

**PERFORMANCE OF INTEGRATED LOGISTIC SYSTEM IN HEALTH
FACILITIES: A CASE OF SINGIDA REGION**

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**PERFORMANCE OF INTEGRATED LOGISTIC SYSTEM IN HEALTH
FACILITIES: A CASE OF SINGIDA REGION**

By

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**Dissertation Submitted in Partial Fulfillment of the Requirements for the
Degree of Master of Science in Pharmaceutical Management of
Muhimbili University of Health and Allied Sciences**

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November, 2013**

CERTIFICATION

The undersigned certify that he has read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled *Performance of Integrated Logistic System in Health Facilities: A case of Singida Region Tanzania*, in (Partial) fulfillment of the requirements for the MSc. Programme (Pharmaceutical Management) of Muhimbili University of Health and Allied Sciences.

.....
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Supervisor

Date

DECLARATION

I, **Elikana Lubango** declare that this **dissertation** is my own original work and that it has not been presented and it will not be presented to any other University for the similar or any other degree award.

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DEDICATION

This work is dedicated to my mother, Mariam P. Nkilingi and father Zephania E. Isanzu. I love you all.

ABSTRACT

Background: The Integrated Logistics System (ILS), a system for reporting about use of drugs and related medical supplies and for requesting resupply, designed to move beyond the previous supply system by integrating the drugs and supplies for numerous vertical programs. Unsatisfactory performance of ILS fail to fulfill the six right of logistic system of ensuring that the right medicines, in the right quantities, in the right condition are delivered to the right place, at the right time for the right cost. However the performance of ILS in Singida region, Tanzania is unknown.

Objective: To assess the performance of integrated logistic system in health facilities in Singida region, Tanzania

Methods: The study was a cross sectional survey using logistic indicator assessment tools, developed by JSI DELIVER PROJECT for assessing the performance of logistic system in health facilities. It was conducted between April and May 2013. For this study a total of 55 health facilities were included of which 15 health centers were selected by convenient and 40 dispensaries selected randomly. The central zone Medical Stores Department (MSD – Dodoma) was included as the sole government agency for medicines and medical supplies in public health facilities and makes a samples size of 56

Results: Stockout duration was observed to be high for oxytocin injection, artemether/lumefantrine tablets and amoxicillin capsules and low for dizepam injection in all districts. The average supply gap ranged from 28.9% in Singida Municipal to 45.6% in Singida District. The average order fulfillment rate ranged from 54.4% in Singida District to 71.1% in Singida Municipal. Over supply of tracer medicines was found in Singida Municipal and delivery of unordered was observed in Singida Municipal, Iramba and Manyoni Districts. The average delivery time of medicines consignment in districts ranged from 16.5 to 48 hours in Singida Municipal and Singida district respectively and it was found to be independent on the distance from the zonal MSD. Availability of LMIS register ranged from 85.5% for injection and 98.2% for patient registers, filling accuracy ranged from 68.1% for injection to 93% for dispensing registers. Majority of health facilities in Singida Municipal adhered to prescribed storage standards while in Manyoni district 60% health facilities scored in unacceptable range storage condition. Generally 27% of health facilities visited had good storage conditions, 29% scored in acceptable range

and 44% scored in unacceptable range as per JSI DELIVER/WHO 2003 storage standard.

Conclusion: The performance of ILS in the region varies within the districts. The overall availability of medicines in the region is still low. The stock-out duration of essential medicines is still high in the region, some key medicines were stocked out for more than 3 months. Order fulfillment rate by MSD is low and varies between districts in the region. The average delivery time of medicines from the zonal MSD to the health facilities is still high and it was found not depending on the distance from the zonal medical stores. Availability and completeness of LMIS tools in health facilities is still a problem and a number of health facilities were not adhering to prescribed storage standards.

TABLE OF CONTENTS**PAGE**

Certification	i
Declaration	ii
Acknowledgement	iii
Dedication	iv
Abstract	v
Acronyms	x
List of figures	xi
List of tables	xii
Chapter one	
1.1.0 Introduction	1
1.1.1 Activities of the logistic system.....	1
1.1.2 Heart of the logistic system.....	2
1.1.3 Essential drug kits (EDP).....	3
1.1.4 Indent system.....	4
1.1.5 Integrated logistic system.....	4
1.1.6 Different levels of ILS.....	7
1.1.7 ILS ordering cycle.....	8
1.2.0 Statement of the problem	11
1.3.0 Rationale of the study	12
1.4.0 Objectives	13
1.4.1 Broad objective.....	13
1.4.2 Specific objectives.....	13
1.4.3 Research questions.....	13
1.5.0 Literature review	14
Chapter two	
2.0 Methods and materials	17
2.1.0 Study design.....	17
2.2.0 Study area.....	17
2.3.0 Study population.....	17
2.4.0 Sample size.....	17

2.5.0 Research instrument	17
2.6.0 Pre-testing of tools.....	18
2.7.0 Data collection and management.....	18
2.8.0 Ethical consideration.....	20
2.9.0 Data analysis.....	20
2.10 Inclusion and exclusion criteria	20

Chapter three

3.0 Results.....	22
3.1.0 Stockout duration of tracer medicines	22
3.2.0 Supply gap and order fulfillment rate of medicines by MSD in health facilities	23
3.3.0 Average delivery time of medicines consignment from MSD to health facilities.....	26
3.4.0 Availability and completeness of LMIS tools.....	27
3.4.3 Knowledge of healthcare providers on LMIS tools.....	29
3.4.4 Verification of data collected in R&R forms.....	30
3.5.0 Health facilities storage condition of medicines and medical supplies.....	31
3.6.0 Perception of healthcare providers on performance of ILS to meet Customer needs.....	34

Chapter four

4.0 Discussion.....	37
5.0 Conclusion and recommendations	42
5.1.0 Conclusion.....	42
5.2.0 Recommendations.....	43
5.3.0 Area for further research.....	45
5.4.0 Study limitations.....	45

References.....	46
Annexes.....	48
Annex 1: LMIS tools used in ILS.....	48
Annex 2: List of tracer medicines.....	50
Annex 3: Stock duration assessment table.....	51
Annex 4: Percentage difference between the quantity of tracer medicines ordered and the quantity received.....	52
Annex 5: Average delivery time assessment table.....	53
Annex 6: Availability and filling accuracy of LMIS tools.....	54
Annex 7: Storage/warehouse condition table.....	56
Annex 8: Interview guide on performance of ILS	58
Annex 9: Informed Consent Form.....	63

LIST OF ACRONYMS

ACO	Assistant Clinical Officer
ALU	Artemether / Lumefantrine
AMO	Assistant Medical Officer
CHF	Community Health Fund
CHMT	Council Health Management Team
CO	Clinical Officer
DMO	District Medical Officer
EDP	Essential Drug Programme
FBO	Faith Based Organization
HF _s	Health Facilities
ILS	Integrated Logistic System
IPLS	Integrated Pharmaceutical Logistic System
LMIS	Logistic Management Information System
MOHSW	Ministry of Health and Social Welfare
MSD	Medical Stores Department
MSH	Management Science for Health
NHIF	National Health Insurance Fund
PSU	Pharmaceutical Services Unit
R&R	Report and Request
RHMT	Regional Health Management Team
WHO	World Health Organization

LIST OF FIGURES

Figure 1: The logistic Cycle.....	3
Figure 2: ILS Supplies and Information flow.....	6
Figure 3: Stockout duration(in days) of tracer medicines in Singida region.....	22
Figure 4 : Average delivery time of medicines from the Zonal MSD to H/F.....	27
Figure 5: Knowledge of healthcare providers on the use of stock LMIS tools...	30
Figure 6:Health facilities filling accuracy score of Report and Request form data elements in Singida region.....	31
Figure 7:Percentage score of health facilities storage condition.....	33
Figure 8: Shortcomings of ILS reported by healthcare providers.....	34
Figure 9: Strengths of ILS over the previous supply system reported by healthcare provider	35

LIST OF TABLES

Table 1: Schedule for order cycle activities of the year.....	10
Table 2: Supply gap and order fulfillment of medicines in Iramba district Health Facilities.....	23
Table 3: Supply gap and order fulfillment of medicines in Manyoni district Health Facilities.....	24
Table 4: Supply gap and order fulfillment of medicines in Singida district Health Facilities.....	25
Table 5: Supply gap and order fulfillment of medicines in Singida Municipal Health Facilities.....	26
Table 6: Availability and completeness of LMIS registers.....	27
Table 7: Availability and Completeness of LMIS forms	28
Table 8: Summary of social demographic characteristics of the respondents....	29
Table 9: Health facilities adherence to prescribed standard of storage conditions.....	32

CHAPTER ONE

1.1.0 INTRODUCTION

Logistic is part of supply chain management that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirement. (1)

1.1.1 ACTIVITIES OF THE LOGISTIC SYSTEM

i. Serving customers

In a logistic system products are selected, procured, stored, and distributed to meet customer needs. In the system health commodities are stored to ensure that commodity security exists for every customer to obtain and use when they need them. In addition to serving the needs of the end customer, each person in the process is serving the needs of more immediate customers. For example in ILS the Zonal Warehouse provides customer service when they issue medicines to the health facility and the Central Medical Stores provide customer service when they issue medicines to the Zonal Medical Stores. The logistics system ensures customer service by ensuring that the right medicines, in the right quantities, in the right condition are delivered to the right place, at the right time for the right cost. Each activity in the system, contributes to excellent customer service by ensuring commodity security. (2,3)

ii. Product selection.

The selection of medicines are limited to public sector health facilities, for each level of health care in public sector a limited list of medicines is prepared as the basis for supplying pharmaceuticals. In health facilities therapeutic committees are responsible for product selection using the Hospital formulary manual, National Essential Medicines List or Standard Treatment guidelines. Products selected for use have impact on the logistic system making the necessity of considering logistics requirements during product selection. (2,4)

iii. Quantification.

Estimation of the quantity and cost of the products required for a specific health service to ensure an uninterrupted supply for health services, determining when the products should be procured and distributed is done after products have been selected

In Integrated logistic system health facilities determine the required quantity and cost of each product is determined by using the Report and Requesting form.(3,4)

iv. Procurement.

When a supply plan has been developed as part of the quantification process, quantities of products must be procured. The Pharmaceutical procurement agent (MSD) procures from international or local sources of supply and health facilities procure from the Medical Stores Department. In any case, procurement should follow a set of specific procedures that ensure an open and transparent process that supports the six rights of logistic system (4,5)

v. Inventory management: storage and distribution.

After products have been procured and received by the procurement agent, they must be transported to the service delivery level where the client will receive the products. During this process, the products are stored until they are sent to the next lower level, or until the customer needs them.

1.1.2 HEART OF THE LOGISTIC SYSTEM

i. Logistic information system

Information is the engine that drives the logistics cycle and enables the logistics system to run smoothly. For example, information about product consumption and inventory levels must be gathered before the product is procured.

ii. Organization and Staffing

A logistics system can only work if well-trained, efficient staff monitor stock levels, place orders, and provide products to clients. Again for a logistics system to work correctly, logistics staff must make the six rights a top priority.

iii. Budget

Allocation and management of finances directly affect all parts of the logistics cycle, including the quantities of products that can be procured, the amount of storage space that may be available, the number of vehicles that can be maintained, and the number of staff working in logistics.

iv. Supervision

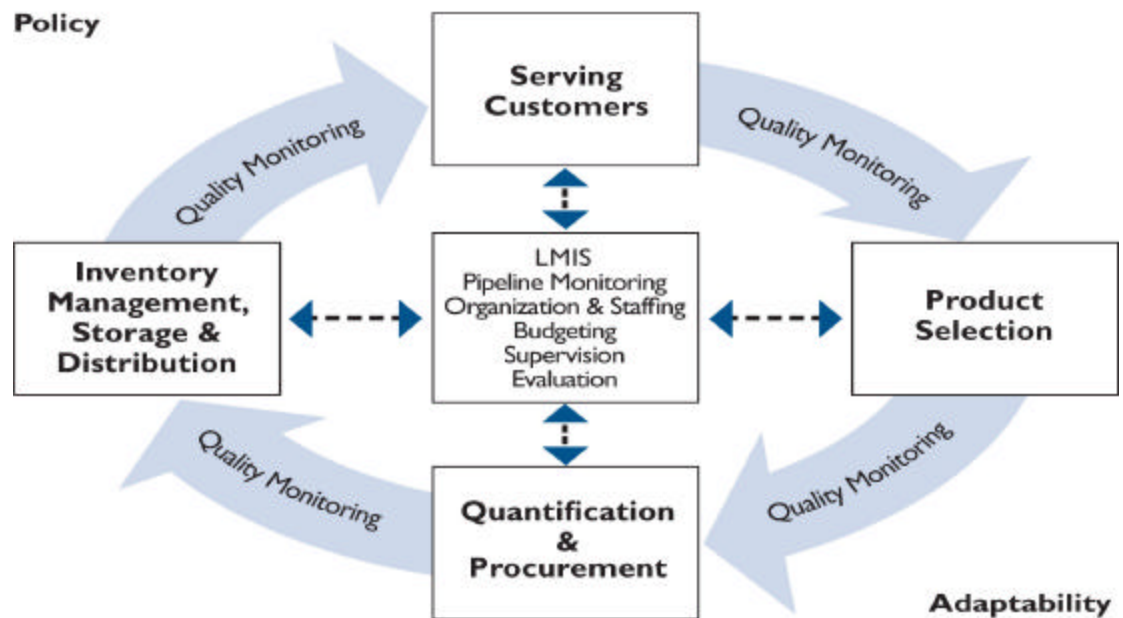
Supervision of the staff who work within the logistics system keeps it running smoothly and helps to anticipate needed changes. Routine, effective supervision,

coupled with on-the-job training in logistics, helps to both prevent and resolve supply problems and human resource constraints.

v. Monitoring and Evaluation

Routine monitoring and periodic evaluation of the logistics system activities help to demonstrate how well the system is performing, the areas that can be improved, as well as the system's impact on service provision. (2) Activities of the logistic cycle are summarized in figure 1 below.

Figure 1: The Logistic cycle



Source: The Logistics Handbook: A Practical Guide for the Supply Chain Management of Health Commodities

In Tanzania different pharmaceutical supply systems have been used to ensure availability of medicines and other medical supplies in health facilities, these includes

1.1.3 ESSENTIAL DRUG KITS (EDP)

The Essential Drugs Program kit system a “push”-based kit system started to operate in 1984. Through this system, the Pharmaceutical Services Unit (PSU) at the central level determined the contents of the kits utilizing national morbidity data and each dispensary and health center received these uniformly packed kits. Rural health facilities received their drugs through a monthly provision of EDP kits; two types of

kits (Yellow kit for dispensaries and Blue kit for health centres) were established and distributed through the zonal medical stores. Every year the composition of the kits for health centres and dispensaries was reviewed and when necessary adjusted within the limits of available donor contributions. The kits were uniform for the whole of Tanzania because of their fixed contents; they were procured and packed in Europe without any Tanzanian involvement. Thus different morbidity patterns and attendance rates were not taken into account. This system resulted into complaints about undersupply or oversupply of certain EDP drugs in the kits. (6)

1.1.4 INDENT SYSTEM

The indent system was designed in the late 1990s, following decentralization to transfer responsibility for ordering from the central to the district level and to address the inherent problems with kits, such as shortages of some products in the kits and overstock of others. Although the indent system was seen as an improvement over the kit system, there were still shortcomings.

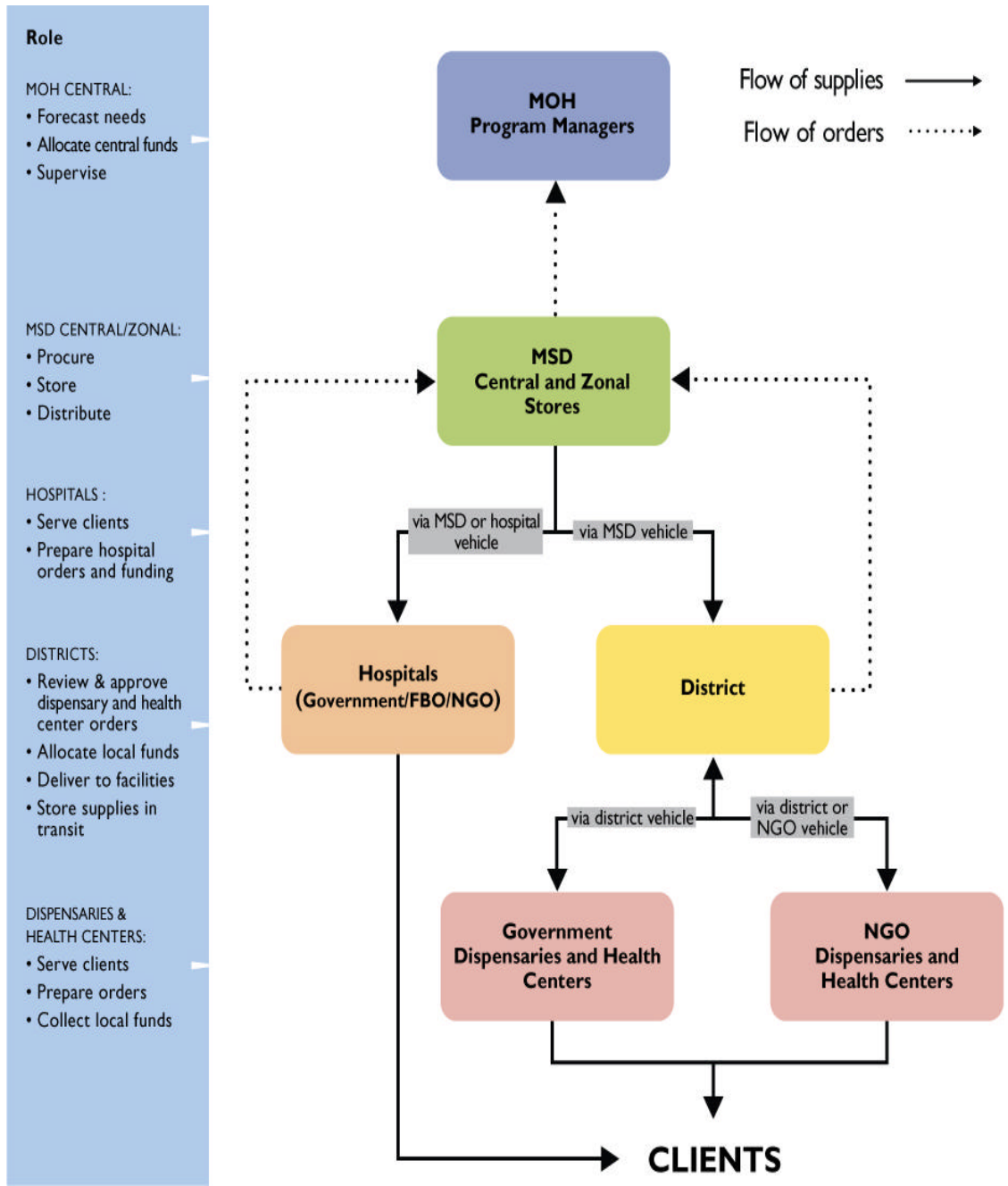
1.1.5 INTEGRATED LOGISTIC SYSTEM

In 2002 the Ministry of Health and Social Welfare (MOHSW) decided to create a new system to replace the kit and indent systems, it first conducted an assessment of the old system in order to identify key problem areas such as bottlenecks throughout the system, lack of facility-level data to decision makers at higher levels, irregular ordering cycles, delivery delays, wastage and expiry, and stock outs. Following the results of the previous logistics system assessment, the MOHSW completed a comprehensive system design intending to address and improve on the logistics issues from the previous kit and indent systems. Following the system design in 2005, Tanzania transitioned to the system called an integrated logistics system (ILS), this is a “pull” system designed to include most vertical programs and Essential Medicines in one system, and to couple routine reporting with routine resupply, which enhances accountability and provides data to the central level. The ILS was designed to bolster institutional capacity to more efficiently manage data as well as store and distribute commodities using a single set of procedures to manage various categories of products.

Integrated Logistic System is a type of indent system where dispensaries, health centers, and hospitals order quantities of each supply according to their needs and within their budget.

Through this system all supplies are managed using the same basic systems and procedures, facility staff determines needs and makes orders and the ordered quantities are based on the quantities of supplies that are used to serve clients and the quantities of stock held by the facility at the time the order is placed. The orders are sent to the supplier (MSD) and the supplier packs the supplies and delivers them to the districts or directly to health facilities. The districts then distribute the supplies to health centers and dispensaries. (3,7) ILS supplies and information flow are shown in figure 2 below.

Figure 2: ILS Supplies and Information flow



Source: Integrated logistic system procedure manual

1.1.6 DIFFERENT LEVELS INVOLVED IN ILS AND THEIR RESPONSIBILITY

Pharmaceuticals Services Unit in the MOHSW

The Pharmaceuticals Services unit is responsible for pharmaceutical policy, providing technical support, budgeting for pharmaceuticals and supplies, and forecasting medicine and supplies needs for all public facilities, as well as Faith Based Organizations (FBO) facilities. The major responsibilities of the Pharmaceutical Services Unit in the integrated logistic system are to:

- ? monitor the overall performance of the ILS
- ? liaise with other government ministries/agencies on issues relating to ILS
- ? provide technical support
- ? compile annual forecasts of supplies based on facility and programs data
- ? work with the Medical Stores Department to ensure timely procurement of supplies
- ? liaise with MSD on issues relating to procurement and distribution
- ? analyze compiled data from facility and program reports

Medical Stores Department (MSD)

The Medical Stores Department (MSD) is an autonomous institution under Ministry of Health and Social Welfare responsible for provision of service to the public health sector. It has financial and managerial autonomy. Its major responsibilities in ILS are to:

- ? procure medicines, medical supplies and equipment; storage and distribution
- ? receive and process all orders for medicines and related medical supplies
- ? deliver supplies for dispensaries and health centers to the District medical officers (DMO's) office or direct to the health facility.
- ? produce and distribute feedback reports to health facilities, districts, program managers and Pharmaceutical Service Unit.
- ? maintain, produce and distribute financial statements
- ? update and distribute price list to facilities
- ? distribute Management Tools to health facilities during routine deliveries

Regional medical office/Regional health management team

In ILS the regional health management team is responsible for conducting supportive supervision and providing training (refresher and on job training to healthcare providers).

The district medical office/ Council health management team

The responsibilities of the district medical office in the ILS are to

- ? review the order (R&R forms) from health facilities, in this case a District pharmacist or any other member from Council Health Management team (CHMT) trained on ILS review the technical aspects of the order for completeness and correctness.
- ? assess the availability of funds from other sources such as CHF, NHIF, user fee or other funds that may be available to cover the total cost of the facility order.
- ? approve the order after verification for completeness and correctness.
- ? submit the order to the medical store department.
- ? conduct supportive supervision on ILS to the health facilities.
- ? Conduct training on ILS to new healthcare provider.

Health facility

The health facility is responsible for the following: to

- ? Prepare order of the medicines, medical supplies and medical equipment needed at the facility.
- ? Ensure logistic management tools are filled properly and timely updated
- ? Ensure the storage guideline for medicines and medical supplies is adhered

1.1.7 ILS ORDERING CYCLE BY HEALTH FACILITIES

Under the ILS, dispensaries and health centers submit orders quarterly (every 3 months) to the District medical office for the supplies to meet the needs of their clients. The facility in-charge determines the quantities of supplies they need and ensures that the quantities they order can be paid for and respond to the level of services that are provided by qualified health care workers.

The facility orders are placed using form 2A, the Report and Request Form (R&R) for priority medicines, medical supplies and medical equipment which includes 120 essential drugs and medical supplies and form 2C for additional medicines, medical

supplies and medical equipments. In each district, the facilities are divided into three groups: A, B, and C to facilitate product deliveries while minimizing the need for resources (time, vehicles), taking into account geographic location, existing roads, shipment quantities, and other factors. Each month, MSD delivers the supplies of one of these three groups to the District Medical office, resulting in four deliveries to each facility each year. The system is designed so that facilities should have a maximum buffer stock of seven months and a minimum of three months' supply. The ordering cycle is carried out as follows.

- ? **Week One:** The dispensaries and health centers fill out the request forms and deliver them to the District medical officer or Pharmacist.
- ? **Week Two:** The District Pharmacist verifies the forms, calculations and budget. If needed, the order forms are revised according to the facilities budget and pharmacist's judgment.
- ? **Week Three:** After collecting all the order forms for the cycle, the district delivers the forms in person to the zonal MSD office.
- ? **Weeks Four – Nine:** MSD consolidates district orders and adjusts orders according to the MSD stock levels and the facilities budget. Customer's quotations are created and Sales Invoice generated. Items are picked, packed and delivered to the district medical office.
- ? **Weeks Nine -Eleven:** District office delivers supplies to the health facilities.(
8)This cycle of activities repeats from year to year as shown in table 1 below.

Table : 1 Schedule of order cycle activities of the year

Order being	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Prepared R & R completed by facility based on data from past 3 months and submitted in Week 1 of the month. District approval and submission to MSD by Week 3 of the month	A	B	C	A	B	C	A	B	C	A	B	C
Processed Orders packed by MSD and prepares to deliver to the District by Week 2 of the following month	C	A	B	C	A	B	C	A	B	C	A	B
Received District receives shipment from MSD and arranges delivery to the facilities by Week 3 of the month	B	C	A	B	C	A	B	C	A	B	C	A

Source: Integrated logistic system procedure manual September, 2008

1.2.0 STATEMENT OF THE PROBLEM

Integrated Pharmaceutical Logistic System improves the drug supply chain by integrating drug requisition, distribution, and reporting into a single mechanism. Effective logistic system helps to ensure commodity security and it determine success or failure of any public health program; it benefits public health programs by increasing program impact, enhancing quality of care, improving cost effectiveness and efficiency.

An ineffective logistics system provides inadequate, inappropriate supplies to healthcare providers, decreasing their professional satisfaction, motivation and morale. Unmotivated staffs are more unlikely to deliver a higher quality of service; Customers become unconfident with the health program and demotivates them to seek and use health services; can result into losses due to overstock, wastage, expiry of medicines, damage and pilferage; fails to generate, collect, organize, report adequate and reliable information to decision makers that enables to make logistic system decision; contributes to unimproved cost effectiveness in all parts of a program, and fails to stretch limited resources. In Ethiopia a study conducted to determine the effect of IPLS on TB drug supply management revealed that ? health facilities implementing IPLS experienced lower TB drug stock out than those health facilities not implementing IPLS. Facilities not using IPLS had a 1.5 times higher TB drug stock out rate than health facilities using IPLS.(9) In Tanzania, the pharmaceutical supply system in public health facilities from the Medical Stores Department is done through the integrated logistic system. While improvements have been made as a result of the ILS, the system faces a number of challenges of ensuring commodity security in health facilities. Review of the health facility report and requisition forms at MSD zonal stores in 2010 observed that performance of ILS in the districts varied, even within the same zone. (10) There is a need to assess the performance of pharmaceutical logistic system of different health programs which have been integrated into one system.

1.3.0 RATIONALE OF THE STUDY

Ineffective pharmaceutical logistic system may compromise the delivery of health care services in health facilities. Currently in Tanzania the supply and management of medicines, medical supplies and laboratory reagent and diagnostic equipment from the Medical Stores Department to health centre's and dispensaries is managed through the integrated logistic system whereby health facilities determine the quantity of items to be used and then order within their budget. Pharmaceuticals contribute a large part of the total health budget it is therefore important to ensure that the right goods, in the right quantities, in the right condition, are delivered to the right facility, at the right time, for the right cost in order to minimize losses that might occur since resources are scarce.

It is consequently necessary to monitor the performance of integrated logistic system in order to identify areas where performance has been lower than the expected target, requiring remedial measures to be taken on a continual basis.

This study will provide information to be used in identification of the factors affecting the performance of integrated logistic system. Furthermore the study is intended to encourage decision makers, MOHSW, Medical Store Department and other stakeholders to conduct monitoring and evaluation of pharmaceutical logistic system from time to time whereby better performance will avoid commodity shortages and ensure full supply pipelines and commodity security.

1.4.0 OBJECTIVES

1.4.1 Broad objective.

To assess the performance of integrated logistic system in health facilities in Singida region.

1.4.2 Specific objectives

1. To determine stock-out duration of tracer medicines in health facilities
2. To find out the supply gap and order fulfillment rate of tracer medicines by MSD in health facilities
3. To find out the average delivery time of medicines consignment from the Zonal Medical Stores Department through the district to the health facility.
4. To determine availability and filling accuracy of logistic management information tool used for inventory management and reporting
5. To assess storage conditions of the facility used for medicines and other medical supplies.
6. To assess the perception of healthcare providers on the performance of ILS to meet the customer need

1.4.3 RESEACH QUESTIONS

1. For how many days were the tracer medicines stocked out in health facilities for the past 12 months?
2. What is the supply gap and order fulfillment rate of medicines by MSD in health facilities?
3. What time did it take to deliver medicines consignment from the zonal Medical Stores Department to the district warehouse and then from the district to the health facility?
4. Are the logistics management information system tools used for inventory management and reporting available and properly filled?
5. Is there a safe, protected storage area that meets acceptable storage condition standards to prevent damage and ensure efficient handling of medicines and other medical supplies?
6. What are you perception on integrated logistic system to meet the customer needs?

1.5.0 LITERATURE REVIEW

Tanzania fully transitioned to an Integrated Logistics System (ILS) from one based on distribution of standard essential medicine kits as of 2009. The government, private and faith based organizations, health centers and dispensaries send orders to the district on a quarterly basis. The districts review and approve orders and send them to the zonal Medical Store Department (MSD). The MSD processes the orders and debits the facility accounts. Districts may allocate supplementary funds from local sources. Hospitals can place orders with the MSD for medical supplies as needed. The MSD delivers orders placed to districts, while districts are responsible for delivering medical supplies to their health centers and dispensaries. Health facilities order once every three months and the system is intended for each facility to carry a buffer stock of three to seven months. The system was introduced with the aim of providing the following key benefits.

- ? To allow each facility to determine its own needs
- ? To assist in managing drug finances
- ? To reduce the number of forms previously used in vertical systems
- ? To enhance record keeping
- ? To facilitate supervision
- ? To promote a more rational use of medicines and transportation
- ? To enable data collection for planning and budgeting
- ? To minimize wastage and pilferage

Since introduction of ILS, availability and access to medicines is a critical issue, with many studies showing problems with chronic stock outs of essential medicines. A study conducted by MOHSW shows that of 40 tracer medicines, only 11 medicines were available in over 50 percent of the public facilities surveyed. (11)

A number of health facilities have been reported complaining of receiving items they did not order , items delivered in quantities below their request and sometimes they are forced to receive and pay for the deliveries regardless of whether they are congruent with the order.

There are several reasons which have been mentioned that affect the performance of ILS as it was expected which include.

- i. The late submission of orders results in a standard “push” order package to be given to any facility without a request order by the deadline. This push package may include drugs that the health facilities did not request for or do not need. (12)
- ii. The quantity a health facility requested in the order form is sometimes changed at the level of district medical officer and/or zone medical store department, according to the available budget and stock on hand at the MSD warehouse. Thus the quantity a health facility receives is often less than the requested amount or contains higher number of items that MSD ‘pushed’ to reduce its stock.
- iii. District offices may be filling the order form instead of the facility. Sometimes, order forms are photocopied and submitted for several facilities.(13)

A review of health facility Report and Request forms at MSD zonal stores conducted in 2010 revealed that, the performance of ILS varies greatly from one district to another. There were high-performing and low-performing districts in all zones and the performance did not depend upon distance from the district to the MSD zonal store; some low-performing districts were adjacent to the MSD, while there were high-performing districts that were located significant distances away. The study showed that districts were not submitting R&R forms on time or within the appropriate delivery group, per ILS submission guidelines. Some districts submitted R&R forms from all delivery groups within the same month. A large number of the forms submitted were incomplete and missing critical information such as facility name, facility code, and date of submission. Districts were also not consistently verifying R&R forms for completeness or accuracy. Lastly, there appeared to be long delays between the completion of forms at the facility and their arrival at the MSD.

Overall, stock-on-hand data collected showed significant stock-outs of antimalaria commodities, essential medicines, and reproductive health commodities across the country. For family planning commodities, approximately half of the health facilities sampled were stocked out of combined oral contraceptives, injectables and male condoms. Similarly, Artemether/Lumefantrine (ALu) stock-outs were prevalent

across all zones, only five out of the 123 districts had all four presentations of ALu in stock. Although a large number of facilities had at least one presentation available which could still be used to treat patients, 25 percent of facilities sampled were stocked out of all four ALu presentations. There were only 34 districts where all facilities in the sample had at least one presentation in stock. (10)

A study conducted in five regions in early 2010, tracing malaria medications, family planning supplies and three essential medicines showed that, the stock out rates for the medicines ranged from 32 percent to 54 percent, but stock outs for family planning supplies were much higher, 77 percent for Depo-Provera. On the other hand the study revealed problems in the distribution chain in which facilities do not place orders when they are supposed to or miscalculate their orders, Council Health Management Teams (CHMTs) do not forward orders to the MSD on a timely basis, the MSD does not fill the order in full because of its own stock issues, and/or the CHMT does not deliver the goods from the MSD to facilities in a timely manner.(11)

Maintaining proper storage conditions for health commodities is vital to ensuring their quality. Product expiration dates are based on ideal storage conditions and protecting product quality until their expiration date is important for serving customers and conserving resources. (14)

A drug tracking study conducted in Tanzania by Euro Health Group in collaboration with MSH Tanzania showed that, The general storage space is not sufficient in the majority of the hospitals (6 of 8) and Public health facilities (8 out 12). Over 70% of those interviewed reported insufficient storage space as a major obstacle in being able to store medicines appropriately. (15)

CHAPTER TWO

2.0 METHODS AND MATERIALS

2.1.0 Study design.

The study was a cross sectional survey, both prospective and retrospective aiming at assessing the performance of integrated logistic system in health facilities in Singida region, Tanzania.

2.2.0 Study area

The survey was conducted in Singida region, in health facilities that receive medicines and medical supplies from Medical Stores Department through the integrated logistic system. The sample was drawn from Singida municipal, Singida district, Manyoni district, and Iramba district.

2.3.0 Study population

The study population was 192 health facilities (56 in Singida district, 71 in Iramba district, 57 in Manyoni district and 8 in Singida Municipal) of Singida region, these health facilities are of different levels as shown below.

- a. 9 Hospitals (3 Government, 0 Private, and 6 FBOs)
- b. 19 Health centre's (15 Government, 2 Private and 2 FBOs)
- c. 164 Dispensaries (150 Government, 2 Private and 12 FBOs)

Only 165 health facilities (15 Health centers and 150 dispensaries) operates through integrated logistic system.

2.4.0 Sample size

The total of 55 health facilities were included in the study of which 15 health centers were selected by convenient and 40 dispensaries selected randomly. The central zone Medical Stores Department (MSD – Dodoma) was included as the sole government agency for medicines and medical supplies in public health facilities and makes a samples size of 56.

2.5.0 Research instruments

The logistic indicator assessment tools, a quantitative data collection instrument developed by JSI DELIVER PROJECT was used to conduct a facility based survey to assess the integrated logistic system performance in public health facilities an interview on perception of the integrated logistic system to health facility in-charge

or member of the health facility committee was conducted using an interview guide to collect qualitative data. The following logistic assessment indicator was used

- a. Number of days that a facility experienced a stock out at any point for the past 12 months
- b. Supply gap and order fulfillment rate by MSD in public health facilities
- c. Average delivery time of medicine and medical supplies from the Zonal Medical Store to the health facilities.
- d. Accuracy of logistic data for inventory management at health facility
- e. Percentage of health facilities that maintain acceptable storage conditions
- f. Performance of healthcare providers on integrated logistic system to meet customer need.

2.6.0 Pretest of data collection tools

Data collection tools were pretested in one Health centre and one dispensary of Singida region to ensure its validity and clarity. The results of pretesting and accompanying comments were used to revise the instrument before distributing it to the actual sample. Health facilities which were used for pretesting of data collection tools were not be included in the study.

2.7.0 Data collection and management

Data was collected using logistic indicator assessment tool for assessing health logistic system performance. Each indicator was used for specific purpose and needed specific data source and data requirements as explained below. Data collection was conducted from March to April 2013.

Indicator no 1:

Number of days that a facility experienced a stock out at any point for the past 12 months, from January to December 2012

Purpose of indicator:

This indicator was used to measure absence of tracer medicines for the past 12 month (January to December 2013) and used as an indicator of the ability of integrated logistic system to meet clients' needs.

Indicator no 2:

Order fulfillment rate of tracer medicines by MSD in health facilities

Purpose of indicator:

This indicator was used to measure the efficiency of an integrated logistic system in ensuring that products reach their destinations in the quantities requested.

The indicator was calculated using the following formula.

$$\frac{\text{Summation of quantity ordered} - \text{Summation of quantity received}}{\text{Summation of quantity ordered}} \times 100$$

Indicator no 3:

Average delivery time of medicines from the zonal warehouse to the health facilities

Purpose of indicator.

This indicator was used to measure the average amount of time taken to deliver an order from a supplying store to a subordinate store.

Indicator no 4:

Availability of management tool and accuracy of logistic data for inventory management

Purpose of indicator:

This indicator was used to measure the accuracy of data on product stock levels at the health facility. This indicator is essential because the logistic system relies completely on stock data to forecast, procure, and deliver the right quantities of medicines and medical supplies to storage and service delivery sites.

Report and Request forms which are used for reporting consumption and requesting supplies from MSD were reviewed to verify if the data which are generated at the facility are correct. This was done by verifying the data elements (received, issued, consumption, stock on hand and loss/adjustments) in the form. Then the percentage accuracy filling score was calculated by taking the sum of the correct filling $[A^1]$ dividing by 5 and multiplying by 100, $\{A^2 = \frac{A^1}{5} \times 100\}$.

Indicator no 5:

Percentage of health facilities that maintain acceptable storage conditions.

Purpose of indicator:

This indicator was used to measure the conditions of storage facilities compared with a list of conditions required to protect the integrity of products. The indicator was calculated using the formula below

$$\frac{\text{No. of facilities meeting certain storage condition}}{\text{Total no. of facilities visited}} \times 100$$

Indicator no 6:

Perception of healthcare provider on performance of ILS to meet the customers need. An interview was conducted to health facility in charge or member of health facility committee on the performance of integrated logistic system. An interview guide with open ended questions was used to encourage the interviewee to talk at length on efficiency and shortcomings of the integrated logistic system.

2.8.0 Ethical Considerations

The study received ethical clearance from MUHAS high degree ethical committee of research and publication committee. Permission to do the study was granted by District Executive Directors after receiving request letter to conduct the study. Consent for healthcare providers participation was sought from healthcare providers themselves and confidentiality on their information was highly maintained.

2.9.0 Data analysis

The Data collected by using Logistic indicator assessment tools were entered into the computer software and thereafter analyzed using Software Package for Statistical Science Solution (SPSS) version 16.0 and Excel spread sheet. Pearson chi-square test was performed to check association of availability and completeness of LMIS tools. The difference between availability and completeness of LMIS tools were considered statistically significant at P-value < 0.05

Time frame of the data collected

The data of twelve months from January to December 2012 was collected for retrospective study using quantitative logistic management information tools while the prospective data was collected at the time of visit at the health facility using the checklist. For qualitative data an interview using an interview guide was used.

2.10 Inclusion and Exclusion criteria**Inclusion criteria**

- ? Health centers and dispensaries within Singida region
- ? Willing health facilities
- ? Health centers and dispensaries that receive medicines and medical supplies through integrated logistic system.
- ? Personnel consented to interview

Exclusion criteria

- ? Personnel not consented to interview
- ? Health facilities which are not under ILS program

CHAPTER THREE

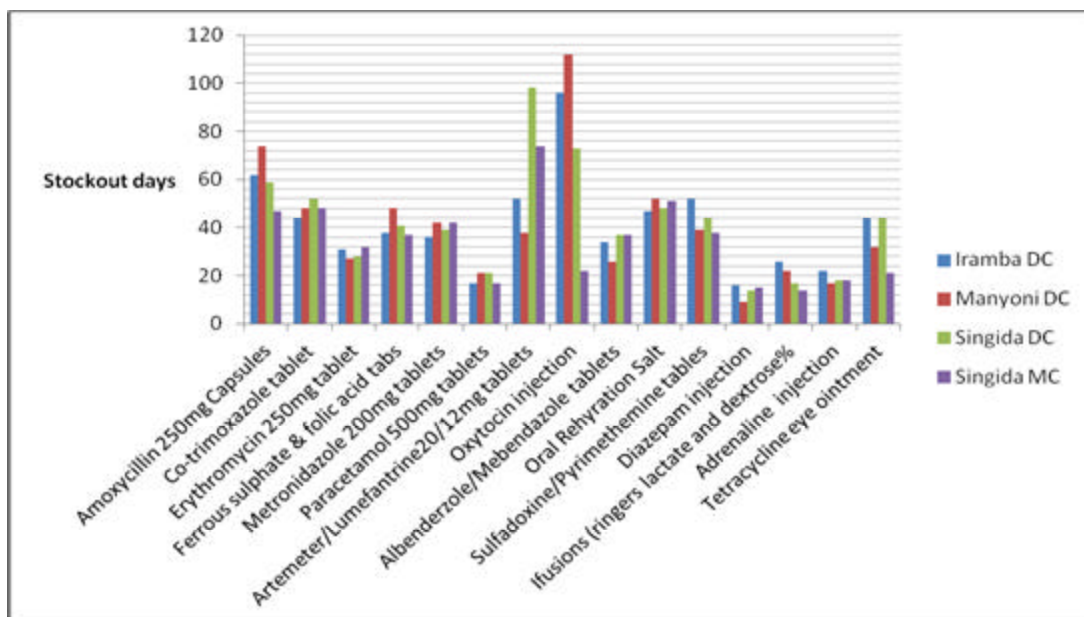
3: RESULTS

This chapter reports the results obtained from the survey of 55 public health facilities in Singida region and 1 warehouse in Dodoma region. The survey was conducted from March to June 2013. The public health facilities involved were 15 health centers and 40 Dispensaries and the Zonal Medical store department. The results of this study are categorized according to the specific objectives answering the research question at hand.

3.1: STOCKOUT DURATION (IN DAYS) OF TRACER MEDICINES IN HEALTH FACILITIES JANUARY TO DECEMBER 2012

Manyoni district experienced high stockout of oxytocin injection(112 days), Amoxicillin capsules (74 days), Ferrous sulphate and Folic acid tablets (48 days) and Oral rehydration salt (52 days) than any other district. In Iramba district the stockout was high for Sulfadoxine/Pyrimethamine tablet (52 days) and Tetracycline eye ointment (44 days). In Singida district stockout duration was observed to be high for Artemether /Lumefantrine tablets (98 days) and Cotrimoxazole tablets (52 days) compared to other districts while in Singida Municipal health facilities stockout duration of most tracer medicines revealed to be low compared to other districts surveyed in Singida region. Stockout duration of tracer medicines in health facilities of the four districts are shown in figure 3 below.

Figure: 3 Stockout duration (in days) of tracer medicines in Singida region



THE SUPPLY GAP AND ORDER FULLFILMENT RATE BY MSD IN HEALTH FACILITIES

The MSD Supply Gap was observed in Singida region during assessment of health facilities report and request forms and the actual MSD deliveries. The average supply gap ranged from 28.9% in Singida Municipal to 45.6% in Singida District. The average order fulfillment rate ranged from 54.4% in Singida District to 71.1% in Singida Municipal. Over supply of tracer medicines was revealed in Singida Municipal and delivery of unordered was observed in Singida Municipal, Iramba and Manyoni Districts.

In Iramba District, order fulfillment rate ranged from 25.8% to 82.3% for Artemether /Lumefantrine (20mg/120mg) and cotrimoxazole (80mg/400mg) tablets respectively. There was no oversupply of the tracer medicines and 122 (Pack of 10 ampoules) of oxytocin injection were supplied in health facilities while were not ordered in report and request form as shown in table 2 below

Table: 2 Supply Gap and Order Fulfillment rate in Iramba District

Tracer medicines	Quantity ordered	Quantity received	% Supply gap	% Order Fullfillment rate
Amoxicillin 250 mg Capsules	658	483	26.7	73.3
Cotrimoxazole Tablets	644	530	17.7	82.3
Erythromycin 250mg Tablets	248	183	26.2	73.8
Ferrous sulphate & Folic acid Tabs	259	181	30.1	69.9
Metronidazole 200mg Tablets	414	267	35.5	64.5
Paracetamol 500mg Tablets	814	689	15.4	84.6
Artemether/Lumefantrine Tabs	1731	447	74.2	25.8
Oxytocin injection	0	122	0	0
Albendazole/Mebendazole Tabs	307	233	24.1	75.9
Oral rehydration Salt	449	146	67.5	32.5
Sulfadoxine/Pyrimethmine Tabs	498	208	58.2	41.8
Diazepam Injection	106	75	29.2	70.8
Infusion (R/L and D5%)	1349	852	36.8	63.2
Adrenaline Injection	116	80	31	69
Tetracycline eye ointment	188	125	33.5	66.5
Average order fulfillment rate and supply gap			36.1	63.9

In Manyoni District, order fulfillment rate ranged from 30.6% to 92.4% for Oral rehydration salt and Albendazole 100mg/Mebendazole 200mg tablets respectively. There was no oversupply of the tracer medicines and 34 (Pack of 10 ampoules) of oxytocin injection were supplied in health facilities while were not ordered in report and request form as shown in table 3 below

Table: 3 Supply Gap and Order Fulfillment rate in Manyoni District

Tracer Medicines	Quantity ordered	Quantity received	% Supply gap	% Order fulfillment rate
Amoxicillin 250 mg Capsules	344	250	27.3	72.7
Cotrimoxazole Tablets	449	302	32.7	67.3
Erythromycin 250mg Tablets	173	145	16.2	83.8
Ferrous sulphate & Folic acid Tablets	291	200	31.3	68.7
Metronidazole 200mg Tablets	310	167	46.1	53.9
Paracetamol 500mg Tablets	554	370	33.2	66.8
Artemether/Lumefantrine 20/120mg	2423	874	63.9	36.1
Oxytocin injection	0	34	0	0
Albendazole/Mebendazole Tablets	212	196	7.6	92.4
Oral rehydration Salt	317	97	69.4	30.6
Sulfadoxine/Pyrimethamine Tablets	562	256	54.5	45.5
Diazepam Injection	49	34	30.6	69.4
Infusion (R/L and D5%)	2440	1059	56.5	43.5
Adrenaline Injection	79	51	35.4	64.6
Tetracycline eye ointment	194	111	42.8	57.2
Average order fulfillment rate and supply gap			39.1	60.9

In Singida District, order fulfillment rate ranged from 19.1% to 81.1% for Oral rehydration salt and Albendazole 100mg/Mebendazole 200mg tablet respectively. The supply gap was high for Oral rehydration salt (80.9%) and low for Paracetamol tablets (18.9%) and the average order fulfillment rate in the district was found to be 54.4%. There was no oversupply or delivery of unordered tracer medicines revealed in the district. The Supply gap and order fulfillment rate of tracer medicines in the district are shown in table 4 below.

Table: 4 Supply Gap and Order Fulfillment rate in Singida District

Tracer Medicines	Quantity ordered	Quantity received	% Supply gap	% Order fulfillment rate
Amoxicillin 250 mg Capsules	389	262	32.7	67.3
Cotrimoxazole Tablets	635	421	33.7	66.3
Erythromycin 250mg Tablets	286	148	48.3	51.7
Ferrous sulphate & Folic acid Tablets	414	249	39.5	60.5
Metronidazole 200mg Tablets	358	152	57.4	42.6
Paracetamol 500mg Tablets	788	640	18.9	81.1
Artemether/Lumefantrine 20/120mg	1087	642	40.9	59.1
Oxytocin injection	65	35	46.2	53.8
Albendazole/Mebendazole Tablets	363	253	30.3	69.7
Oral rehydration Salt	597	114	80.9	19.1
Sulfadoxine/Pyrimethmine Tablets	437	258	41	59
Diazepam Injection	120	57	52.5	47.5
Infusion (R/L and D5%)	3010	1644	45.4	54.6
Adrenaline Injection	115	58	49.6	50.4
Tetracycline eye ointment	381	126	66.9	33.1
Average order fulfillment rate and supply gap			45.6	54.4

In Singida Municipal, order fulfillment rate ranged from 19.6% to 138.9% for Oral rehydration salt and Diazepam injection respectively. The supply gap was high for Oral rehydration salt (80.4%) and low for cotrimoxazole tablets (3.1%). Oversupply by 18.8% and 38.9% was observed for Infusion (Ringer Lactate or Dextrose 5%) and Dizepam injection respectively. Delivery of 70 ampoules of oxytocin injection which were not ordered in report and request form was observed. The average order fulfillment rate in the district was found to be 71.1%. The Supply gap and order fulfillment rate of tracer medicines in the district are shown in the table 5 below.

Table: 5 Supply Gap and Order Fulfillment rate in Singida Municipal

Tracer Medicines	Quantity ordered	Quantity received	%Supply gap	% Order fulfillment rate
Amoxycillin 250 mg Capsules	243	96	60.5	39.5
Cotriomoxazole Tablets	223	216	3.1	96.9
Erythromycin 250mg Tablets	100	76	24	76
Ferrous sulphate & Folic acid Tablets	224	154	31.3	68.7
Metronidazole 200mg Tablets	128	88	31.3	68.7
Paracetamol 500mg Tablets	289	204	29.4	70.6
Artemether/Lumefantrine 20/120mg	824	357	56.7	43.3
Oxytocin injection	0	7	0	0
Albendazole/Mebendazole Tablets	76	69	9.3	90.7
Oral rehydration Salt	153	30	80.4	19.6
Sulfadoxine/Pyrimethmine Tablets	278	134	51.8	48.2
Diazepam Injection	18	25	-38.9	138.9
Infusion (R/L and D5%)	404	480	-18.8	118.8
Adrenaline Injection	33	19	42.4	57.6
Tetracycline eye ointment	60	35	41.7	58.3
Average order fulfillment rate and supply gap			28.9	71.1

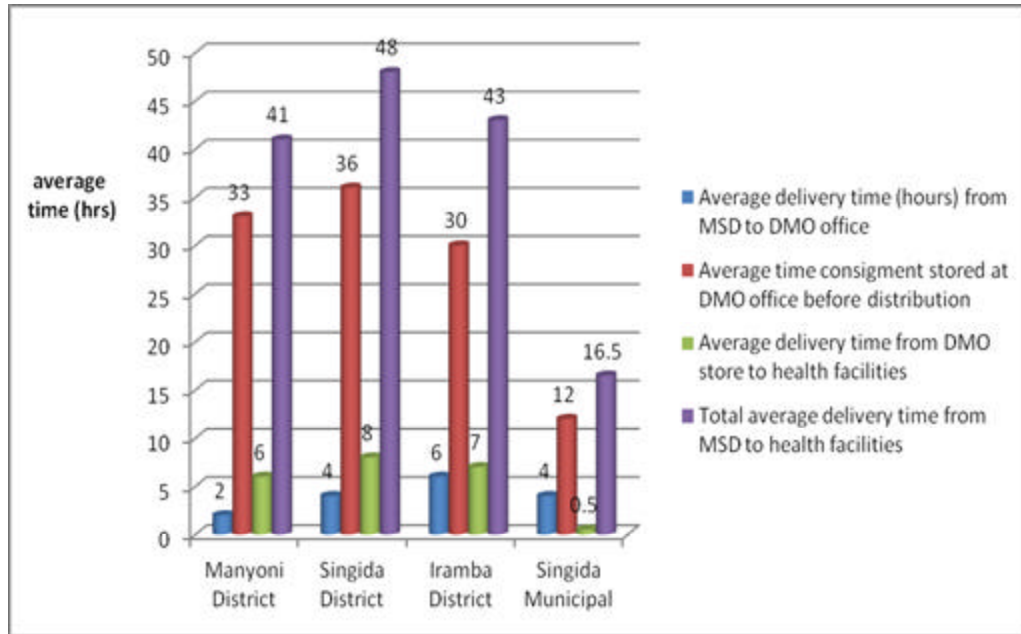
3.3: AVERAGE DELIVERY TIME OF MEDICINES CONSIGNMENT

FROM THE ZONAL MEDICAL STORE TO HEALTH FACILITIES

The finding revealed that the average time taken to deliver medicines consignment from The Zonal Medical Store to the health facilities was 16.5 hours for Singida Municipal, 43 hours for Iramba District, 48 hours for Singida District and 41 hours for Manyoni District. At the District Medical Store Office's the consignment was stored for an average of 33 hours for Manyoni District, 36 hours for Singida District, 30 hours for Iramba District and 12 hours Singida Municipal. The average time taken to deliver the consignment from the District Medical Stores to health facilities ranged from 30 minutes to 8 hours.

The average delivery time of medicines consignment in the region is shown in figure 4 below.

Figure: 4 Average delivery time of medicines consignment from MSD to Health facilities



3.4: AVAILABILITY AND COMPLETENESS OF LMIS TOOLS

3.4.1: Availability and completeness of LMIS registers

In the health facilities surveyed patient registers were found to be available in 98.2% (n=54) and injection register were available in 85.5% (n=47) of the health facilities. Store ledgers and dispensing registers were available in 92.7% and 93.4% respectively. In facilities where patient registers were observed to be present, 87% (n=47) of the registers were correctly filled. Completeness for injection register was 68.1% (n=32), store ledgers and dispensing registers were correctly filled in 84.3% (n=43) and 93% (n=49) health facilities respectively. Chi-square test was done to find out the association between availability of ILS registers and its completeness. Results obtained ($\chi^2 = 5.984$, $df = 1$ and $P\text{-value} > 0.05$) for patient register revealed that there was no significant association of its availability and completeness. However a $P\text{-value} < 0.05$ was obtained in other registers (store ledger, dispensing and injection register) showing the statistical significant association between its availability and completeness as shown in table 6 below.

Table: 6 Availability and completeness of LMIS registers in Singida region

Registers	Availability	Correctly filled	df	P-value	Chi-square
Store ledger	51(92.7%)	43 (84.3%)	1	0.0001	15.458
Patient register	54(98.2%)	47(87.0%)	1	0.14	5.984
Dispensing register	53(93.4%)	49(93.0%)	1	0.01	16.95
Injection register	47(85.5%)	32(68.1%)	1	0.0001	13.025

N(Total number of health facilities visited)=55

3.4.2 : Availability and completeness of LMIS forms

Of the fifty five health facilities that were visited MSD Sales Invoices were observed to be available in 96.4% (n=53) of the facilities of which 96.2%(n=51) were correctly filled, 85.5% (n=47) of the facilities had report and request forms of which 81% were correctly filled. Goods receiving note, a form which is supposed to be available during delivery of medicines consignment at the health facility and which is supposed to be signed by healthcare provider after confirming that the consignment is in good condition was not available in all health facilities. Only one health facility of the fifty five facilities visited had verification and claim form and correctly filled, this form is used to document and report discrepancies observed with goods delivered from MSD and make claims. When a Chi-square test was performed a P-value <0.05 obtained showing that, there was statistical significant association between availability and completeness of the ILS forms as shown in table 7 below.

Table : 7 Availability and completeness of LMIS forms in Singida region

ILS Forms	Availability	Correctly Filled	df	P-value	Chi-square
Prescription forms	5(9.1%)	4(80.0%)	1	0.0001	43.137
R & R forms	47(85.5%)	38(81.0%)	1	0.0001	20.926
MSD sales invoice	53(96.4%)	51(96.2%)	1	0.0001	26.462
Good Received Note	0(0%)	0(0%)			
Verification and claim forms	1(1.8%)	1(100%)	1	0.0001	55

N (Total number of health facilities visited)=55

3.4.3: KNOWLEDGE OF HEALTHCARE PROVIDERS ON THE USE OF STOCK MANAGEMENT TOOLS

On assessing the knowledge on when stock management tools are used, healthcare providers were asked to mention where do they record information on the quantities of medicines dispensed (consumption) and quantities of medicines in stock (stock on hand).

Socio -Demographic information of respondents

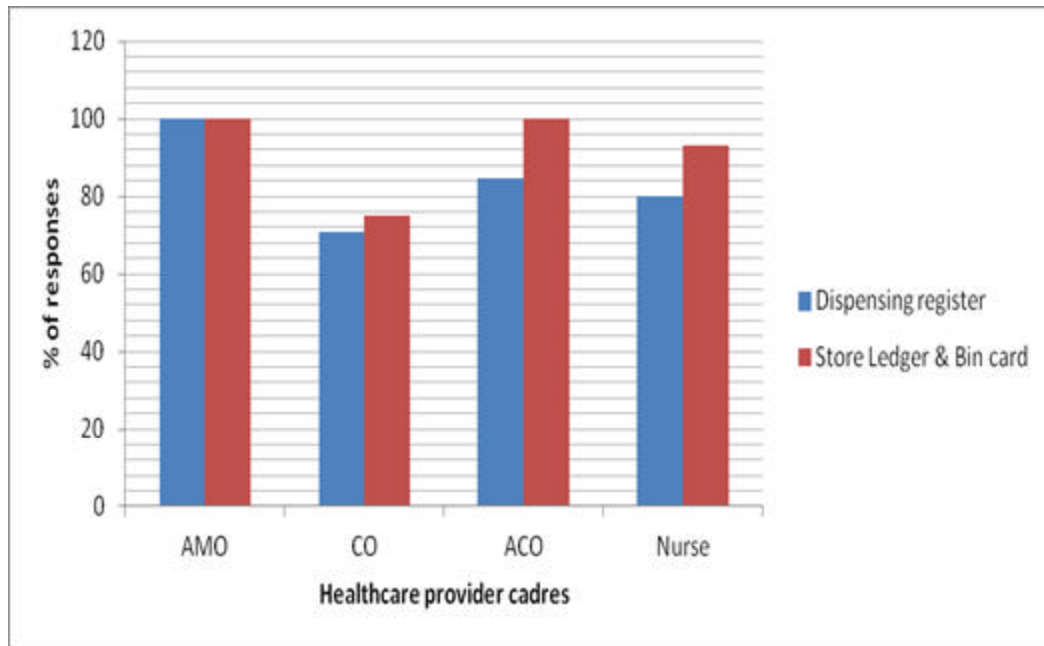
The Majority (72.7%) of respondents (as indicated in table 8 below) were male and aged (56.4%) between 30 to 50 years. Professionally, 5.5% of respondents were Assistant Medical Officers, 43.6% were Clinical officers, 23.6 assistants clinical officers and 27.3% nurses. The majority of respondents (70.9%) attended training on Integrated Logistic System of medicines and medical supplies in health facilities. Social demographic information of respondents are shown table 8 below

Table 8 Summary of social demographic characteristics of the respondents (n = 55)

Characteristic	Number	Percentage
Sex		
Female	15	27.3
Male	40	72.7
Age group category (in years)		
below 30	7	12.7
30 to 50	31	56.4
above 50	17	30.9
Profession		
Assistant Medical Officer	3	5.5
Clinical officer	24	43.6
Assistant clinical officer	13	23.6
Nurse	15	27.3
Training on ILS		
Yes	39	70.9
No	16	29.1

Majority of respondents; 100% of AMO, 70.8% of CO, 84.6 of ACO, and 80% of Nurses correctly mentioned dispensing register as the LMIS tools used to record quantities of medicines dispensed. Store ledger and Stock card(Bin card) were correctly mentioned by 100% of AMO, 75% of CO, 100 of ACO and 93.3% of Nurses as the register used to record quantities of medicines in stock as shown in figure 5 below

Figure: 5 Knowledge of healthcare providers on the use of stock LMIS tools

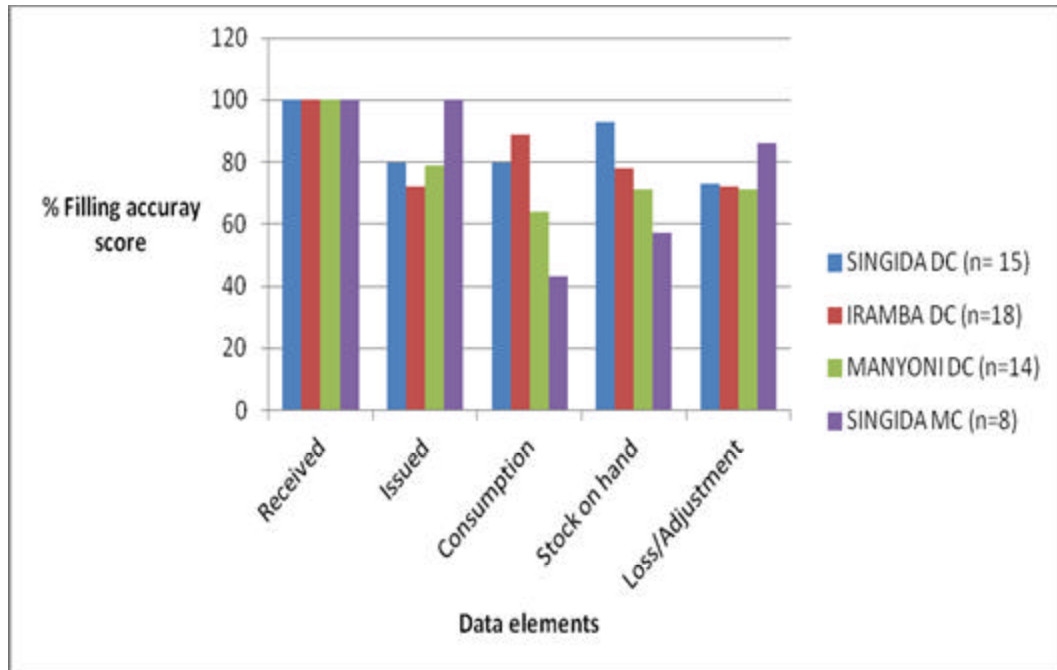


3.4.4: Verification of data collected in report and request forms

Verification revealed that, health facilities surveyed in all district correctly filled received data, the filling accuracy of issued data was high in Singida Municipal health facilities (100%) and low in Iramba district health facilities (72%), for consumption data filling accuracy was high in Iramba district (89%) and low in Singida Municipal health facilities (43%), for stock on hand data filling accuracy was high in Singida district (93%) and low for Singida Municipal health facilities (57%) while 86% of health facilities in Singida Municipal and 71% of health facilities in Manyoni District filled correctly the data element for loss or adjustment respectively.

Health facilities filling accuracy of the report and request form data elements in all four districts of Singida region are shown in figure 6 below.

Figure: 6 Health facilities filling accuracy of report and request form data elements in Sigida region



3.5.0: HEALTH FACILITIES STORAGE CONDITIONS OF MEDICINES AND MEDICAL SUPPLIES

To provide clients with high-quality products, health facility must have safe, protected and well-organized storage areas to help prevent damage and to ensure efficient handling of products. In assessing storage areas, a tool with 17 universal guidelines for proper storage was used. Health facility's adherence to these storage conditions was assessed through direct observation and results are shown in table 9 below

Table: 9 Health facilities adherence to prescribed storage standards

Storage Standard as per JSI DELIVER/WHO 2003	Number of health facilities adhering to prescribed standard
Products that are ready for distribution are arranged so that identification labels and expiry dates and/or manufacturing dates are visible.	42 (76%)
Products are stored and organized in a manner accessible for first-to-expire, first-out (FEFO) counting and general management.	33 (60%)
Cartons and products are in good condition and not crushed due to mishandling. If cartons are open, determine if products are wet or cracked due to heat/radiation.	30 (55%)
Facility makes it a practice to separate damaged and/or expired products from good products and remove them from inventory.	49 (89%)
Products are protected from direct sunlight at all times of the day and during all seasons	38 (69%)
Cartons and products are protected from water and humidity during all seasons	52 (95%)
Storage area is visually free from harmful insects and rodents.	50 (38%)
Storage area is secured with a lock and key but is accessible during normal working hours, with access limited to authorized personnel.	52 (95%)
Products are stored at the appropriate temperature during all season according to product temperature specifications	21 (38%)
All hazardous waste(e.g needle, toxic material) are properly disposed off and not accessible to non-medical personnel.	52 (95%)
Storeroom is maintained in good condition (e.g clean, all trash removed, shelves are sturdy and boxes are organized)	40 (74%)
Product are stacked at least 10 cm (4 inches) off the floor.	13 (25%)
Products are stacked at least 30 cm (1 foot) away from the wall and other stacks	19 (35%)
Products are stacked no more than 2.5 meters (8 feet)	17 (31%)
Fire safety equipment is available and accessible (any item identified as being used to promote fire safety should be considered).	30 (55%)
Products are stored separately from insecticide and other chemicals	16 (29%)

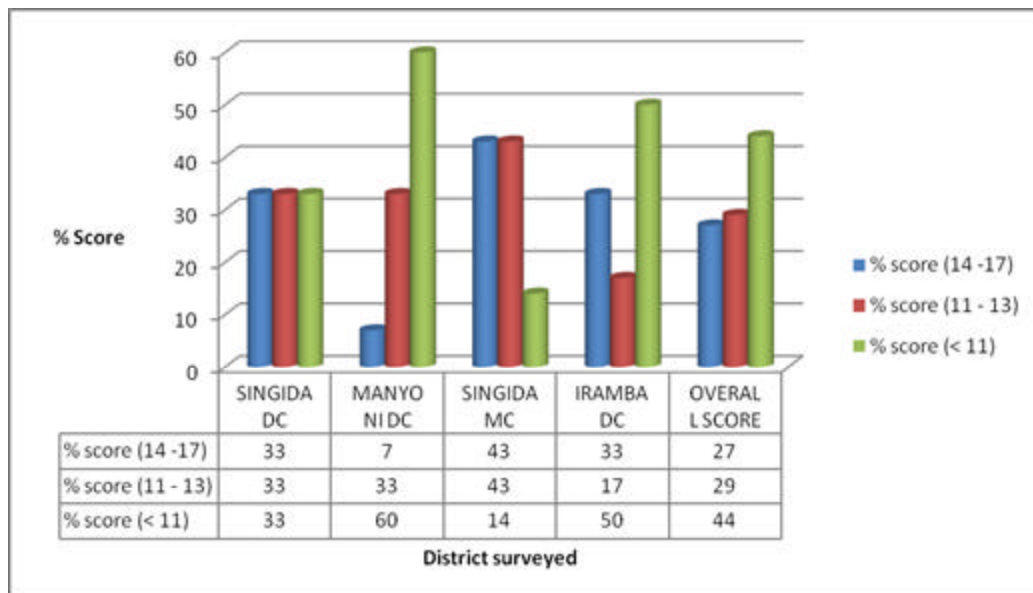
The health facilities storage space and organization for existing product and reasonable expansion (i.e. receipt of expected product deliveries for the foreseeable future) was inadequate , only 24 % of the health facilities had adequate storage space. In less than half of the health facilities products were not organized in a manner accessible for first expiry/first-out. Arrangement of products in the storeroom was a

challenge with 75% health facilities not stacked their products at least 10cm off the floor, 65% of the health facilities not stacked products 30cm away from the wall and 69 of the health facilities arranged products more than 2.5 meters high. About 45% of the health facility visited had no fire safety equipment in the storage area and those which have, 80% they use a bucket of sand as fire safety equipment. Health facilities that make a practice of separating damaged and/or expired products from good products and remove them from inventory were 89%. About 95% of the facility were able to protect products from water and humidity, secure the store room with lock and key and ensure proper disposal of hazardous waste. Ten to thirty percent of health facilities faced challenges of insect and bat infestation and lack of temperature regulation.

3.5.1: Score of storage condition in surveyed health facilities in Singida region

Twenty seven percent of the health facilities visited had good storage conditions (i.e. answered favorably for at least 14 of the 17 conditions assessed). Twenty nine percent of the facilities scored in the acceptable range (i.e., 11 to 13 of the storage conditions were found in compliance) and Forty four percent scored in the unacceptable range (i.e. assessed favorably on eleven or fewer of the storage conditions). Health facilities storage condition score are shown in figure 8 below.

Figure: 7 Percentage score of health facilities storage condition



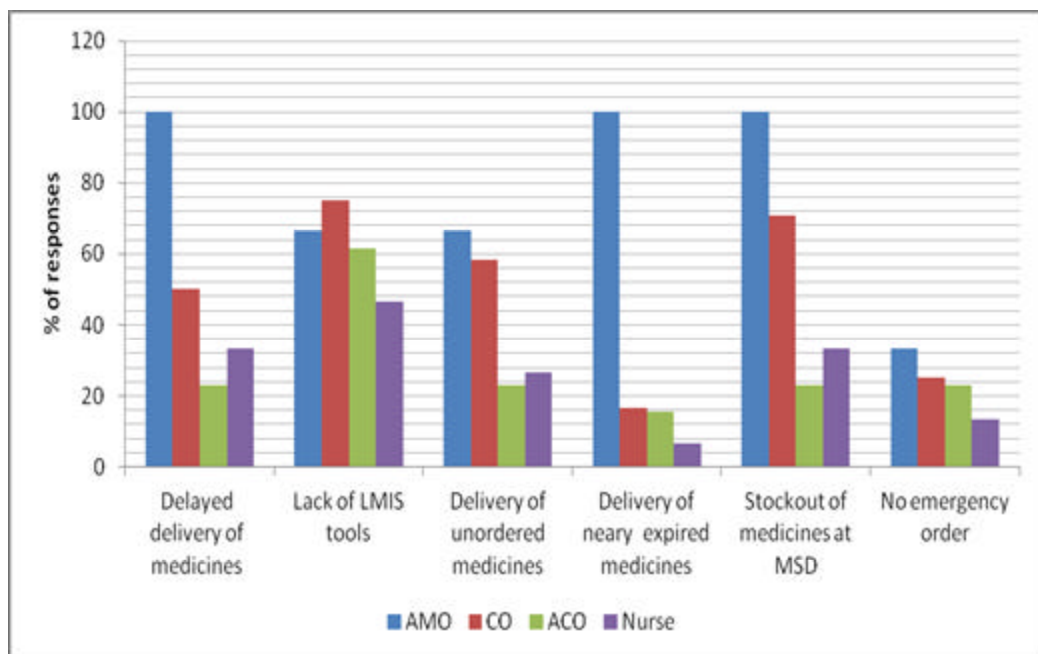
3.6.0 PERCEPTION OF HEALTHCARE PROVIDERS ON PERFORMANCE OF ILS TO MEET CUSTOMERS NEED.

During interview of 55 healthcare providers (as shown in table 8) on the perception of ILS, a number of shortcomings, strengths and area of improvement to enhance its good performance were mentioned as explained below.

3.6.1 Shortcomings of Integrated Logistic system

The shortcomings reported during the interview are; Delayed delivery of medicines from the Zonal Medical Stores to health facilities was reported by 100% of AMO, 50% of CO, 23.1% of ACO and 33.3% of Nurses. Delivery of nearly expired medicines was mentioned by 100% of AMO, 16.7% of CO, 15.4% of ACO and 6.7% of Nurses. Delivery of unordered medicines were mentioned by 66.7% of AMO, 75% of CO, 61.5% of ACO and 46.7% of Nurses. Stock-out of ordered medicines at the Zonal MSD reported by 100% of AMO, 70.8% of CO, 23.1% of ACO and 33.3% of Nurses. Emergency order was mentioned by 33.3% of AMO, 25% of CO, 23.1% of ACO and 13.1% of Nurses as the component of ILS which is currently not exercised. The shortcomings are shown in figure 8 below.

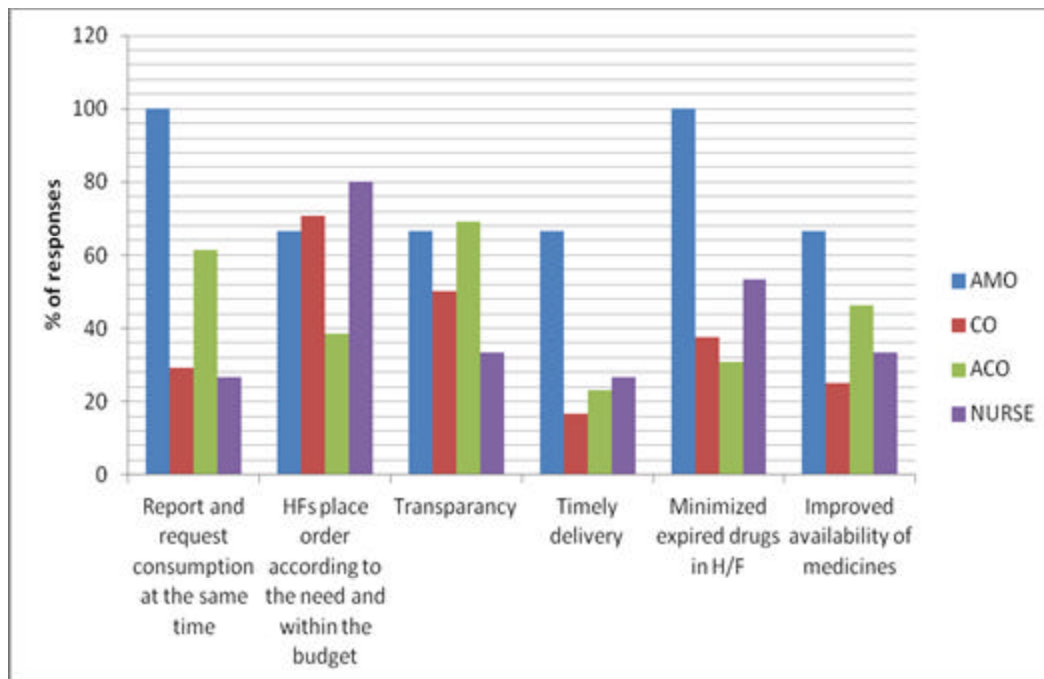
Figure: 8 Shortcomings of ILS reported by healthcare providers



3.6.2 Strengths of ILS over the previous supply systems on ensuring availability of medicines in health facilities.

The strengths of ILS over the previous system reported during the interview includes; Ability to report and request consumption at the same time mentioned by 100% of AMO, 29.2% of CO, 61.5% of ACO and 26.7% of Nurses. Ability of health facility to order according to their needs and within their budget 66.7% of AMO, 70.8% of CO, 38.5% of ACO and 80% of Nurses. Transparency on medicines requested, issued and health facility fund available at Medical Stores Department was reported by 66.7% of AMO, 50% of CO, 69.2% of ACO and 33.3% of Nurses. Timely delivery of ordered medicines at the health facility was reported by 66.7% of AMO, 16.7% of CO, 23.1% of ACO and 26.7% of Nurses. As shown in figure 9 below, 100% of AMO, 37.5% of CO, 30.7% of ACO and 53.3% of Nurses interviewed reported the system has minimized piling-up of expired drugs in health facilities and improved availability of medicines in health facilities since introduction of ILS was mentioned by 66.7% of AMO, 25% of CO, 46.2% of ACO and 33.3% of Nurses interviewed. Strengths of ILS reported by healthcare providers are shown in figure 9 below.

Figure: 9 Strengths of ILS over the previous supply systems reported by healthcare provider



3.6.3: Areas of improvements to enhance good performance of ILS

Healthcare providers were asked on the area of improvement to enhance good performance of ILS. The following areas were mentioned

- ? 64 percent of healthcare providers mentioned training especially to newly recruited staff on use of LMIS tools.
- ? Provision of adequate LMIS tools was mentioned by 58% of healthcare providers interviewed
- ? Stock-out of medicines at MSD and flow of information's between different levels involved in ILS were mentioned by 36% of healthcare providers as the areas of improvements.
- ? Also direct delivery and fund allocation based on population saved by health facilities were reported by 30% and 26% healthcare providers respectively.

CHAPTER FOUR

4: DISCUSSION

The logistic indicator assessment tools enable assessment of different aspect of logistic system in public health facilities such as stock-out duration, order fill rate, average delivery time, availability and filling accuracy of logistic management information tool, storage conditions at health facilities and community perception of the logistic system to meet customer needs. (16)

Availability of essential drugs at all times in health facilities is an important factor in provision of quality health care. Persistent shortages and/or stock-outs of medicines in health facilities suggest a low or poor quality of healthcare, which should be addressed. The study observed that, In Singida Municipal stockout of most tracer medicines revealed to be low compared to other districts in the region. It was also found that some key medicines were out of stock for more than 3 months (112 days for oxytocin injection in Manyoni district and 98 days for Artemether/Lumefantrine in Singida district) which is an indication of poor performance of ILS. Though this shows there is an improvement of supply as it was reported before in 2008 where the average stock out of medicines was 135 days per year in health facilities. (19) However, there is still the need to develop mechanisms for improvement so that medicines are in stock 100% of the time. One of the efforts is the direct delivery system of medicines that has been mentioned to contribute towards improvement of stock-out in most health facilities.(12) Another possible explanation to this is, some medicines e.g. oxytocin injection are missing in the ordering form(form 2A) which is used by health facilities for reporting the previous consumption and requesting other supplies. Instead these medicines are supposed to be ordered using a blank form (form 2C) which is neither available nor used by healthcare providers. Stock-out of essential medicines and other medical supplies at the Medical Stores Department is another cause and this is confirmed by an assessment which was done by the MoHSW which showed that availability of essential medicines at the Central MSD was 72% on average. (3) There is a need to improve the capacity of the MSD to ensure full supply pipeline of medicines and medic al supplies in health facilities through integrated logistic system.

The goal of introduction of ILS was ensures that the right medicines, in the right quantities, in the right condition are delivered to the right health facilities at the right time and for the right cost. (2) This study showed that, the average health facilities order fulfillment rates by MSD varies between districts, the average order fulfillment rate was found to be high in Singida Municipal (71.7%) and low in Singida district (54.4%). In the three district (Iramba, Manyoni and Singida districts) the average order fulfillment rate was found to be low compared to the average order fulfillment rate of 67.3% by the MSD that was found in Mbeya region (18) and the overall average order fulfillment rate of 65% revealed in the in-depth assessment of medicine supplies in Tanzania in 2008. (19)

What was evident from the study is that the average delivery time is high in Singida region. It was found that, the high average delivery time does not depend upon distance from the zonal MSD and this is confirmed by the district which is adjacent to the zonal MSD (Manyoni district 118 km) has high average delivery time than Singida Municipal located about 248 km distance away from MSD in which the total average delivery time is 16.5 hours while Singida district (120 km)and Iramba district (about 210 km) away from the Zonal MSD have total average delivery time of 48 and 43 hours respectively (Figure: 5). The possible cause of high average delivery time in Singida region are; time which consignment is delayed at the district medical office before delivery (ranging from 12 to 16 hours); inadequate vehicles or unreliable transport at the district and poor infrastructure from the district head quarter to the health facilities. There is need of introducing direct delivery of medicines and medical supplies in Singida region from the Zonal MSD to shorten the route and minimizing the average delivery time.

Logistic management information tools are useful for proper management of pharmaceutical resources in health facilities, these tools are supposed to be available at the health facilities at all the time during reporting the consumption and requesting supplies, deliveries of supplies at the facility and dispensing medicines to the client. (20) The study showed that, availability of registers ranged from 85.5% (n=47) and 98.2%(n=54) of health facilities and the accuracy filling of registers was low for injection register (68.1%) and some health facilities were not updating store ledger. (Table: 3) This might be caused by inadequate knowledge on how to fill the LMIS tools (as described in subsection 3.4.3). MSD sales invoice were available in

96.4% and correctly filled in 96.2% of the health facilities and the incomplete invoice were missing the signature of the authorized personnel and MSD stamp. This might be due to the fact that, MSD sales invoice are generated directly from MSD database and hence minimizing human error. Verification and claim forms were available in only one health facility, this means that facilities lack an important and useful document which is used to report discrepancies observed with goods deliveries from MSD and make claims (Table: 4). LMIS tools are printed by MSD and sold to the health facilities, MSD should ensure availability of LMIS tools at any time when are needed by health facilities this will enhance good management of data at the level of health facilities which in turn assist the MSD itself during quantification.

On the other hand, it was found that facilities did not fill the report and request forms completely and correctly. Some health facilities filled in only the “amount requested” column of the form. Others had difficulties to apply the formula used to calculate consumption and there was often little relation between the “consumption” column and the “amount requested” column (as described in subsection 3.4.4) which should (theoretically) be related. Instead, it appears as though facilities were ordering based on estimates of how much they would need, instead of calculations based on previous consumption. (10) In all district the filling accuracy was high for received data elements. In Singida Municipal the issued data filling accuracy was high and low for consumption data elements compared to other districts.

Maintaining proper storage condition for health commodities is vital to ensuring their quality. Product expiration date are based on ideal storage condition and protecting product quality until their expiration date is important for serving customers and conserving resources.(14) In Singida region storage condition of medicines and other medical supplies in health facilities is still a challenge. The study showed that, majority of health facilities in Manyoni district were not adhering to prescribed storage standard while Singida municipal majority of health facilities scored in good and acceptable range storage condition. Generally in the health facilities visited it was found that of the 55 health facilities (Figure: 8) only 27% (n=15) had good storage condition and 44% (n=24) scored in acceptable range. This is possibly because most of the health facilities were found in rural area where infrastructure (e.g. electricity) that support good storage practice of medicines and medical

supplies is poor. Also about 40% of the health facilities visited were unable to organize the products in a manner accessible for first expiry /first out. The structures of health facilities do not provide adequate space to ensure good storage practice, it was found that because of inadequate space products in the storeroom are not kept in an arrangement that maintain quality of the product. This may be caused by inadequate knowledge or negligence in exercising good storage practice in health facilities.

Healthcare providers interviewed in health facilities mentioned a number of shortcomings (as shown in figure 8) that needs some intervention to enhance the performance of ILS these includes; delayed delivery of medicines from the Medical Stores Department to the District Medical Office and then from the district to the health facilities, Lack or inadequate LMIS tools for organizing, correcting and generating information which is an engine that drive and enable any logistic system to run smoothly. (2) Delivery of unordered or nearly expired medicines resulting to pilling up and expiring of medicines in health facilities, Stock-out of medicines at MSD which reported also in the ILS pilot test evaluation. (20) Lastly, Unwilling of MSD to allow and process emergency order through ILS in case of shortage at the health facilities, this means that health facilities once are stocked out remain without medicines until the next ordering cycle.

On the other hand, the study also probed more deeply into staff feelings and attitudes toward the ILS. Specifically, facility-level staff members were asked how confident they felt since introduction of ILS and the following strengths of ILS (as described in subsection 3.6.2) were mentioned.

- i. Ability of the system to report the previous consumption and request another supplies which is done using R&R forms utilizing data generated from different LMIS tools such as store ledger, dispensing register.
- ii. Through this system health facilities request medicines and other supplies according to their needs and within their budget.
- iii. The system is more transparency as it allow health facilities to know funds available at MSD through sales invoice which are brought to the facilities together with the consignment. The community is also involved during opening of consignment through members of health facilities committee.

- iv. The average delivery time has been decreased compared to the previous supply system e.g EDP and Indent system.
- v. ILS has minimized piling-up of expired drugs in health facilities as health facilities request only the right product and in the right quantity.
- vi. Availability of medicines in health facilities has been improved compared to the previous system.

To enhance good performance of ILS respondents identified areas which needs improvements, these includes; direct delivery of medicines from MSD to health facilities to shorten average delivery time, disbursement of fund according to population saved by the facility, training of health staff on proper usage of LMIS tools to ensure proper filling of tools and good generation of data in health facilities. Improved availability of medicines at MSD and flow of information between lower level and high level of the integrated logistic system.

5: CONCLUSION AND RECOMENDATION

5:1 CONCLUSION

The performance of ILS in the region varies within the districts. The overall availability of medicines in the region is still low. The stock-out duration of essential medicines is still high in the region, some key medicines were stocked out for more than 3 months. Order fulfillment rate by MSD is low and varies between districts in the region. The average delivery time of medicines from the zonal MSD to the health facilities is still high and it was found not depending on the distance from the zonal medical stores. Availability and completeness of LMIS tools in health facilities is still a problem and a number of health facilities were not adhering to prescribed storage standards. The study also identified a number of challenges facing ILS in health facilities which can be solved by different stakeholders involved in the system. These includes; Stock-out of medicines in health facilities; less quantity of medicines supplied than the quantity ordered by the health facilities; delivery of unordered and or nearly expired medicines; long average delivery time of medicines consignment from the Zonal MSD to health facilities; inadequate and low filling accuracy of LMIS tools in health facilities; unsatisfactory storage condition of medicines and medical supplies in health facilities and inability of health facilities to place emergency order in case of shortage.

5:2 RECOMMENDATIONS

Emergency order should be placed during stock-out. Health facilities should be allowed to place emergency orders which is also documented in the ILS manual but not practiced

Ensure provision of information on availability of medicines and medical supplies. MSD should provide information in health facilities informing availability of medicines and other medical supplies that were out of stock at the time health facilities order were placed. Report and request forms should be reviewed to check the items which were undersupplied or not supplied and resupplied to meet the need of health facilities.

Augment training for staff regarding the correct completion of logistic management tools. Although the number of respondents reported they learned how to complete logistics forms and records at a logistics workshop or through on-the-job training, the updating of stock cards, store ledger, dispensing and injection register remains low throughout the system. Intensified efforts, including training through logistics workshops and on-the-job training opportunities, to ensure adequate training in how to complete related forms and records is needed to address this gap and hence ensuring quality data are organized and generated by health facilities.

Revising report and request form to incorporate missing essential medicines. Report and Request forms (form 2A) should be reviewed to incorporate essential medicines which are currently missing e.g. oxytocin injection which are supposed to be ordered using blank form (form 2c) a form which is less used by health facilities.

Implementing direct delivery system. A direct delivery system of medicines and medical supplies using Medical Store Department vehicles which is currently operating in ten regions of Tanzania inland should be implemented in Singida region. This will shorten the average delivery time and hence the lead time as sometimes the consignments are delayed at the District Medical Store Office for some days due to lack of vehicles.

Improve facility storage condition. There are still a significant proportion of facilities that fall within the unacceptable storage condition range, particularly with respect to cleanliness, organization, sufficient space, and availability of fire

equipment. Ensuring adequate storage conditions and addressing areas of weaknesses could be addressed and reinforced through regular and structured supervision visits.

Ensure availability of Logistic Management Tools. Inadequate LMIS tools were observed in health facilities. Without adequate logistic management tools, management of medicines and medical supplies, reporting consumptions and requesting other supplies becomes compromised. Availability of appropriate tools, combined with intensified training efforts, may help address the generation of poor data which is currently observed in health facilities.

5.3.0: AREA FOR FURTHER RESEARCH

This study just focused on public health facilities operating through ILS which are located in Singida region and saved by the central MSD Zonal office , further research can be carried out to cover other regions saved by different MSD Zonal offices in the country to assess the magnitude of the problem.

5.4.0: STUDY LIMITATIONS

The limitation of this study, however, is that the findings were restricted to only public health facilities in one region. The study would have been richer if it was carried out in more than one region to get better understanding on the performance of ILS in health facilities.

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ANNEX : 1
LOGISTIC MANAGEMENT INFORMATION TOOLS USED IN
INTEGRATED LOGISTIC SYSTEM

Management tools are documents that are used for proper management of resources of a health facility. In order to ensure the continuous availability of quality supplies (in other words, to fulfill the six rights). The management tools used in ILS includes.

(i) Forms

Number	Form name	Purpose	Primary user
Form 1	Prescription Form	To account for medicines prescribed and dispensed to patients	Prescriber, Dispenser
Form 2A	Dispensary or Health Centre Report & Request for priority medicines and related medical supplies and equipment	To order priority medicines, and related supplies, from MSD for dispensaries or health centers.	Dispensary or Health Center in charge
Form 2B	Hospital Report & Request for priority medicines and related medical supplies and equipment	To order priority medicines and related supplies from MSD	Hospital Pharmacist in charge
Form 2C	Blank Report & Request for additional medicines and related medical supplies and equipment	To order additional medicines and related medical supplies not printed on Forms 2A & 2B	Dispensary or Health Center in charge or Hospital Pharmacist in charge
Form 3	Order compilation	To determine if all facilities have sent in their reports and the total funding level needed	District Medical Office
Form 4	MSD Sales Invoice	To inform a facility what MSD has sent and to compare what is received with what was ordered and approved	MSD and Dispensary or Health Center In charge or Hospital Pharmacist In charge
Form 6	Goods received note (GRN)	To account for the number of packages received from MSD.	Hospital, Dispensary or Health Center In charge, DMO, and MSD

Number	Form name	Purpose	Primary user
Form 7	Verification and Claims form	To document and report discrepancies observed with goods delivered from MSD and make claims	MSD and Dispensary or Health Center In charge or Hospital Pharmacy In charge

ii. Worksheets

These are management tools that assist in making decision, worksheets in ILS includes.

Number	Worksheet name	Purpose	Primary user
1	Assigning delivery groups	To assign health facilities to a delivery schedule	DMO
2	ILS supervision checklist	To use during supervisory visits	DMO, District Pharmacist and other CHMT Supervisors

(i) Registers

These are used to collect, organize and maintain data on transactions that occur in the ILS. They collect data or information that is generated as day-to-day ILS activities are conducted. ILS registers document all transactions from the receipt of commodities until they are dispensed or issued out of the facility and different registers are used at different points in the logistics system. The registers included in ILS are shown in the table below

Number	Register name	Purpose	Primary user
1	Stores Ledger	To account for supplies stored in storerooms	Dispensary or Health Center Storekeeper or Pharmacy Storekeeper
2	Patient s register	To collect patient data and diagnosis	Prescriber
3	Dispensing register	To collect data on drugs dispensed	Dispenser
4	Injection register	To collect data on injections given	Nurse

ANNEX 2: LIST OF TRACER MEDICINES

S/N	Name of tracer medicines	Unit of issue
1	Amoxicillin 250mg Capsules	1000 T
2	Co-trimoxazole tablets	1000 T
3	Erythromycin 250mg tablet	1000 T
4	Ferrous sulphate & folic acid tabs	1000 T
5	Metronidazole 200mg tablets	1000 T
6	Paracetamol 500mg tablets	1000 T
7	Artemether /Lumefantrine 20/120 mg tablets	30T
8	Oxytocin injection	Ampoule
9	Albendazole/ Mebendazole tablets	1000T
10	Oral Rehydration Salt	SACHET
11	Sulfamethoxazole/Pyrimethamine tablets	1000T/500T/100T
12	Diazepam injection	Ampoule
13	Infusions (ringers lactate and dextrose5%)	500mls / 1000 mls
14	Adrenaline injection	Ampoule
15	Tetracycline eye ointment	Tube

ANNEX: 6

Table 4: Availability and filling accuracy of Logistic Management Information tools

Facility: Date:

District: Investigator:.....

AVAILABILITY OF LOGISTIC MANAGEMENT INFORMATION TOOL		
1	Are the following the following forms used in ILS available at the facility (Ask for copy to justify the answer)	Prescription form..... A Report and Request forms.....B MSD sales invoice.....C Good received noteD Verification and Claims forms.....E
2	Are the following the following register used in ILS available at the facility (Ask for copy to justify the answer)	Stores Ledger.....A Patient register.....B Dispensing register.....C Injection register.....D
FILLING ACCURACY OF LOGISTIC MANAGEMENT INFORMATION TOOL		
3	Are the following the following forms used in ILS at the facility correctly filled (Ask a copy to check for completeness)	Prescription form.....A Report and Request forms.....B MSD sales invoice.....C Good received noteD Verification and Claims forms.....E
4	Are the following the following register used in ILS at the facility correctly filled (Ask a copy to check for completeness)	Stores Ledger.....A Patient register.....B Dispensing register.....C Injection register.....D
GENERAL KNOWLEDGE OF HEALTHCARE PROVIDERS		
5	Where do you record information on the quantities of medicines dispensed (consumption)?	Patient Register..... A Pharmacy Register.....B Stores LedgerC Stock CardD Not Recorded.....E Other _____ F
6	Where do you record information on the quantities of medicines in stock (stock on hand)?	Patient Register..... A Pharmacy Register.....B Stores LedgerC Stock CardD Not Recorded.....E

		Other _____ F
7	How often are you supposed to submit reports to the higher level?	Monthly 1 Quarterly 2 Semi-annually 3 Annually 4 Other 5
8	What factors influence not being able to submit your report on time?	Takes too long 1 Not enough time between reports 2 Don't have the forms 3 Approval process is too long 4 Difficulties in transmitting reports (mail, email, telephone, collection) 5 Other 6
9	How long does it take you to complete your report/order?	Days: _____ Hours: _____
10	How did you learn to calculate the order quantity for drugs required at facility?	During a training workshop A On-the-job training B Never been trained C Other (<i>specify</i>) D

VERIFICATION OF DATA COLLECTED IN REPORT AND REQUEST FORM

11	Verify the type of data collected in the R&R forms (<i>Look at the R&R forms to verify.</i>)		
a.	Received	Yes 1 No 0	
b.	Issues	Yes 1 No 0	
c.	Consumption	Yes 1 No 0	
d.	Stock on hand	Yes 1 No 0	
e.	Losses/adjustments	Yes 1 No 0	
	[A ¹]= Sum of A		
	[A ²]= Score= A ¹ ÷ 5 × 100		
	<p>Note: Indicate “Yes” if the data filled in the report and request form are correct and “No” if the data filled are incorrect. Sum the total number of correct filling [A¹]. Calculate the score of the accuracy filling [A²] by dividing the sum of the correct filling [A¹] by 5 and multiplying by 100</p>		

ANNEX: 7

Table 5: Storage/warehouse conditions table

Facility: Date:

District: Investigator:.....

Tick the types of commodities stored in this area

Essential drugs ? Contraceptives ? Vaccines HIV test kits ? STI drugs ? TB drugs ?

DESCRIPTION	COMMENT
1. Products that are ready for distribution are arranged so identification labels and expiry dates and/or manufacturing dates are visible. Yes ? No ?	
2. Products are stored and organized in a manner accessible for first expiry/first-out (FEFO) counting and general management. Yes ? No ?	
3. Cartons and products are in good condition, and are not crushed. If cartons are open, products are not wet or cracked from heat/radiation (fluorescent lights in the case of condoms, Depo Provera® stored upright). Yes ? No ?	
4. The facility makes it a practice to separate damaged and/or expired products from good products and removes them from inventory. Yes ? No ?	
5. Products are protected from direct sunlight at all times of the day and during all seasons. Yes ? No ?	
6. Cartons and products are protected from water and humidity during all seasons. Yes ? No ?	
7. Storage area is visually free from harmful insects and rodents. (Check the storage area for traces of rodents or insects). Yes ? No ?	
8. Storage area is secured with a lock and key but is accessible during normal working hours, with access limited to authorized personnel. Yes ? No ?	
9. Products are stored at the appropriate temperature during all season according to product temperature specifications. Yes ? No ?	
10. All hazardous waste (e.g., needles, toxic materials) is properly disposed off and is not accessible to non-medical personnel. Yes ? No ?	

DESCRIPTION	COMMENT
11. Storeroom is maintained in good condition (e.g., clean, all trash removed, shelves are sturdy, boxes are organized). Yes ? No ?	
12. The current space and organization is sufficient for existing products and reasonable expansion (i.e., receipt of expected product deliveries for the foreseeable future). Yes ? No ?	
13. Products are stacked at least 10 cm (4 inches) off the Floor Yes ? No ?	
14. Products are stacked at least 30 cm (1 foot) away from the walls and other stacks. Yes ? No ?	
15. Products are stacked no more than 2.5 meters (8 feet) high Yes ? No ?	
16. Fire safety equipment is available and accessible (any item identified as being used to promote fire safety should be considered). Yes ? No ?	
17. Products are stored separately from insecticides and chemicals. Yes ? No ?	
[A ¹]= Sum of A	
[A ²]= Score= $A^1 \div 17 \times 100$	
<p>Note: Indicate “Yes” if all parts of the statement are true for the store room and “No” if any part of it is false. Sum the total number of true statements [A¹]. Calculate the score of the store room [A²] by dividing the sum of the true statements [A¹] by 17 and multiplying by 100</p>	

ANNEX: 8**INTERVIEW GUIDE ON PERFORMANCE OF INTEGRATED LOGISTIC SYSTEM****Self introduction****The objectives of this survey:**

Good day. My name is _____ a postgraduate student at Muhimbili University of Health and Allied Sciences. I am conducting a survey regarding the performance of integrated logistics system in health facilities in Singida region as the partial fulfillment of my study.

I am visiting selected health facilities throughout the region; this facility was selected to be in the survey. The objective of the survey is to assess the performance of integrated logistic system in health facilities.

The results of this survey will provide information to decision makers and other stakeholders that will enable them to make decisions and to promote improvements of the system.

I would like to ask you a few questions about the performance of ILS at this facility. In addition, I would like actually to have access of some documents used in recording and generating informations required in the system. Again you are free to ask any question concerning this survey.

Name of the facility _____

Facility location

City/town: _____

Region _____

District _____

Code of the facility.....

Facility Type: (1=Warehouse; 2=SDP)

If SDP, mark type of facility: (1=District hospital; 2=Health centre; 3=Dispensary;

4=Other _____).....

Operating Authority 1=Government; 2=NGO.....

Qn 1. What do you understand about integrated logistic system

Qn 2. What are the advantages of integrated logistic system over the previous supply system on ensuring availability of medicines and other medical supply at the health facility.....

Qn 3. What are the shortcoming of integrated logistic system compared to previous system ensuring availability of medicines and other medical supply at the health facility.....

Qn 4. Did the Medical Stores Department supply the quantity of medicines according to order placed by the health facility if No, the difference is large enough to affect the healthcare delivery at the facility before the next order is placed(See R&R form and Sales invoice to confirm)

Qn 5. What is the lead time from the order is prepared at the facility until when the medicines consignment is delivered at the facility.....

Qn 6. There is any staff trained on ILS at the facility..... if Yes how many.....

If No. How do you fill the tools used in integrated logistic system.....
.....

Qn 7. What is the perception of the community on integrated logistic system regarding the availability of medicines and other medical supplies compared to the previous pharmaceutical supply system.....
.....

Qn 8. Through this system it happened the Medical Stores Department to supply neary/expired stock If Yes, what do you do with such a stock.....
.....
.....

Qn 9. Do you know the budget for medicines and other medical supplies of your facility per quarter that is deposited in the facility account by the government If Yes, how do you get the financial informations of the account
.....
.....

Qn 10. What should be done at the facility level and high level to improve the performance of integrated logistic system.....
.....
.....

Qn 11. Do you have any other informations regarding the integrated logistic system..... If Yes, Explain
.....
.....

**MWONGOZO WA USAHIRI WA DODOSO LA MFUMO WA USAMBAZI WA
DAWA NA VIFAA TIBA KWENYE VITUO VYA KUTOLEA HUDUMA**

Jina la kituo_____

Eneo kituo kilipo

Mji: _____

Mkoa_____

Wilaya _____

Namba ya kituo.....

Aina ya kituo: (1=Bohari; 2=Kituo cha kutolea huduma)

Kama ni Kituo cha kutolea huduma ,ainisha aina ya kitu: (1=Hospitali ya Wilaya; 2=Kituo cha afya; 3=Zahanati; 4= Nyingine_____)

Miliki wa kituo 1= Serikali; 2=Shirika lisilo la kiserikali.....

Sw1. Unajua nini kuhusu mfumo wa usambazaji wa dawa na vifaa tiba nchini

.....
.....
.....

Sw 2. Ni faida zipi zimepatikana tangu mfumo mpya usambazaji wa dawa na vifaa tiba nchini (ILS) kulinganisha ni mifumo iliyokuwepo awali

.....
.....
.....

Sw 3.Ni mapungufu yapi yaliyopo kwenye mfumo wa sasa wa usambazaji wa dawa na vifaa tiba kwenye vituo vya kutolea huduma ya afya nchini

.....
.....

Sw 4. Bohari kuu ya dawa huwa inasambaza kiwango cha dawa kinacholingana na maombi ya kituo Kama jibu ni Hapana, Tofauti huwa ni kubwa kiasi cha kuathiri utoaji wa huduma kabla ya mzunguko mwingine wa uagizaji kufika (Angalia

Fomu ya Taarifa na maombi ya dawa na vifaa tiba na Fomu ya mauzo kutoka Bohari ya dawa kujiridhisha)

.....
.....
.....

Sw 5. Inachukua muda gani kupokea shehena ya dawa na vifaa tiba tangu uandaaji wa taarifa ya maombi hadi upokeaji wa shehena kituoni.....

.....

Sw 6. Kuna mtumishi yeyote kituoni ambaye amepata mafunzo ya mfumo unaotumika sasa kusambaza dawa na vifaa tiba vituoni kama Hapana, Munawezaje kujaza vitendea kazi (mfano leja ya mali, Fomu ya taarifa na maombi n.k) vinavyotumika kwenye mfumo wa usambazaji wa dawa na vifaa tiba kwenye vituo vya kutolea huduma ya afya.....

.....
.....

Sw 7. Nini maoni ya jamii kuhusu mfumo wa usambazaji wa dawa na vifaa tiba ukilinganisha na mifumo iliyokuwepo zamani

.....
.....
.....

Sw 8. Kupitia mfumo wa usambazaji wa dawa na vifaa tiba unaotumika sasa hivi, lishawahi kutokea Bohari ya dawa ikasambaza shehena ya dawa au vifaa vinavyokaribia/vimeshamaliza muda wa matumizi Kama jibu ni Ndiyo, Ni nini huwa kinafanyika kuhusu shehena hiyo.....

.....
.....

Sw 9. Je unajua bajeti ya dawa na vifaa tiba ya kituo chako kwa robo inayotolewa na Serikali.....Kama jibu ni ndiyo, ni jinsi gani munapata taarifa ya fedha kwenye akaunti ya kituo.....

.....

Sw 10. Ni nini kifanyike kituoni na mamlaka za juu ili kuboresha utendaji kazi wa mfumo unaotumika kusambaza dawa na vifaa tiba vituoni.....

.....

Sw 11. Unataarifa zingine zozote kuhusiana na mfumo wa sasa wa usambazaji wa dawa na vifaa tiba kama jibu ni Ndiyo, eleza.....

.....

ANNEX: 9**Informed Consent Form (English Version)**

Study name: Performance of integrated logistic system in health facilities in Singida region.

Researcher: Elikana Lubango

Sponsor: Ministry of Health and Social Welfare and Muhimbili University of Health and Allied Sciences.

Purpose of the research: To assess the performance of integrated logistic system in health facilities in Singida region.

Risks and Discomfort: We do not foresee any risk and discomfort from your participation in research.

Voluntary Participation: Participation of the health facility in the study is completely voluntary and facility may choose not to participate at any time. The decision of not participating will not influence the availability of the right medicines, in the right quantities, in the right condition which will be delivered to the right place at the right time and for the right cost that you may be receiving now or in the future.

Withdraw from the Study: The health facility can stop participating in the study at any time for any reason. The decision to stop participating, to refuse to provide relevant information or to respond to particular questions will not affect the relationship between you and a researchers or any other group associated with the project.

Confidentiality: All information you supply during the research will be held in a confidence, the name of the health facility will not appear in the report or any publication of the research. The health facility data will be kept in a locked facility and only research staff will have access to this information. Confidentiality will be provided to the fullest extent possible by law.

Questions about the research: If you have questions about the research in general or about your role in the study, please feel free to contact Mr, Elikana Lubango either by telephone at + 255 716 22 43 77 or by e-mail: ellypharm@yahoo.co.uk (Principal

investigator) or Dr. R S Malele + 255 715 28 79 55 or by email: rmalele@muhas.ac.tz
(Principal Supervisor)

This research will be reviewed by the research and publication ethical committee,
Muhimbili University of Health and Allied Sciences.

Legal Rights and Signatures:

I(*fill in your name here*), consent to participate in
.....(*insert study name here*). I
understand the nature of this study and wish to participate. I am not waving any of my
legal rights by signing this form. My signature below indicates my consent.

Signature:Date :.....(*Participant*)

Signature:.....Date:.....(*Principal investigator*)

Fomu ya ombi la ridhaa: (Swahili version)

Jina la utafiti: Utendaji kazi wa mfumo wa usambazaji wa dawa na vifaa tiba kwenye vituo vya kutolea huduma ya afya katika mkoa wa Singida.

Mtafiti: Elikana Lubango

Wafadhiri: Wizara ya Afya na Ustawi wa Jamii na Chuo Kikuu cha Afya na Tiba Muhimbili (Muhaz)

Dhumuni la utafiti: Kuangalia utendaji kazi wa mfumo wa usambazaji wa dawa na vifaa tiba kwenye vituo vya kutolea huduma ya afya katika mkoa wa Singida.

Madhara na hatari: Hatutegemei madhara wala hatari yeyote kwa ushiriki wako katika utafiti huu.

Ushirikishwaji kwa hiari: Ushiriki katika utafiti huu ni wa hiari na unaweza kuamua kutoshiriki muda wowote ule.

Kujitoa kwenye utafiti: Unaweza kujitoa kwenye utafiti muda wowote ule na kwa sababu yoyote ile. Maamuzi yako ya kuamua kutoshiriki hayataathiri mahusiano yako na mtafiti au watafiti.

Usiri wa taarifa: Taarifa zote utakazotoa wakati wa utafiti zitatunzwa kwa siri, hali kadhalika jina lako halitaonekana kwenye ripoti ya utafiti. Taarifa zitatunzwa sehemu salama ambapo ni watafiti tu watakao ruhusiwa kuitumia kwa kufanikisha utafiti tu na si vinginevyo.

Maswali juu ya utafiti: Kama una swali au maswali kuhusu utafiti huu au ushirikishwaji wako kwenye utafiti. Tafadhali jisikie huru kuwasiliana na Bwana Elikana Lubango kwa simu namba + 255 716 22 43 77 au kwa barua pepe ellypharm@yahoo.co.uk (*Mtafiti Mkuu*) au na Dr. R.S Malele + 255 715 28 79 55, barua pepe rmalele@muhas.ac.tz (*Msimamizi Mkuu wa Utafiti*)

Utafiti huu utapitishwa na jopo la kamati ya utafiti na machapisho la Chuo Kikuu cha Afya na Tiba Muhimbili.

Kama una maswali kuhusu mchakato au haki za ushiriki kwenye utafiti, tafadhari wasiliana na Prof. M. Mushi mwenyekiti wa kamati ya jopo la utafiti na machapisho la chuo (MUHAS) kwa sanduku la posta 65013 Dar es Salaam au simu namba 2150302 – 6

Haki za kisheria na saini.

Mimi(*andika jina la mshiriki*) naridhia kushiriki

katika utafiti wa.....(*andika jina la tafiti*).Unaofanywa
na(*andika jina la mtafiti*). Nimesoma maelezo ya
utafiti huu nimeona umbile la kazi la hii, faida zake, madhumuni yake, ushiriki katika kazi
hii si wa kulazimishwa na nimeona hauna madhara yeyote na yale yote yatakayotokea ni
mambo ambayo hayatarajiwi.

Saini:..... Tarehe:

Mshiriki

Saini:..... Tarehe:

Mtafiti