15: SOURCES CONSULTED BY DISTRICT PHARMACY MANAGERS TO ACCOUNT FOR LOSSES/ADJUSTMENTS WHEN DETERMINING ORDER QUANTITIES, OCTOBER 1, 2016 – MARCH 31, 2017**



The recommended practice is, at all facilities, the DPMs should verify data using all five sources. None of the DPMs used all five sources of information when accounting for the losses and adjustments. All respondents reviewed the stock card and three reviewed the Receipt and Issue Voucher or asked the health facility staff when determining losses/adjustments. None of the DPM respondents indicated that they used the Goods Received register.

Four of the DPMs admitted to changing the average monthly consumption (AMC) calculated in Auto Order System during ordering. Of these, three DPMs admitted that they *always* change it. Reasons for changing the AMC varied across the respondents. Four of the DPMs check to see if the calculated AMC makes sense considering the historical malaria burden in the facility. If the AMC does not make sense, they review the AMC. By design, DPMs are permitted to change the AMC as a correction to previous anomalies and not for the purposes of increasing order quantities for the coming season.

All of the interviewed DPMs report that provincial leads supervise them during data collection and ordering exercises. Findings indicate that this supervision is not standard, as two of the DPMs reported that they were *always* supervised and three reported *being* sometimes supervised.

### 3.10.2 Practices of Central Level LMIS Staff in Aggregation and Reporting of Logistics Data, and Other Challenges

#### *Roles of Central level DPS logistics officers*

Two central level DPS Logistics Unit Officers were interviewed as part of data collection. Their roles include managing aspects of the LMIS to ensure adequate supply to facilities and accurate central-level record keeping. Some specific tasks include:

- Reviewing of ZAPS order forms
- Analysis and cleaning of data entered into the AutoOrder system by ZAPS teams
- Recording of NatPharm proof of deliveries in the TopUp system
- Follow-up with Provincial Logistics Officer and NatPharm Stock Controller to resolve data discrepancies.

The central level DPS logistic unit officers perceived that the possible causes for the case-consumption discrepancy can be attributed to the use of alternate formulations when one formulation is out of stock and poor recording practices, especially during outbreaks.

#### *AutoOrder review and adjustments*

When DPS officers identify data that is inconsistent with the facility size, season, and/or malaria endemicity, the survey indicated that they typically review AutoOrder data to:

- Look for outliers in AMC, data entry errors, etc.
- Ensure that quantities ordered and stocks delivered are accurately recorded.
- Identify failures of AutoOrder to include adjustments in calculations of ending balances.

It is worth noting that there is no standardized protocol for this data review process and individuals may vary slightly in their approach. However, interview respondents state that anomalies are picked up in approximately 30 percent of order forms, primarily among facilities in higher burden areas. They also state that the most common problem is capturing adjustments. Though there is no standardized protocol for this data review process, there exists a ZAPS SOP which outlines the role of each institution and its implementation at the facility level, though adherence to SOPs is inconsistent at the facility level despite national-level trainings.

*Note*: This SOP was not available for review at the time of the interview.

### *Actions taken when problems are identified*

When problems are identified, the survey indicated that the following actions are taken:

- DPS central-level staff assess all of the data in LMIS and report all anomalies.
- As needed, LMIS staff liaise with the Provincial DPS Logistics Officer to resolve discrepancies.
- In instances where NatPharm rations commodities or do not meet the full order needs, these numbers are revised by DPS staff who ensure that they are correctly reflected in LMIS.

# 4. Discussion and Limitations

## 4.1 Discussion

This section discusses the factors that contribute to historically observed disparities between the first-line ACT consumption and reported malaria cases. The findings presented in this document are limited to the analysis of the primary data collected from the target districts over the six-month study period, combined with the analysis of perceptions following interviews with key malaria programme stakeholders. To recap, these stakeholders include provincial-level, district-level, facility-level, and community-level staff involved in malaria diagnosis and treatment. Impressions are also drawn from the analysis of data quality indices of accuracy, consistency, and reliability. The findings do not include any analysis of historical desk review data over the 40-months of study as originally intended where patterns, trends, or other associations could be explored to confirm perceptions and reach stronger conclusions. This is because the historical facility-level data of malaria cases and commodities' consumption was not shared with the study team at the analysis and report-writing phase.

### 4.1.1 Malaria Burden Characteristics, Respondents Characteristics, and Roles of VHWs in Malaria Care Management

Ninety-three percent (93%) of respondents in this study were either a Primary Care Nurse (61.1%) – the predominant cadre in rural health clinics – or a registered General Nurse, Matron, or Sister-in-Charge (31.9%). This is important as these cadres are most versed in the management of the day-to-day aspects of malaria case and commodity management at these facilities. All facilities in the study had associated VHWs and all facilities in the study had VHWs that tested for malaria. Sixty-five percent (65%) of VHWs both tested and treated malaria, while 35 percent tested only and referred positive patients. This overall ratio reflects the ongoing prioritization of trainings offered to VHWs in high-burden districts to test and treat. Only VHWs trained in case management are allowed to test and treat for malaria. In these high burden areas, VHWs are not allowed to test only and refer except in cases of severe malaria needing treatment at health facilities where VHW can give pre-referral treatment when available. In low-burden and elimination districts, VHWs do not currently test and treat as they have not been trained. All facilities in Mt. Darwin and 82 percent of facilities in Buhera District have VHWs that test and treat. However, as noted in the methodology section, some of the study districts in this study are low burden-districts (e.g. Mazowe) and as such, are not priority districts for training of VHWs to test and treat. This is why in Mazowe District for example, only 25 percent of facilities have VHWs that test and treat malaria at the community level. The test and treat training is only being recently extended to low-burden areas.

### 4.1.2 Case-Consumption Disparities and Contributory factors

Overall, the data reveals that the disparity ratio of ACTs used-to-confirmed cases was 3.06 in the sampled facilities and the RDTs used-to-suspected case was 3.11. This means that, in the sampled facilities and communities in the study period, three times more ACTs were administered for the treatment of malaria than there were confirmed cases. It also means that approximately three times more RDTs were used in the diagnosis of malaria than were suspected malaria cases. As stated previously in the results section, it is useful to note the poor documentation of VHW case data with several facilities missing data and in some cases up to whole months of VHW return data in the monthly facility VHW Return Form. This could account for the under-representation of malaria cases relative to

ACT consumption and contribute to the ACT-to-case ratio disparity; however, the magnitude of this contribution could not be determined from the available data.

The highest levels of case consumption disparities were in Mt. Darwin and Goromonzi. Mutare had a relatively low disparity ratio despite recording the heaviest malaria burden. This picture contradicts the presumption that perhaps wider case-consumption disparities would be seen in higher-burden districts. This point is further buttressed by the fact that Mutare District recorded the same ACTs-to-case disparity ratio as Mazowe despite the former having almost four-times the case burden. We note that the impact of the discrepancy was more significant (even if the ratio was lower) in areas with more cases. On the other hand, there could be a simpler explanation, whereby too many ACTs were issued from dispensary points relative to the lower burden of disease, in the districts with higher disparity. We also observed higher RDT-suspected cases disparity in areas with fewer suspected cases. Goromonzi records the highest RDTs-suspected case disparity ratio and this may be related to the higher number of cases seen at the clinics in Goromonzi, where the index of suspicion of malaria (when a patient presents with a fever) tends to be higher compared to hospitals.

The contribution of the community level to the ACT-to-case is more clearly isolated when the calculated ratios are disaggregated by facility and by community (VHW level). During the survey period, approximately 6.5 times more ACTs were consumed for every case seen at the community level, compared to two times more at the facility level. This disaggregation implies that the disparity burden was more significant at community level. However, since only 4.3 percent of VHWs respond that they administer ACTs without recording corresponding confirmed cases (i.e. treat unconfirmed or negative cases) and as many as 40.2 percent report stock outs (which should actually pull the disparity ratios in the opposite direction), the study team sought other explanations for the disparity. The team dug deeper to test if the disparity "disappears" once the actual number of cases and ACTs consumed at the VHW level is known. This was simulated by calculating the case-to-consumption disparity from the 199 individual VHW return forms sampled during the study. The results are shown in Table 19 below:

**TABLE 19: DISPARITY RATIOS CALCULATED BASED ON DATA FROM 199 INDIVIDUAL VHW RETURN FORMS, OCTOBER 1, 2016 – MARCH 31, 2017**

| District | ACTs Consumed | Confirmed Malaria Cases | Disparity between ACTs Consumed and Confirmed Cases (Ratio) |
|---|---|---|---|
| Buhera | 19 | 65 | 0.29 |
| Goromonzi | 382 | 482 | 0.79 |
| Mazowe | 18 | 34 | 0.53 |
| Mt Darwin | 56 | 92 | 0.61 |
| Murewa | 0 | 25 | 0.00 |
| Mutare | 908 | 896 | 1.01 |
| Total | 1383 | 1594 | 0.87 |

The study team noted from the results above that the available VHWs data did not indicate a real disparity at the VHW level. This points to an issue related to how the LMIS estimates consumption. LMIS considers all issues to VHWs as consumed and when compared to cases seen at VHWs, this

creates a disparity. This data indicates the crucial need to strengthen practices including the reconciliation of cases and consumption at community level. Lack of proper accounting for actual consumption at VHWs, returned stock and expiries at VHWs and failure to have monthly VHW Return forms from all VHWs contribute to this disparity. The results indicated that only 1of 47 facilities account for stock at the VHW-level on ordering. Health facility workers reconcile RDT and medicines consumed to cases in the CBHW/RDT Medicine Register in only 59 percent of facilities. Even when this reconciliation is done, it often ends in the CBHW/RDT Medicines Register and is not translated to reconciliation of VHW stock cards in facilities. Reconciliation on the VHWs stock card would help in tracking actual consumption at VHW level. These same observations are true for returns from the VHWs or expired, damaged or usable stock, as they are often not well-documented and accounted for at facility level. Data on Monthly VHW Return Forms at health facilities is often incomplete or missing, as sometimes not all VHWs bring their monthly returns to the facilities or sometimes bring them late. There are no clear mechanisms as to how facilities deal with the late individual VHW Return forms after submission of the facility monthly VHW Return Form. Whereas in the CBHW/RDT Medicines Registers, there is a clear linkage between each case and the ACT presentations given (which takes care of the cutting or combining of ACT presentations), there is no linkage on the facility VHWs return form, which only records number of cases. So this valuable information is lost.

The "negative" disparity in table 19 indicates that across the districts (except in Mutare), there are likely more cases than there are ACTs consumed at the VHW level. This finding is in keeping with the stock outs reported by 40.2 percent of the interviewed VHWs. It also indicates that the observed disparity at the community level is possibly only an apparent one due to poor record-keeping and data documentation.

The comparison of LMIS to HMIS data assumes that each case of malaria uses one RDT and receives one presentation of ACTs. In practice, more than one ACT presentation or RDT may be associated with a confirmed or suspected case due to issues such as repeat doses in patients who vomit within 30 minutes of a dose. It could also be due to combining of presentation to make up for the correct dosage when the appropriate ACT presentation is out of stock or presumptive treatment of malaria during outbreaks or RDT shortages. As a result, a disparity ratio of up to 1.5 may not be unexpected under normal circumstances, even with good recording, reporting, and stock management practices in place. Literature reviews also indicate that a similar study was carried out in Zambia in 2015 following a 2013 calculated disparity ratio of 2.56[3]. However, the overall level of discrepancy found in this study is much higher and similar to the disparity ratios and trends calculated from the 2014-2016 nationwide historical desk review of LMIS and HMIS data described above in the background section. This higher disparity might occur in cases of frequent stock outs of the commonly used ACT presentations leading to rampant use of combination of ACT presentation to treat cases. The study finds that 41 percent of VHWs reported stock outs of presentations of ACTs. For the assumption to be true, the supply of ACT presentations should mirror or match the epidemiology of malaria in a specific area (pediatric age-groups versus adults). An oversupply of 1x6 presentations, for example, in a place where the majority of cases of malaria cases occur in adults as is the case in Zimbabwe, leads to combining of presentations to treat this majority of cases. Relying on historical data of consumption based on such previous supplies without matching it to the epidemiology of cases will mean a continuous oversupply the same presentations, thus perpetuating the disparity. This might be a contributing factor to the continued disparity seen in Zimbabwe over the years.

[3] USAID | DELIVER PROJECT, Task Order 7, and the Zambia Integrated Systems Strengthening Program. 2015. Zambia: Disparities between Reported Confirmed Malaria Cases and Artemisinin-based Combination Therapy Uptake in Selected Districts. Arlington, Va.: USAID | DELIVER PROJECT, Task Order 7.

There was generally a high level of awareness of the disparity between cases and consumption at the administrative/central levels, with more than half of respondents at these levels stating they have previously investigated to determine causes of the disparities in their province/districts. This was not the case at facility and community levels where this awareness of any case-consumption disparity was much lower. This is because lower levels often do not have access to the LMIS data and often the cases and administered ACTs reported in the HMIS tools used at the lower levels match more closely. This is a reflection of an infrequent practice of malaria data aggregation and use (or rather non-use) at lower levels. It also represents a missed opportunity to strengthen the system, and is a potential solution to increase awareness of the disparity problem at lower levels – a critical step for addressing the observed disparity.

### *Malaria Management and recording practices*

As noted in the results above, the observed malaria test positivity rate (number of confirmed cases/number of suspected cases) in this study is 13.6 percent. This means that for every confirmed case, seven suspected malaria cases are parasitologically screened. This test positivity rate is 13-percentage points lower than the national average of 26 percent over the same period (HMIS/DHIS2) and could indicate a higher index of suspicion and lower RDT-testing threshold in practice.

Higher burden facilities tend to have more VHWs and based on the discussion above, the commodities issued to them do not appear to be properly accounted for. Higher burden facilities also receive more commodities and thus, mismanagement of commodities at those facilities is likely to have a greater impact on the overall disparity picture. Mazowe and Buhera Districts, the lowest malaria burden districts, were observed to have the least differences in the values of key indicators when comparing across the reporting tools, reflecting higher accuracy of data reported. Conversely, Mutare and Mt. Darwin districts had the highest differences across the reporting tools' indicators and are the highest burden districts. This relationship between burden of cases and increased inaccuracy of reporting or likelihood of reporting errors are most likely due to sheer workload, inadequate supply of tools, or other causes as highlighted above.

Poor and inconsistent recording practices, difficulty understanding/completing data collection forms and tools, and workload issues were also most commonly cited as a reason for case-consumption disparities, particularly by facility-level and community staff at the lower levels. At the facility level, it was discovered that there is inconsistency with respect to which forms are used to complete the monthly summary form (T5). VHWs also significantly cut/combine ACTs presentations when faced with shortages, and appear to inconsistently record such practices. Most VHWs reported referring patients in the event of stock outs of certain ACT presentations. However, a similar proportion cut/combine presentations, which increases the likelihood of errors in recording or reporting. If the directionality of this practice is in favor of using multiple courses to treat an individual patient, then this practice contributes the observed case-consumption disparities. Since this practice of cutting/combining ACT presentations has been observed to be prevalent (so as to provide some treatment at the point of service), it would be thus beneficial to enact changes to this practice. When faced with shortages and a need to combine presentations, the skills of VHWs (and indeed other health workers) need to be improved to combine presentations properly and, more importantly, to accurately record those occurrences to avoid data errors.

### *Adequacy of Data and Tools*

The dichotomous data management systems (HMIS and LMIS) represent parallel systems which are often asynchronous. Both systems – which are very separate – pose difficulties for smooth comparison of cases and ACTs consumption as illustrated by this study. Of the data and tools themselves, key informants reported high performance measures of data quality and tool adequacy. However, this impression was not the case on direct observation where there were incompletely filled tools, or not

filled at all, and more importantly, there was a high occurrence of improvisation in record-keeping. Findings showed that where tools are available, health workers and VHWs generally complete key sections of data collection forms and registers, but there are inconsistencies in what sources get input into the monthly T5 form, and this affects the accuracy and reliability of the data and reliability data systems.

The wide differences in values of key malaria indicators is a definite contributor to the case-consumption disparity observed in the study districts, as revealed through assessment of data quality and accuracy at facility and lower levels on the various data collection and aggregation registers and forms. However, these differences also indicate a need to strengthen accuracy of case and commodity data reported up the chain to the national level. Differences in indicator values may also be due, in practice, to the non-standardized number and type of tools used in collating malaria data at facility level. More analysis is needed to determine the magnitude of this effect. Standardizing and streamlining the number of tools and the data collection collation process might lead to a reduction in recording errors and thus case-consumption disparities.

### *Logistics systems and Ordering practices*

Shortages of ACTs/RDTs, limited availability of appropriate and updated facility/community-level forms and dispensing registers, and logistics difficulties were common issues cited by all categories of staff interviewed for this survey as potential contributors to the historically observed case-consumption disparities. The magnitude and effect of each of these issues could not be determined; however it is reasonable to infer that the consequent practices in the face of these shortages (e.g., cutting and combining ACT presentations to make up the required dosage and inconsistent dispensing) contribute to observed disparities.

There are also gaps and inconsistencies with the tracking of commodities at the VHW/community level leading to likely overestimations of malaria commodities consumed. The ideal is that all facilities should account for all sources when carrying out physical counts at the time of ordering ACTs. Omitting any stock at the time of physical count leads to overestimation of consumption as stock not accounted for by physical count are considered consumed. This is the particular case for a significant proportion of facilities revealed by this study for which there was failure to account for stock at VHWs level. This stock is assumed to be consumed when portions of it remain in the community at time of stock delivery.

In addition to the VHW/Community level, 64 percent of the facilities reported conducting physical counts at the community level, but only 47 percent take them into account during the ordering process. This discordance in logistics management behavior warrants deeper exploration, and perhaps at least a review of the protocols to be followed during the ordering process.

Two out of the five DPMs interviewed track and/or physically count VHW stock, and only three take into account wards and outpatient stock when determining order quantities. In addition, there are inconsistencies at the facility level particularly in practices by facility staff when determining order quantities. These practices indicate a general non-adherence to the standard operation procedures. Not considering all stocks during ordering leads to the distortion of consumption and contributes to the observed case-consumption disparities. Since these determinations feed into the ZAPS system from which consumption data is derived, this can also contribute to an overestimation of consumption. At the higher/central level, there is no standardized protocol for the AutoOrder data review. Facilities are unaware of the processes and adjustments that happen at higher levels which would enable them to better manage their supplies at their facilities and for the VHWs linked to them. Survey findings also indicated that, at the facility stock management level, adjustments and transfers (in or out) are the predominant logistic actions that contribute to the overall case-consumption disparities (i.e., an over-estimation of consumption in most cases) much more than expiries or losses.

DPS central-level tools and approaches for commodities management, including those designed to identify discrepancies in the LMIS system, appear to be sufficient in principle. However, these actions need to be codified and adopted into a standardized protocol. Such standardization will also help clarify the relatively common instances of anomalies in the commodities and ordering data and reduce the significant time and effort currently required to identify and reconcile them. In addition, facilities must do their part to better manage and record supplies at that level.

Finally, pilferage does not appear to be a significant contributor to the observed case consumption disparity. Interviewed cadres were not asked whether pilferage existed or not, but rather whether there was a possibility of pilferage in the system. In instances where pilferage was cited as possible, it was generally perceived to be limited in magnitude *if it were to occur*, an impression mainly expressed only by higher-level executives and few district-level staff. There were no confirmed or reported cases of pilferage, and the assessment had no objective way of assessing for this.

## 4.2 LIMITATIONS OF THE STUDY

The design of the multistage purposive sampling technique limits any statistical cross-provincial comparisons of the results of this study. There was no "case-control" matching of the districts to allow for these types of comparisons. This study's intention was to unearth differences in practices that could foster learning; however, as only seven of the 63 districts in the country were purposively sampled, and just 72 of the over 1,600 health facilities randomly selected to make up the sample size, this methodology limits the external validity of the findings which cannot be extrapolated to districts beyond this study.

Historical data at the facility level (particularly VHW-related case management data) was not available in many cases, and collection and entry was poorly done, which was only discovered at the later data cleaning stage, prompting data re-entry from the source paper forms into the analysis database. This limitation particularly affected the VHW return forms and the VHW registers as the analysis team could only glean information from 50 facilities, some of which were missing entire aggregate VHW return information for some months. This was also the case with the commodities' forms, such as the facility loses and adjustments forms, FOF, and VHW stock forms. The VHW stock card on the Form 6 Losses and Adjustment Data Collection tool did not include a column to record RDTs, thus the disparity calculation had to rely on secondary LMIS data.

## 4.3 RECOMMENDATIONS

Based on the above conclusions, the study team recommends the following actions:

Overall: Institute a comprehensive package of reforms for improving implementation of disease surveillance and commodity management at the facility and (particularly) VHW/community level. Critical areas that need to be addressed include poor record keeping and reporting practices (especially in higher-burden areas), case and drug consumption documentation during outbreaks, and tracking of the combined and split of ACT formulations when the indicated formulation is out of stock. The Directorate of Pharmacy Services and the NMCP should consider implementing the following specific recommendations.

1. Institutionalize the comparison of case data and logistics data at supervisory and health facility level. Include these in support and supervision tools, monitoring, and data quality assessments at district and provincial level. Increase the capacity for malaria data aggregation, analysis, and use at lower levels. This could help increase awareness of the disparity problem at lower levels.

2. Review the Zimbabwe Assisted Pull system noting successes, challenges and areas of improvement in the whole process from data collection, consolidation, reporting and use of data. Specifically, for malaria consider computing a seasonality index to ensure that calculations for resupply respond to malaria seasonality. Quantification and supply of ACTs should consider the epidemic profile of malaria in the country and various districts to ensure availability of all presentations in the right quantities to minimize cutting and combining of presentations. This will ensure that the LMIS assumption of one ACT presentation per case is realized.
3. Review the VHW logistics system and integration of the data in DHIS2. This should be coupled with a clearly defined support and supervision framework for their activities and also data collection and reporting system. All health facilities should have a record of actual consumption and remaining stock of ACTS and RDTs with VHWs at the time of ordering.
4. Conduct regular data quality checks and periodic data analyses in both LMIS and HMIS, which could be done virtually by employing mobile technologies. Roll out of an electronic logistics management information system (eLMIS) should be expedited to ensure accurate data collection at point of use and enable a more efficient analysis of the LMIS and HMIS from across the systems.
5. Review the number and content of different malaria data collection tools at facility and community level to rationalize and streamline the processes and reduce workload associated with filling in multiple forms that collect similar information.
6. Strengthen supportive supervision and mentorship at all levels, particularly between the district and facility levels, and between the facility and VHWs.

# Appendix 1: Data Analysis Framework

| Objective | Survey Questions | Analysis Action |
|---|---|---|
| **Primary Objective 1:** Determine the factors that contribute to the observed disparities recorded between the first-line ACT consumption and reported malaria cases | VHWQ - VH2- What issues do you face in filling out this form?<br><br>VHWQ - VH 4- What issues do you think could be contributing to the discrepancy between ACT consumption and reported cases?<br>DHEQ-DHE5, 5a- Do you think there may be some pilferage of ACTs? If yes, how significant of a problem do you think pilferage may be? Tick appropriate response<br><br>DHEQ-DHE 3- What are the likely cause of the Disparity in your district?<br>HFQ -HF3 Include HF 8 and HF9<br><br>HFQ-HF10- In your opinion, what might be the reasons for a discrepancy between reported cases and consumption of ACTs at the facility level?<br>HIOQ-HIO2- Are you receiving reports from all facilities?<br>PHEQ-PHE 1c If yes, what are the likely causes of the disparities in your province?<br>PHEQ -PHE 3a, b- Do you think there may be some pilferage of ACTs? If yes, how significant of a problem do you think pilferage may be? (very significant, somewhat significant, not very significant)<br><br>DPMQ-DPM14- What are the possible causes of the Disparity in your district?<br>DPMQ -DPM 16a, b- Do you think there is pilferage of ACTs? If yes, how significant of a problem do you think pilferage may be? (Select one)<br><br>HMIS Table 2- reasons for disparities | VHWQ- VH 2- Extract percentage of "no issues" response from total responses<br>VHWQ - VH 4- coding of responses<br><br>DHEQ-DHE 5, 5a- Extract percentage of "yes" response from total responses<br>Populate percentage of each response "very significant, somewhat significant, not very significant"<br><br>DHEQ -DHE 3- coding of responses<br><br>HFQ-HF10- coding of responses<br><br>HIOQ-HIO 2- Extract percentage of "T5" and "VHW return form"<br><br>PHEQ-PHE1c- coding of responses<br><br>PHEQ -PHE 3a,b- Extract percentage of "yes" response from total responses<br>Extract percentage of each response "very significant, somewhat significant, not very significant"<br><br>DPMQ-DPM 14- coding of responses<br><br>DPMQ -DPM 16a,b- Extract percentage of "yes" response from total responses<br>Extract percentage of each response "very significant, somewhat significant, not very significant" |

| Objective | Survey Questions | Analysis Action |
|---|---|---|
| | FLAF Comments | Code HMIS Table 2 "other" responses and tabulate all responses for each of the five comparisons<br><br>Code FLAF comments and tabulate responses |
| **Primary Objective 2:** Determine and describe the magnitude, temporal trends and geographical distribution of observed Disparities between first-line ACT consumption and reported malaria cases from 2014-2016 | Desk Review | Compare the aggregate ACT LMIS consumption vs HMIS Cases (confirmed + unconfirmed given ACTs) |
| **Primary Objective 3:** Recommend actions to address the various contributing factors identified | HF11, VH3c, PHE2, DHE4, DPM15 - What do you think could be done to minimize this discrepancy? | Thematically code the responses by cadre<br>PHE<br>DHE<br>DPM<br>Health facility in-charges<br>VHW |
| **Secondary Objective 1:** Verify the accuracy of data reported by facilities within HMIS and LMIS | HMIS<br>Compare unconfirmed cases given ACTs in T5 vs OPD,<br>Compare the disparities by month for unconfirmed cases given ACTs between the T5 vs OPD<br><br>Compare confirmed cases in T5 vs OPD,<br><br>Compare the disparities by month for confirmed cases between the T5 vs T12/IMNCI<br><br>Compare number of patients given ACTs in T12/IMNCI vs number of confirmed cases given ACTs in T5.<br><br>Compare the disparities by month for number of patients given ACTs in T12/IMNCI vs number of confirmed cases given ACTs T5<br><br>Create the same tables for the following:<br>T5 vs T3, | Compare tested cases in T5 vs T12/IMNCI, monthly and totals Disaggregate by district, province and facility type (hospitals and clinics)<br><br>Produce tables for unconfirmed cases given ACTs by month and totals for T5 vs T12/IMNCI<br>Disaggregate by district, province and facility type (hospitals and clinics)<br><br>Conduct disparity analysis using standard deviation of differences in unconfirmed cases given ACTs between T5 and T12/IMNCI<br><br>Produce tables for confirmed cases given ACTs by month and totals for T5 vs T12/IMNCI<br>Aggregate by district, province and facility type (hospitals and clinics) |

| Objective | Survey Questions | Analysis Action |
|---|---|---|
| | T5 vs RDT Register<br>T3 vs T12/IMNCI<br>Unconfirmed cases given ACTs, confirmed cases given ACTs<br>Analysis of disparities as recorded in the HMIS form<br><br>LMIS – Compare the totals for losses on stock card vs Auto-order Commodity Receipt (ACR) by district and facility type<br>Compare the adjustments on stock card vs ACR by district and facility type<br>Compare the expiries on the expired medicines register vs stock card<br><br>LMIS – FLAF - Compare the totals for losses on stock card vs ACR by district and facility type<br>Conduct a disparity testing<br>FLAF -Compare the totals of adjustments on stock card vs ACR by district and facility type<br>Conduct a disparity testing<br>FLAF - Compare the expiries on the expired medicines register vs stock card<br>Conduct a disparity testing<br><br>FSOF - % of facilities that reported a stock out of any ACT presentation<br>FSOF - % of facilities that were stocked out of all ACT presentations<br>FSOF - % of facilities that reported a stock out of RDTs<br><br>Compare the issues to dispensary vs issues to VHW<br>How many VHWs reported expiries and what were the quantities?<br><br>Identify possible factors for disparities between the physical count and the stock card balances<br><br>Compare the aggregate ACT LMIS consumption vs HMIS Cases (confirmed + unconfirmed given ACTs)<br>Compare the issues to VHW to VHW Return Forms consumption | Conduct disparity analysis using standard deviation of differences in confirmed cases between T5 and T12/IMNCI<br><br>Produce tables for number of patients given ACTs T12/IMNCI vs number of confirmed cases given ACTs T5 by month and totals. Disaggregate by district, province and facility type (hospitals and clinics)<br><br>Conduct disparity analysis using standard deviation of differences between number of patients given ACTs T12/IMNCI vs number of confirmed cases given ACTs T5 by month and totals<br><br>Produce tables for the reasons for disparity for each of the 5 scenarios in questions 113-116. |

| Objective | Survey Questions | Analysis Action |
|---|---|---|
| | VHW Return Forms – Suspected and confirmed individual vs aggregate<br>Number of ACTs given to patients - individual vs the aggregate | |

| Objective | Survey Questions | Analysis Action |
|---|---|---|
| **Secondary Objective 2:** Assess the adequacy[4] and reliability of the current data collection tools for malaria case and commodity data needs within the HMIS and LMIS | **RELIABILITY**<br>HIOQ -- HIO2iii- HIO2iv Are you receiving reports from all facilities?<br>HIOQ – HIO3 Are people consistently filling the relevant information? (yes/no)<br>HIOQ - HIO4 Are people consistently tallying? (yes/no)<br>HIOQ - HIO6 Are facilities putting monthly summaries on key data elements in the T12/IMNCI?<br>HIOQ – HIO8 Are suspected cases equal to the number of tested cases?<br><br>**ADEQUACY**<br>VHWQ- VH2- What issues do you face in filling out this form?<br>HIOQ-HIO1bi- HIO1biv Are these forms readily available?<br>HIOQ-HIO2i- HIO2ii Do you have the current version?<br>HIOQ - HIO5 Do all facilities have the column for completing the unconfirmed Cases given ACTs (T5)? (yes/no)<br>HIOQ – HIO7 When aggregating are all blocks complete<br><br>ADEQUACY (HMIS Table)<br>Does it have all the columns? (Y/N)<br>Does it have the column for Unconfirmed Cases given ACTs? (Y/N)<br><br>RELIABILITY (HMIS Table)<br>Are people consistently filling the relevant information? (Y/N)<br>Are people consistently tallying? (Y/N)<br>Is information from all departments captured? | HIOQ-HIO2iii and HIO2iv- Number of HIOs receiving T5, VHW return forms, and both forms<br>HIO3 Proportion of people who fill in the information adequately<br>HIO4 Proportion of DHIOs who said yes to consistently tallying<br>HIO6 Percentage filling in monthly totals<br>HIOQ – HIO8 Percentage of HIOs reporting suspected cases equal to tested cases<br><br>VHWQ-VH2- Thematic coding of response. Percentages by response type<br>VHWQ-VH2- Extract percentage of "no issues" response from total responses<br>HIOQ-HIO1bi – HIO1biv- Number of HIOs reporting availability of T12/IMNCI, T9, T5, VHW return forms, and all forms<br>HIOQ-HIO2i and HIO2ii- Number of HIOs with the current version of T5, VHW return forms, and both forms<br>HIOQ - HIO5 Percentage of HIOs who responded yes (T5)<br>HIOQ – HIO7 Proportion of DHIOs reporting that all blocks are complete<br><br>Percentage Yes for "does the form have a column for disaggregate by RDT test Done/ RDT Result/ Treatment" and also by Form type. Provide a table.<br><br>Percentage Yes for "does the form have a column for disaggregate by RDT test Done/ RDT Result/ Treatment" and by Form type. Provide a table.<br><br>Percentage Yes if people consistently filling disaggregate by |

[4] Adequacy in this context refers to whether system and tools are accurately measuring the data elements of interest

| Objective | Survey Questions | Analysis Action |
|---|---|---|
| | | RDT test Done/ RDT Result/ Treatment and by Form type. Provide a table.<br>Percentage Yes if people consistently tallying disaggregate by RDT test Done/ RDT Result/ Treatment and by Form type. Provide a table.<br>Percentage Yes if data from all departments is being captured. Disaggregate by: RDT test Done/ RDT Result/ Treatment and also by Form type. Provide a table.<br><br>Thematically code the comments and pull out proportions for each code. Breakdown by question. |
| **Secondary Objective 3ia** Evaluate:<br>I. The practices of health facility staff for recording and reporting of malaria case and ACTs consumption | HFQ-HF1- Which of these forms do you use when aggregating or collecting malaria data?<br>HFQ-HF2- What is the primary source of the data you use for the T5 malaria cases? *Tick one*<br>HFQ-HF4- On average how many cases are given ACTs and are not recorded or counted as malaria cases in a month?<br>HFQ-HF7- When ZIPS/ZAPS ordering delivery teams were coming (Oct 2016 to March 2017) were the facility staff involved in the following: counting stock, giving information on stock outs, giving information on losses and adjustments, giving information on expiries, determining the quantity to be ordered/delivered?<br><br>HFQ-HF8- HF8 For the purposes of ZIPS/ZAPS from which areas do you get your physical counts? (Tick appropriate✓)<br><br>HFQ-HF14- How do you track stock at VHWs level? (explain process) If not mentioned, prompt<br>HF15- How do you determine how many ACT courses to give each VHW? Calculate using the formula in the VHW register, supply based on stocks at clinic, supply based on other criteria?<br>HFQ-HF16 - How are ACTs and RDTs issued to VHWs recorded at clinic (explain and verify)? If not mentioned, prompt<br><br>HFQ-HF17- When ordering teams visit the facility do they | HFQ-HF- percentage of health facilities using T3 only, RDT only, T12/IMNCI only, T3&RDT, T3&T12/IMNCI, RDT&T12/IMNCI, All three, other ….<br>Interpretation<br><br>HFQ-HF2- percentage of HFs whose primary source for t5 malaria cases is T3, T12/IMNCI, RDT, other(recode based on responses)<br>Interpretation<br><br>HFQ-HF4- Come up with ranges for number of cases given ACTs but not recorded as malaria cases i.e. 0, 0-9, 10-19, 20-29, 30 and above<br>Proportion of HFs reporting 0, 0-9, 10-19, 20-29, 30 and above (*present this info in a pie chart*)<br>Total number of cases given ACTs but not recorded as malaria case for all the facilities<br><br>HFQ-HF7- percentage of facilities involved in counting stock, giving information on stock outs, giving information on losses and adjustments, giving information on expiries, determining the quantity to be ordered/delivered.<br>Also include percentage of facilities involved in all the processes to signify optimal involvement *(present the info in a bar graph)*<br><br>HFQ-HF8- percentage of HFs doing physical counts in |

| Objective | Survey Questions | Analysis Action |
|---|---|---|
| | consider stocks available at VHWs level?<br><br>Facility Physical Count Form - FPCF | pharmacy, dispensary, wards, VHWs, all the areas<br><br>HF14- percentage of HF doing physical counts, reconciliation of records, document return of usable stock, document expiry, doing all<br><br>HFQ-HF15-– Firstly, recode 'other criteria' then present percentage using formula, supply based on stocks, recodes for other criteria (Is this a mutually exclusive question? If so we can present in a pie?)<br><br>HFQ-HF16- ambiguous<br><br>HF17- proportion considering VHWs vs those who do not<br><br>FPC F- percentage of facilities that had any disparity of actual physical count and stock card balance |
| **Secondary Objective 3ib**<br>Evaluate:<br>I. The practices of VHWs for recording and reporting of malaria case and ACTs consumption | VHWQ-VH1- VH1 When completing the VHWs malaria return form from which sources do you take information from?<br><br>VHWQ-VH8a-Are there ever instances in which ACTs are given to patients but not recorded or counted as a malaria case?<br><br>VHWQ-VH8b- If yes, under what instances?<br><br>VHWQ-VH10- Have you ever, during the period under review dispensed ACTs to patients without RDT testing?<br><br>VHWQ-VH13- When there is a stock out of RDTs how are suspected cases recorded? (Do not prompt)<br><br>VHWQ-VH15- How do you handle expired stock? | VHWQ-VH1- percentage using RDT register, IMNCI, recodes for other, RDT & recodes for other. Interpretation<br><br>VHWQ-VH7b - recode responses. Report percentage contribution of each response.<br><br>VHWQ-VH8a - percentage of VHWs who have given ACTs but did not record the cases<br><br>VHWQ-VH8b- percentage of VHWs reporting outbreaks, lack of time, RDT stock outs, clients seen after hours, others (recode). NB: the denominator is those who responded yes to VH8a.<br><br>VHWQ-VH10- percentage of VHWs who ever dispensed ACTS without RDT testing<br><br>VHWQ-VH13- Proportion of VHWs not recording, recording as suspects, recording as confirmed ,others when there are RDT stock outs |

| Objective | Survey Questions | Analysis Action |
|---|---|---|
| | | VHWQ-VH15-On handling of expired percentage reporting different practices i.e. record in RDT register, if *there are other responses, recode.* |
| **Secondary Objective 3ic**<br>Evaluate:<br>The practices of HIOs for recording and reporting of malaria case and ACTs consumption | HIOQ-HIO1ai- HIO1av Which of these forms do you use when aggregating malaria data? | HIOQ-HIO1a- Number of HIOs using T12/IMNCI, T9, T5, VHW return forms, other, and all forms |
| **Secondary Objective 3ii:**<br>Practices of district pharmacy managers in determining order quantities | DPMQ-DPM1a (ii) - How do you determine stock available during ordering? (Check all that apply)<br><br>DPMQ-DPM1b- If physical count, which sources do you include? (Check all that apply)<br><br>DPMQ-DPM2 (ii) Do you check all available storerooms, if more than one?<br><br>DPMQ-DPM3 (ii) - Do you have access to all available storerooms?<br><br>DPMQ-DPM4 (ii) - How often do you involve health facility staff during physical count and determining losses, adjustments and order quantities? (Select one)<br><br>DPMQ-DPM5 (ii) - How do you account for losses /adjustments when determining order quantities? (Check all that apply)<br><br>DPMQ-DPM6 (ii) - How do you determine the days stocked out? (Check all that apply)<br>DPM7a- Do you ever change the average monthly consumption calculated by the software?<br>DPM7b- If yes, how often do you make the change?<br><br>DPM8- Under what circumstances do you change average monthly consumption? | DPM1a- Number of DPMs reporting using physical count, stock cards, both, other(recode) to determine available stock during ordering<br><br>DPM1b- Number of DPMs checking storeroom, dispensaries, wards, OPD, VHW, other, all areas when doing physical count<br><br>DPM2- out of x DPMs, y DPMs check all available storerooms<br><br>DPM3- x DPMs have access to all rooms out of y DPMs<br><br>DPM4- The number of DPMs who always, sometimes, never involve facility staff during physical count, determining losses and adjustments<br><br>DPM5- Number of DPMs using ,Stock card, Receipt and Issue Voucher, Goods Received Register, Expired Medicines Register, Ask health facility staff. All of these to account for loses and adjustments<br><br>DPM6- Number of DPMs using stock cards, asking health staff, using both to determine days stocked out<br><br>DPM7a- Number of DPMs who change monthly consumption calculated by the software |

| Objective | Survey Questions | Analysis Action |
|---|---|---|
| | DPM9- What do you do if the software calculates a negative monthly consumption? (Check all that apply)<br><br>DPM10a, - Do you check to see if the AMC makes sense in comparison to the malaria burden in the facility?<br><br>DPM10b- If yes, what do you do?<br><br>DPM11a- Does someone supervise you during the data collection and ordering process?<br><br>DPM11b- If so how often do they supervise your work? (Select one) | DPM7b- Out of those who answered yes the number of DPMs who change monthly consumption' sometimes', 'always', 'never'<br><br>DPM8- recode circumstances mentioned and report their frequencies<br><br>DPM9- impossible so no needs to analyse. Should look at data to make sure it is not being reported. |
| **Secondary Objective 3iii:**<br>Practices of central level LMIS staff in aggregation and reporting logistics data and other challenges | Thematic analysis of interviews | |
| **Secondary Objective 4:**<br>Describe the treatment recording practices at facilities in specific scenarios, namely<br>During malaria outbreaks<br>ii. When specific first-line ACT presentations are not in stock<br>When RDTs are not in stock | HFQ- HF3a-b- ACTs administered but cases not recorded<br>HFQ- HF6- recording of suspected cases in stock out of RDTs<br>HFQ- HF5- Management of suspected cases in face of RDTs stock out (unprompted)<br>VHWQ-VH8a-b- ACTs administered but cases not recorded<br>VHWQ-VH11- Have you had stock outs of RDTs (for the Oct 2016- March 2017?)<br>VHWQ-VH7b- Dispensing practice in face of stock outs of any ACT presentation<br>VHWQ-VH9- In outbreaks how do you dispense and record ACTs?<br>VHWQ-VH12- Management of suspected cases in face of RDTs stock out (unprompted)<br>VHWQ-VH13- Recording of suspected cases in face of RDTs stock out (unprompted) | HFQ- HF3a-b- Calculate percentage of "yes" dosage. Disaggregate by outbreak, RDT Stock outs, lack of time, after hour clients<br>HFQ- HF6- Code other and calculate percentage distribution of responses<br>HFQ- HF5- Code other and calculate percentage distribution of responses<br>VHWQ- VH8a-b-Calculate percentage of "yes" dosage. By outbreak, RDT Stock outs, lack of time, after hour clients<br><br>VHWQ-VH11- Calculate percentage of "Yes"<br>VHWQ-VH7b- Thematically code responses, then calculate percentage distribution of themes.<br>VHWQ-VH9- Thematically code responses, then calculate responses of themes<br>VHWQ-VH12- Calculate percentage distribution of responses<br>VHWQ-VH13- Calculate percentage distribution of |

| Objective | Survey Questions | Analysis Action |
|---|---|---|
| | | responses |
| **Other useful Analytical pieces:**<br>Context/Background<br>Awareness<br>VHWs | HFQ-HF9a- Are you aware of any discrepancy between the number of cases reported by your facility and the reported consumption of ACTs?<br>HFQ-HF12- How many VHWS are served by the clinic?<br>HFQ-HF1 3a (i)- Do you have VHWs served by clinic who are testing and treating?<br>HFQ-HF1 3a (ii) - Do you have VHWs served by clinic who are testing only and referring?<br>HFQ-HF13b - If yes how many VHWs served by clinic are testing and treating malaria?<br>HFQ-HF13c- How many were trained in community malaria case management among those who are testing and treating?<br>VHWQ-VH3a, bi- Are you aware of any discrepancy between the number of cases reported and the reported consumption of ACTs?<br><br>PHEQ- PHE1a, b- Is the PHE aware of the disparities between the number of reported malaria cases and consumption of ACTs?<br>PHEQ- PHE1 b- If yes, has the PHE investigated any causes of the disparity?<br>DHEQ- DHE1- DHE1 Is the DHE aware of the disparities between the number of reported malaria cases and consumption of ACTs?<br>DHEQ-DHE2- Has the DHE investigated any causes of the Disparity?<br>DPMQ- DPM12- Are you aware of the Disparities between the number of reported malaria cases and consumption of ACTs?<br><br>VHWR -Number of VHWs testing and treating malaria<br>Number of VHWs attached to facility<br><br>VHWSF – Issued stock to VHWs<br><br>FLAF – Issues stock to dispensary | HFQ-HF9a- Proportion of respondents<br><br>HFQ-HF12- Proportion of VHWs<br><br>HFQ-HF13a(i)- Proportion of clinics with VHWs that test and treat<br><br>HFQ-HF13a(ii)- Proportion of clinics with VHWs that test and refer<br><br>HFQ-HF13b- Proportion of VHWs that test and treat<br><br>HFQ-HF13c- Proportion of VHWs trained in community malaria management who are testing and treating<br><br>VHWQ-VH3a,bi- Proportion of respondents<br><br>PHEQ- PHE1a, b- Number of PHEs that are aware of the Disparities<br><br>PHEQ- PHE1 b- Number of PHEs that investigated causes of the Disparity<br><br>DHEQ- DHE1- DHE1- Number of DHEs that are aware of the Disparities<br><br>DHEQ-DHE2- Number of DHEs that investigated causes of the Disparity<br><br>DPMQ- DPM12- Number of DHEs that are aware of the Disparities<br><br>DPMQ- DPM13- Number of DPMs that had knowledge of prior investigations to determine causes of the Disparity<br><br>VHWR – Proportion of VHWs treating and testing malaria.<br><br>VHWSF - How many VHWs reported expiries and what were the quantities |

| Objective | Survey Questions | Analysis Action |
|---|---|---|
| | | FLAF - Compare the issues to dispensary vs issues to VHW |
| **Recommendations** | DHE4, PHE2, HF 11 | Compile recommendations from each cadre and level and tabulate occurrences of each stated recommendation |

### HMIS Aggregate Analysis Form

| Number of Unconfirmed Cases given ACTs | T12/IMNCI | T5 | T3 | RDT Register |
|---|---|---|---|---|
| Oct-16 | | | | |
| Nov-16 | | | | |
| Dec-16 | | | | |
| Jan-17 | | | | |
| Feb-17 | | | | |
| Mar-17 | | | | |
| | | | | |

### FLAF

| Number of confirmed Cases | Number of patients given ACTs T12/IMNCI | Number of confirmed malaria Cases (T5) | Number of confirmed malaria cases T3 | Number of confirmed malaria cases RDT Register |
|---|---|---|---|---|
| Oct-16 | | | | |
| Nov-16 | | | | |
| Dec-16 | | | | |
| Jan-17 | | | | |
| Feb-17 | | | | |
| Mar-17 | | | | |

| DISTRICTNAME | Expired Stock | Damaged | Other | Unspecified | Total Losses | Losses (ACR) | Quantity Expired Medicines Register |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

| DISTRICTNAME/ FACILITY TYPE | Adjustments (Stock card) Transfer In | Adjustments (Stock card) Transfer Out | Adjustments (Facility order Form) Transfer In | Adjustments (Facility order Form) Transfer Out |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |

# Appendix 2: Field Supervision Checklist

**Pre-visit logistics**

| Item | Description | Responsible | Available (Tick if completed and x if not completed) |
|---|---|---|---|
| **Letter to PMDs has been received** | Check with Malaria Focal Person at Province | DPS | ✓ |
| **Facilities notified of the survey** | Facilities notified of date / time of visit and to make the following available and in place: OPD and ward registers, stock cards, T3, T12/IMNCI, expired medicines registers, Attendance registers for the Oct-March period. Completed VHWs RDTs/Medicines register , aggregate VHWs Return Forms by month(for Oct 2016-March 2017), | Provincial/District members of team | |
| **VHWs and School Health Masters (where available) have been notified (Trained and testing and treating malaria)** | Facilities to notify 5 VHWs to come to the clinic on set day with: VHW registers and individual VHWs Monthly Return Forms for Oct 2016-March 2017, | District | |

**Provincial Level**

| **Tools** | **Description** | **Responsible** | **Available (Tick if completed and x if not completed)** |
|---|---|---|---|
| **Letter from PS** | Signed Letter of invitation for training and survey from PS | Team Leader | |
| **Letter from PMD / or endorsed letter** | Endorsed letter from PMD | Team leader | |
| **PHE Interview (Tool)** | Completed tool after discussions with PHE. | Team Leader | |

**District Level**

| Tools | Description | Responsible | Available (Tick if completed and x if not completed) |
|---|---|---|---|
| **Endorsed letter from PMD** | Signed letter by PMD for use at District | Team Leader | |
| **Endorsed letter from DMO** | Signed letter from DMO for use at Health facility | Team Leader | |
| **List of Health Facilities** | List of facilities for that district for planning | Team Leader | |
| **DHE tool** | Completed tool after discussions with DHE | Team Leader | |
| **Health Information Officer (HIO) Tool** | Completed tool after interviewing the HIO | Team Leader | |
| **District Pharmacy Manager Tool** | Completed tool after interviewing the DPM | Team Leader | |

**Facility Level**

| Tools | Description | Responsible | Available (Tick if completed and x if not completed) |
|---|---|---|---|
| **Endorsed letter from DMO** | Signed letter from DMO for use at Health facility | Team Leader | |
| **Facility level Questionnaire** | Completed facility questionnaire | Team Leader | |
| **Form 1: HMIS** | T3, T12/IMNCI (including departmental) , IMNCI register, ANC register, OPD dispensing register, Wards | Team Leader | |
| **Form 2 : VHWs** | Five VHWs questionnaires per facility completed, where applicable | Team Leader | |
| **Form 3: VHW Return** | VHW forms for 5 VHWs per facility completed | Team Leader | |
| **Form 4: Physical Count** | Completed form with Physical Counts per facility per product on the day of visit | Team Leader | |
| **Form 5: Stock Out Form** | Completed Stock out form per facility using Auto-order Commodity Receipt Voucher (ACR) , stock cards | Team Leader | |
| **Form 6: Loses and Adjustment** | Completed form after reviewing stock cards, expired medicines register | Team Leader | |

# Appendix 3: CDCS Questionnaires and Tools

**Central Level Tool: FGD on LMIS**

Introductory script and verbal consent: Hello, I'm ___ from ___. I'm working with the NMCP to conduct an assessment to determine what may be causing the very large discrepancy we are seeing between the number of malaria treatment courses that are consumed, compared to the number of malaria cases that are reported. As part of this assessment, I'd like to ask you some questions. We'll talk in private and the answers you give will be combined with those from others for the report. Your participation is voluntary and you can stop at any time or skip questions if you prefer. May I begin the questions? [ ] Yes No [ ] Facilitator should check the appropriate box and those who do not give consent should be excused from the focus group discussion.

1. Can you briefly describe your roles?

2. Do you ever notice data that is inconsistent with the facility size, season and malaria endemicity?

3. How do you pick the data inconsistences during data capture?

4. What type of inconsistences do you normally pick?

5. How often do you pick them?

6. Do you feel the current approach is adequate to pick the anomalies?

7. What follow up actions do you undertake in case of data anomalies?

a. Within the LMIS e.g. can you flag the data, do you make attempts to correct it

b. To facilities

c. To NatPharm

8. Are there any SOPs on these processes? Verify and state the version

9. Do you think the SOPs are being followed? (look in the SOPs and what it says, adequacy)

10. What do you think could be done differently to improve the process? (e.g., improvements and timing of the process, improvements to the software, data generation and quality at the facility level, improvements to the data collection tools)

**PHE, DHE and DPM Questionnaires**

**PHE Questionnaire**

Province: _____

Designation: _____

*Introductory script and verbal consent*: Hello, I'm ___ from ___. I'm working with the NMCP to conduct an assessment to determine what may be causing the very large discrepancy we are seeing between the number of malaria treatment courses that are consumed, compared to the number of malaria cases that are reported. As part of this assessment, I'd like to ask you some questions. We'll talk in private and the answers you give will be combined with those from others for the report. Your participation is voluntary and you can stop at any time or skip questions if you prefer.
May I begin the questions? [ ] Yes No [ ]

1. PHE1a Is the PHE aware of the variances between the number of reported malaria cases and consumption of ACTs? (Yes/ No)
2. PHE1b If yes, has the PHE investigated any causes of the variance (Yes/ No)
3. PHE1c If yes, what are the likely causes of the variances in your province?
4. PHE2 How do you think the variances can be minimized? (Yes/ No)
5. PHE3a Do you think there may be some pilferage of ACTs (Yes/ No)
6. PHE3b If yes, how significant of a problem do you think pilferage may be? (Very significant, somewhat significant, not very significant)

**DHE Questionnaire**

Province: _____

District: _____

Designation: _____

1. DHE1 Is the DHE aware of the variances between the number of reported malaria cases and consumption of ACTs? (Yes/ No)
2. DHE2 Has the DHE investigated any causes of the variance?
3. DHE3 What are the likely cause of the variance in your district?
4. DHE4 How do you think the variance can be minimized?
5. DHE5 Do you think there may be some pilferage of ACTs? (Yes/ No)
6. DHE5a If yes, how significant of a problem do you think pilferage may be? Tick appropriate response

☐ Very Significant ☐ Somewhat Significant ☐ Not very significant

**District Pharmacy Manager (District) Questionnaire**

Province: _____

District: _____

Designation: _____

1. DPM1a: How do you determine stock available during ordering? (Check all that apply)
   ☐ Physical Count ☐ Stock Cards ☐ Other, please explain_____
2. DPM1b: If physical count, which sources do you include? (Check all that apply)
   ☐ Storeroom(s) ☐ Dispensary/ Dispensaries ☐ Out patients Department (OPD)
   ☐Wards ☐VHW stocks ☐ Other, please explain_____
3. DPM2: Do you check all available storerooms, if more than one? (Yes/ No)
4. DPM3: Do you have access to all available storerooms? (Yes/ No)
5. DPM4: How often do you involve health facility staff during physical count and determining losses, adjustments and order quantities? (Select one)
   ☐ Always ☐ Sometimes ☐ Never
6. DPM5: How do you account for losses /adjustments when determining order quantities? (Check all that apply)
   ☐ Stock card ☐ Receipt and Issue Voucher ☐Goods Received Register ☐Expired Medicines Register ☐ Ask health facility staff ☐ Other, please explain _____
7. DPM6: How do you determine the days stocked out? (Check all that apply)
   ☐ Review stock card ☐ Ask health facility staff
8. DPM7a: Do you ever change the average monthly consumption calculated by the software?
9. DPM7b: If yes, how often do you make the change
   ☐ Always ☐ Sometimes ☐ Never
10. DPM8: Under what circumstances do you change average monthly consumption?
11. DPM9: What do you do if the software calculates a negative monthly consumption? (Check all that apply) ☐ Change to zero ☐Leave as is ☐Other, please explain_____
12. DPM10a Do you check to see if the AMC makes sense in comparison to the malaria burden in the facility? (Yes/ No)
13. DPM10b: If yes, what do you do?
14. DPM11a: Does someone supervise you during the data collection and ordering process?
15. DPM11b: If so how often do they supervise your work? (Select one)
    ☐ Always ☐ Sometimes ☐ Never
16. DPM 12: Are you aware of the variances between the number of reported malaria cases and consumption of ACTs? (Yes/ No)
17. DPM13: From your knowledge have there been any prior investigations to determine causes of this variance?
18. DPM14: What are the possible causes of the variance in your district?
19. DPM15: How do you think the variance can be minimized?
20. DPM16a Do you think there is pilferage of ACTs? (Yes/ No)
21. DPM16b If yes, how significant of a problem do you think pilferage may be? (Select one)
    ☐ Very Significant ☐ Somewhat Significant ☐ Not very significant

**Health Information Officer (District) Questionnaire**

Province: _____

District: _____

1. HIO1a: Which of these forms do you use when aggregating malaria data?

☐ T12 ☐ T9/IMMIS ☐ T5 ☐ VHW Return Form ☐ Others /Comments (specify)

2. HIO1b: Are they readily available. Yes or no

3. HIO1c: Do you have the current version (Nov 2015). Verify ☐ T5 ☐ VHW Return Form

4. HIO2: Are you receiving reports from all facilities? ☐ T5 ☐ VHW Return Form

5. HIO3: Are people consistently filling the relevant information on T12 (Yes/ No)

6. Are people consistently tallying T3? (Yes/ No)

7. Do all facilities have the column for completing the unconfirmed cases given ACTs on T5? (Yes/ No)

8. HIO6: Are facilities putting monthly summaries on key data elements in the T12? (Yes/ No)

9. HIO7: When aggregating data are all blocks complete? (Yes/ No)

10. HIO8: Are suspected cases equal to the number of tested cases? (Yes/ No)

**Health Facility Questionnaire**

Province: _____

District: _____

Name of health facility: _____

Designation of staff interviewed: _____

1. HF1: Which of these forms do you use when aggregating or collecting malaria data?

☐ T3 ☐ T12 ☐ RDT registers ☐ Other (specify)

2. HF2: What is the primary source of the data you use for the T5 malaria cases? Tick one

☐ T3 ☐ T12 ☐ RDT registers ☐ Other (specify)

3. HF3a: Are there ever instances in which ACTs are given to patients but those individuals are not recorded or counted as a malaria case? (Yes/ No)

4. HF3b: If yes under what circumstances?

☐ In an outbreak ☐ Lack of time ☐ RDT Stock outs ☐ Clients seen after hours

5. HF4: On average how many cases are given ACTs and are not recorded or counted as malaria cases in a month?

6. HF5 When there is a stock out of RDTs how are suspected cases managed? (Do not prompt)

☐ Given ACTs ☐ Referred to other facilities ☐ Not treated ☐ Referred for microscopy

☐ Borrow from other facilities ☐ Other (specify)

7. HF6; When there is a stock out of RDTs how are suspected cases recorded? (Do not prompt)

☐ Not recorded ☐ Recorded as suspects ☐ Recorded as confirmed cases ☐ Other (specify)

8. HF7; When ZIPS/ZAPS ordering Delivery teams were coming (Oct 2016 to March 2017) were the facility staff involved in the following: Process of counting stock (Yes/ No); Giving information on stock outs (Yes/ No); Giving information on losses and adjustments (Yes/ No); Giving information on expiries (Yes/ No); Determining the quantity to be ordered/delivered (Yes/ No).
9. HF8: For the purposes of ZIP/ZAPS from which areas do you get your physical counts? (Tick appropriate) ☐ Storeroom(s) ☐ Wards ☐ Dispensary ☐ VHWs ☐ Other, specify
10. HF9a: Are you aware of any discrepancy between the number of cases reported by your facility and the reported consumption of ACTs? (Yes/ No). If the answer is no skip to HF 12
11. HF9b: If yes, have you investigated the situation to determine possible causes for this variation?
12. HF10: In your opinion, what might be the reasons for a discrepancy between reported cases and consumption of ACTs at the facility level?
13. HF11: What do you think could be done to minimize this discrepancy?
14. HF12: How many VHWS are served by the clinic?
15. HF13a: Do you have VHWs served by clinic who are (tick appropriate response) ☐ Testing and treating ☐Testing only and referring
16. HF13b: If yes how many VHWs served by clinic are testing and treating malaria?
17. HF13c: How many were trained in community malaria case management among those who are testing and treating malaria?
18. HF14: How do you track stock at VHWs level (explain process) If not mentioned, prompt. Conduct physical counts (Yes/ No); Do data reconciliations in their registers (Yes/ No); Document return of usable stock from the VHWs to the facility (Yes/ No); Document expired/unusable stock returned from the VHWs to the facility (Yes/ No)
19. HF15: How do you determine how many ACT courses to give each VHW? ☐ Calculate using the formula in the VHW register ☐ Supply based on stocks at clinic ☐ Supply based on other criteria (specify)
20. HF16: How are ACTs and RDTs issued to VHWs recorded at clinic (explain and verify)? If not mentioned, prompt
21. HF16a: Do you keep records for issues of stock to each VHW? (Yes/ No)
22. HF16b: How do you record issues to the VHWs on the stock card? e.g. issues or losses/adjustments
23. HF17: When ordering teams visit the facility do they consider stocks available at VHWs level? (Yes/ No)

**VHW Questionnaire**

Province: _____

District: _____

Name of health facility affiliated to: _____

1. VH1: When completing the VHWs malaria return form from which sources do you take information from? ☐ VHWs RDT/Medicines Register ☐ IMNCI Register ☐ Other (specify)
2. VH2: What issues do you face in filling out this form?
3. VH3a: Are you aware of any discrepancy between the number of cases reported and the reported consumption of ACTs? If No skip to VH6 (Yes/ No)
4. VH3b: If yes, have you investigated the situation to determine possible causes for this variation?

5. VH3c: What do you think could be done to minimize this discrepancy?
6. VH4: What issues do you think could be contributing to the discrepancy between ACT consumption and reported cases?
7. VH6: Where do you keep your malaria commodities? ☐ Dedicated Storage Box

   ☐ Wardrobe /Cupboard ☐ Other (specify)
8. VH7a: Have you ever had stock outs of any presentation of ACTs from October 2016 to March 2017? (Yes/ No)
9. VH7b: If there was a stock out of any ACT presentation how were the ACTs being dispensed to patients who would normally have received the presentation that was out of stock?
10. VH8a: Are there ever instances in which ACTs are given to patients but not recorded or counted as a malaria case? (Yes/ No)
11. VH8b: If yes, under what instances? ☐ In an outbreak ☐ Lack of time ☐ RDT Stock outs ☐ Clients seen after hours
12. VH9: In outbreaks how do you dispense and record ACTs?
13. VH10: Have you ever, during the period under review dispensed ACTs to patients without RDT testing? (Yes/ No)
14. VH11: Have you had stock outs of RDTs (for the Oct 2016- March 2017? (Yes/ No)
15. VH12: When there is a stock out of RDTs how are suspected cases managed? (Do not prompt) ☐ Given ACTs ☐ Referred to clinic ☐ Not treated ☐ Other, specify
16. VH13: When there is a stock out of RDTs how are suspected cases recorded? (Do not prompt) ☐ Not recorded ☐ Recorded as suspects ☐ Recorded as confirmed case ☐ Other, specify
17. VH14: Have you had any expiries of RDTs or ACTs? (Yes/ No)
18. VH15: How do you handle expired stock? ☐ Record in RDT register ☐ Return to facility

## HMIS Form

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Form 1: HMIS** | | | | | | | | | | | | |
| **Health Facility: ..... District** ..... | | | | | | | | | | | | |
| **Province** ..... | | | | | | | | | | | | |
| **Date** ..... | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| **Month (2016-2017)** | **Number of Tested Cases (T12) and IMNCI Register** | **Number of Confirmed Cases (T12) and IMNCI** | **Number of Unconfirmed cases given ACTs (T12)** | **Number of patients given ACTs (T 12) and** | **Number of Tested malaria Cases RDTs** | **Number of confirmed malaria Cases RDTs** | **Number of confirmed malaria Cases (T3) (if not filled write** | **Suspected Cases tested (T5)** | **Number of confirmed malaria Cases** | **Unconfirmed patients given ACTs (T5)** | **Confirmed patients given ACTS (T5) Total** | **Any Confirmed Outbreaks in the month recorded** |
| Oct-16 | | | | | | | | | | | | |
| Nov-16 | | | | | | | | | | | | |
| Dec-16 | | | | | | | | | | | | |
| Jan-17 | | | | | | | | | | | | |
| Feb-17 | | | | | | | | | | | | |
| Mar-17 | | | | | | | | | | | | |

| **Give possible reasons for the variance (ask Health facility Staff)** | | |
|---|---|---|
| T12/IMNCI Confirmed Cases and T5 Patients given ACTs | | 1. Pressure of Work 2. Relief staff not well versed with register 3. Other, specify |
| T5 Confirmed Cases and T5 ACTs given | | 1. Pressure of Work 2. Relief staff not well versed with register 3. Other, specify |
| T3 Confirmed Cases and T5 confirmed cases | | 1. Pressure of Work 2. Relief staff not well versed with register 3. Other, specify |
| T12/IMNCI cases and T5 cases | | 1. Pressure of Work 2. Relief staff not well versed with register 3. Other, specify |
| T12/IMNCI ACTs given and T5 ACTs given | | 1. Pressure of Work 2. Relief staff not well versed with register 3. Other, specify |

| **COMMENTS ON ADEQUACY AND RELIABILITY OF TOOLS (INTERVIEWER)** | | | | |
|---|---|---|---|---|
| **T12** | **RDT test done** | **RDT Result** | **Treatment** | **Comments** |
| Does it have all the columns (Y/N) | | | | |
| Are people consistently filling the relevant information(Y/N) | | | | |
| **T3( Version.....** | | | | |
| Are people consistently tallying (Y/N) | | | | |
| **T5 (Version.....)** | | | | |
| Does it have the column for Unconfirmed Cases given ACTs? (Y/N) | | | | |
| Is information from all departments captured? | | | | |

## VHW Returns Form

| **Form 2: VHW RETURNS** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Health Facility: ..... | | | | District: ..... | | | | | | | |
| Province: ..... | | | | | | | | | | | |
| Date: ..... | | | | Number of VHWs attached to facility ..... | | | | | | | |
| | | | | Number of VHWs testing and treating malaria ..... | | | | | | | |
| Month | Number of Suspected Cases VHWs Return Form | | Number of Confirmed Cases (VHWs Return Form) | | Number of ACTs given to patients VHWs Return Form | | Number of ACTs issued to VHWs (stock Card) | | | | Number of VHWS on facility Return Form |
| | Facility Return Form | Aggregate Total from individual forms | Facility Return Form | Aggregate Total from individual forms | Facility Return Form | Aggregate Total from individual forms | 1x6 | 2x6 | 3x6 | 4x6 | |
| Oct-16 | | | | | | | | | | | |
| Nov-16 | | | | | | | | | | | |
| Dec-16 | | | | | | | | | | | |
| Jan-17 | | | | | | | | | | | |
| Feb-17 | | | | | | | | | | | |
| Mar-17 | | | | | | | | | | | |
| Are there updated standard forms at the facility? (Y/N) | | | | | | | | | | | |
| **Instructions** | | | | | | | | | | | |
| For each month request the clinic aggregated VHWs return form submitted to district. Also request the individual VHWs forms that were aggregated to produce the monthly VHW return. Compare the data elements of interest in the aggregate and total of the individual forms | | | | | | | | | | | |

**Physical Counts Form**

| **Form 3: PHYSICAL COUNT: In Storeroom** | | | | | |
|---|---|---|---|---|---|
| Health Facility: ..... | | | District: ..... | ..... | |
| Province: ..... | | | | | |
| | | | | | |
| Date: ..... | | | | | |
| | | | | | |
| | **1 x 6** | **2 x 6** | **3 x 6** | **4 x 6** | **RDT** |
| Physical Count on day of visit | | | | | |
| Stock card balance | | | | | |
| Variance (Physical Count - Stock Card Balance) | | | | | |
| | | | | | |
| **Possible reasons for the variances (Response from District Pharmacist, Nurse, Stores)** | | | | | |

**Stock Out Form**

| | | | | | |
|---|---|---|---|---|---|
| **Form 4: Stock out** | | | | | |
| **Health Facility: ……District:** …….. | | | | | |
| **Province: ……...** | | | | | |
| **Date: ……** | | | | | |
| **Month** | **1 x 6** | **2 x 6** | **3 x 6** | **4 x 6** | **RDT** |
| Oct-16 | | | | | |
| Nov-16 | | | | | |
| Dec-16 | | | | | |
| Jan-17 | | | | | |
| Feb-17 | | | | | |
| Mar-17 | | | | | |
| **If there was a stock out of any ACT presentation how were the ACTs being dispensed to patients who would normally have received the presentation that was out of stock?** | | | | | |
| **Instructions** | | | | | |
| Check Physical count balances on stock card where ending balances are zero, then confirm with facility of there was a complete stock out or some product was in the dispensary or another area. Record the number of days stocked out , if no stock out record zero | | | | | |

## Losses and Adjustments Form

Form 5: Losses and Adjustments: To be Filled by Product

Health Facility: ..... Province ..... District ..... Date (DDMMYYYY) .....

| Product | Month | Losses (Stock card) | | | | | Losses (ACR) (populate using the ACRs at Facility | Quantity Expired (Expired Medicines Register) | Number of ACTs issued to Dispensary | Number of ACTs issued to VHWs | Adjustments (Stock card) | Adjustments (Stock card) | Adjustments (Facility order Form) | Adjustments (Facility oder Form) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Expired Stock | Damaged | Other | Unspecified | Total Losses | | | | | Transfer In | Transfer Out | Transfer In | Transfer Out |
| 6x1 | Oct-16 | | | | | | | | | | | | | |
| | Nov-16 | | | | | | | | | | | | | |
| | Dec-16 | | | | | | | | | | | | | |
| | Jan-17 | | | | | | | | | | | | | |
| | Feb-17 | | | | | | | | | | | | | |
| | Mar-17 | | | | | | | | | | | | | |
| 6x2 | Oct-16 | | | | | | | | | | | | | |
| | Nov-16 | | | | | | | | | | | | | |
| | Dec-16 | | | | | | | | | | | | | |
| | Jan-17 | | | | | | | | | | | | | |
| | Feb-17 | | | | | | | | | | | | | |
| | Mar-17 | | | | | | | | | | | | | |
| 6x3 | Oct-16 | | | | | | | | | | | | | |
| | Nov-16 | | | | | | | | | | | | | |
| | Dec-16 | | | | | | | | | | | | | |
| | Jan-17 | | | | | | | | | | | | | |
| | Feb-17 | | | | | | | | | | | | | |
| | Mar-17 | | | | | | | | | | | | | |
| 6x4 | Oct-16 | | | | | | | | | | | | | |
| | Nov-16 | | | | | | | | | | | | | |
| | Dec-16 | | | | | | | | | | | | | |
| | Jan-17 | | | | | | | | | | | | | |
| | Feb-17 | | | | | | | | | | | | | |
| | Mar-17 | | | | | | | | | | | | | |
| Comments | | | | | | | | | | | | | | |