



**AN ASSESSMENT ON PHARMACEUTICAL STORAGE
SYSTEM IN THE CASE OF ARSI ZONE GOVERNMENTAL
HEALTH CENTERS.**

**THESIS SUBMITTED TO ADDIS ABABA UNIVERSITY
SCHOOL OF COMMERCE FOR PARTIAL FULFILLMENT OF
THE REQUIREMENT OF DEGREE MASTER OF ART IN
LOGISTICS AND SUPPLY CHAIN MANAGEMENT**

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DECLARATION

Sisay Bekele declared that this research paper entitles “Assessment of the Arsi zone Governmental Health Centers Pharmaceutical Storage System” is my own and I dare to say it is my research own. That has not been produced by others in any other universities for any form. To this end, I acknowledged all sources of information that I used to produce the study appropriately and I would say perfectly.

Declared by

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Board of Examiner Page

This is to certify that the research paper prepared by Sisay Bekele entitled by an “Assessment of the Arsi zone Governmental Health Centers Pharmaceutical Storage System.” for the partial fulfilment of the requirement for the Degree of Master of Arts in Logistics and Supply Chain Management Complies with the Regulation of the University and accepted for defense standard with respect to originality and quality.

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ACRONYMS & ABBREVIATIONS

AASC	Addis Ababa University School of Commerce
AIDS	Acquired immune deficiency syndrome
AMC	Average monthly consumption
BPR	Business process Reengineering
EOP	Emergency order point
FEFO	First-to-Expire, first-out
FIFO	First-in, First-out
FP	Family planning
HIS	Health information system
HIV	Human immunodeficiency virus
HMIS	Health management information system
ICC	Inventory control card
JSI	John Snow, Inc.
LIAT	Logistics Indicators Assessment Tool
LMIS	Logistics management information system
LSAT	Logistics System Assessment Tool
MIS	Management Information system
MOH	Ministry of Health
ORHB	Oromia Regional Health Bureau
SOP	Standard Operating procedure
SDP	Service Delivery Point
USAID	U.S. Agency for International Development
VEN	Vital, Essential, and Nonessential

Abstract

The Health facilities of any region in the country have a responsibility for establishing of reliable, cost-effective, and sustainable pharmaceutical supply chains that will capable for meeting the demand of its local area people and patients, likely wise all H/Facilities found in the Arsi Zone are responsible to avail and store pharmaceutical for preventing and curative health services. To accomplish different health activities the health facilities, need enough warehouse space for storage of supplies. Unlike other products pharmaceutical supplies need standard warehouse for minimizing of wastages due to poor storage management activities any pharmaceutical warehouse components are arranged to provide cost-effective and efficient product flows to clinical users. These components comprise 1) the warehouse facility; 2) the material handling equipment & layout; 3) warehouse internal operations or activities 4) receiving and issuing of orders from suppliers or users. The total population of H/centers found under the ZHD is 98 and the sample size was 40 for this study. Primly all Zonal H/centers were stratified by 26 woredas and H/centers found under the woreda town were selected for assessment purposely being they have high volume patient and supply consumptions. The researcher believes that the impact of poor storage practices & shortages of space in high volume H/centers were sever than the rest nearby H/Centers. The rest 14 were selected in random probability methods. (40% X 96). The research method for gathering of information employed was a mix of interviewing to store managers and relevant management members by using the standard questionnaires' which was categorized in to six major sections. In addition to this I observe the actual operation practices inside warehouses during my selfpresentation of questioners to the store heads like availability of pallets, shelves, recording & documentation practices and finally about space adequacy status. The total sum of the recommendations was then presented to AAUSC for academic fulfillment and the statement of my recommendations will be my next phase of effort to realize this research in to practices.

Key Word *Descriptive & diagnostic An Assessment on Pharmaceutical Storage System in the Case of Arsi Zone Governmental Health Centers*

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Chapter one

1. Introduction.

Health care require the right quality & quantity of medical supplies for providing of services to its patients, for this cross-sectional activity ensuring of availability by storing of essential medicines in affordable cost is mandatory. Despite this fact, Pharmaceuticals Fund and Supply Agency (PFSA) was established in 2007 by Proclamation No. 553/2007 to improve availability in the integrated pharmaceutical supply chain management system and developed SOP in for accomplishment of different logistics activities, however there is still several problems including poor warehouse management, non-availability, unaffordability, poor cold storage and recording system with in the country. This assessment was conducted for identifying of pharmaceutical warehouse management challenges found at Arsi ZHD H/centers for in lightning of the existing challenges and proposing of possible solutions. The aim of this research was specifically focus on the imbalance of existing supplies volume and health centers storage space against incremental health service demand of supplies in a single zone, in addition to this I was asses the implementations and utilizations of recording tools (Bin-cards), cold storage conditions, logistics M&E and pharmacy work force skill assessment and presenting it in scientific methods for future management interventions and further study. My assement is limited to one ZHD and excluding of Hospitals & private sector store management.

1.1 Background of the Study

The Health facilities of any region in the country have a responsibility for establishing of reliable, cost-effective, and sustainable pharmaceutical supply chains that will capable for meeting the demand of its local area people and patients, likely wise all H/Facilities found in the Arsi Zone are responsible to avail and store pharmaceutical for preventing and curative health services. To accomplish different health activities the health facilities, need enough warehouse space for storage and Inventory controlling system. Unlike other products pharmaceutical supplies need standard warehouse for maintaining of the proper storage conditions of health commodities for ensuring of their quality. The perfect storage conditions protect products quality until their expiration date by maintain until for serving of customers.

Although a lot of efforts are given at different levels of the pharmaceutical storage management, still the existing challenges of warehouse space shortages, poor recording, and reporting practice at most Arsi Health facilities is the bottlenecks in pharmaceutical management for achieving of the target of other health programs' like Tuberculosis, HIV/AIDS, Malaria, Mothers & Childes Health care etc..... goals, Businesses often fail due to logistics problems that affect their ability to fulfill one or more of the six rights. A business that offers an excellent atmosphere and excellent customer service but cannot meet the customer's need by fulfilling all six rights, will ultimately leads to failed. The store managers should understand that they must fulfill the six rights. For this store managers and stock holders must make every effort to ensure that their customers receive the products they expect when they want them at the price they are willing to pay. Satisfied customers in turn will want to return to the same store, professionals must watch frequently does the store always meet the six rights? Does it offer the goods you want at the right price when you want or need them? If not, where is the problems? (USAID | DELIVER PROJECT. 2007. The Logistics Handbook: A Practical Guide for Supply Chain Managers in Family Planning and Health Programs. Arlington, Va.: USAID | DELIVER PROJECT.) The Health programs demands rise from year to year, but the space of drug stores remain the same and could not hold the current additional pharmaceutical volume for storing and maintain of supplies in the right way. The man power requirement was still not fulfilled as per requirement and some knowledge gaps has been fulfilled by off-site trainings which was highly costly and might not be a sustainable solution. The infrastructure gap of pharmaceutical storage management starts from its construction phase and designing stages of medical store. It was printed and distributed the written pharmaceutical guidelines by donors to FMOH and RHB for meeting of the needs of district level facilities store, but the challenges have been at its implementations. The purpose of good inventory control system is to inform personnel when and how much of a pharmaceutical to be order by maintaining of an appropriate recoding tools, if not all reports were not reliable and informative for refill decisions. A well designed and well operated storage system helps to prevent shortages, oversupply, and expiry of pharmaceuticals. "SOP manual for the. Integrated Pharmaceuticals Logistics System in Health facilities of Ethiopia"

1.2 Background of the Organization

Arsi zone is found at the center of Oromia region and the zonal health Department (ZHD) is located about 175 KM at south-east from Addis Ababa and 75 KM at south from Adam. The altitude ranges from 2700 to 1500 Meter above sea level. Hence, it is classified as medium altitude climatic condition with 85% of the area is highland. The zone is sub divided administratively in to 24 Woredas and 2 town administrations with a total population of 2,944,582. Among the 18 Oromia Zones; Arsi is the second largest zone by its size of population, despite its compactness of population there is frequent outbreak of communicable diseases like typhus, relapsing fever, typhoid, malaria, etc. To overcome such fatal communicable disease the need of consistence supply chain management through a reliable inventory management should be a key activity for the Zonal H/Dept., Woreda H/Offices and H/Facilities management. “From Arsi ZHD annual review meeting presentation 2009 E.C at Adam town”

1.3 Statement of the Problem

Any pharmaceutical warehouse components are arranged to provide cost-effective and efficient product flows to clinical users. These components are 1) the warehouse facility; 2) the material handling equipment & layout; 3) warehouse internal operations or activities 4) receiving and issuing of orders from suppliers or users. The major statement of problems identifying of the impact of space shortage for poor warehouse management, how shortage of metal shelve affect utilizing the overhead spaces, How absence of monitoring and evaluation system interrupt periphery level of pharmaceutical logistics system. In addition to this I will verify the contribution of pharmacy work force shortages for poor warehouse management with in the H/centers of the zone. Managing of pharmaceuticals in needs sufficient warehouse space, storage materials, training, skill, and financial commitment. This assessment has therefore working to identify the ap of good pharmaceutical storages management at Arsi Zone governmental H/Centers. The other pillar activity of store manager is updating of balances whenever receiving and issuing of pharmaceuticals, however this activity does not accomplish as per the direction of IPLS SOP and usually major area of error during reporting for re-fill purpose. The researcher will study the magnitude of problems regarding to utilization of recording tools in a sampled H/centers for finding the root cause. As part of the US President's Emergency Plan for AIDS Relief (PEPFAR), the Supply Chain Management System (SCMS)

has been strengthening the supply chains of cold chain system during procurement, store, and distribution to health commodities to lower level of H/facilities, presently, Management suffer in the entire logistics infrastructure and acute shortages of trained man power for cold chain management and I will learn about this problem and suggest possible solutions at the end of my analysis.

1.4 Objective of the Research

1.4.1 General Objective

- ❖ To assess the storage management practices in the case of Arsi Zone governmental H/Centers.

1.4.2 Specific Objective

1. To assess the organization and arrangements of supplies according to field of categorization.
2. To find out the store manager's skills about pharmaceutical warehouse management.
3. To assess the cold chain storage management conditions of the H/Centers.
4. To propose a sustainable solution for provision of training than current practices.
5. To verify about the formal supportive activities of higher level management for their medical store improvement through monitoring & evaluation system.

1.5 Research Question

My research question is majorly for answering of the imbalance of supply volume and storage space in accordance with the existing scale upping health service demand? And about the implementations and utilizations of recording tools like Bin-cards or automations at the store? In addition to that to identify the store manager's knowledge gaps? What must be the intervention solutions for sustainable solutions? Such as cold storage management, recording practices, arrangements, lay out, and availability of storage materials will be thoroughly assessed by utilizing of questionnaires' the researcher believe that there were no mechanisms in place for logistics monitoring & evaluation system with in the zone and will be insight what must be done for future? Even if it is noticeable by other assessments I will deeply investigate

the exact magnitude of shortage of pharmacy professionals with in the zone objectively and propose my suggestion to the findings.

1.6 Significance of the Study

Population growth and demands of basic health care have direct relationships, as a result the zonal health department supply need for different health care programs like HIV/AIDS, Family planning, malaria, and tuberculosis proportionally accelerated in terms of volume and varieties. To meet the growing supply demand of population, the health care system enquires larger quantity of volume of medical supplies to the health centers each quarter, but the holding capacity of H/centers stores were not ready themselves to the overflowing of items in each year. More products mean more storage space, when supplies are shipped to health facilities finding of sufficient storage space is becoming difficult and this complication highly compromised quality of health service. A great number of H/Centers in Arsi Zone have no enough storage space, sufficient shelves for exploiting of overhead spaces, recording tools for informed inventory management, physical count system, and logical arrangements of pharmaceuticals for easy picking and packing of supplies. The rational of conducting this survey is to revel of all the observed gaps and for provision of base line information to the concerned body for future intervention. This study will also help to give recent knowledge of poor health commodities managements at health centers of Arsi ZHD decision makers for further study and intervention.

1.7 Scope of the Study.

The scope of this research restricted to single zone H/Cs by excluding of other six high patient volume Hospitals and private sector pharmaceutical suppliers and retailers. The range of this assessment could not include other pharmaceutical logistics elements of cycle such as selection, procurement, quantification, LMIS, and the ultimate customer satisfaction of Arsi zone HCs clients.

1.8 Limitation of the Study.

This research will be conducted by excluding of governmental Hospitals, Health posts, private health service providers and private pharmacy retail outlets. Currently private public partnership is at its pre-matured stages and both parties' communication is still under the distrust step and I might not optimistic about retrieving of honest information's openly from this sector and I decide to exempt them from my study. I am certain that because of the above challenges, this research might not provide full picture of zonal pharmaceutical storage system.

1.9 Organization of the Paper

The research project is organized as follows: Chapter one deals with the background of study, Organization problems, Objectives of research questions, significance, scope, and limitation of the study. Chapter two contains some theoretical background and review of literature. The research methodology; data Presentation; analysis and discussion of the research is presented in Chapter three and four respectively. Chapter five consist the research summery, conclusion and possible recommendation of the researcher. Finally, the survey questionnaire that was used for this data collection, list of all H/centers found under the zone, few pictures and bibliography is attached to this document by annexing.

Chapter Two

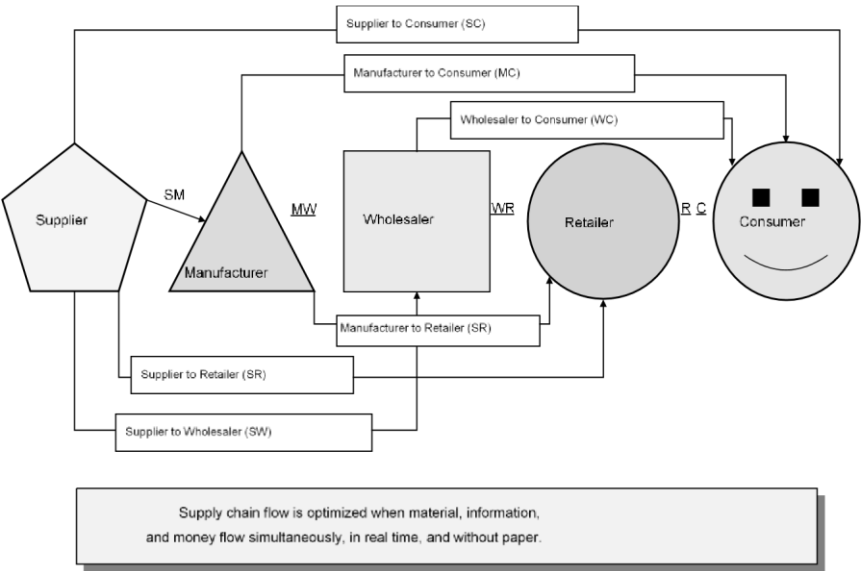
Related Literature review

1: Theoretical Literature review

1.1 Pharmaceutical Store Management.

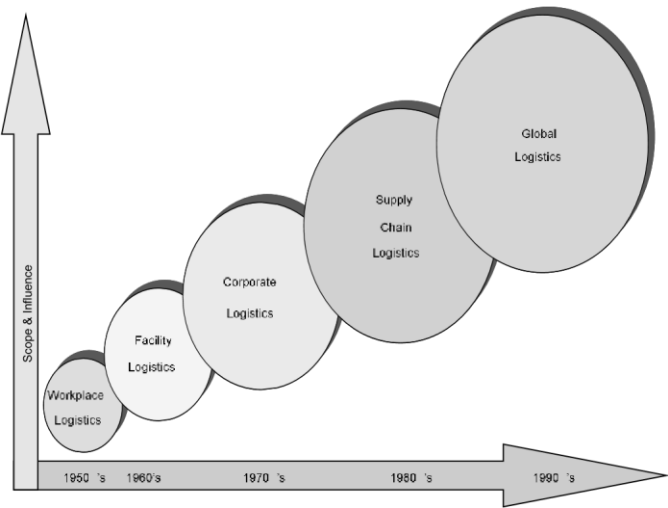
Pharmaceuticals should be protected from sun, heat, and water. Following of manufacturer Instructions will be recommended for storing medical supplies. All the vital information's of direction for storing pharmaceuticals are usually common and printed on the product carton and boxes. The following thirteen principles are minimum requirements among others for storing of pharmaceuticals. Supply chain logistics is the flow of material, information, and money between corporations (inter workstation, inter facility, intercorporate, and inter chain). There is a lot of confusion surrounding the terms logistics and supply chain management. It distinguishes the two by explaining that the supply chain is the network of facilities (warehouses, factories, terminals, ports, stores, and homes), vehicles (trucks, trains, planes, and ocean vessels), and logistics information systems (LIS) connected by an enterprise's supplier's suppliers and its customer's customers. Logistics is what happens in the supply chain. Logistics activities (customer response, inventory management, supply, transportation, and warehousing) connect and activate the objects in the supply chain. To borrow a sports analogy, logistics is the game played in the supply chain arena. It is unfortunate that the phrase supply chain management has been so readily and commonly adopted as a reference to excellence in logistics. First, it is not supply (or demand) that should dictate the flow of material, information, and money in a logistics network. There are some links in the chain and some circumstances in which supply should dictate flow and Products are stored at every health facilities of the pipeline; almost everyone working in the supply chain is responsible for product storage. Storage ensures the physical integrity and safety of products and their packaging throughout the various storage facilities until they are dispensed to clients. An important goal in storage of health products is the correct staging of health products to ensure that orders can be filled and distributed. Regardless of storage facility size from a small health center to a central warehouse the main operational activities for storage are very similar. SUPPLY CHAIN STRATEGY

Edward Frazelle Supply Chain Strategy the evolution of



logistics fig 1.4, page 10

FIGURE 8-4 Common warehouse activities.



Edward Frazelle Supply Chain Strategy the evolution of logistics fig 1.4, page 6

Pallet warehouse receives, stores, and ships supplies on pallets. The pallet's dimensions determine floor stack pallet position number in a storage area or pallet number wide in a rack bay between two rack upright posts. Rack dimensions along with clearances determine rack row and rack bay number that will fit between two building columns. Pallet height determines

the pallet number in the floor stack in the rack bay in the vertical stack. A pallet height is the distance between the bottom deck board and the highest export carton top. The pallet weight determines pallet number for each floor stack, pallet or load beam level number for each rack bay and design, rack posts base plate thickness, foot print, design, and forklift truck wheel size. The forklift truck or crane weight determines the floor thickness and rebar characteristics.

Put away is the act of placing merchandise in storage, it includes the material handling, location verification, and product placement but storage is the physical containment of merchandise while it is awaiting a demand. The storage method depends on the size and quantity of the items in inventory and the handling characteristics of the product or its container, however order picking is the process of removing items from storage to meet a specific demand and it is the basic service a warehouse provides for customers and is the function around which most warehouse designs are based. Edward Frazelle Supply Chain Strategy the evolution of logistics fig 8.4, page 229

Different document like the second growth and transformation plan (GTPII), Ethiopian Hospital & H/Center reform growth, (EHRIG/EHCRIG) documents and other assessment reveals that the strength of the supply chain system and the quality of pharmacy service are highly dependent on availability of skilled and knowledgeable pharmacy personnel. FMOH, RHBs and PFSA have been conducting various capacity building activities and supportive supervisions on supply chain and rational medicines use. Findings of surveys and routine supportive supervision reports implied that there is still a challenge in terms of availing competent and compassionate pharmacy professionals in adequate numbers. Pharmacy logistics mentoring has been therefore introduced as one of the capacity building strategies that can enhance pharmacy personnel knowledge and skill; and improve their job performance, satisfaction, and retention. Findings of surveys conducted at the national level and reports of routine follow ups indicate that there is knowledge and skill gap as a major challenge that affected supply chain performance and pharmacy service quality. Taking this and other gaps into account, the government of Ethiopia has developed health sector transformation plan. The health sector transformation plan, in line with second growth and transformation plan (GTPII), has set ambitious goals to improve equity, coverage and utilization of essential health services, improve quality of health care, and enhance the implementation capacity of the health sector at all levels of the system. The HSTP has also identified four interrelated transformation agendas.

These are transformation of quality and equity of health care, woreda transformation, a movement towards compassionate, respectful, and caring health professionals, and information revolution. Competency, professional attitude, and availability of health professionals at all levels is pivotal to the realization of the strategic objectives and stretched targets of the HSTP. Pharmacy mentoring with other strategic initiatives being undertaken will therefore play a big role in ensuring competent pharmacy professionals with serving attitude in sustained approach at minimal cost. Mentoring is a mechanism that organizations can use to nurture and grow their employees, and it is gaining popularity worldwide for its benefits such as building professional competency, commitment, performance, and job satisfaction. It also helps transfer knowledge and skill from one person to another with very minimal cost. As it is hardly possible to retain very experienced and skilled people, organizations are turning to mentoring programs to transfer knowledge and skills from experienced and skilled employees to the others. This can be a perfect approach to fill gaps when experienced employees resign from their responsibilities; hence mentoring can ensure sustainability of quality service.

It is also an effective way for sharing best practices from high performing health facilities to the relative low performing health facilities and is a tool supporting the implementation of standards like EHRIG/EHCRIG. There are bench marks that can justify the need for pharmacy mentoring. Among these, the mentoring in pharmacy service areas that started in relation to the commencement of ART services at hospitals and health centers with the support of implementing partners such as one example that made the ART pharmacy service exemplary for other pharmacy services. Promising results have been also achieved by other mentoring programs in terms of increasing professional competency and improving quality of services.

1.2 Constructing of a Medical Store

When a storage plan is designed in conjunction with a warehouse management system (WMS) program, the design team will consider the factors that determine a warehouse's ability to satisfy the objectives of holding capacity & minimizing cost and time for satisfying customers need In addition to the H/centers store must be accessible for unloading and transporting supplies to different department of the H/center vendor SKU and customer order flow considerations, major design considerations are facility design, activities needed to complete a storage transaction, WMS computer interface with a warehouse computer, storage location

philosophy and practices, whether or not the warehouse uses an AS/RS crane, carton handling, SKU WMS identification, SKU storage position type and identification, storage aisles, vehicles and vehicle routing patterns, SKU deposit activity, and transaction communication.

1.2.1 Location

The store must be accessible to all the health facilities or units to be served ideally, a medical store should be located by itself on a separate lot to enhance security and minimize human and automobile congestion. Ensure road access for the largest vehicle that might ever need to come to the store. Do not build the store close to trees with big roots. This can kill the tree, and conversely, trees with aggressive root systems can damage the building's foundation. "USAID | DELIVER PROJECT. 2007. The Logistics Handbook: A Practical Guide for Supply Chain Managers in Family Planning and Health Programs. Arlington, Va.: USAID | DELIVER PROJECT. Originally published in 2004.

Drainage: Build the store on a raised foundation to allow rainwater to drain away from the store. If possible, locate the store in an area on higher ground, the accessibility locates the store so that supplies can be easily received and distributed.

1.3 Designing a medical store

Capacity/space: Storage facilities must have the capacity for both storage and handling. Ideally, space should be evenly divided between the two. New products and packaging innovations, as well as an increase in products related to the prevention and treatment of diseases like HIV/AIDS, malaria, tuberculosis, and hepatitis B, have increased the volume of products and medical consumables that flow through warehouses. This includes items such as bed nets and insecticides

For preventing malaria and more medicines to treat TB because of the increasing number of TB cases due to HIV/AIDS. When designing a new facility, do not underestimate the storage requirements.

Cold storage: In larger facilities it is more efficient to use cold rooms rather than numerous refrigerators or freezers (which generate heat). Ideally, larger facilities should have one room with a negative temperature for frozen products (-20°C) and another room with a positive but cold temperature (2°–8°C) for products requiring refrigeration. “The Logistics Hand book by USAID DELIVER March 2007”

Ventilation: The location and design should ensure maximum air circulation to avoid concentrations of fumes or gases and to prevent condensation of moisture on products or walls. Use an extractor fan to remove fumes, gases, and moisture.

Roof Design: A slanting roof to allow water run-off. Extend the roof over the windows to give extra protection from rain and direct sunlight.

Walls and floor: The walls and floors of a medical store should be permanent and smooth for easy cleaning. Walls preferably should be constructed of brick or concrete blocks. Perforated or bored bricks might be used for the upper portion of the wall to allow ventilation, but these should be screened to prevent the entry of rodents and other pests. Construct or treat floors of larger facilities to ensure they can withstand the frequent movement of heavy products and equipment. This should be done with the guidance of an engineer.

Doors Plan: Doors wide enough to allow for the relaxed movement of supplies and handling equipment. Large facilities, such as those at the central level, often use forklifts and other handling equipment. Ensure doors are strong and reinforced to provide adequate security. Fit them with two strong locks and install metal grills for extra protection. “The Logistics Hand book by USAID DELIVER March 2007”

1.4 Monitoring and evaluation

M&E of supply chains (M&E) M&E plan, relates goals, objectives, and interventions to problems; shows how indicators and tools measure achievement of objectives quantitative. Measure that is objective and verifiable, usually a numeric value qualitative. Measure that is subjective and descriptive usually based on an individual’s perception or interpretation inputs. Set of resources (e.g., funds, policies, personnel, facilities, supplies, etc.) required to implement a program/activity process. Set of interventions (e.g., training, supervision, reporting) in which

inputs are used to achieve objectives and desired results outputs. Results obtained at the program level, direct products, or deliverables of a program (e.g., number of people trained, M&E materials developed and available for use) outcomes. Results obtained at the population level following interventions (e.g., improved access and product availability, improved skills) impact. Long-term results or outcomes also obtained at the population level (e.g., changes in total fertility rate [TFR] or in morbidity and mortality) feedback. Presentation of information to decision makers or lower level personnel, based on information received. (Pharmaceutical M&E document printed in 2009 EC)

2: Empirical Literature Review

The Functions and the design of pharmaceutical supply chain (by PFSA BPR October 2008, Addis Ababa) The government has designed and implemented clear policies, strategies, and programs to promptly liberate Ethiopia from the existing backward socio-economic condition & attain middle income country position, so that the public benefit from the outcome. To make available the virtues of the policies, strategies and programs designed by the government to the public, building efficient capacity in the health sector which can convey satisfactory product & service is mandatory. One cannot talk about satisfactory health service delivery without giving special attention about pharmaceuticals supply. According the master plan study conducted by FMOH & other relevant studies clearly show; the existing public pharmaceuticals supply system has gotten a lot of historical problems. Unaffordability, no availability, irrational use, non-value adding redundant activities at every level of the supply chain and miss management are some of the findings which result in customer dissatisfaction. Hence to solve the existing problem in the public pharmaceuticals supply system, transforming the existing service delivery in to customer based, visionary, mission focused process which is organized around outcomes through applying the precept of business process reengineering techniques which is being practiced as part of the civil service reform program is worth considering. The redesigning of the pharmaceuticals supply core process include identification of; performance baseline, customers/stakeholders needs & expectations, desired outcomes, stretch objectives, followed by selection of sub processes which have their own input & output. The sub processes are organized together so that output of one becomes input of the other and ultimately produce outcome which gives

maximum satisfaction to the customer. Cascading of competencies, pinpointing responsibilities, location of task and estimation of HR need is covered in the redesigning process. By the virtue of radical redesign carried out, namely; organizing around outcomes, pull pharmaceuticals supply system, port to hub the Public Health Facility (PHF) delivery system, PHF need based capacity building regarding inventory management system, storages and process based organizational structure, etc. the following achieved.

- ✦ Reduction of national pharmaceuticals wastage rate from 8% to <2% (golden standard)
- ✦ reduction of overall cycle time for forecasting, procurement, storage, and direct delivery to public health facilities from 491 days to average 165 days
- ✦ Establishment of formal system for reporting pharmaceuticals quality complaint and assurance of rational pharmaceuticals use
- ✦ Improving customer satisfaction in terms of availability and quality of service at public health facilities from 51% to 100%

Hence to achieve the above major indicators, rules, procedures, performance strategy and implementation plan compatible with the new process must be in place. Plus. To avoid the historical problems in the public pharmaceuticals supply system, establishment of central procurement agency was mandatory. Hence PFSA is established to overcome the problems & assure uninterrupted supply of pharmaceuticals to the public at an affordable price. Nevertheless, to effectively carry out the duties & responsibilities given on to PFSA, principles of different logistics performances must be considered worthy. The Pharmaceuticals Fund and Supply Agency was established in September 2007 by Proclamation No. 553/2007 as part of logistic master plan implementation.

The major objectives of PFSA are:

1. To enable public health institutions, supply quality assured essential pharmaceuticals at affordable price in sustainable manner to the public;
2. To play a complementary role in developmental efforts for health service expansion and strengthening by ensuring enhanced and sustainable supply of pharmaceuticals;
3. To create enabling conditions for enhancing the accumulation of fund in its revolving and cost recovery process and thereby ensure the realization of the objectives.

Visual inspection in a perfect pipeline, all products would be stored under ideal temperature and humidity conditions, and according to proper storage guidelines. In the real world, the quality of storage conditions may vary widely from place to place. You may want to verify the quality. Visual inspection is the process of examining products and their packaging to look for obvious problems with product quality of some products. In a warehouse facility, storekeepers can best verify quality by visually checking the condition of all products in their facility on a regular schedule. Products may have two basic types of damage during shipment and storage that affect their quality either mechanically or chemically. Mechanical damage is caused by physical stresses, such as crushing or tearing when the products are loaded, off-loaded, or when cartons or inner boxes are stacked. This kind of damage is usually limited to crushed or torn parts. Chemical damage is more difficult to detect and is usually not obvious during a visual inspection. Laboratory testing is usually required. Some indications of chemical damage may include changes in the color, odor, or consistency of the product. Arranging of medical supplies The general rules of stacking cartons on the pallets or on shelves should be away from the wall at least 10 cm (4 inches) off the floor and at least 30 cm (1 foot) away from the walls and other stacks and must not exceed 2.5 m (8 feet) high. Special Storage Conditions Some pharmaceutical products need storage in an access-controlled environment.

It is important to identify products that are at risk of theft or abuse or have the potential for addiction, and to provide increased security for those items. This includes products that are in high demand or have the potential for resale (black market value). Usually, National Essential Medicines Lists (NEML) includes several narcotics and psychotropic medicines; one or two will be on facility lists. Typical examples are Narcotics: such as morphine and opium preparations. These medicines need greater attention. There are specific procedures in place for the procurement, reception, storage, dispensing, and administration of controlled substances. Special ordering forms should be used. Refrigerators and freezers Some products are very heat sensitive but must not be frozen and store at usually kept in the first and second part of the refrigerator 2°–8°C (36°–46°F): These are (never the freezer). This temperature is appropriate for storing vaccines for a short period of time. Stock Record The minimal information that should be collected on stock records for medicines and other health products includes product name/description, stock on hand/beginning stock balance, receiving date/Issues date, losses/adjustments and ending balance

Assessing of Stock Status, the purpose of assessing stock status is for answering of how often, how much, and when stock will be ordering to replenish the depleted amount of stocks. The re-order level is every two months for increasing of the minimum amount of 2 months stock to its maximum level called 4 months, the average monthly consumption (AMC) amount of pharmaceutical computed from each bin cards based on the last three months of consumption and then the AMC utilize for deciding of maximum level stock number of pharmaceuticals. $\text{Max Qty} = 4 \times \text{AMC}$. The Reorder amount = $\text{Max Qty} - \text{stock on hand}$. (IPLS SOP printed in 2007 E.C.).

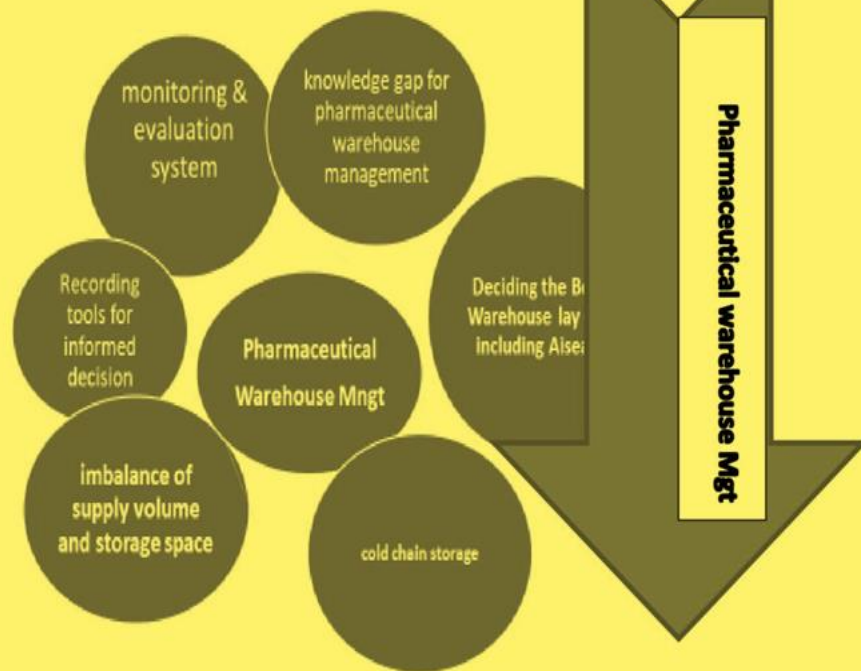
Proper Storage of Health Commodities The store should be clean, disinfected, dry, well-lit, and well-ventilated for promoting of good storage condition to pharmaceuticals. The other activity of store management is securing of storeroom from water penetration, fire risks, theft, and floods in collaboration with the H/Centers management bodies, beside this maintaining of cold storage through regular cold chain recording, reporting, and keeping of the stock level between the maximum & minimum level for avoiding of stock out requires skill and experience for all pharmacy work force to maximize customer satisfaction. In principle any pharmaceutical in carton should be stored at least 10 cm (4 in) off the floor, 30 cm (1 ft.) away from the walls and other stacks, and no more than 2.5 m (8 ft.) high and shall be away from insecticides, chemicals, old files, office supplies, and other materials. All cartons must be stacked arrows point up, and ensure that identification labels, expiry dates, and manufacturing dates are visible for monitoring of first expiry first out during transaction. Optimizing of storage space usage & proper storage includes the effective use of storage space. If too much space is unused, a storeroom is underused, and money is wasted. But, if products are crammed into too small space, they may be damaged because good storage procedures are harder to follow. Thus, warehouse managers must learn how to calculate the space needed to store incoming shipments and how to calculate overall storage requirements for the warehouse, as well as an ideal layout. To develop a workable layout and to calculate storage requirements at a large warehouse, which may serve multiple purposes; it is important to identify the various warehouse activities that would influence layout planning, determine the space requirements and ideal layout for each activity, and then reconcile space requirements with any constraints. To optimize storage space, larger warehouses may require pallets, racking, shelving, and/or material-handling equipment, such as forklifts. To determine space requirements, you need to consider total stored volume equivalents,

the required space for receiving, inspection, and quarantine required space for picking, packing, and shipping type of storage media, per commodity, required operation aisle distances type of material handling equipment required. Receiving Health Commodities. When receiving of pharmaceuticals the store manager should be arranged products in the receiving area monitoring of FEFO Inspection of packages for damaged or leakages, counting the number of units for each product received and compares to issue voucher and ensuring of supplier labeled visibility on every package or unit is mandatory.

3: Conceptual frame work of pharmaceutical warehouse Management

Although a lot of efforts are given at different levels of the pharmaceutical storage management, still the challenges of warehouse space shortages, and functional challenge involved in the storing of products. By this research I try to find the gap of lay out design at all health Centers and communicate to government body and donors. The paper work to identify the amount of the space imbalance for storing of supply of volume and health centers storage space. Poor recording, and reporting practice at most Arsi Health facilities is the bottlenecks in pharmaceutical management for achieving of the planned of health programs' like Tuberculosis, HIV/AIDS, Malaria, family planning Health care etc..... goals, the society Health program demands increase from year to year like HIV/AIDS, malaria drugs family health etc. but the space of drug stores remain the same and could not hold the current additional pharmaceuticals volume for storing and maintain of supplies in the right way. To achieve a storage concept with warehouse management system (WMS) program strategy objectives, my study must efficiently have indicated and supported the utilization of scarce resources by minimizing of wastages. The resources are facility layout, warehouse storage/pick concept suppliers, employees or labor, site location, building that is owned by Ministry of Health for WMS program.

3:-Conceptual frame work for pharmaceutical warehouse Mgt



Chapter Three

Methodology of the Study

3.1 Research design

The research design was descriptive and diagnostic research study method and I organized my data in to five major sections and presented by seven charts and ethical clearance starts from the AAU i.e. getting a written permission from the school, then going to the health institutions with the letter we get from the school for receiving of permission from the health center heads and then progress to get consent from the actual respondents usually pharmacy store head. Ethically, informed consent of the respondent will be obtained first, the right of the respondents to refuse and to answer for few or all questions will be respected; thus, names and address of the interviewees will not be being recorded in the questionnaire. The research type was a descriptive and diagnostic research and its approach of data collection tools was a closed ended kind of questioners. The researcher of this thesis paper was supervisor of Arsi zone H/facilities for strengthen of an existing Integrated Pharmaceutical Logistics System (IPLS). Data quality was controlled by making pretested at three East shoa zone H/centers before the data collection to see if the questionnaires were simple, understandable, consistence, sequenced, coherent and completeness of the responses right after data collection. The actual data collection will be conducted from March 14-31/2018 by the researcher along with his duty of quarterly zonal supportive supervision activity without any additional research cost. The dependent Variables of research were pharmaceutical storage management and inventory control system of Arsi zone H/centers and an independent variable was the socio-demographic variables such as age and sex of respondents. The copy of thesis study will be submitted to AASC Library & department secretary, and Arsi Zone health department.

3:2 Data Source and Data Collection Instruments.

Data was collected using a descriptive dichotomous closed ended structured questionnaire that has focused about storage space, recording, reporting, store personnel's skill assessment etc. The source of information will be majorly health centers pharmaceutical warehouse heads and for few inquiries the facility head or his/her delegator has been responded for few cross-

sectional facts like monitoring and evaluation system and pharmacy personnel's workforce fulfillment at the H/Center. The questioners were categorized in to five sections called store manager profile which includes Respondents' age, profession, yrs. of experience & level of education, Pharmaceutical Warehouse Managers skill assessment which consists level of education, training, etc., recording and reporting of transactions sections includes about updating of balances, availability of formats, the storage materials and space assessment encompass availability of metal rack & pallets, adequacy of space and the arrangement of supplies were assessed in this section. The remaining sections comprises about cold chain storages management and M&E system of pharmaceutical logistics implementation with in the H/center and its reporting systems to next level were thoroughly studied by self-presenting to the store managers and by cross examination the answers with the actual practices in placed.

3:3 Population and Sampling Frame.

The target of study population was 98 governmental homogenous Health centers found under the Arsi zone Health department. For this study I plan to collect to my research from 40 (41%) participant health centers pharmaceutical store for obtaining of greater accuracy and reliability of results. Data will be collected along with my supportive supervision duty without an additional cost.

3:4 Sampling Techniques.

The total population of H/centers found under the ZHD is 98 and the sample size was 40 for this study. Primly all Zonal H/centers were stratified by 26 woredas and H/centers found under the woreda town were selected for assessment purposely being they have high volume patient and supply consumptions. The researcher believes that the impact of poor storage practices & shortages of space in high volume H/centers were sever than the rest nearby H/Centers. The rest 14 were selected in random probability methods. (40% X 96).

3.5 Method of Data processing and analysis

The research method for gathering of information employed was a mix of interviewing tore managers and relevant management members by using standard questionaries' which was categorized in to six major sections. In addition to this I observe the actual operation practices inside warehouses about materials handling equipment's like pallets, shelves, recording &

documentation practices and finally about space adequacy. The total sum of the recommendations was then presented to AAUSC for academic fulfillment and the statement of work will be my next phase of effort to realize this research in to practice. The data entry and analysis then were conducted using manual calculators and computer and data was presented in table it the frequency and percentage of the variables attribute.

Chapter Four

Data Presentation of result, discussion, and interpretation.

The analysis and interpretation of this study resulted based on the data collected from the Arsi Zone H/Centers warehouse managers of selected Health institutions. The data was collected through self-presenting questionnaire. Out of 40 questionnaires to be selected H/centers all were properly responded for the provided requests and aggregated for analysis. The researcher was tried to observe the physical facilities set-ups and the working environment of pharmaceutical management during data collection and took few pictures that enabled to answer the basic research questions raised at the beginning of the study. Responses have been aggregated, summarized, and analyzed in the following sections.

Table 1 Respondents sex composition.

Sex Type n=40		Qty
Male		22
Female		18

The chart gives information on the composition of the respondents in terms of sex. The reason that the researcher included this part was to make sure that respondents were in appropriate mix in terms of gender. As the chart indicated, there was an appropriate mix of gender in the study. Hence, the responds to the items in the instrument were balanced.

Table 2 Respondents' age, profession, yrs. of experience & level of education

1	Age n=40	18-25	16	40%
		26-35	19	48%
		36—45	5	12%
		46—55	0	0%
		more than 55	0	0%
2	Level of Education n=40	Degree	4	10%
		Diploma	36	90%
		Certificate	0	0%
3	Profession n=40	Pharmacy Related	19	47%
		Nurse	21	53%
		H/Officer	0	0%
4	Yrs. of Experience n=40	1-5 Years	29	73%
		6-10 Year	11	27%
		11-15 Year	0	0%
		more than 16 yrs.	0	0%
5	Job Description n=40	Managing of store is my only role at this facility?	22	55%
		I have an additional duty other than managing of store.	18	45%

According to the BPR of Oromia Regional Health Bureau (ORHB) one pharmacist and one pharmacy technician allocated for each H/caners and both are exclusively works for the department (ORHB BPR document). Table 2 results the demographic information of the respondents. It summarized the respondents' age, profession, and years of experience, job description & level of education. Information on age and level of education might give the researcher a clue about employees' understanding and capability requirements as well as a hint pertaining to the institutions' employees training and coaching needs. Most respondents were in the age range of 26-35 (48%) which was by the time that employees are more concerned about career and promotion. When it comes to the level of education, it is clear from the table that above 90% of the respondents was an educational level of diploma. This indicated that the need for training and development was there and worth considering. When it comes to fulfilment of pharmacy work force only 4% & 48% of pharmacists and pharmacy technicians satisfied; Therefore, the public institutions under study were supposed to provide an effective training and advance educational packages for strengthen of the existing pharmaceutical warehouse management skills.

Argumentatively most of the respondents in the sample were in the age range 26-35 (48%) which was more concerned about career and promotion. On the other hand, it is indicated that 73% of the respondents have been an experience of less than five years at the health facilities. In addition to the above challenges 45% of store managers have an additional duty other than managing of store which indicates that the H/Centers management less consideration for warehouse management. From this very point interpret that a remarkable amount of health centers store managers has an additional duty and might not have full devotion for warehouse management. The chart above gives information concerned the number of years an employee has been serving in the H/Centers, about 73% of warehouse managers have been experienced between 1 to 5 years this helps the researcher to understand the management consideration at different levels regarding pharmaceutical warehouse management. Hence it was clear from the chart that 53% & 45% of pharmaceutical warehouse have been managed by non-pharmacy professionals which have an additional duty other than store management respectively. All the above facts of table 2 study and analysis indicated that a remarkable Health centers management member provide low attention for pharmaceuticals warehouse management and highly compromised during the delivery of professional service to customers.

Table 3 Pharmaceutical Warehouse Managers skill assessment.

Sr No	Pharmaceutical Warehouse Managers skill assessment.	Yes	No
1	Do you take any medical warehouse management lesson at your college? n=40	47%	53%
2	How to design the medical stores n=40	47%	53%
3	Basic principles of arrangements n=40	47%	53%
4	Cold chain management? n=40	47%	53%
5	Waste disposal management?	47%	53%
6	Safe disposal OF supplies? n=40	47%	53%
7	How to receive, issue and store supplies n=40	100%	0%

According to WHO, PFSA and BPR of region pharmacy department must be managed by pharmacy professionals However, from table 2 the outcomes identified that 53% of Arsi zone H/centers were managed by non-pharmacy personnel's and majority of them did not have formal skill on basic principles of pharmaceutical arrangements, waste disposal, and cold chain managements which included at the curriculum of pharmacy education because of this most next indicator were the result of first indicator. From the table & graph 3; I summarized that the importance of skill man power for performing of key pharmaceutical management activities was paramount.

Table4: -Recording and reporting of transactions

Sr No	Recording and Reporting of transactions	Yes	No
1	Do you use bin cards for updating of supply balance? n=40	100%	0%
2	If yes, did it regularly update? n=40	40%	60%
3	Do you submit periodic performance report? n=40	0%	100%
4	Stock on Hand of medical supplies? n=40	0%	100%
5	Monthly Qty Used? n=40	0%	100%
6	Qty Received by item and price? n=40	0%	100%
7	Does the Medical store have an annual plan? n=40	0%	100%
8	If Yes Do you submit periodic performance report n=40	0%	100%

The integrated pharmaceutical Logistics system (IPLS) manual stated that, 100% of supplies should have its own separate bin card and always shows the current ending balance of respective goods but as revealed in the table 4, only 40% of bin card record indicates the exact balance of pharmaceuticals when compared to physical count. In table four 100% of Arsi Zone H/Centers warehouse managers do not have a documented and endorsed annual plan and performance reporting system from lower to higher level management, because of this no periodic performance report to next level about the stock on hand, consumption & received amounts of supplies from lower level to next level. From the above table I understood that 100% of H/Centers utilize bin-cards for updating of supplies, however only 40% of warehouse managers properly updating during transactions. As demonstrated in table four 100% of Arsi Zone H/Centers warehouse managers do not have annual work plan as well as periodic logistics performance report system such as monthly stock on hand, quantity received and consumption data to next level for informed decisions.

Table 5: -The storage materials and space assessment

Sr No	The storage materials and space assessment.	Yes	No
1	Do You have enough Warehouse space compared to supplies?	20%	80%
2	Do you have enough metal rack?	48%	52%
3	Do you have wooden pallets?	28%	72%
4	Do you have metal cabinet with locker?	0%	100%
5	Does the warehouse logically arrange?	43%	57%
6	Products are arranged and visible	40%	60%
7	Storage area is visually free from harmful insects and rodents.	43%	57%
8	Products are stored at an appropriate temperature. Expired products are separated from usable stock. Does the warehouse have a dedicated receiving and dispatching area?	8%	92%
9	Storage area is visually free from harmful insects and rodents.	53%	47%
10	Products are stored at an appropriate temperature. Expired products are separated from usable stock. Does the warehouse have a dedicated receiving and dispatching area?	0%	100%

IPLS SOP manual specified that all H/Centers of Arsi Zone have different gaps regarding to appropriate pharmaceutical storage system. For instance, out of 40 assessed H/Centers, only 20% of H/centers have adequate warehouse space when compared to available medical supplies, besides this 48% and 28% of them have adequate metal racks and wooden pallets respectively for proper storing of small and bulky medical supplies; this means that majority (52% & 72%) of the facilities in Arsi zone do not have adequate metal racks and wooden pallets for handling of medical supplies. Good storage practices manifested from the beginning during designing phase of H/Centers, for instance no warehouses of Arsi Zone H/Centers have a dedicated dispatching and receiving area for incoming and outgoing of supplies, similarly, 100% of the Zonal governmental pharmacy stores do not have metal racks with locker for storing of dangerous ingredients like narcotic and psychotropic substances. The problems in related to warehouse materials leads inappropriate arrangement of medical supplies, because of this, 60% of the assessed facilities do not properly arranged pharmaceutical supplies as per their field of category which hampered the issuing of items. However; the result has shown that 53% of the facilities separate usable stock from un-usable (Expired & damaged) for guarding of any possibilities of mix-ups.

When we compare availability of good cold chain storage system for refrigerated items, 92% of H/Centers did not have an appropriate cold storage system as per the guideline of supplier. The survey assures that 92% of medical stores from 40 assessed H/Centers not free from harmful rodent and insects. Table 4 summarizes the storage materials and space assessments. As illustrated in the summery of table there is a critical shortage of materials for storing of medical supplies, out of 40 assessed H/Centers, More than 2/3 of facilities were not have an adequate space when it compared to the availability of medical supplies. In addition to that only 52% and 72% of them do not adequate metal racks and wooden pallets respectively for proper storing of small and bulky medical supplies. When we compare to the availability of cold items storage system for refrigerated items, 92% of H/Centers did not have an appropriate cold storage system, in addition to the problems related to warehouse materials the pharmacy store managers have also gaps in proper arrangement and handling of medical supplies. Because of this, 60% of the assessed facilities do not properly arranged pharmaceutical supplies as per their field of category which makes difficult to easy monitoring of the stock out of products from the group of items. However; the result has shown that 53% of the facilities separate usable stock from un-usable (Expired & damaged) for guarding of any possibilities of mix-ups and to maximize the limited storage space. (DELIVER US-AID; Guidelines for proper storage of health commodities).

Table 6: - Cold Chain Storages management.

Sr No	Cold Chain Storage System.	Yes	No
1	Do you have a functioning refrigerator(s) to store vaccines and or other medical supplies?	25%	75%
2	Is the temperature recording chart up-to-date? n=40	0%	100%
3	Products are stored at the appropriate temperature. n=40	8%	92%
4	Are refrigerators located away from any surrounding objects (approximately ½ meter)?	18%	82%

The World health Organization encourages firm follow up of cold chain storage system from manufacturing stage to end users but 75% of H/Facilities have no functional refrigerators at their store, from the 25% of H/Centers having refrigerator no one have temperature recording tool for monitoring of the daily temperature status, correspondingly the researcher observed that from 40 assessed H/centers only 37 H/centers or 92% of them were stored cold chain items in appropriate temperature conditions. According to storage guidelines functional refrigerators must be located away from walls at least half a meter, however, from 10 H/Facilities which have a refrigerator only 18% of facilities were localize their refrigerator according to the guidelines. From the table 5, The researcher of this study observed that the cold chain storage assessment had an incredible challenge, $\frac{3}{4}$ of H/centers have no functional refrigerators at their medical stores, I randomly request that how they keep cold items until dispensed to patients, and many of them were stored those commodities at other departments who have a functional refrigerator. 25% of H/Centers having refrigerator have no temperature recording charts for monitoring of the daily temperature status, correspondingly the researcher observed that from 40 assessed H/centers only 37 of them or 92% of H/Centers were stored cold chain items inappropriate temperature conditions.

Table 7: -Monitoring & Evaluation System of Pharmaceutical Management

Sr No	M&E system of Pharmaceutical Management	Yes	No
1	Is there a documented policy or guideline for storing n=40	100%	0
2	Is there a written guideline for destroying of expired products? n=40	45%	55%
3	Does the H/facility fulfill pharmacy professional recruitment as per the BPR n=40	53%	47%
4	Is there a practice of transferring skill & knowledge from trained to untrained staffs n=40	0%	100%
5	Are there any vacant positions of pharmacy filled by other Professionals? n=40	53%	47%
6	Is there any challenge you may encounter when you want to fill pharmacy vacant position? n=	63%	37%
7	Does the Medical store have an annual plan? n=40	0%	100%
8	Does the store manager submit periodic performance report to the H/C head? n=40	0%	100%

WHO, Harmonized Monitoring and Evaluation Indicators for Procurement and Supply Management System published by World Health Organization 2011; Suggest that in placing of monitoring and evaluation System is vital when managing of any activities in a sustainability way so that for providing of an appropriate service to clients. Monitoring & evaluation system also develops good integrity among the staffs and leads an attractive loyalty for the communities and institution. For this reason, the assessment is therefore, trying to check the situation of monitoring and evaluation systems of the daily and periodic activities of the pharmacy store coordination performances by the H/Centers managers for system improvements. The above table and the following graph has shown the percentage of warehouse managers having an annual work plan, performance report to their immediate supervisors, availability of guidelines, fulfillment of human resource as per the BPR etc. The respondents of the following questions were health center head or his/her delegator, since pharmaceutical supply chain management has been an integral part of health care system and a cross cutting activity for the improvements of health service. The assessment results confirmed that 100% of the facilities have a documented policy and guidelines for storing of medical supplies, however, 100% of H/Centers store managers do not have an annual plan and performance report to H/Centers managements, furthermore all H/Facilities do not have any knowledge and skill transferring mechanisms from trained to un-trained health professionals during relocating of staffs which indicates that the low level of management ownerships at all level.

From graph 7 we can observe that 47% of H/Centers fulfil pharmacy professional recruitments as per the regional health bureau BPR, on the other hand from the 53% of H/Centers which is already fulfill other health professional in place of pharmacy vacant positions, 63% of H/Centers encountered a challenge when they need to fulfill pharmacy vacancy. Discussion & Interpretation from table 6 we can have observed that 47% of H/Centers fulfilled pharmacy professional recruitments as per the regional health bureau BPR, on the other hand from the 53% of H/Centers which is already fulfilled other health professional in place of pharmacy vacant positions, 63% of H/Centers encounter a challenge when they need to fulfill pharmacy vacancy due to shortage of trained man power in the market. The assessment results confirmed that 100% of the facilities have been a documented policy and guidelines for storing of medical supplies, however, 100% of H/Centers store managers do not have an annual plan and performance report, furthermore all H/Facilities do not have any knowledge and skill

transferring mechanisms from trained to un-trained health professionals during relocating of staffs. From this fact we could concluded that there was less follow ups of performance by the management members.

Chapter Five

Summery, Discussion, Conclusion and Recommendation.

5:1 Summary

The purpose of storing pharmaceuticals is availing of the right number of products in the right quantities whenever required for provision of health service. As illustrated in section three and four about the skill of professionals who complete the day to day activities of all activities inside pharmacy store do not have expertise awareness in respect to pharmaceutical management and most of them were busy by other department duty like delivery wards and some of them assume the pharmaceutical warehouse management task as an additional obligation and do not consider it as par time responsibility, as a result of this all the recording of transactions do not show exact amount of physical count of supplies, subsequently request for re-fill from suppliers was not based on facts. Lack of storage materials like metal racks and wooden pallets intensifies the mismanagement of pharmaceuticals all the above challenges did not monitored by the health center management and zonal health department and might be not acknowledged for managerial corrective actions and one of my hope will be this assessment finding will help the zonal health department decision makers as a base line data for introducing of the existing facts.

5.2 Discussion

Pharmaceuticals Fund and Supply Agency (PFSA) is coordinating sector wide efforts aimed at significantly improving the sustainable availability of quality assured pharmaceuticals at an affordable price to the public and promote rational use of medicines. In collaboration with partners the agency conducts various capacity building activities and supportive supervision to health facilities. As part of this effort, the Agency in collaboration with donors has developed the first edition of Pharmacy logistics mentoring manual which will serve as a guide for pharmacy mentoring in health facilities of Ethiopia with a view of enhancing pharmacy professional's knowledge and skill; improving their job performance, satisfaction, and retention; and enhancing productivity. Pharmacy logistics mentoring has various benefits to

mentees, mentors, and the health system at large. Stronger and sustainable supply chain system and rational medicine use need close working among different stake holders. Vertical and integrated systems each have their own advantages and disadvantages. It is often the case that within a given country some logistics functions remain vertical, whereas others are integrated. For example, contraceptives, ORS, and vitamin A capsules may be procured by separate programs, but they may also be subsequently stored and transported together. Procurement, in this example, is said to be vertical, whereas storage and transport are integrated. There is ongoing debate about the advantages and disadvantages of vertical and integrated logistics management. This debate is not, however, a major focus of this handbook. (See the suggested reading list at the end of the book for sources of additional information about how integration can affect logistics. “USAID | DELIVER PROJECT. 2007. The Logistics Handbook: A Practical Guide for Supply Chain Managers in Family Planning and Health Programs. Arlington, Va.: USAID | DELIVER PROJECT.”

The BPR of Oromia Regional Health Bureau (ORHB) one pharmacist and one pharmacy technician allocated for each H/centers and both are exclusively works for the department (ORHB BPR document). When it comes to fulfilment of pharmacy work force only 4% & 48% of pharmacists and pharmacy technicians satisfied; Therefore, the public institutions under study were supposed to provide an effective training and advance educational packages for strengthen of the existing pharmaceutical warehouse management skills. The integrated pharmaceutical Logistics system (IPLS) manual which was printed in 2007 etc. stated that 100% available supplies should have its own separate bin card and always shows the current ending balance. WHO, US-AID Deliver guidelines and PFSA SOP manuals promotes separate warehouse for health facilities and must be equipped with material handling materials for storing of pharmaceuticals and strictly prohibit putting of medicines on floor but from the study the researcher finds that a lot of gaps regarding pharmaceutical arrangements and storing. The Harmonized Monitoring and Evaluation Indicators for Procurement and Supply Management System published by World Health Organization 2011; Suggest that in placing of monitoring and evaluation System is vital when managing of any medical supplies activities in a sustainability way so that for providing of an appropriate service to clients. Monitoring & evaluation system also develops good integrity among the staffs and leads an attractive loyalty for the communities and institution. For this reason, the assessment is therefore, trying to check

the situation of monitoring and evaluation systems of the daily and periodic activities of the pharmacy store logistics performances by the H/Centers managers for system improvements but the findings indicate that there is no M&E system in the entire pharmaceutical logistics system.

5:3 Conclusion

1. The assessment confirms that majority of the warehouse managers working in the Arsi Zone H/Centers do not have knowledge and experience on warehouse management skills and didn't able to implement a standard storage practice.
2. Majority of Arsi Zone H/Centers do not have an updated recording and reporting systems from lower to higher level; Because of this, pharmaceutical transaction and management systems lacks transparency.
3. The Cold chain supply chain system of H/Centers is not reliable and lacks follow-ups for maintenance un-functional refrigerators which indicated low managerial and technical support from next higher level.
4. The critical shortage of pharmacy personnel aggravates poor pharmaceutical management and it lacks transparency & accountability.
5. The research of this survey concluded in bold that an absence of monitoring and evaluation system at all level caused invisible the entire Arsi Zone H/Centers regarding the entire warehouse management system.

5.4 Recommendations

Based on the findings and conclusions drawn from the study, the following recommendations were proposed.

1. I strongly recommend strengthening of among public university-FMOH & US-AID partnership for outsourcing of training.
2. I wish to mention to the concerned body for including of logistics subjects in to pharmacy curriculum.
3. I recommend that, If the Zonal H/department will in place the right monitoring and evaluation system through regular reporting & supportive supervision for immediate corrective measure through formal feedback mechanisms
4. I mention for management bodies if the H/Centers and upper level of management should plan to provide warehouse management training packages for enhancing of the skills of H/Professional's working at the medical stores.
5. I remark also for Arsi Zonal Health Department should be fulfill the pharmacy human resource need of H/Centers found under it as per the regional Health bureau business process re-engineering (BPR) structure.
6. I strongly recommend for pharmacy section work force that in placing of functional recording tools for each transaction for reliable report generation for re-fill decisions.
7. Being cold chain Items are susceptible to change in to poisonous substances pharmacy personnel should be committed to utilize refrigerators for the intended purposes and in-placing of temperature monitoring mechanisms according to the guidelines.
8. Logistics M&E system must be implemented at all level of administrative stages by cascading it from upper to lower level.

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LIAT by DELIVER US-AID – 2008

BUSINESS PROCESS REENGINEERING PHARMACEUTICALS SUPPLY CORE
PROCESS October 2008, Addis Ababa

Annex

List of H/centers found under Arsi ZHD

Bin-Card Format

Questioner

Pictures having consent HCs Management without declaring the name of HCs

		Arsi zone H/Facilities Location and infrastructure information						
Sr No	Nam e of H/Cs	Zone	Woreda	Service Type	Suggested Re-fill period	Total # of HCs in the Woreda	Sample Size 40%	Rema rk
1	Adele HC	Arsi	Amigna	AntiAritro Virus tt	2 Months	2	1	
2	Sade Mikael HC	Arsi	,,	PMTCT	2 Months			
3	Aseko HC	Arsi	Aseko	AntiAritro Virus tt	2 Months	3	1	
4	Chafa Keyu HC	Arsi	,,	PMTCT	2 Months			
5	Tereta chafa HC	Arsi	,,	PMTCT	2 Months			
6	Bale HC	Arsi	Bele Gesgar	AntiAritro Virus tt	2 Months	3	1	
7	Oda jarjaro HC	Arsi	,,	PMTCT	2 Months			
8	Jidda Segno Gebeya HC	Arsi	,,	PMTCT	2 Months			
9	Chole HC	Arsi	Chole	AntiAritro Virus tt	2 Months	4	2	
10	Moye HC	Arsi	,,	PMTCT	2 Months			
11	Waregu Jawi HC	Arsi	,,	PMTCT	2 Months			

12	Magna L/buna HC	Arsi	,,	PMTCT	2 Months			
13	Segure HC	Arsi	Digelu & Tijo	AntiAritro Virus tt	2 Months	5	2	
14	Digalu HC	Arsi	,,	PMTCT	2 Months			
15	Tijo HC	Arsi	,,	PMTCT	2 Months			
16	Hofi HC	Arsi	,,	PMTCT	2 Months			
17	Arabi HC	Arsi	,,	PMTCT	2 Months			
18	Diksis HC	Arsi	Diksis	AntiAritro Virus tt	2 Months	2	1	
19	Watera Gola HC	1A rsi	,,	PMTCT	2 Months			
20	Dhera HC	Ar si	Dodota	AntiAritro Virus tt & Lab	2 Months	2	1	
21	Amude HC	Ar si	,,	PMTCT	2 Months			
22	Abajama HC	Ar si	Guna	PMTCT	2 Months	3	1	
23	Nageele HC	Ar si	,,	PMTCT	2 Months			

24	Dima HC	Arsi	,,	PMTCT	2 Months			
25	Iteya HC	Arsi	Hitosa	PMTCT	2 Months	4	2	
26	Boru jawi HC	Arsi	,,	PMTCT	2 Months			
27	Sibu Abadir HC	Arsi	,,	PMTCT	2 Months			

28	Walargi HC	Arsi	„	PMTCT	2 Months			
29	Siltana HC	Arsi	Honkolo Wabe	PMTCT	2 Months	3	1	
30	Machitu HC	Arsi	„	PMTCT	2 Months			
31	Wabe Kebana HC	Arsi	„	PMTCT	2 Months			
32	Arboye HC	Arsi	Jeju	PMTCT	2 Months	4	2	
33	Adis Hiwot HC	Arsi	„	AntiAritro Virus tt	2 Months			
34	Bolo HC	Arsi	„	PMTCT	2 Months			
35	Danab Gudo HC	Arsi	„	PMTCT	2 Months			
36	Mararo HC	Arsi	Lemu Bilbilo	AntiAritro Virus tt	2 Months	6	2	
37	Samera HC	Arsi	„	PMTCT	2 Months			
38	Koji Kubsa HC	Arsi	„	PMTCT	2 Months			
39	Lemu HC	Arsi	„	PMTCT	2 Months			
40	Sirbo HC	Arsi	„	PMTCT	2 Months			

41	Robe Gerjeda HC	Arsi	„	PMTCT	2 Months			
42	Huruta HC	Arsi	Lode Hitosa	AntiAritro Virus tt	2 Months	4	2	
43	Lode jimata HC	Arsi	„	PMTCT	2 Months			
44	Ligaba HC	Arsi	„	PMTCT	2 Months			
45	Kuselegna HC	Arsi	„	PMTCT	2 Months			
46	Abomsa HC	Arsi	Merti	AntiAritro Virus tt	2 Months	4	2	
47	Angada (Gorasil) HC	Arsi	„	PMTCT	2 Months			
48	Golgota HC	Arsi	„	PMTCT	2 Months			
49	Hela HC	Arsi	„	PMTCT	2 Months			

50	Kersa HC	Arsi	Munessa	AntiAritro Virus tt	2 Months	6	2	
51	Gumguma HC	Arsi	„	PMTCT	2 Months			
52	Lakicha HC	Arsi	„	PMTCT	2 Months			
53	Shune HC	Arsi	„	PMTCT	2 Months			
54	Kenchere HC	Arsi	„	PMTCT	2 Months			
55	Eego HC	Arsi	„	PMTCT	2 Months			
56	Robe HC	Arsi	Robe	AntiAritro Virus tt	2 Months	5	2	
57	Sadika HC	Arsi	„	PMTCT	2 Months			
58	Habe HC	Arsi	„	PMTCT	2 Months			
59	Endeto HC	Arsi	„	PMTCT	2 Months			
60	Jena HC	Arsi	„	PMTCT	2 Months			
61	Seru HC	Arsi	Seru	AntiAritro Virus tt	2 Months	2	1	
62	Waji Abaya HC	Arsi	„	PMTCT	2 Months			
63	Gobesa HC	Arsi	Shirka	AntiAritro Virus tt	2 Months	5	2	
64	Tereta HC	Arsi	„	PMTCT	2 Months			

65	Sole HC	Arsi	„	PMTCT	2 Months			
66	Gebre Kirstos HC	Arsi	„	PMTCT	2 Months			
67	Gado Guna HC	Arsi	„	PMTCT	2 Months			
68	Sire HC	Arsi	Sire	PMTCT	2 Months	4	1	
69	Benben HC	Arsi	„	PMTCT	2 Months			
70	Lode Lamafo HC	Arsi	„	PMTCT	2 Months			
71	Bale Kamisa HC	Arsi	„	PMTCT	2 Months			

72	Kula HC	Arsi	Sude	PMTCT	2 Months	5	2	
73	Halila HC	Arsi	„	PMTCT	2 Months			
74	Gersa HC	Arsi	„	PMTCT	2 Months			
75	Semera HC	Arsi	„	PMTCT	2 Months			
76	Alemgena HC	Arsi	„	PMTCT	2 Months			
77	Golja HC	Arsi	Tiyo	PMTCT	2 Months	4	2	
78	Beriti HC	Arsi	„	PMTCT	2 Months			
79	Bilalo HC	Arsi	„	PMTCT	2 Months			
80	Gonde HC	Arsi	„	PMTCT	2 Months			
81	Bekoji HC	Arsi	Bekoji Town	AntiAritro Virus tt & Lab	2 Months	1	1	
82	Ogolcho HC	Arsi	Zuway Gugda	AntiAritro Virus tt	2 Months	6	3	
83	Arata HC	Arsi	„	PMTCT	2 Months			
84	Chefe Jilla HC	Arsi	„	PMTCT	2 Months			
85	Kiyansho HC	Arsi	„	PMTCT	2 Months			
86	Hula Arba HC	Arsi	„	PMTCT	2 Months			
87	Adere Lepo HC	Arsi	„	PMTCT	2 Months			
88	Ticho HC	Arsi	Tena	AntiAritro Virus tt	2 Months	4	2	
89	Hasan usman HC	Arsi	„	PMTCT	2 Months			
90	Wadego Hitossa HC	Arsi	„	PMTCT	2 Months			
91	Sole Medero HC	Arsi	„	PMTCT	2 Months			
92	Assela HC	Arsi	Assela Town	AntiAritro Virus tt	2 Months	2	1	
93	Halila HC	Arsi	„	PMTCT	2 Months			
94	Chancho HC	Arsi	Gololcha	AntiAritro Virus tt	2 Months	5	2	
95	Tumuga HC	Arsi	„	HIV Prevention Moth.to Child tt	2 Months			

96	Haro HC	Arsi	„	PMTCT	2 Months			
97	Mine HC	Arsi	„	PMTCT	2 Months			
98	Jinga dibu HC	Arsi	„	PMTCT	2 Months			
				Total Pop & Sample size		98	40	

"Questionnaires for Data collection on the assessment of Arsi Zone governmental
H/centers Pharmaceutical storage management and Inventory controlling system."
Target Subject

Section 1:-HEALTH INSTITUTION INFORMATION

S.No	QUESTIONS and FILTERS
	Region _____ Zone _____ Woreda _____ City/Town _____ Code of H/Center _____

Respondent will be H/Center Head
Monitoring and Evaluation system of Pharmaceutical Supply Chain System

S.No	QUESTIONS and FILTERS	CODE CATEGORIES	SKIPS
1.1	"Does the H/facility fulfill pharmacy professional Recruitment as per the BPR"	Yes..... No.....	
1.2	"Is there a practice of transferring skill & knowledge from trained to untrained staffs"(obtained from trainings) from trained to untrained staff?	Yes..... No.....	
1.3	"Is there any vacant positions of pharmacy filled by other professionals?"	Yes..... No.....	
1.4	"Is there any challenge you may encounter when you want to fill pharmacy vacant position?"	Yes..... No.....	
1.5	Would you mention the challenges?	Yes..... No.....	

1.6	Does the store manager submit periodic performance report to the H/C head?	Yes..... No.....	
1.7	If yes for Q 1.7 what type of report		
1.7.1	stock on Hand of medical supplies	Yes..... No.....	
1.7.2	Qty Received by item and price?	Yes..... No.....	
1.8	Does the Medical store have an annual plan?	Yes..... No.....	

1.1 Sex Male-----, Female-----

1.2 Age 18-25-----,26-35-----,36--45-----, 46--55-----, or more than 55---

1.3 Yrs of Expe.1-5yrs-----6-10 yrs-----11-15yrs-----more than 16yrs-----

1.4 Level of Education Degree-----Diploma-----Certificate-----

1.5 Profession Pharmacy Related-----Nurse-----H/Officer-----Other-----

1.6 Is managing of store is your only role at this facility? Yes..... No.....

Section 3 Pharmaceutical Warehouse Managers skill assesment.

Respondant will be warehouse Mgr for the all the following questions.

S.No	QUESTIONS and FILTERS		CODE CATEGORIES	SKIPS
3.1	Do you take any medical warehouse management lesson before you were graduated from your school of pharmacy?		Yes..... No.....	
3.2	If yes for Q 2.1, what content of subject matters include		Yes..... No.....	
	3.2.1	How to design the Lay out of your medical stores using storage materials?	Yes..... No.....	

	3.2.2	Basic principles of medical supplies arrangements?	Yes..... No.....	
	3.2.3	Basic principles of medical supplies arrangements?	Yes..... No.....	
	3.2.4	Waste disposal management?	Yes..... No.....	
	3.2.5	Safe disposal of hazardous biological	Yes..... No.....	
	3.2.6	How to receive, issue and store medical stores?	Yes..... No.....	

Section 4 Recording and Reporting of transactions

S.No	QUESTIONS and FILTERS		CODE CATEGORIES	SKIPS
4.1	Do you use bin cards for updating of supply balance? If yes Did it regularly updated?		Yes..... No.....	
4.2	Do you submit periodic performance report? If yes for Q 4.2 what type of report		Yes..... No.....	
	4.2.1	stock on Hand of medical supplies?	Yes..... No.....	
	4.2.2	Monthly Qty Used?	Yes..... No.....	
	4.2.3	Qty Received by item and price?	Yes..... No.....	
4.3	Does the Medical store have an annual plan?		Yes..... No.....	
	4.3.1	If Yes Do you submit periodic performance report	Yes..... No.....	

Section 5 The storage materials, Lay out and space assessment

S.No	QUESTIONS and FILTERS		CODE CATEGORIES	SKIPS
5.1	Do you have enough Warehouse space compared to supplies?		Yes..... No.....	
5.2	Do you have enough metal rack for storing of supplies?		Yes..... No.....	
5.3	Do you have wooden pallets for storing of heavy & bulky products?		Yes..... No.....	
5.4	Do you have metal cabinet with locker for narcotic drugs?		Yes..... No.....	
5.5	Does the warehouse logically arranged		Yes..... No.....	

5.6	Products that are ready for distribution are arranged so. That identification labels and expiry dates and/or manufacturing dates are visible?	Yes..... No.....	
5.7	Storage area is visually free from harmful insects and rodents. (Check the storage area traces of bats and/or rodents [droppings or insects.]	Yes..... No.....	
5.8	Products are stored at the appropriate temperature according to product temperature specifications.	Yes..... No.....	
5.9	The facility makes it a practice to separate damaged and/or expired usable products from products and removes them from inventory.	Yes..... No.....	
5.10	Does the warehouse have a dedicated receiving and dispatching area?	Yes..... No.....	

Section 6 M&E systems of pharmaceutical warehouse management.

S.No	QUESTIONS and FILTERS	CODE CATEGORIES	SKIPS
6.1	Is there a documented policy or guideline for storing Observe of medical supplies	Yes..... No.....	
6.2	Is there a written procedures/guidelines for? Destroying damaged and expired products	Yes..... No.....	
6.3	Does the H/facility fulfill pharmacy professional recruitment as per the BPR	Yes..... No.....	
6.4	Is there a practice of transferring skill & knowledge from trained to untrained staffs	Yes..... No.....	
6.5	Are there any vacant positions of pharmacy filled by other Professionals?	Yes..... No.....	
6.6	Is there any challenge you may encounter when you want to fill pharmacy vacant position?	Yes..... No.....	
6.7	Does the Medical store have an annual plan? report to the H/C head?	Yes..... No.....	
6.8	Does the store manager submit periodic performance	Yes..... No.....	

Section 7 cold chain storage conditions.

S.No	QUESTIONS and FILTERS	CODE CATEGORIES	SKIPS
7.1	Do you have a functioning refrigerator(s) to store vaccines and or other medical supplies?	Yes..... No.....	
7.2	Is the temperature recording chart up-to-date?	Yes..... No.....	

7.3	Do you have enough refrigerator for storing of cold chain items?	Yes..... No.....	
7.4	Are refrigerators located away from any surrounding objects (approximately ½ meter)?	Yes..... No.....	

Bin Card

Name of the Health Facility: _____

Product Name, Strength and Dosage Form _____

Unit of Issue: _____

Maximum Stock Level: _____

Emergency Order Point: _____

Average Monthly Consumption (AMC): _____

Date	Doc. No. (Receiving or Issuing)	Received from or Issued to	Quantity				Batch No.	Expiry Date	Remarks
			Received	Issued	Loss/Adj	Balance			