College of Business and Economics

School of Commerce

Graduate Program in Logistics and Supply Chain Management

Assessment on the Integrated Pharmaceuticals Logistics System Implementation: The case of Health Facilities in Halaba Special Woreda and City Administrations of Hawassa and Shashemene

A Thesis Submitted to Addis Ababa University College of Business and Economics School of Commerce in Partial Fulfillment of the Requirement for the Master's Degree in Logistics and Supply Chain Management

By

Agumassie Kindu

October, 2018

Addis Ababa, Ethiopia

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Declaration

I the undersigned declare that this thesis is an original report of my research in partial fulfillment of the requirements for the Master of Arts in Logistics and Supply Chain Management, has been written by me and has not been submitted for any previous degree. Due references have been provided on all supporting literatures and resources.

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Abstract

Integrated Pharmaceuticals Logistics System is a single pharmaceuticals reporting and distribution system based on the overall mandate and scope of PFSA. It aims to ensure that patients always get pharmaceuticals they need. The objective of this study is to assess the implementation of integrated pharmaceuticals logistics system in meeting its objectives in selected public health facilities. Descriptive study design was used with a quantitative approach. Data were analyzed by using SPSS and presented in form of tables and graphs. Chi square and Fisher's exact test of independence were employed to measure associations between some variables of interest. The study's finding showed that 75% of the health centers are receiving their products through woredas. All hospitals get their program commodities directly from PFSA while only 57% of health centers reported that their program commodities are delivered by higher levels (PFSA, ZHDs or WoHOs). Overall availability in the facilities at the day of visit was found to be 93.3% while availability for all tracer items during the six months prior to the visit was found to be 82%. 65% of the health facilities reported that they are resupplied fully with the quantities they requested. Only 44% of HCs adhere to storage requirements while 83% of hospitals do. 44% of Health centers fulfill the allowable wastage rate (below 2%) while the wastage rate in 56% of the health centers was found to be between 2% to 8%. The study concludes that the overall implementation of the system was found to be fairly good in terms of its set objectives. However, much is left to be done if the system is to be full-fledged.

Key words: *Tracer pharmaceuticals, product delivery modality, IPLS implementation, Lead time*

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Acronyms

PFSA: Pharmaceuticals Fund and Supply Agency

IPLS: Integrated Pharmaceuticals Logistics System

ICS: Inventory Control System

LMIS: Logistic Management Information System

BC: Bin Card

IFRR: Internal Facility Report and Resupply

RRF: Report and Requisition Form

HPMRR: Health Post Monthly Report and Resupply form

HF: Health Facility

MCH: Maternal and Child Health

ART: Anti-Retroviral Treatment

OPD: Outpatient Dispensary

DU: Dispensing Unit

HC: Health Center

RDF: Revolving Drug Fund

WoHO: Woreda Health Office

ZHD: Zonal Health Department

RHB: Regional Health Bureau

SOP: Standard Operating Procedure

WHO: World Health Organization

Chapter 1: Introduction

1.1. Background of the Study

The provision of inclusive health care requires the availability of safe, effective and affordable drugs and related supplies of the required quality, in adequate quantity at all times. Despite this fact, in the past, the pharmaceutical supply chain management system of the country had several problems including non-availability, unaffordability, poor storage and stock management and irrational use (PFSA, 2015).

To solve these problems in public health facilities, Pharmaceuticals Fund and Supply Agency (PFSA) was established in 2007 by Proclamation No. 553/2007. The Agency is mandated to avail affordable and quality pharmaceuticals sustainably to all public health facilities and ensure their rational use. So as to execute its mandate in the area of pharmaceuticals supply in an efficient and effective manner, and as part of a major intervention to improve the supply chain situation in the country, PFSA, in partnership with its support partners—the USAID | DELIVER PROJECT, Supply Chain Management Systems (SCMS), and others in the sector—developed and began implementing the Integrated Pharmaceuticals Logistics System (Shewarega et al, 2015).

Integrated Pharmaceuticals Logistics System (IPLS) is the term applied to the single pharmaceuticals reporting and distribution system based on the overall mandate and scope of PFSA. It aims to ensure that patients always get pharmaceuticals they need. To be successful, the system must fulfill the six rights of supply chain management by ensuring the right products, in the right quantity, of the right quality, at the right place, at the right time and for the right cost (PFSA, 2015).

The IPLS integrates the management of essential pharmaceuticals including the following pharmaceuticals that were used to be managed vertically: HIV/AIDS, Malaria, TB and Leprosy, EPI, MCH and purchased essential drugs.

The three main elements in the IPLS are: Logistic Management Information System (LMIS), Inventory Controlling System (ICS) and Pharmaceuticals Storage System.

The purpose of an ICS is to inform personnel when and how much of a pharmaceuticals to order and to maintain an appropriate stock level to meet the needs of patients. A well designed and well operated inventory control system helps to prevent shortages, oversupply, and expiry of pharmaceuticals.

LMIS is aimed at collecting, organizing, and reporting information to different levels in the system in order to make decisions that govern the logistics system and ensure that all six rights are fulfilled for each client.

The purpose of Pharmaceuticals Storage System is to help ensure that storage facilities protect the shelf life of products, that only high-quality products are issued, and that there is little or no waste due to damaged or expired products. If proper storage procedures are followed, customers can be assured that they have received a high quality product.

To initiate IPLS, a number of interventions were implemented, including large-scale capacity building trainings for health facilities and higher levels, a program of supportive supervision, physical improvements to warehouses and storerooms, and implementing paper-based and automated logistics information management systems (LMIS). Capacity building trainings had been given for the last eight years to pharmacy professionals in the health facilities throughout the country. Gap filling trainings are also being given to professionals who did not have gotten the training.

Workshops and consensus meetings had been held at different times with relevant stakeholders of the health care system to create system ownership and institutionalization. Logistics related technical working groups are established at the administrative levels of the system: Regional, zonal and district (woreda) level.

Despite the efforts made to institutionalize the system in the health facilities, there are still many challenges, of which unavailability of essential pharmaceuticals takes the lion’s share.

According to Aronovich,et al (2010), supply chain implementation is evaluated based on four metrics namely: Response time, cost/financial indicators, quality (of product and service) and

productivity. The supply chain functions to be measured are product selection/forecasting, sourcing/procurement, warehousing/storage, inventory management, logistics management information system, distribution/transportation. As a logistics system, IPLS is a subset of a supply chain management and implementation metrics to be used for the evaluation of IPLS implementation would have considered such parameters. However, the interest of this study is based primarily on how IPLS is performing in the selected health facilities as per the systems' objectives. The study is a facility based survey and it does not include the implementation evaluation of other members in the pharmaceutical supply chain. In line with this, implementation of the integrated pharmaceuticals logistics system needs to be measured and evaluated based on certain parameters like timely response to orders, availability of essential commodities, good storage practice, wastage rate, minimum-maximum inventory control system, reporting and record keeping practices (LMIS), handling of emergency orders, and fill rate. Hence, implementation evaluation of the IPLS would imply the aforementioned set of certain parameters of importance.

1.2. Statement of the Problem

According to WHO (2011), poor availability of essential pharmaceuticals is the main barrier to access to medicines, especially in the public sector.

Integrated Pharmaceuticals Logistics System (IPLS) was designed as a system to address problems of the past vertical and fragmented logistics system in which stock outs and wastage were high and frequent. It is aimed at ensuring that patients and/or customers always get the pharmaceuticals whenever and wherever they need them in adequate quantities with a good condition (PFSA, 2015).

To initiate IPLS, a number of interventions were implemented, including large-scale capacity building trainings for health facilities and higher levels, a program of supportive supervision, physical improvements to warehouses and storerooms, and implementing paper-based and automated logistic information management systems (LMIS). Even though this system is being implemented as part of ensuring health commodity security and has brought prominent changes in the area of pharmaceutical supply chain since its inception in eight years before, there is still paramount shortage of essential pharmaceuticals in the health facilities as it is eminent from

recurring complaints of customers. Emergency orders are placed frequently and there are still frequent stock outs in the health facilities.

To provide clients with high-quality products, each facility must have safe, protected, and well-organized storage areas that will prevent damage. Despite this, there is a storage malpractice in the health facilities. The management of the health facilities does not pay as much attention as it is required for maintaining appropriate storage conditions of the pharmaceuticals. Warehouses and store rooms are sub-standard which hardly could maintain the intended shelve lives of the pharmaceuticals. Newly constructed facilities are devoid of standard store rooms. Poor storage conditions like exposure to direct sunlight, putting pharmaceuticals on the floor, junks put together with the usable pharmaceuticals and the like are some of the problems seen.

Despite a conventional delivery lead time is set, yet, facilities complain about delays of deliveries from PFSA hubs and woreda health offices. Timely delivery to the health facilities has to be made so as to better serve their community. There is shortage of Logistics Management Information System tools which makes recording and reporting difficult.

Though few researches were made with regard to assessing the implementation status of IPLS, implementation evaluation assessments of the system need to be conducted periodically so that it could be able to respond as required.

1.3. Research Questions

1. How well is the pharmaceuticals storage condition of health facilities maintained?
2. With respect to ensuring sustainable pharmaceuticals availability with minimal wastage, what is the implementation level of IPLS?
3. Are pharmaceuticals being delivered by PFSA and Woreda Health Offices to health facilities within the conventional lead time?
4. What is the level of using direct delivery modality for resupply of pharmaceuticals to the health facilities?

1.4. Research Objectives

1.4.1. General Objective

To assess the implementation of integrated pharmaceuticals logistics system in meeting its objectives in public health facilities in Halaba Special Woreda and city administrations of Hawassa and Shashemene

1.4.2. Specific Objectives

1. To assess the fulfilment of storage condition requirements against the standards in the guidelines of good storage practice in the IPLS SOP
2. To measure the level of implementation of IPLS in ensuring sustainable availability of tracer pharmaceuticals
3. To assess the implementation of IPLS in delivering pharmaceuticals to health facilities within the conventional lead time
4. To assess availability and proper utilization of Pharmaceuticals LMIS formats in the health facilities

1.5. Significance of the Study

To improve supply chain implementation, it is a must to understand how it is currently performing. Measuring the pharmaceutical supply chain implementation shows where the supply chain is inefficient and helps determine how to deal with these inefficiencies. Knowing the implementation status of the system in terms of its objectives will play a pivotal role in seeking better solutions.

This assessment tries to find any gap between the set objectives and, how the system actually works at the public health facilities in the selected study area.

IPLS implementation assessments need to be undertaken periodically to be able to know whether the system is functioning as per its set objectives. Assessment findings obtained at one specific time might be changed at another due to many factors-system related or non system related factors. Thus it is mandatory to carryout studies on a periodic and continual basis so as to be able to tap different implementation challenges that could be faced at different times. Decisions like

system redesign or supply chain optimization will be made or some other solutions will be sought to alleviate the challenges faced based on such assessment findings pertaining to its implementation.

Findings of the study will be helpful for the health facilities themselves, PFSA and for the administrative units (WoHOs, ZHDs, RHBs).

1.6. Scope of the Study

The study's center of attention was on assessing the implementation of IPLS with respect to IPLS-specific implementation indicators in the selected health facilities. Members of the pharmaceutical supply chain other than selected health facilities were not included in the study as it is a facility based survey.

The study was conducted in public hospitals and health centers under Halaba Special Woreda and City Administrations of Hawassa and Shashemene which have started service three years and above. Private health facilities and other non- governmental facilities will not be included in the study since IPLS was primarily designed to be implemented in governmental health facilities.

Selected list of essential pharmaceuticals were used to measure the status of pharmaceuticals availability. LMIS records and reports were reviewed during the assessment.

1.7. Limitation of the Study

As there are few facility based studies made with regard to implementation evaluation and assessment of the system, it makes difficult for results to be compared.

Since the number of health facilities in the three areas is small, the study may not be adequate enough to conclude for the general population (i.e. all the public health facilities in the system).

The emphasis of this study is on selected essential medicines for public health-not all medicines that are expected to be available in the facilities. Lack of adequate budget was also an issue that made the study a bit difficult.

1.8. Operational Definition of Terms

- **Integrated Pharmaceuticals Logistics System (IPLS):** is the term applied to the single pharmaceuticals reporting and distribution system based on the overall mandate and scope of the PFSA which aims to ensure that patients always get pharmaceuticals they need.
- **Logistics Management Information System (LMIS):** is the management of logistics information which includes collecting, organizing, and reporting information to other levels in the system in order to make informed decisions.
- **Inventory Control System (ICS):** is a system with a purpose of informing personnel when and how much of a pharmaceutical to order and to maintain an appropriate stock level to meet the needs of patients.
- **Logistics Indicators Assessment Tool (LIAT):** is a quantitative data collection instrument developed by DELIVER, which is used to conduct a facility-based survey to assess health commodity logistics system implementation and commodity availability.
- **IPLS Implementation:** the execution and accomplishments of the Integrated Pharmaceuticals Logistics system as per the standard indicators used to assess the implementation of IPLS. System implementation (of the integrated pharmaceuticals logistics system) will therefore be evaluated based on the accomplishment of the standard indicators set for the IPLS which include: timely delivery/response to orders, reporting and record keeping practices (LMIS), minimum-maximum inventory control system, emergency order handling, fill rate, wastage rate, storage practices and availability of essential commodities.
- **Tracer pharmaceuticals/health commodities/products:** Pharmaceuticals/health commodities/products which must be available all the time (24/7) to render the health service.

1.9. Organization of the Study

The organization of the study is as follows: **Chapter one** discusses about the introductory part of the study. An insight about the health commodity supply chain challenges is offered and the purposes of the Integrated Pharmaceutical Logistics system are presented. In **Chapter two** the

review of relevant literatures is presented. C**hapter three** discusses the research methodology where the study design and methods of data collection, sources of data and data collection procedures are presented in. **Chapters four** presents the results/findings & discussions while **chapter five** presents the conclusions and recommendations of the study. In the annex are standard indicators for IPLS implementation assessment. Data collection instrument is also annexed.

Chapter 2: Review of Related Literature

2.1. Logistics Management Practices and Structure of Health Product Supply Chain

According to JSI (2011), inventory management is the heart of pharmaceutical supply management system. Inventory management for pharmaceutical supply appears to be easy in that all that must be done is to order, receive, store, issue and reorder limited list of items. In reality however, the task is difficult and in many countries poor inventory management in public drug supply system leads to financial wastage, shortage of essential drugs, a decrease in quality of patient care and an increase in inventory costs. An evaluation of the integrated logistics system in Tanzania revealed that 94 percent of the piloted districts improved the timeliness with which facilities submit their report and requisition forms. Additionally, the findings demonstrated expanded accessibility and visibility of logistics data; increased use of data for supply chain management; and increased accountability, transparency, and responsibility (USAID | DELIVER PROJECT, 2016).

Supply chains not only deliver medicines and health products to the population, they also return critical information regarding need, demand, and consumption to health system planners. Supply chain play a role in each of the categories identified for health system implementation improvement (USAID | DELIVER PROJECT, 2016).

Health product supply chains in developing countries are fraught with many problems. Ineffective supply chains weaken the overall health system's ability to respond to the healthcare needs of the population and put treatment programs at risk (Yadav, 2015).

Most governments in low-income countries, especially in sub-Saharan Africa, choose a distribution model where the government procures drugs and distributes them to health clinics using a publicly run Central Medical Store (CMS) and a government-owned transport fleet. There is considerable heterogeneity in the governance structure of Central Medical Stores (CMS) in different countries.

According to Yadav (2015), products are first distributed from the CMS to regional or district level stores depending upon the geography, administrative structure and the number of health facilities in a country. In most countries instead of a supply chain design based on technical or operational considerations, the structure of the supply chain is mapped directly to the administrative structure of the health system. It is argued that this creates convenience of administration and governance.

With the introduction of IPLS, various recording and reporting formats were designed for use at different levels of the healthcare supply chain. Availability and usage of standard forms and tools are critical supply chain indicators. At the facility level, bin cards, stock cards, Internal Facility Report and Resupply Form (IFRR), Health Post Monthly Report and Resupply Form (HPMRR,) and Report and Requisition Form (RRF) were introduced to record commodity transactions and report quantities for resupply. PFSA, with partners, have printed and distributed these forms to health facilities (Shewarega et al, 2015).

Pross Nagitta et al (n.d.) asserts that availability of essential drugs and supplies in the public health sector is a continuing problem due to a combination of problems that include: Lack of an agreed procurement policy; lack of a single, Ministry of Health - led procurement strategy; lack of an integrated procurement approach (MOH ,donors, NGOs, vertical programs); lack of credible data and information for procurement planning; poor forecasting; funding structures and arrangements not always able to support procurement and ineffective procurement arrangements with suppliers. Interventions along the supply chain approach ought to be made on the assumption that constraints that face essential drugs supply are multifaceted and addressing them requires a whole set of interlinked actions along entire drugs supply chain, hence the applicability of the systems' theory. Anecdotal evidence from Uganda reveals that health centers tend to suffer from collaborative constraints. This has negatively affected health centers' ability to serve patients well due to uncontrolled stock outs while at the same time drugs are reported as expired and therefore unfit. This phenomenon is unwarranted leading to increased wastage, which is not needed in supply chain implementation. Companies have continued to seek new ways of improving operational implementation through supply chain inter-linkages. This ultimately has translated into building close relationships with key supply chain actors so as to

enable participants achieve wastage and enhancement of service delivery leading to flexibility in dealing with supply and demand uncertainties (Pross Nagitta et al, n.d).

To make the supply chain component of distribution and logistics efficient, it has to respond to short-term changes in demand or supply quickly and to handle external disruptions smoothly. Hence an efficient supply chain has to be responsive to changes in the market. Responsiveness requires that accurate information is available to facilitate decision-making. Information technology can help to collect process and share information. Timely flow of information facilitated by collaborative inter linkages enables supply chain members to be responsive to customer's needs and act very fast (Uganda SURE, n.d.)

According to Uganda SURE (n.d.), one of the most critical factors to assuring an effective supply chain in Uganda is to improve data quality throughout the health system. The objective has been to allow staff members at all levels, from health center to national level, to access data for analysis and decision making.

Although government health facilities, national governments, academics, consultants and experts in philanthropic foundations have recognized the importance of investments in healthcare supply chains, a deeper and structured understanding of supply chain issues is lacking. Understanding the root causes of underimplementation in healthcare supply chains represents an important gap in knowledge. Given that public sector, private sector and NGO supply chains are inextricably linked with multiple points of interface, it is important to understand this for the system as a whole. Such information is key to the development of remedial interventions that can improve access to medicines and strengthen health systems (Kraiselburd et al, 2012).

The need for fundamental reform of the supply chains for health products in developing countries is more necessary. Bold and concerted action is required to create a supply chain that is responsive to the needs of patients in a cost-effective manner. Policy makers, industry leaders, academics, and practitioners need to work together to build a roadmap for supply chain reform in each country. Such a roadmap needs to be based on robust understanding of supply chain science, political economy of the health system (Yadav, 2015). While supply chain challenges in the health sector are complex, they provide specific and highly visible opportunities for quick

returns on investment. Supply chain reform can therefore act as a catalyst for broader health system reform. As is the case with any health system reform initiative, supply chain reform requires strong and objective evidence coupled with serious feasibility and do ability analysis.

According to Yadav (2015), the following reform issues should be considered to effectively reform the supply chain of health products:

1. **Reducing Tiers in the System:** In a supply chain where information systems between different tiers are weak it is critical to have fewer tiers and less institutional complexity. Fewer tiers and less overall institutional complexity can reduce waste of resources; improve information flows and coordination; increase the speed of product and information flow through the supply chain; make planning easier; and reduce uncertainty.
2. **Increasing the Frequency of Replenishment at Each Tier:** Reducing the lead time from the suppliers and increasing the frequency of replenishment at each stage is a critical area for supply chain reform. Increasing the frequency of replenishment increases the speed and velocity of the supply chain and decreases the reliance on long-term forecasts. As the frequency of replenishment increases, the supply chain is driven by actual consumption/demand. This helps create a more continuous flow of products from the point of manufacturing to the service delivery points. Admittedly, a higher frequency can lead to higher transport costs. Changing the frequency of replenishment at any stage requires creating a communications and advocacy strategy that demonstrates how the additional cost of transport is offset by increases in service level.
3. **Streamlining Information Flows:** One of the main sources of under performance in public sector supply chains stems from the lack of information capture and information sharing. In order to deliver high implementation at low cost, supply chains need almost real time information about stock, consumption, shipments and other such variables. Enhancing information content, accuracy, and frequency has a great potential to overcome the numerous problems encountered in public sector supply chains. Enhanced supply chain visibility through better information about inventory, orders, consumption and shipments will also create greater accountability in the system.

4. **Outsourced Transport:** Lack of well-functioning transport is a key barrier for the public sector supply chain. The availability of vehicles for distribution of medicines is often limited

due to lack of transport planning, poor vehicle maintenance and inappropriate use of vehicles. Instead of trying to own and operate a government fleet of trucks, it is better to contracting third party transport providers to distribute stock from the CMS to the health facilities.

2.2. Availability and Utilization of Logistics Information and Records

The ultimate purpose of effective pharmaceuticals logistics activities is aims to ensure that patients always get pharmaceuticals they need, to be successful, the system must fulfill the six rights of supply chain management by ensuring the right products, in the right quantity, of the right quality, at the right place, at the right time and for the right cost (PFSA, 2010).

Uganda Sure (2014) indicated that a good pharmaceutical management information system provides the necessary information to make sound decisions at all levels of the sector. Effective medicines management requires policy makers, program managers, and health care workers to use and present information. Stakeholders and decision makers need to be able to easily access and share information, challenges faced, and decisions made.

Storekeepers play a central role in assuring medicines availability and preventing expiry by monitoring stock levels, filling out stock cards, quantifying needs, and placing orders (Uganda sure, 2014).

A study by Shewarega et al (2015) showed that availability of blank bin cards, IFRRs, and RRFs are high at hospitals (above 90 percent) and health centers (close to 80 percent). However, the availability of the recording and reporting formats decline when moving down the supply chain. Clearly, more must be done to improve the availability of all LMIS forms. Availability and utilization of the logistics management information system (LMIS) formats necessary for recoding and reporting purposes were found to be reasonable; but, there is certainly room for improvement, and discrepancies were observed by level of facility and product types.

2.3. Stock Availability

The most important output of a logistics system is stock availability, which will improve health outcomes. Stock outs in any health system represent a critical system failure. They can result in patients going without life-saving pharmaceuticals and reduced confidence in the health system. Even where stock outs are not high, facilities with too little stock at the time of the visit are either likely to stock out or will require an emergency order before they receive their next routine order; while overstocks can mean waste and inefficiency (Shewarega et al, 2015).

Pross Nagitta indicated that availability of essential drugs and supplies in the public health sector is a continuing problem due to a combination of problems which ought to be tackled urgently to avert disastrous outcomes through supply chain accountability.

Any good health system necessitates supply chains that can guarantee consistent availability of affordable, high-quality medicines, vaccines and health products at all health service delivery points. Several factors contribute to poor availability of medicines and health products at health clinics in government-run systems. The failure to use a systematic diagnostic of why supply chains are underperforming leads to ad-hoc projects that address only the surface symptoms of the underlying structural causes (Yadav, 2015).

2.4. Logistics Reports

Logistic reports move data up and down through the supply chain and help in decision making. To facilitate correct and consistent reporting and resupply within the facility and among the different levels in the health supply chain, IPLS introduced the IFRR, HPMRR, and Hospitals and health centers use the RRF to report their consumption and to request the resupply quantity every two months from PFSA; while health posts use the HPMRR every month to report their consumption to the resupply health center; the health center can then calculate their resupply quantity. The IFRR is an internal facility report and request form between the facility dispensing units and the main facility store (Shewarega et al, 2015).

2.5. Order Fill Rate

For most products assessed, according to Shewarega et al, the percentage of facilities resupplied with the quantity ordered was about 60 percent, both at the hospital- and health center–level. At the health center, ORS, RHZE (which is a combination of four drugs), hormonal implants, and nevirapine are resupplied in more than 70 percent of facilities. The study's finding showed that at hospitals, eight products out the 15 analyzed were resupplied in about 70 percent of the facilities. At both the hospitals and health centers, the resupply with the requested quantities was near or below 50 percent for amoxicillin (33 percent at hospitals and 40 percent at health centers) and dextrose (50 percent at hospitals and 42 percent at health centers).

2.6. Emergency Order

With IPLS, the minimum-maximum inventory control system is intended to ensure that facilities always have enough stock to serve their clients and to avoid placing emergency orders. Under normal condition, hospitals and health centers are expected to send their RRF report bimonthly to PFSA and other higher levels. If the stock on hand is below the established emergency order points—two weeks for hospitals and health centers, and one week for health posts—IPLS recommends placing emergency orders to avoid stock outs (Shewarega et al, 2015).

2.7. Transportation and Distribution

According to Shewarega et al, (2015), in the Ethiopian supply chain, commodities are delivered to facilities using a combination of mechanisms. Since March 2012, PFSA has directly delivered program commodities to many health facilities—all hospitals and accessible health centers. As an interim approach, the remaining health centers are receiving their products through woredas or zonal health offices (PFSA delivers to them). For RDF products, health facilities are expected to use their own vehicle, or other transportation, to collect their purchased products from higher levels or vendors. Health posts are expected to collect their products from their resupply health center every month.

In most health facilities (78 percent of the hospitals and 71 percent of health centers), program commodities are usually delivered to their stores via delivery from a higher level; while most health posts (76 percent) collect their products from the supplying health center. In the case of

RDF commodities, facilities themselves (92 percent of hospitals and 75 percent of health centers) collect from the suppliers, primarily from PFSA (Shewarega et al, 2015).

2.8. Supervision

Supervision is an important part of quality assurance for the implementation of any logistics system. It can also alert managers to potential problems at the facility level: stock outs, under stocks and overstocks, poor storage conditions, and products near their expiry dates.
Most facilities receive support from higher levels using supportive supervision (Shewarega et al, 2015).

Integrated Supportive Supervision is a process of guiding, helping, training, and encouraging staff to improve their implementation in the provision of high-quality health services. It emphasizes the use of integrated tools for all priority programs and empowering of health service providers at all levels (Ethiopian Federal Ministry of Health, 2010).

2.9. Pharmaceutical Storage management

To provide clients with high-quality products, each facility must have safe, protected, and well-organized storage areas that will prevent damage. According to Shewarega et al, stores that met at least nine of the 11 criteria (80 percent of the criteria) were considered acceptable; those meeting less than nine were rated unacceptable. On average according to this study, slightly more than half (55 percent) the facilities met acceptable storage conditions (80 percent of the criteria or more). Health center stores (63 percent) did better than hospitals (43 percent). Only 29 percent of health posts had acceptable storage conditions. The study showed that health facility stores need improvement in that the storage condition for a significant percentage of health facilities did not meet the standard criteria. A study by WHO (2009) in Kenya indicated that storage conditions in public health facilities are critically inadequate, putting at risk the quality of medicines distributed through this sector.

Chapter 3: Research Methodology

3.1. Description of the Study Area

This study was conducted in health centers and hospitals of Halaba Special Woreda and City Administrations of Hawassa and Shashemene. Halaba Special Woreda is located 80kms west to the SNNP Region's capital, Hawassa while Shashemene is 25 kms north to Hawassa city. A total of 22 public health facilities, which have been functional since 2016, are currently found in the three study areas; 6 hospitals and 16 health centers.

3.2. Research Approach

A quantitative approach was employed in the selected health facilities to collect logistics data within the period from July 10 to August 10, 2018 through structured interviews.

3.3. Research Design

A cross-sectional descriptive study was mainly employed at hospitals and health centers in the study areas. Data were collected by observation, physical inventory taking, assessment of facility records, and structured interviews with health-facility pharmacy personnel.

A cross-sectional descriptive study was chosen since the objective of the study is to have a clear picture of the implementation level of IPLS. Health centers and hospitals were the unit of analysis for this study which are represented by their respective store managers.

3.4. Population and Sample

There are a total of 22 health facilities in the study areas of Halaba Special Woreda and City administrations of Hawassa and Shashemene. Hence, the study population was 22 pharmacy store managers/heads in the 22 health facilities (6 hospitals and 16 health centers).

Sampling: All the 22 pharmacy store managers/heads of the HFs were included (no sampling was made)

3.5. Data Sources and Data Collection Procedures

The pharmacy store manager or head of the pharmacy department (one store manager or head of pharmacy per facility) of the health facilities served as a primary source of data for measuring the implementation status of IPLS in the selected health facilities. Store manager or head of the

pharmacy department were chosen as they are the primarily responsible individuals who represent the health facilities in relation to the IPLS. Relevant documents were reviewed and physical count was undertaken for checking the availability of tracer pharmaceuticals.

Structured Questionnaire was used for data collection which was adapted from Logistics Indicators Assessment Tool (LIAT) developed by USAID/DELIVER PROJECT and IPLS implementation supportive supervision tools developed by PFSA.

Two pharmacy professionals from PFSA were given orientation training to facilitate the data collection procedure. After the training, pre-testing of the questioner was done. The pre-test helped evaluate the clarity and appropriateness of certain concepts of the questionnaire and the mastery of the interviewers with the concepts. The pre-test was done in 2 health facilities that were not part of the study.

Health facilities were approached with official letters written from PFSA-Hawassa Branch to inform the respondents about the survey. The questions were made clear, non-offensive and easy to respond to for the subjects under study in an effort to help reduce non response.

The questionnaires were administered through the data collectors. Then Heads of the facilities were approached to obtain consent for undertaking the data collection. The data were primarily collected from pharmacy store managers of the Health facilities within the period from July 10 to August 10, 2018.

3.6. Data Analysis and Presentation

Data was entered into and analyzed by SPSS version 20 after checking for completeness, accuracy and uniformity.

During the analysis, descriptive statistics frequencies and cross tabulations along with tables and graphs were principally used and computed. The results were presented by tables and figures. Appropriate system implementation indicators were calculated and discussed.

3.7. Measurement and Instrumentation

Nominal and ordinal measurement scales were used to measure variables of interest in the study.

Integrated Pharmaceuticals Logistics System Implementation Survey Data Collection Tool (ANNEX I) was used which was adapted from standard instruments developed by USAID/DELIVER project, namely LIAT and LSAT. A set of standard indicators (ANNEX II) adapted from USAID/DELIVER Project was used to measure the supply chain implementation and stock status of tracer commodities.

3.8. Data Quality Assurance

The completeness, accuracy and uniformity of the collected data were checked at each day of data collection by the data collectors and investigator to ensure validity and reliability issues. To maximize the response rate and minimize the response bias, face to face interviews and physical assessments of the different records and reports were undertaken by data collectors. Pre test was carried out in two health facilities which are out of the study areas.

3.9. Research Variables

- ✓ Product availability
- ✓ LMIS Formats (Bin card, IFRR) availability
- ✓ Storage condition
- ✓ Product wastage
- ✓ Delivery modality from PFSA (Direct or Indirect-through woreda)
- ✓ Fill rate
- ✓ Push/pull system based delivery

3.10. Ethical Consideration

A letter of consent was obtained from the health departments of the City Administrations of Hawassa and Shashemene as well as from Halaba Special woreda health office. Then Heads of the facilities were approached to obtain assent for undertaking the data collection. Consent from the study participants was obtained prior to getting started with the study.

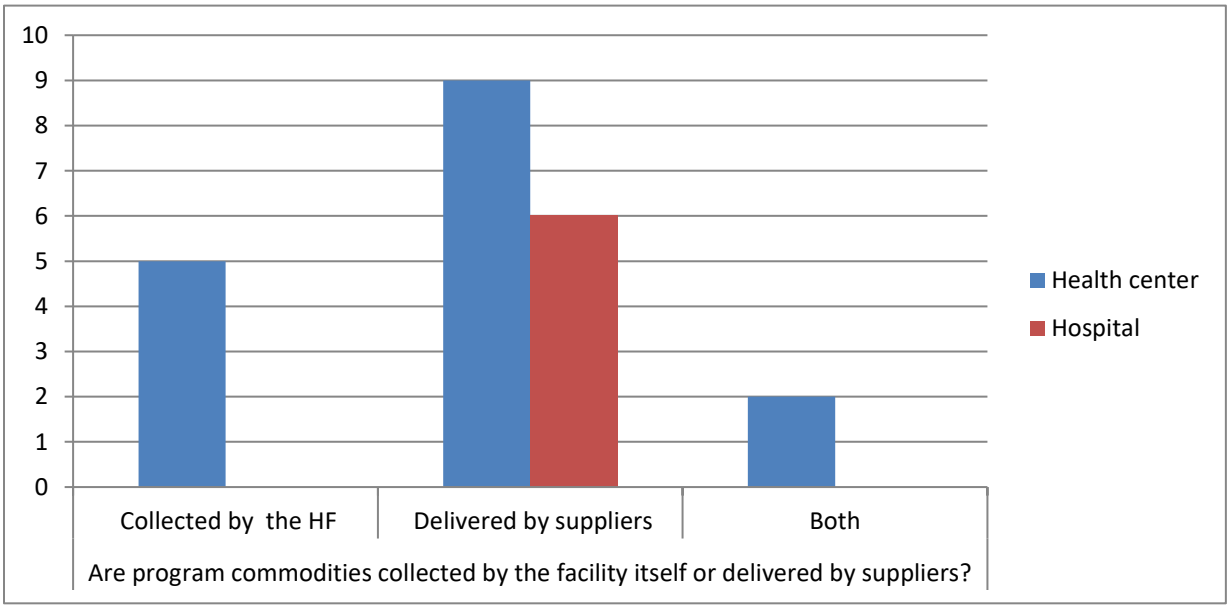
So as to ensure confidentiality and reliability of the data to be filled, no personal identification of the study participants was made.

Chapter 4: Results and Discussion

4.1. Product Delivery Modality from PFSA and Transportation

All the six hospitals are direct delivery sites while 12 out of 16 health centers are indirect delivery sites (woreda pass through). PFSA's plan was to reach all the hospitals and health centers directly to deliver health program commodities in the long run. All hospitals and some of the health centers are receiving their products directly from PFSA. For RDF products, health facilities are expected to use their own vehicle, or other transportation, to collect their purchased products from higher levels or vendors. In the interim, woreda-pass-through will be used to reach the rest of the health centers. The study's finding showed that 75% of the health centers are receiving their products through woredas which is indicative of the higher volume of work left to be done by PFSA. All the health facilities reported that they collect their RDF pharmaceuticals by their own while the scenario comes to be different when it comes to program commodities. All hospitals get their program commodities directly from PFSA while only 57% of health centers reported that their program commodities are delivered by higher levels (PFSA, ZHDs or WoHOs) as shown in Figure below. 12% of health centers reported that they sometimes collect commodities by their own and sometimes are delivered with.

Figure 4.1: Delivery of Commodities (Transportation)



As shown in figure 4.1, 15 out of 22 HFs (68%) have their products delivered by suppliers (PFSA, ZHD. WoHO) while 5 out of 22 HFs (22%) collect their products by themselves. All the hospitals have their products delivered from suppliers while there are variations in health centers.

4.2. in card availability in the HFs

Almost all (21 out of 22) HFs have blank bin cards in their pharmacy store rooms (95%).

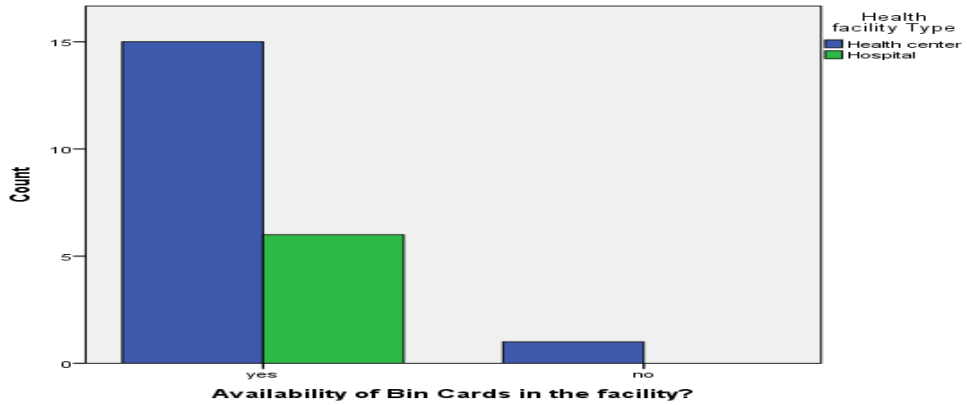


Figure 4.2: Bin card availability in the HFs

4.3. Number of pharmacy personnel and Number of trained personnel in IPLS in the facility

The number of pharmacy personnel in the HFs ranges from 44 to 1. 50% of the health centers have only 1 or 2 pharmacy personnel. It is very difficult to implement IPLS in a health facility with only 1 or 2 pharmacy professionals. Only 2 pharmacy professionals are available in one of the hospitals which hinder the system's execution.

All HFs, except one, have got at least one IPLS trained pharmcy staff. Training coverage in the study area was found to be 95% (with at least one pharmcy staff trained in IPLS) which is indicative of the very good effort made by PFSA to reach all the health facilities. Eventhough only one pharacy staff may not be sufficient enough to run the system, it is assumed that the one trained staff can train others through on the job training.

4.4. Availability and Updating of Bin cards for tracer pharmaceuticals

The average availability of bin cards for the tracer pharmaceuticals in hospitals is 100% while in the health centers availability ranges from 56% for TDF/3TC/EFV to 94% for Amoxicillin, Depo- provera and Cotrimoxazole, the average being 82%.

A national survey conducted 4 years ago showed that bin card was available in 90% of hospitals and 80% of health centers. Compared to a national IPLS survey, there is an improvement with regard to availability of bin cards in hospitals while the result is comparable in the health centers.

Updating of bin cards in the health centers ranges from 73% to 100%, while in hospitals it ranges from 67% to 100%. The percentage with updated bin card is calculated only for facilities that use bin cards for the products assessed (i.e. The denominator for the number of bin cards updated is the number of bin cards available; not the number of total health facilities as shown in the Table 1 and Figure 4.3 below.

Table 1: Availability and updating of BCs

S.No	Name of Tracer Pharmaceuticals	Health center		Hospital	
		Availability of BC in percent	Updated BC in percent (of HCs with BC available)	Availability of BC in percent	Updated BC in Percent
1	Amoxicillin capsule	94	80	100	67
2	Ferrous sulphate plus folic acid tablet	81	92	100	100
3	Blood lancet	81	100	100	100
4	HIV test kit	88	100	100	100
5	Giemsa stain solution	88	100	100	100
6	Medroxyprogesterone acetate	94	80	100	83

	(Depo provera)				
7	Nevirapine 10mg/ml oral suspension	63	90	100	100
8	TDF/3TC/EFV (300+300+600mg) tablet	56	89	100	67
9	Oxytocin injection	75	75	100	83
10	RHZE/RH (TB kit)	94	87	100	83
11	Cotrimoxazole 240mg/5ml suspension	94	73	100	67
12	Oral Rehydration Salt (ORS)	81	69	100	100
13	Gentamycin injection	88	79	100	100
14	Normal saline	75	100	100	83
15	Co-artem tablet (of any pack size)	88	86	100	67
16	Ceftriaxone 1gm/0.5gm inject	81	92	100	83

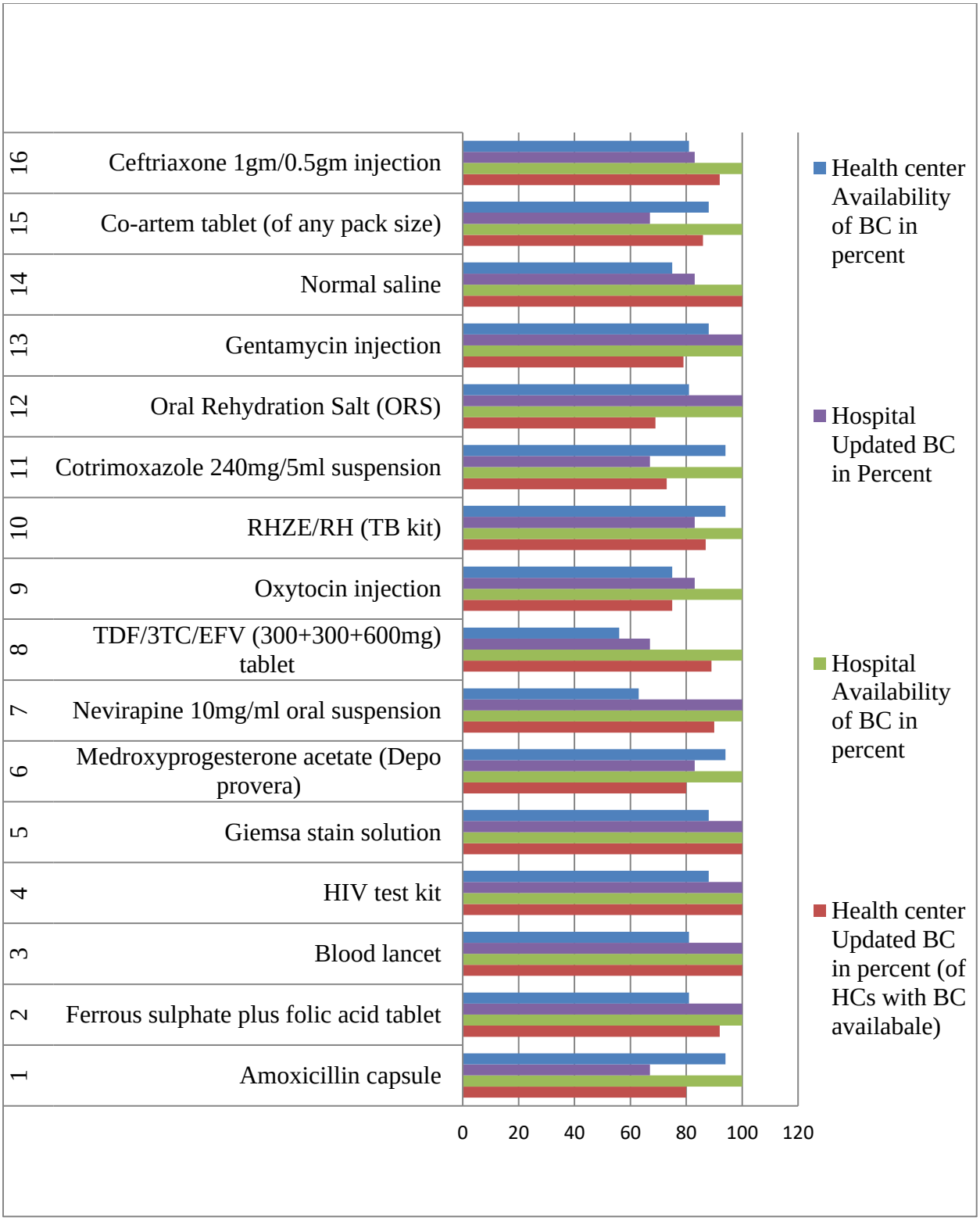


Figure 4.3: Availability and Updating of Bin card

4.5. Usage of IFRR by the DUs in the HFs

To reduce the workload on store managers and homogenize the replenishment of commodities for DUs, IPLS recommends that facility stores set up a resupply schedule for the dispensing units. Resupply of the DUs is done based on the agreed up on resupply schedule.

On average, IFRR usage by the dispensing units in the health facilities was found to be 73.2% as shown on Table 2 and figure 4.4 below. Overall, there is a higher level of IFRR usage in OPDs of the health facilities (91%) while the level is lower in Lab dispensing unit. There is a very good level of IFRR usage in Hospitals (93.2%) while the overall usage of IFRR in health centers is much lower than in hospitals (64.8%).

Table 2: Usage of IFRR in percent by the DUs in the HFs

Health facility Type	OPD	ART	MCH	LAB	TB
Health center	88	67	63	50	56
Hospital	100	100	83	83	100
Total	91	80	68	59	68

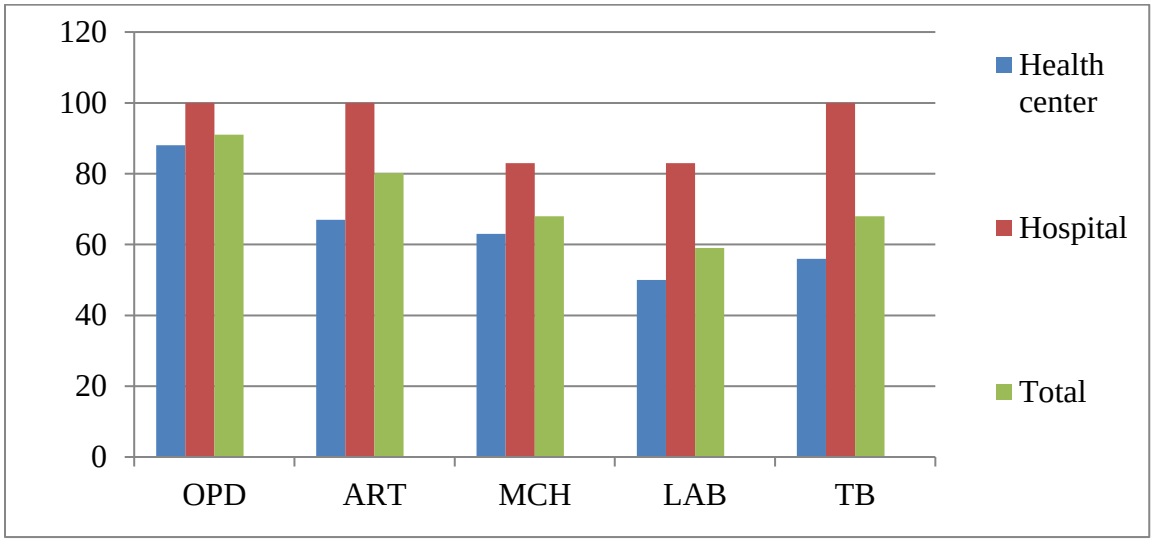


Figure 4.4: Usage of IFRR in percent by the DUs in the HFs

4.6. Stock Availability at Day of Visit

Stock availability at health facilities was assessed by collecting data on stock on hand on the day of visit. The frequency and duration of stock outs during the six months (prior to the visit) were determined. Data were collected on 16 essential pharmaceuticals. Availability was assessed only in facilities that reported managing the product.

Overall availability in all the health facilities at the day of visit was found to be 93.3%. Compared to a national survey, there is a slight increase in the availability (90% in the national survey).

Five items namely, Gentamycin injection, TDF/3TC/EFV, ORS, Blood lancet and Geimsa stain solution were available across all health centers at the day of visit while Ceftriaxone, TB kit and Ferrous sulphate plus folic acid were items with a relatively higher stock outs (19%, 12% and 12% respectively). Over all, availability of TB Kit was the lowest on average of the total health facilities (only 77%). Products with 100% availability in both health centers and hospitals were found to be ORS, Gentamycin injection and Blood lancet. See Table 3 below.

Table 3: Stock Availability at day of visit, August 2018

S.No	Name of Tracer Pharmaceuticals	Health center		Hospital	
		Availability	Not managed in the HF	Availability	Not managed in the HF
1	Amoxicillin capsule	94	0	100	0
2	Ferrous sulphate plus folic acid tablet	88	0	83	0
3	Blood lancet	100	0	100	0
4	HIV test kit	94	0	100	0
5	Giemsa stain solution	100	0	83	0
6	Medroxyprogesterone acetate (Depo provera)	94	0	100	0
7	Nevirapine 10mg/ml oral suspension	91	31	83	0

8	TDF/3TC/EFV (300+300+600mg) tablet	100	44	83	0
9	Oxytocin injection	94	0	83	0
10	RHZE/RH (TB kit)	88	0	66	0
11	Cotrimoxazole 240mg/5ml suspension	94	0	100	0
12	Oral Rehydration Salt (ORS)	100	0	100	0
13	Gentamycin injection	100	0	100	0
14	Normal saline	94	0	100	0
15	Co-artem tablet (of any pack size)	94	0	100	0
16	Ceftriaxone 1gm/0.5gm injection	81	0	100	0

4.7. Availability of Essential Pharmaceuticals during Six Months Prior to Assessment

This helps determine whether facilities are intermittently stock out of the selected tracer items during a six month period before the day of visit. Bin cards are used to determine the data and for items having no bin cards, store managers were asked to have their informed guesses. Average availability for all the items during six months was generally found to be high (82%). However, TB kit and cotrimoxazole suspension were the ones with critical shortages during the six months. See Table 4 below.

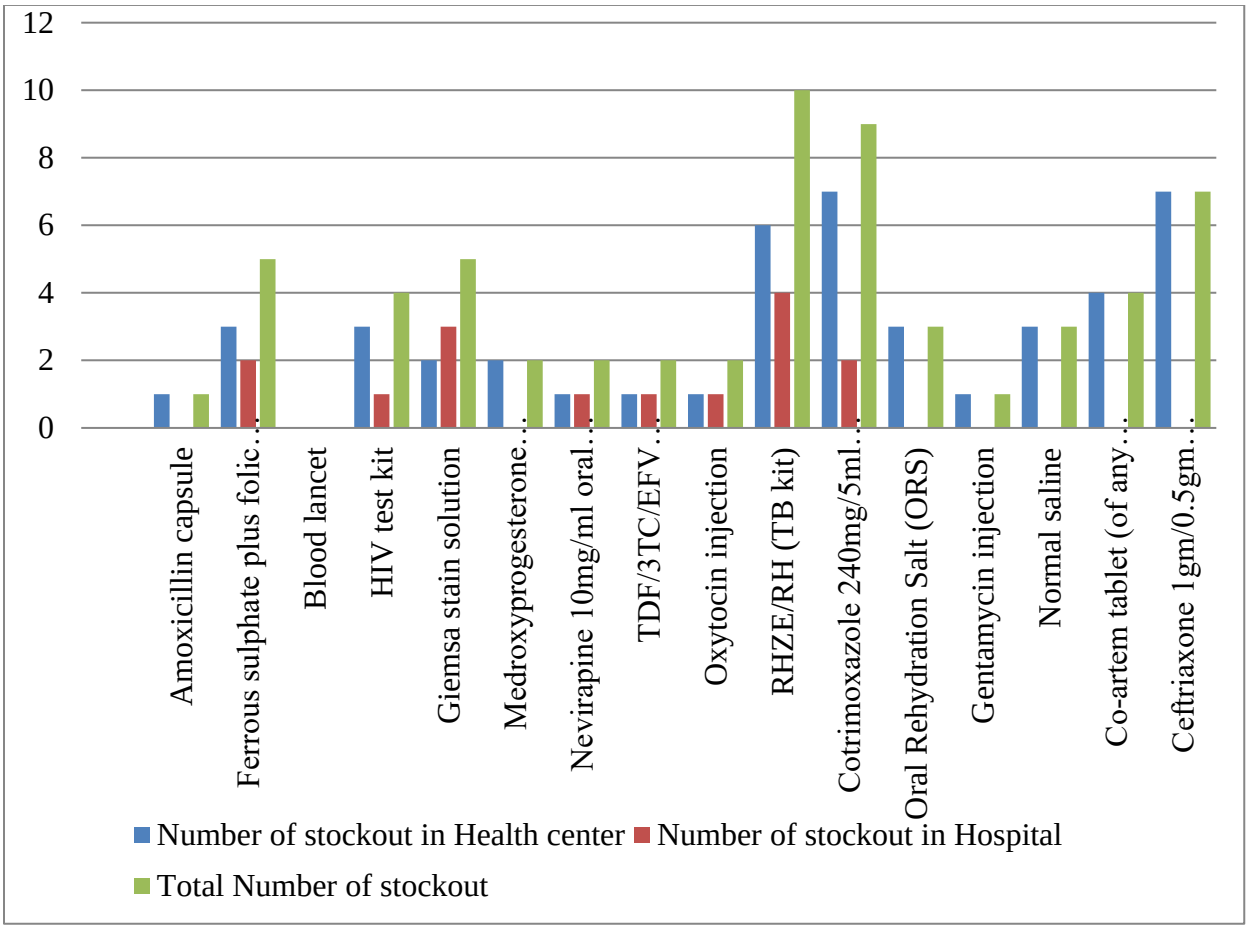
Table 4: Stock Availability during the six months prior to visit

S.No	Name of Tracer Pharmaceuticals	Health center		Hospital	
		Availability	Not managed in the HF	Availability	Not managed in the HF
1	Amoxicillin capsule	94	0	100	0
2	Ferrous sulphate plus folic acid tablet	75	0	50	0
3	Blood lancet	100	0	100	0
4	HIV test kit	81	0	83	0
5	Giemsa stain solution	88	0	50	0
6	Medroxyprogesterone acetate (Depo provera)	88	0	100	0
7	Nevirapine 10mg/ml oral suspension	91	31	83	0
8	TDF/3TC/EFV (300+300+600mg) tablet	89	44	83	0
9	Oxytocin injection	94	0	83	0
10	RHZE/RH (TB kit)	56	0	33	0
11	Cotrimoxazole 240mg/5ml suspension	56	0	67	0
12	Oral Rehydration Salt (ORS)	81	0	100	0
13	Gentamycin injection	94	0	100	0
14	Normal saline	75	0	100	0
15	Co-artem tablet (of any pack size)	75	0	100	0
16	Ceftriaxone 1gm/0.5gm injection	53	6	100	0

4.8. Frequency of Stock outs

The number of times a stock out occurred in facilities that encountered a stock out of a product at least once in the six months prior to the visit was also assessed. As depicted in Figure 4.5 below, TB kit and cotrimoxazole suspension are the items with too frequent stock outs during the six months period prior to the assessment. On average, only 2.72 health facilities were stock out of at least one essential pharmaceutical for at least one time during the six months period. Number of stock outs was generally found to be higher in health centers than in hospitals.

Figure 4.5: Frequency of Stock outs during the six months period



4.9. Request versus Refill (Fill Rate)

The overall fill rate in hospitals was found to be 76% while in health centers being 73.5%. Overall, fill rate in all the health facilities (both HCs and hospitals) was found to be 75%. A national survey conducted 4 years ago revealed that the percentage of health facilities that reported to be refilled fully with the quantities they requested was 60%. Compared to the national survey conducted four years ago, there is an improvement on the fill rate (60% to 75%).

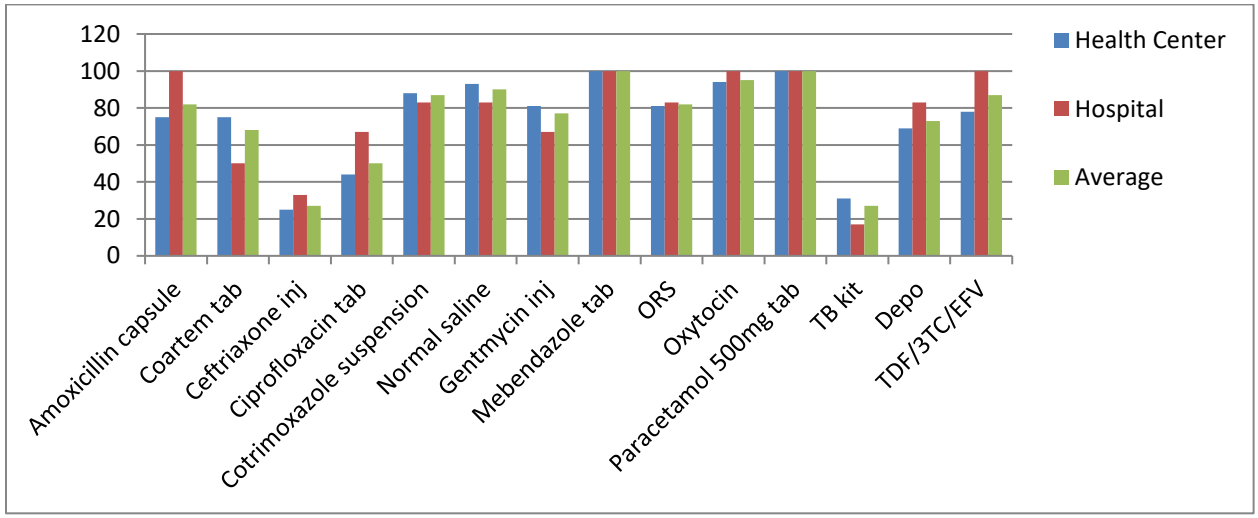
As shown below in Table 5 and Figure 4.6, tracer items with the highest refill rate were found to be Mebendazole tablet, Paracetamol tablet and Oxytocin injection with rates of 100%, 100% and 95% respectively where as items with the lowest fill rate were found to be TB kit, Ceftriaxone injection and Ciprofloxacin tablet with rates of 27%, 27% and 50% respectively.

Fill rate for TB kit was found to be too low (only 17% of hospitals and 31% of health centers were refilled with the quantity they requested).

Table 5: Percentage of Facilities Resupplied Based on Their Request

S.No	Name of Tracer Pharmaceuticals	Percent of HFs Refilled with 100% of their orders		
		Health Centers	Hospitals	Average (HCs &Hospitals)
1	Amoxicillin capsule	75	100	82
2	Coartem tab	75	50	68
3	Ceftriaxone inj	25	33	27
4	Ciprofloxacin tab	44	67	50
5	Cotrimoxazole suspension	88	83	87
6	Normal saline	93	83	90
7	Gentmycin inj	81	67	77
8	Mebendazole tab	100	100	100
9	ORS	81	83	82
10	Oxytocin	94	100	95
11	Paracetamol 500mg tab	100	100	100
12	TB kit	31	17	27
13	Depo	69	83	73
14	TDF/3TC/EFV	78	100	87

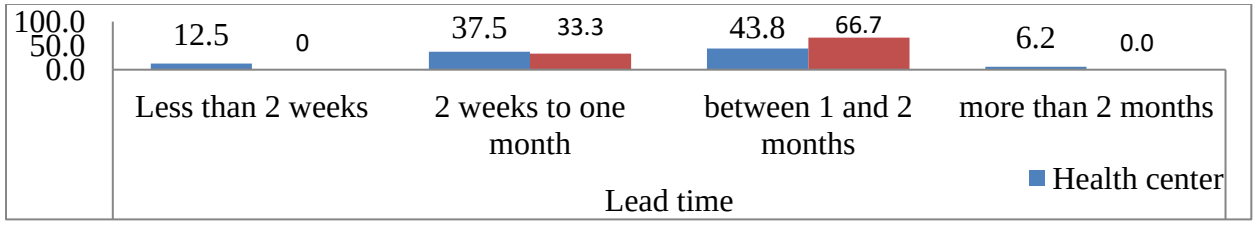
Figure 4.6: Percentage of Facilities Resupplied Based on Their Request



4.10. Lead time (perceived timeliness)

Assessment finding of the perceived timeliness of refill showed that 43.8% of health centers and 66.7% of hospitals are refilled within 1 to 2 months time after submitting their requests to higher levels. 50% of health centers and 33.3% of hospitals reported that they are refilled within the IPLS recommended lead time (one month or less time). On average, 45% of health centers and hospitals receive their products within one month or less time. 6.2% of the health centers reported that they are refilled later than 2 months after submitting their requests while 33.3% of hospitals reported that they are refilled within two weeks to one month time. A national IPLS survey made 4 years ago showed that more than 80% of the health centers and hospitals assessed usually received products requested within one month or less time. Compared to the national survey, implementation of the system in meeting the recommended lead time is found to be much less.

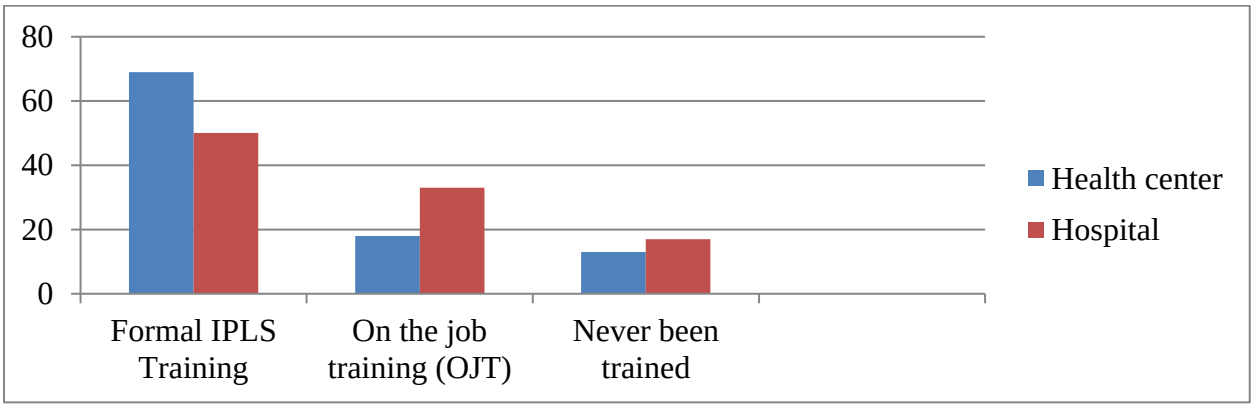
Figure 4.7: Lead time (perceived timeliness)



4.11. Training on Logistics Management (IPLS or other logistics training)

This was assessed to know how the store managers in the facilities get to know how to complete pharmaceutical logistics related records and reports. In health centers, nearly 69% of the store managers got formal IPLS training while 18% of them got OJT and the rest 13% never got any logistics related trainings. In hospitals, 50% of the store managers got formal IPLS training while 33% got OJT and those never been trained in any logistics related trainings were 17% as depicted in Figure 4.8 below.

Figure 4.8: Percent of Health facilities with their store managers trained in Logistics management training



4.12. Emergency order

The assessment result indicated that a very high majority of the health facilities placed at least one emergency order during the last three months prior to the assessment (75% of HCs and 100% of the hospitals placed emergency orders). Two out of six hospitals reported that they placed three or more emergency orders while 4 hospitals placed 2. In the IPLS, minimum-maximum inventory levels are set to prevent stock outs and avoid overstocks and likely wastages. In this system, facilities (health centers and Hospitals) place orders on a fixed resupply interval with a possibility to place emergency orders when ever stock levels fall at or below the emergency order point (2 weeks). Frequent emergency orders placed means that the minimum-maximum inventory control system is poorly functioning. Because in this system, facilities place

orders having a two months safety stock aimed at preventing unprecedented stock outs that might be occurring. Having a two months safety stock, if facilities place frequent emergency orders, it is indicative of the poor functionality of the minimum-maximum inventory control system of the IPLS.

As shown in figure 4.10 below, 93% of health centers place emergency orders when there is stock out while only 7% reported that they place emergency orders when stock levels fall at or below two weeks. 83% of the hospitals reported that they place emergency orders when stock levels fall at or below two weeks. The emergency order point in hospitals and health centers is set to be 2 weeks in the IPLS. This point triggers an action to be taken to prevent stock out from happening. This assessment showed that hospitals are much better than health centers in placing emergency orders within the established emergency order point.

Figure 4.9: Number of emergency orders placed in the health facilities

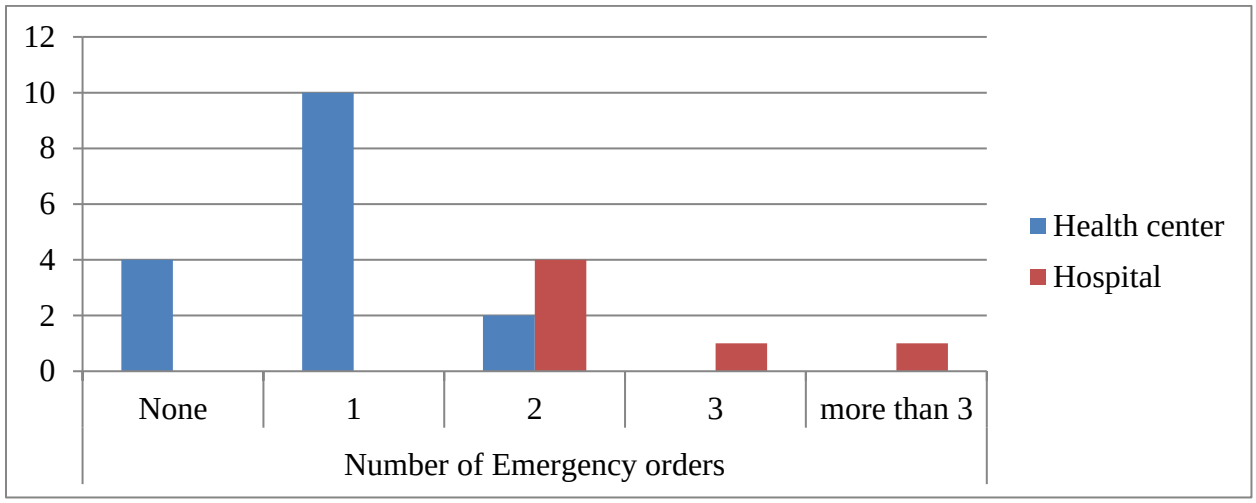
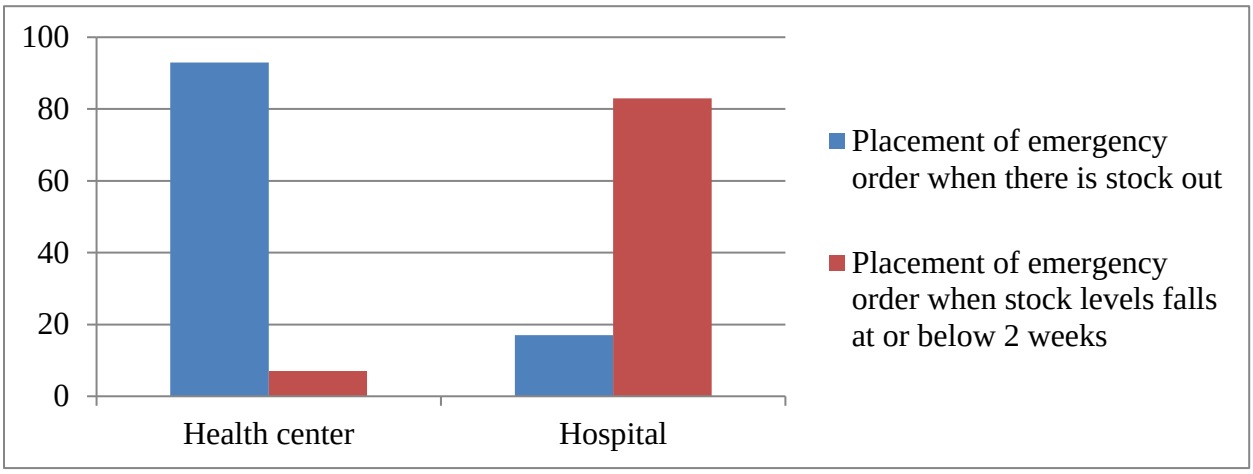


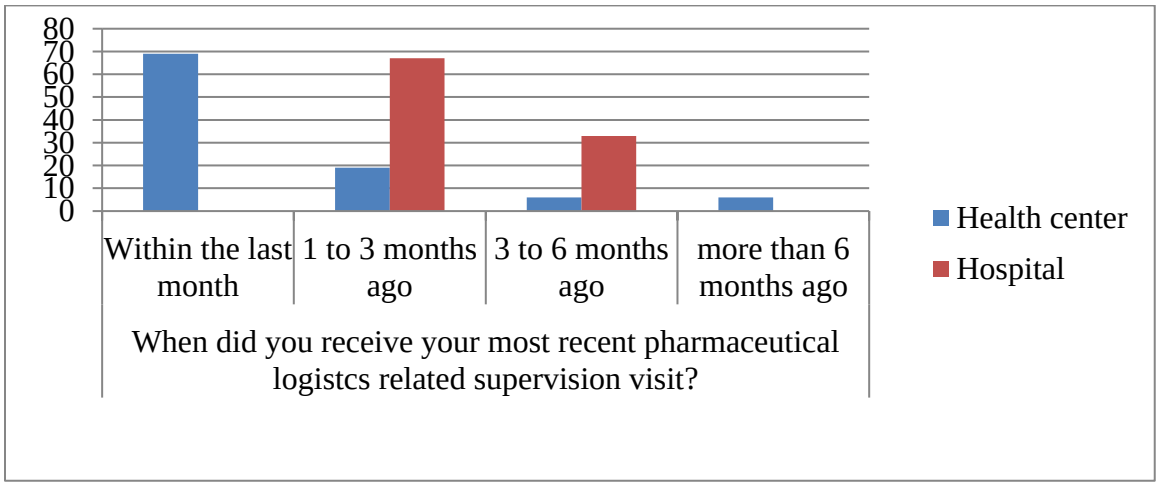
Figure 4.10: The time when emergency order is placed by the facilities



4.13. Pharmaceutical Logistics Related Supportive Supervision in the Health Facilities

Most facilities receive support from higher levels using supportive supervision. This might be due to a relatively better road access to the facilities included in this assessment. All the health facilities reported that the supportive supervisions they received include logistics related elements. However, none of them received written feedbacks of the supervisions.

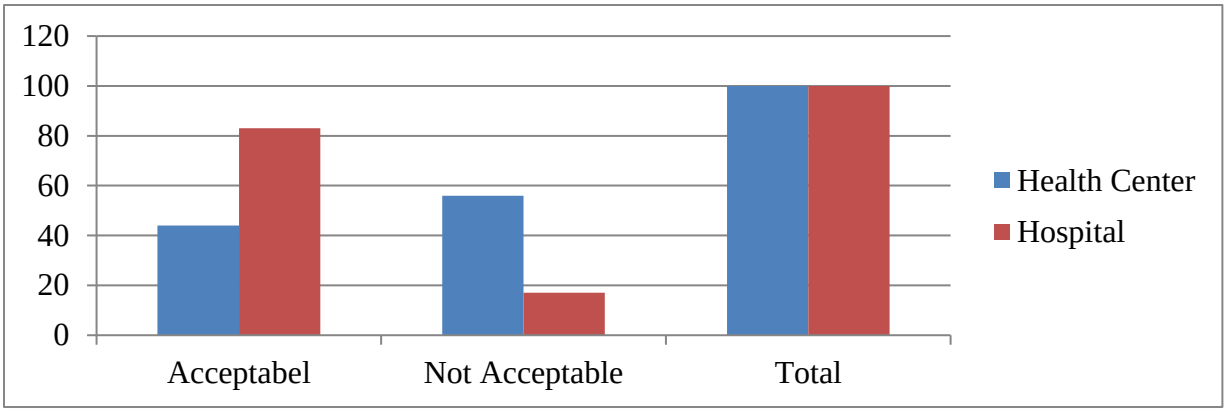
Figure 4.11: Percentage of HFs Receiving Supervisions from Higher Levels in the System



4.14. Pharmaceutical Storage

The storage conditions of health facilities were assessed based on 11 standard criteria taken from IPLS SOP manual. Observations and interviews with facility staff were used to evaluate the obedience of health facility stores to these criteria. Stores that met at least 80 percent of the criteria were considered acceptable; while those meeting less than nine were rated unacceptable. As shown in Figure 4.12 below, only 44% of HCs adhere to storage requirements while 83% of hospitals do fulfill the requirements. A national IPLS survey conducted 4 years ago showed that 63% of health centers and 43% of hospitals fulfill storage requirements. Though the study area of this assessment is limited, compared to the national survey, health centers in this study performed less while hospitals showed an improvement.

Figure 4.12: Percentage of HFs Fulfilling More than 80% of the Storage Requirements



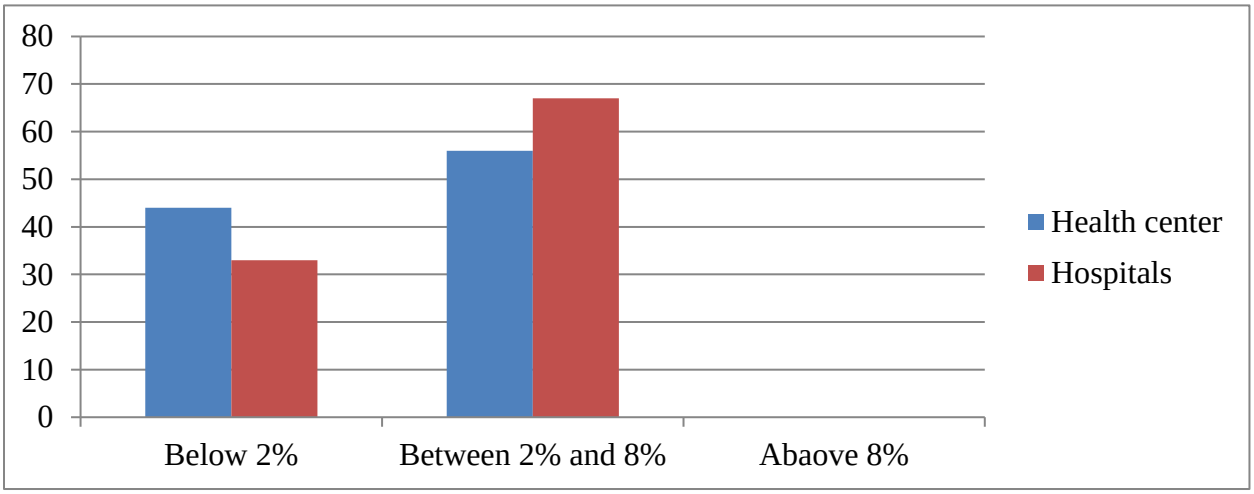
4.15. Wastage Rate (for Purchased Pharmaceuticals)

According to the IPLS standard, pharmaceutical wastage has to be maintained with less than 2% (as eliminating waste is an infeasible and costly practice). According to the IPLS SOP, wastage rate was above 8% before the implementation of IPLS which was far below the WHO standard. The assessment seeks to know whether the wastage rate is within the allowable range. As shown in Table 6 below, 44% of Health centers fulfill the allowable wastage rate (below 2%) while the wastage rate in 56% of the health centers was found to be between 2% to 8%. 67% of hospitals did not fulfill the allowable wastage rate limit.

Table 6: Wastage Rate for Purchased Pharmaceuticals

Wastage Rate	Health centers	Hospitals
Below 2%	44	33
Between 2% and 8%	56	67
Above 8%	0	0

Figure 4.13: Wastage Rate (for purchased pharmaceuticals)



Chapter 5: Summary of Findings, Conclusion and Recommendations

5.1. Summary of Findings

All the six hospitals were found to be direct delivery sites (PFSA directly delivers products) while 75% of the health centers are indirect delivery sites (products are delivered to the HFs through woredas not directly from PFSA).

95 % of the HFs have blank bin cards in their pharmacy stores rooms.

50% of the HFs have only 1 or 2 pharmacy professionals which is very difficult to implement the system fully. IPLS training coverage in the HFS was found to be 95% (with at least one pharmacy professional trained).

Average IFRR usage in the HFs was found to be 73.2%; hospitals-93.2% and HCs-64.8%.

Stock availability at the day of visit was found to be 93.3% on average of the HFs while stock availability during the six months prior to the survey was found to be 82%.

On average, 12.4% of the HFs were stock out of at least one essential pharmaceutical for at least one time during the six months period. There is higher frequency of stock out in the HCs than in hospitals.

The overall fill rate in hospitals was found to be 76% while in the HCs being 73.5% (on average, 75%).

45% of the HCs and hospitals reported that they receive products within one month or less time.

The assessment showed that a very high majority of the HFs placed at least one emergency order (75% of HCs and 100% of hospitals).

44% of the HCs adhere to storage requirements while 83% of hospitals do.

The assessment showed that 44% of the HCs fulfill the allowable wastage rate limit of below 2% while only 33% of the hospitals do fulfill.

5.2. Conclusion

This assessment has tried to provide important information that will help appraise the level of IPLS implementation as per its set objectives in the health facilities visited.

In general terms, IPLS is being implemented in almost all health facilities even though the level of execution widely differs across the facilities assessed.

Though availability of bin cards for the tracer items was found to be good in general, inconsistency was observed across the health centers. Over all, bin card updating in the facilities was found to be fairly good though no tolerance is a possibility for not doing it.

There is a very good level of IFRR usage in Hospitals (93.2%) while in health centers there is a much lower usage level (64.8%).

Over all, the availability of essential medicines is by and large good. However, there is a serious shortage of items like TB kit, cotrimoxazole suspension and ceftriaxone injection.

The overall fill rate in both hospitals and health centers was found to be relatively high.

Majority of the health centers are receiving their products from PFSA indirectly through woredas which entails that much has to be done from PFSA side to increase direct delivery to them. The study finding showed that half of the HCs have gotten only one or two pharmacy personnel and it is tough to put the system into practice with such smaller number of pharmacy personnel.

A very big majority of the health facilities assessed have at least one IPLS trained pharmacy staff which is indicative of the effort exerted from PFSA to put the system into practice in the health facilities. Nevertheless, there are store managers (13% in HCs and 17% in hospitals) who never have gotten any logistics related training. Priority would have been given to train store managers in the facilities as IPLS implementation activities are primarily carried out in the stores of the health facilities.

Though availability and updating of bin cards for the tracer items was found to be good on average, inconsistency was observed in the health centers.

In general, there is a higher level of IFRR usage in OPDs of the health facilities (91%) while the level is lower in Lab dispensing unit. The level of IFRR usage in health centers is much lower than in hospitals. This shows that there is a gap in supporting the health centers.

Overall availability in all the health facilities at the day of visit was found to be 93.3% which is very good. However, TB kit was found to be in frequent stock outs and critical shortage as assessed at the day of visit and during the 6 months time prior to the visit as well.

The study showed that there are a greater number of stock outs in health centers than in hospitals which might be due to the indirect mode of delivery from PFSA. The longer the pipeline of commodities, the harder it will be to keep stocks required.

The overall fill rate in both hospitals and health centers was found to be relatively high. However, TB kit, Ceftriaxone injection and Ciprofloxacin tablet were items with very low fill rates.

Even though the conventional and recommended lead time is set to be between 2 weeks to 1 month, majority of the health facilities assessed reported that they are refilled between 1 to 2 months time after submitting their requests to higher levels. This shows that the system is not performing as required.

With regard to the placement of emergency orders as per the established emergency order point set by the IPLS, the implementation of health centers was found to be very poor while hospitals were found to be abiding with the rule.

The assessment indicated that a very high majority of the health facilities placed at least one emergency order during the last three months prior to the assessment (75% of HCs and 100% of the hospitals placed emergency orders). Three or more emergency orders were placed by one-third of the hospitals having a two months safety stock which is indicative of the poor functionality of the minimum-maximum inventory control system of the IPLS. A two months safety stock would have been sufficient enough to prevent such frequent emergency orders (due to frequent stock outs) not to be placed if the minimum-maximum inventory system was functioning properly.

The study showed that majority of health centers got program commodities delivered by higher levels (PFSA, ZHDs or WoHOs) which is imperative to improve on. Health program products

ought to be delivered to the health facilities by the higher levels (if direct delivery is not possible by PFSA).

All the health facilities reported that the supportive supervisions they received included logistics related elements even though written feed backs were not found to be certain of what logistics elements were really covered during the supervision.

With regard to pharmaceuticals storage management, a significant percentage of health facilities do not meet the standard storage criteria. Health centers performed less than hospitals in meeting the standard requirements of storage.

Wastage rate for purchased pharmaceuticals was assessed in which majority of the health facilities failed to fulfill the allowable wastage rate limit of less than 2%.

Associations between some variables were tested using chi square and Fisher's exact test of independence; the results showing that only the 5^{th} hypothesis was accepted and the rest four rejected. There is an association between delivery modes and whether refill is made based on the recommended lead time.

5.3. Recommendations

Health commodities of serious shortage like TB kit should be given very great attention as the health burden to the community is so paramount and sensitive. Fill rates of such tracer items should be significantly improved.

Even though the conventional and recommended lead time is between 2 weeks to 1 month, majority of the health facilities assessed reported that they are refilled between 1 to 2 months time after submitting their requests to higher levels. Timely delivery of program commodities has to be in place in the facilities so that refill delays will no more be problems of bigger importance. Moreover, in spite of the fact that woredas are expected to deliver program commodities to their health centers for the time being, they also have to meet the recommended lead time to make deliveries on time.

The functionality of the minimum-maximum inventory control system of the IPLS has to be well studied and revised by PFSA and its support partners so that frequent emergency orders which

are not cost effective will be avoided. With regard to the placement of emergency orders as per the established emergency order point set by the IPLS, the implementation of health centers was wound to be very poor. Thus, woreda health offices together with other governmental and nongovernmental stake holder should pay greater attention to support the health centers so that stock outs could be prevented.

IFRR usage in health centers was found to be low and hence the facility management should play a great role in enforcing the dispensing unit staff to strictly use IFRR as per a conventionally established schedule.

The pharmaceuticals storage conditions shall be improved by fulfilling standard requirements. Greater emphasis should be given to maximize the storage spaces of pharmaceuticals. The woreda health offices together with the health facilities should exert efforts to improve the storage conditions of pharmaceuticals. The health facility management should collaborate with developmental partners to furnish pharmaceutical stores and solve problems related with stores management. In line with this, as majority of IPLS implementation activities are carried out in the store, store managers should have be trained in IPLS above all. According to the assessment, 95% of the facilities have at least one IPLS trained pharmacy staff while store managers in 13% of HCs and 17% of hospitals have never been trained in any logistics related training. Therefore, priority has to be given from health facility management to assign trained staff on the stores.

As majority of the facilities fail to be in the allowable wastage rate limit, due attention has to be paid by the health facility management to reduce pharmaceuticals wastage rate.

Most important of all, monitoring and evaluation of IPLS has to be strengthened involving officials and professionals from higher levels in the system. More assessments and studies have to be undertaken on periodic and continual bases to evaluate overall system implementation and sustainability thereby seeking better solutions to the execution of the logistics system.

Gap filling IPLS training has to be provided for the pharmacy professionals by Woreda health offices and PFSA.

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Annexes

Annex I: IPLS Implementation Survey Data Collection Tool

Informed Consent

Introduce yourself to the health facility management and pharmacy staff.

My name is _____. I am from PFSA Hawassa Branch.

I am conducting an assessment regarding the implementation of IPLS at the health facility level for an academic purpose. This is not a supervisory visit and the implementation of individual staff members is not being evaluated. I will be looking at the availability of selected commodities and information about how you order and receive those products. This facility is selected to be in the survey for ease of access.

The objective of the survey is to collect current information on IPLS implementation and stock status of key health products. The results of this survey will provide information to make decisions and to promote improvements in implementing IPLS.

I would like to ask the store manager/pharmacy head a series of questions about the products and supplies available at this facility. In addition, I would like to actually count selected products you have in stock today and observe the general storage conditions.

Do you have any question?
May I begin the interview now?
Thank the respondent and go to section I. After asking questions in section I, visit the store room or storage area where the health products listed are managed.

Section I: Background Characteristics of the Respondent

S.N	Questions	Code Classification
1	Name, title and mobile phone number of person interviewed for this study	Name: _____
		Title: _____
		Mobile number: _____
2	Number of years and months you have worked at this facility?	Years: _____ Months: _____
3	Are you the primary person responsible for managing drugs and medicine products at this facility?	Yes 1
		No……..0
4	How many staff the facility has under the pharmacy unit?	# of pharmacy unit staff /____/
5	How many of them are trained in IPLS?	# of trained staff /_____/
6	Educational qualification of pharmacy unit staff	# of staff with Degree /_____/
		# of staff with Diploma /_____/
		# Other /_____/

Section II: Facility Services and Infrastructure

S.N	Question	Code classification
1	Name of the facility:	
2	Region:	
3	Zone:	
4	Woreda:	
5	City/town:	
6	Type of facility:	1=Health center
		2= Hospital
7	Product Delivery Modalities from PFSA	1= Direct
		2=Indirect
8	Availability of the following facilities at the health facility:	
	Paved Road to the facility	1=Yes, 2=No
	Operational electricity on day of visit	1=Yes, 2=No
	Operational water in the building on the day of visit	1=Yes, 2=No
	Operational telephone (land line or mobile)	1=Yes, 2=No

Section III: IPLS Implementation

S.N	Question	Code classification	Comments
1	Are the following LMIS Formats, Job Aides and SOPs are available at the facility?		
	A. Bin Cards	1=Yes, 2=No	
	B. Health Post Monthly Report and Re-supply form (HPMRR)	1=Yes, 2=No	
	C. Internal Facility Report and Requisition (IFRR)	1=Yes, 2=No	
	D. Facility Report and Requisition Form (RRF)	1=Yes, 2=No	
	E. Standard Operation Procedure (SOP) for IPLS	1=Yes, 2=No	
2	What LMIS forms do you use for reporting/ordering? (Multiple responses are possible.)		
	A. IFRR	1=Yes, 2=No	
	B. RRF	1=Yes, 2=No	
	C. HPMRR	1=Yes, 2=No	
	D. Other		
3	Does the health facility compile and send RRF reports to higher level?	1=Yes, 2=No	**If No, Go to Q No 8**
4	If yes, to whom? Multiple responses are possible.	PFSA……A RHB……..B Zone Health Department……..C WoHO.……D Don't Know….E	
5	How often are the RRF reports sent to the higher level?	Monthly ..... A Every two months…B Quarterly……..C Semi-annually..... ...D Annually ..... E Other _____G	
6	When was the last time the facility sent RRF?	Never ..... ….1	

		With in the last month…….2 2 months ago .....3 More than 2 months ago……4	
7	Are all the columns in RRF filled complete for all medicines?	1=Yes, 2=No	
8	Do major dispensing units (DUs) use IFRR for regular reporting?	1=Yes, 2=No	
8.1	OPD	1=yes 2=No 3=NA	
8.2	ART	1=yes 2=No 3=NA	
8.3	MCH	1=Yes 2=No 3=NA	
8.4	LAB	1=yes 2=No 3=NA	
8.5	TB	1=yes 2=No 3=NA	
9	If health center, how many health posts are served under the health center? (only for health centers)	_____	
10	If health center, how many health posts submitted HPMRR reports in the past three months (three month prior to survey month)? Note: health posts submitted two or three reports should only be counted once.	_____ Ask to see reports and check here # of reports verified.	
11	How did you learn to complete the forms/records used at this facility?	Formal IPLS Training….A Pre service Trainings….B On-the-job training (By other staff from facility) ……..C Never been trained…….D Other…….E	
12.1	How many emergency orders have you *placed* in the last 3 months? If	None…….0 1……1	

	available, ask for documents to verify using RRF	2……..2 3……..3 More than 3……..4 NA…..5	
12.2	If you place emergency order, when do you place it (emergency order)?	1----when there is stock out 2---when stock levels fall at or below 2 weeks 3---when stock levels fall at or below 1 week 4---- not placed	
13	Who determines the facility's resupply quantities?	The facility itself ..... A Higher-level facility (Health Center, PFSA/ Woreda/Zone/RHB) .....B Other _____ C	
14	What are the sources of supply for RDF commodities at this facility? **Multiple answers are possible**	PFSA……A RHB……..…B ZHD…….C Woreda……D Health Center……E Other (specify)____F	
15	What are the direct sources of supply for the program commodities at this facility? **Multiple responses are possible.**	PFSA……A RHB……...B ZHD……..C Woreda……D Health Center……E Other (specify)____F	
16	If multiple responses for Q 14, what is the usual source (or most common source) **select only one answer**	PFSA……1 RHB……..…..2 ZHD……..3 Woreda……4 Health Center……5 Other (specify)____6	
17	On average, for a normal order approximately how long does it take between sending an order and receiving product from main resupply point?	Less than 2 weeks ..... 1 2 weeks to 1 month ..... 2 Between 1 and 2 months…3 More than 2 months 4	
18	Does the facility usually get the quantities of products it orders?	Yes ….1 No …...0 Don't know …..2	

19	If no, why not?	The resupply point does not have adequate supply……A The resupply point was stocked out….B Order amount changed at the resupply point……C Other (specify)_____D	
20	Does this facility normally collect or are the pharmaceuticals/commodities delivered? Program Commodities RDF	Collect……1 Are delivered……..2 Both (explain) ___.....3 Collect……1 Are delivered……..2 Both (explain) ___.....3	
21	When did you receive your most recent supervision visit? Check visitors book, if necessary.	Never received ..... 1 Within the last month .... 2 1 to 3 months ago ..... 3 3 to 6 months ago ..... 4 more than 6 months ago ... 5	
22	Did your last supervision visit include drug management/logistics	Yes …..1 No …….0 Don't know ……..2	

Section IV: Stock Status in the Facility

S. N	Product Name	Units of count	Managed at this facility ? (Y/N)	Bin card available? (Y/N)	Bin card updated (Y/N)	Balance on bin card	Stock out most recent 6 months (Y/N)	number of stock outs	Total number of days stocked out	Physical inventory -Store room	Stock out today ? (Y/N)	Availability of expired product (Y/N
1	Amoxicillin capsule (500mg or 250mg)	10										
2	Arthmeter + Lumfanthrine – 20mg + 120mg tablet (any packing)	Tablet										
3	Ceftriaxone 1gm/500mg injection	Vial										
4	Co-trimoxazole 240mg/5ml suspension, 100ml	Bottle										
5	Normal saline with giving set	Bag										
6	Gentamycin 80mg/2ml ampoule, injection	Ampoule										
7	Oral Rehydration Salt (ORS)	Sachet										
8	Oxytocin 10units/ml in 0.5ml and 1 ml ampoule injection	Ampoule										
9	RHZE-150mg/75mg+400mg+275mg -tablet	24x28										

S. N	Product Name	Units of count	Managed at this facility ? (Y/N)	Bin card available? (Y/N)	Bin card updated (Y/N)	Balance on bin card	Stock out most recent 6 months (Y/N)	number of stock outs	Total number of days stocked out	Physical inventory -Store room	Stock out today ? (Y/N)	Availability of expired product (Y/N
10	Medroxyprogesterone Acetate 150mg/ml in 1 ml vial (Depo-Provera) Injection with 1 ml syringe and needle	Vial										
11	TDF/3TC/EFV (300+300+600mg)	60										
12	Nevirapine 10mg/ml oral suspension	Bottle										
13	Ferrous sulphate + folic acid	Pcs										
14	Giemsa stain 0.76 % solution	Bottle										
15	HIV Test kit (vikia…)	Test										
16	Blood lancet	Pcs										

Section V: Wastage Rate for Purchased Pharmaceuticals (For the year 2010 E.C)

Cost of pharmaceutical purchased during the year 2010 E.C (in ETB)	Cost of pharmaceuticals lost due to expiry, loss or damage in the year 2010 E.C (in ETB)

Section VI: Storage Conditions

S.N	**Description**	**No**	**Yes**	**Comments**
1	Pharmaceuticals are arranged & organized according to a logical categorization, e.g. zoning			
2	Bin Cards are used & updated regularly? (Observe by checking a five or more sample BCs.)			
3	Are unwanted items (damaged or expired drugs, non-pharmaceutical items, etc.) in the store room separated from the usable stock?			
4	Products are arranged so that ID labels, expiry dates, and/or manufacturing dates are visible.			
5	Products are stored & organized in a manner which facilitates use of First-to-expire, first-out (FEFO).			
6	Products are protected from direct sunlight and high heat at all times of the day/during all seasons.			
7	The storeroom is maintained in good condition (clean, no trash, sturdy shelves, and boxes well-organized).			
8	The current space and organization is sufficient for existing products and reasonable expansion (i.e., receipt of expected product deliveries for foreseeable future).			
9	Storage area is secured with a lock and key, but is accessible during normal working hours; access is limited to authorized personnel.			
10	Storage area is visually free from harmful insects and rodents. (Check the storage area for traces of bats and/or rodents [droppings or insects].)			
11	Cartons and products are in good condition, not crushed due to mishandling. If cartons are open, determine if products are wet or cracked due to heat/radiation			

Section VII. Order Fill Rate

S.N	Product	Managed at the facility No=0, Yes = 1	Are RRFs available? No=0 Yes = 1(If NO Skip to next item)	Quantity Ordered For Last Order Period	Quantity Received In Last Order/Procurement	Reasons for discrepancy
1	Amoxicillin 500mg/250 mg Capsule					
2	Arthmeter + Lumfanthrine – 20mg + 120mg tablet (any packing)					
3	Ceftriaxone 1gm/500mg injection					
4	Ciprofloxacin 500mg tablet					
5	Co-trimoxazole 240mg/5ml suspension, 100ml					
6	Normal saline with giving set					
7	Gentamycin 80mg/2ml ampoule, injection					
8	Mebendazole tablet					
9	Oral Rehydration Salt (ORS)					
10	Oxytocin 10units/ml in 0.5ml and 1 ml ampoule injection					
11	Paracetamol 500mg tablet					
12	RHZE-150mg/75mg+400mg+275mg-tablet					
13	Medroxyprogesterone Acetate 150mg/ml in 1 ml vial (Depo-Provera) Injection with 1 ml syringe and needle					
14	Lamivudine + Zidovudine + Nevirapine (150mg + 300mg + 200mg) tablet					

Ask the person/people you interviewed if they want to ask you any questions. Comments or general observations on products management: Thank the person/people who talked with you. Reiterate how they have helped the program achieve its objectives, and assure them that the results will be used to develop improvements in logistics system implementation.

Notes/Comments:

Annex II: Indicators

A set of standard indicators adapted from USAID/DELIVER Project were used to measure the supply chain implementation and stock status of tracer commodities. The survey collected quantitative information on the implementation of the logistics system, and the availability of selected essential commodities.

List of indicators used in the survey:

S.No	Indicators	Data Source
1	Percentage of facilities with bin cards available and updated by product	Presence of bin cards and evidence of utilization in facilities and stores
2	Percentage of facilities with accurate stock balances on bin cards	Comparison of bin card balance and physical inventory count
3	Percentage of facilities that completed and submitted an RRF report for the most recent reporting period	Presence of RRF reports and evidence of utilization in facilities and stores
4	Percentage of facilities with accurate RRF reports	Comparison of the stock balance on the most recent RRF report and on the bin card
5	Percentage of personnel trained in supply chain management and type of training received	Respondent
6	Percentage of facilities receiving logistics supervision within a reasonable amount of time	Respondent
7	Type of transportation used for deliveries/collection	Respondent
8	Percentage of sites stocked out of product at time of visit	Bin card records, respondent, and physical inventory
9	Percentage of sites stocked out of product in last 6 months	Records and respondent
10	Average number of days stocked out in 6 months	Records and respondent
11	Percentage of sites stocked according to plan; months of supply on hand	Average monthly consumption, physical count of product at health facilities
12	Percentage of facilities meeting all (or a desired percentage) of the storage conditions	Visual observation

Annex III: Storage Guidelines Used in the Survey

1. Pharmaceuticals are arranged and organized according to a logical categorization.
2. Bin cards are used and updated regularly? (Observe by checking five or more sample bin cards.)
3. Unwanted items (damaged or expired drugs, non-pharmaceutical items, etc.) are separated from the usable stock (in the store or outside).
4. Products are arranged so ID labels, expiry dates, and/or manufacturing dates are visible.
5. Products are stored and organized in a manner that facilitates use of first-to-expire, first-out (FEFO).
6. Products are protected from direct sunlight and high heat at all times of the day/during all seasons.
7. Storeroom is maintained in good condition (clean, no trash, sturdy shelves, and boxes well-organized).
8. Current space and organization is sufficient for existing products and reasonable expansion (i.e., receipt of expected product deliveries for foreseeable future).
9. Storage area is secured with a lock and key, but is accessible during normal working hours; access is limited to authorized personnel.
10. Storage area is visually free from harmful insects and rodents. (Check the storage area for traces of bats and/or rodents [droppings or insects].)
11. Cartons and products are in good condition, not crushed due to mishandling. If cartons are open, determine if products are wet or cracked due to heat.