Ethiopian Pharmaceutical Supply Agency

Center of Excellence Proof of Concept

Achievement scale up

June 2019,

Adama

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1. Introduction

Ethiopian Pharmaceutical Supply Agency (EPSA) in collaboration with JSI/ADISFree and GHSC-PSM projects has piloted the implementation of center of excellence at Adama EPSA branch. The center of excellence initiative is ultimately designed to accelerate the change management process of the agency through continuous improvement of the operation.

Post implementation evaluation of this project at Adama showed remarkable improvement in warehouse operations. As a result, it was decided to scale up the achievements to other hubs in phase approach starting with seven hubs. To facilitate the scale up in successful manner, EPSA in collaboration with GHSC-PSM has visited Adama hub and conducted one to one interview with Adama hub's key staff to identify and document improved processes and practices for ease of scale up.

Based on the interview with key informants, review of Adama's Center of excellence proof of concept's status minutes and end evaluation report review, major activities that lead to the success in the area of warehouse operations can be summarized as follows;

1. Inventory analysis
    a. ABC analysis
    b. FSN analysis
    c. ABC-FSN matrix development
2. Storage method and Zoning determination and reconciliation
    a. Product flow determination
    b. Fixed Pick- phase creation at the ground
    c. Zoning of commodities based on ABC-FSN matrix developed
    d. Actual available space reconciliation with products flow
3. Product relocation
    a. Product segregation by batch and expiry date, and palletize
    b. Labeling of pallets and wrapping
    c. Relocation of products to its zone
    d. Updating the location in HCMIS

A series of on the job and offsite trainings coupled with close follow-up and coaching of Adama hub yielded committed and capacitated staff that in turn contributed for the above achievements

by implementing the center of excellence proof of concept into practice which can be scale up to other hubs.

This document details basic activities that lead to the improvement of warehouse operation processes and related activities at Adama and is intended to serve as training reference material for the successful scale up of the improved practices.

2. General information on knowledge and skill transfer for CoE scale up

Application of new concept in line with the existing working system refers to changing of the skills and knowledge acquired through training and experience to actual work practices. The efforts also include generalization of knowledge and skill into the actual job performed. Therefore, this unit will guide to transfer knowledge and skill in the Adama EPSA hub which is gained from center of excellence project implementation.

Knowledge is facts, information, and skills acquired through experience or education; or it is an awareness or familiarity gained by experience of a fact or situation. Knowledge Management can be divided in to two: namely explicit and tacit knowledge. The former refers to codified knowledge, such as that found in documents, while the latter refers to non-codified and often personal/experience-based knowledge (Knowledge that people carry in their minds). According to the observation made at Adama and document reviews, the knowledge expected to be transferred from Adama hub to other hub employees are a mixture of tacit and explicit elements rather than being one or the other. None of the two is complete by itself. There is substantial knowledge gained by Adama staff through the process but difficult to document and evident only at work area.

A skill is the ability to do something. We are not born with skills; we learn them as we go along - through the life and work experiences that we have. A skill could be hard or soft. Hard skills are specific, sometimes technical activities that we can do well; but Soft skills are qualities and strengths that are specific to us as an individual. Depending on its nature, each skill that we have will also fall into one of three main categories. These categories are;

1. **Transferable skill**: A transferable skill is one that can be used in a variety of situations or jobs - we transfer them from one job to another. The great thing about transferable skills is that they make us adaptable. Transferable skills can be hard or soft skills. Example:
    - Skills of Problem solving
    - Skills of ability to organize others
    - Skills of ability to work with facts and figures
    - Skills of communication etc.
2. **Self-management skills**: Self-management skills enable us to work well in different types of situations with a variety of people. These can be hard or soft skills. Examples include meeting deadlines, being motivated and showing initiatives to apply center of excellence experience, etc.
3. **Specialist skills**: Specialist skills usually related to a specific job or group of jobs. These are usually hard skills. Examples include fluency in a language or the ability to use specific computer programs and technical equipment

Knowledge and Skill transfer is rapidly accelerated by on job training, coaching and mentoring support to enable successful capacity building. But this requires first developing positive attitude by the one who is going to receive the knowledge and skill from the knowledgeable and experienced person.

Skill and Knowledge transfer mechanism, three steps;

1. **Creating skilled individuals with positive attitude**. Make the goal and objective of the system clear to all implementers and to the management. Show clearly the importance of the center of excellence system to the hubs as well as the implementers and beyond its importance to the organization. Ensure and clarify the nature of the center of excellence as it is non-complicated and non- time wasting. It is known that, it is impossible to develop Positive Attitude within a day; therefore, a repeated and continuous effort in briefing and debriefing of goals and objectives together with the expected outcome of the center of excellence initiative should be explained.
2. **Creating excellent documentation habits**; Documents are a mirror to show actual image of any pharmaceutical activities of the hub. Good documentation is a systematic procedure of preparing, checking, verifying, issuing, storing and reviewing of any documents. Since

good documentation practice is an essential part of the quality assurance. The purpose of documentation is therefore:

- To avail directives, guidelines, Standard Operating Procedures of the implemented system and to use them as a reference material to whom in need of them
- To ensures all personnel know what to do and when to do it
- To ensure that authorized persons have all information necessary for issue of product
- To ensures documented evidence, traceability, provide records and audit trail for investigation
- To ensures availability of data for validation, review and statistical analysis
- To ensure the successor to continue the activity without any interruptions and for continues improvement

Documentation can be divided into:

- **Documents**: Communicate information through policies, processes and procedures
  - Need Updating.
  - Ensure the quality and consistency of processes /activities
  - Preserves learning and knowledge
  - Provide background history
- **Records**: Capture information on worksheets, forms, labels, charts, and so on.
  - Are permanent, not changed/updated.
  - Provides legally valid evidence

3. **Transferring of technical knowledge and skill;**
   - Conducting roll out training
   - Providing on job trainings
   - Conducting hub to hub experience sharing
   - Providing materials and documents required for the implementation and
   - Providing mentoring and coaching of the practical application of the system implemented.

Therefore, knowledge and skill obtained from center of excellence initiative implementation at Adama hub can be transferred to other hubs.

3. Core activities for CoE achievement scale up

3.1. Inventory analysis

Visualizing an increased availability of affordable quality medicine and health supplies and improved effective use of health commodities through improved use of data for decision making, it has been started to execute a detail analysis of inventory in the whole branches of the agency. The result from the operation will give us a potential for minimizing wastage, reducing the overall supply chain cost, and also give a clue for redistribution operation and minimizes the nowadays overstated inter-branch and branch-to-head quarter availability variances and inconsistencies.

Besides, the analysis will enhance our efficiency in warehouse operation activities which in our cases are the most overlooked but critical processes. The following discloses the prime objectives of analyzing the stock movement and inventory management.

This unit comprises matrices based on the value of products, frequencies of issues, product essentiality based on the stock distributed last year and the stock on hand found in the pharmaceuticals warehouse. The matrices depicted in this unit are then – ABC-VEN-FSN.

The below listed points are the prime intents of going through the detail inventory analysis in sorting out by inventory management advantages:

- For pinpointing list of items having expiry date duration less than month of stock and plan for redistribution.
- Depicting the overstocked products for the same intervention above.
- To guide for future reporting and requesting alertness.
- To identify SKUs looking for attention.

FSN analysis: All the items in the inventory are not required at the same frequency. Some are required regularly, some occasionally and some very rarely. FSN analysis classifies items into fast moving, slow moving and non-moving. Here, classification is based on the pattern of issues from warehouse/stores and is useful in controlling obsolescence. To carry out an FSN analysis, the date of receipt or the last date of issue, whichever is later, is taken to determine the number of months, which have lapsed since the last transaction. It also considers the distribution and handling patterns of items from warehouses. The items are usually grouped in periods of 12 months. FSN analysis is helpful in identifying active items which need to be reviewed regularly and surplus items which

must be examined further. Non-moving items may be examined further, and their disposal can be considered.

F-S-N analysis helps to identify:

- Inventory policies and models for each of the categories.
- Review policies for different categories of items.
- Surplus stock where stock greater than consumption
- Non-moving items, for determining optimal stock disposal rules rather than inventory provisioning rules, for releasing the idle capital for productive purpose

Steps in FSN analysis;

1. Determine review period, usually for the past one year
2. Export product frequency of issue data from HCMIS
3. Arrange the product based on the number of issue frequency in descending order
4. Decide cut-off point for each category; using expert opinion;
5. Categorize the products in to fast, slow and non-moving based on the frequency that the item was issued in the specified period.

Note that; To decide the Cut off point for FSN you have to know the actual number of locations which can be used for pick face. Then after categorizing these locations to pharmaceuticals, supplies and chemicals. Then decide the number of products (Pharmaceuticals, supplies and chemicals) that needs pick face. Finally assign pick face to products by evaluating FSN and distance of the location from dispatch area.

ABC analysis; It is an inventory categorization method which consists of dividing items into three categories (A, B, C): A being the most valuable items, and C being the least valuable ones. This method aims to draw managers' attention on the critical few (A-items) not on the trivial many (C-items). ABC analysis provides a mechanism for identifying items which will have a significant impact on overall inventory cost whilst also providing a mechanism for identifying different categories of stock that will require different management and controls. When carrying out an ABC analysis, inventory items are valued (item cost multiplied by quantity issued/consumed in period) with the results then ranked. ABC analysis is the analysis of annual medicine in

consumption and cost in order to determine which items account for the greatest proportion of the budget

In day to day warehouse operations, pharmaceuticals are sometimes under issued, over issued, issued and not accounted into the system, misplaced, stolen etc. This results into inaccuracy in the inventory. Using the ABC categorizing technique continues stocktaking (Cyclic counting) process can be used to count and reconcile the pharmaceuticals. ABC classification of items in the inventory takes account of two basic aspects of products: the cost and annual consumption. The relationship between inventory quantity and inventory value is interesting and can be generalized as below:

Inventory group value	% Volume	% budget consumption
A	10-20%	70-80%
B	10-20%	10-15%
C	60-80%	5-10%

Steps in ABC classification:

1. Determine the annual usage (Consumption value) for each item,
2. Calculate the annual dollar/birr usage for each item,
3. Sort the items according to their annual dollar/birr usage. Arrange all items in descending order of its' annual consumption value.
4. Calculate the accumulated annual dollar/birr usage, percentage of the accumulated annual usage, and the accumulated percentage of the items
5. Decide the cut-offline either based on quantity or based on consumption value. Group the items into A, B, and C classes based on the percentage of annual usage.

VEN analysis; While in ABC, classification inventories are based on their consumption value and criticality of inventories is the basis for vital, essential and non-essential categorization. The VEN analysis is done to determine the criticality of an item and its effect on health care services.

4. **Vital**: This category encompasses those most critical items having extremely high opportunity cost of shortage, without which the activities would come to a halt. Such items must be available when demanded. It is normally used for classification of pharmaceuticals.

5. **Essential:** Essential items are quite critical with substantial cost associated with shortage and should be available in stock. By and large stock out of such items may cause temporary stoppage of activity. In other words, the stock out would result in expensive procurement and cessation of work in a major area of health care operation for which no stand-by facilities are available.
6. **Non-essential**: These group of items do not have very serious consequences viz. stoppage of health care service and so on, if not available when demanded but can be stocked. The stock out may entail nominal losses/expenses of procurement.

It would be advantageous to use V-E-N analysis along with ABC analysis so as to make effective management of pharmaceuticals. So, utilize VEN category in interpreting ABC analysis data. Is A items in V or B list? Sometimes A items were found in N list or even not found in our formulary list so this indicate to review the prescribing behavior of the facility.

ABC-FSN matrix development

Class	F	S	N
A	AF	AS	AN
B	BF	BS	BN
C	CF	CS	CN

Were shall we stock AF, …CN items?

VEN-FSN matrix development

Class	F	S	N
V	VF	VS	VN
E	EF	ES	EN
N	NF	NS	NN

This matrix will help for proper product location in the warehouse. According to VEN-FSN matrix developed by Adama hub, Amoxicillin 500mg capsule was A category product and was fast moving. It was located in the warehouse as follows,

Figure 1- Location of Amoxicillin 500mg capsule in Adama warehouse, May 2019

ABC/VEN/FSN – Matrix by Stock Keeping Units, SKUs

Adama hub conducted all the three (ABC, VEN and FSN) inventory analysis for commodities it handles and categorized the products using the matrix composed of all the three types of classification taking the first letter of each classes. For example, Amoxicillin - 500mg - Capsule was found to be fast moving, Vital and was most valuable (A category product). Taking the first letters of each classification, it was denoted as FVA.

Ser N	Code	Item	Matrix
1	Amox-2	Amoxicillin - 500mg - Capsule	FVA
2	Para-13	Paracetamol - 500mg - Tablet	FEA
3	Alms-21	Aluminium Hydroxide + Magnesium Hydroxide + Simethicon - (225mg + 200mg + 50mg)/5ml - Suspension	FEA
4	Amox-20	Amoxicillin - 125 mg/5 ml - Oral Suspension	FVA
5	Metr-01	Metronidazole - 250mg - Capsule	FVA
6	Cefr-32	Ceftriaxone - 1g in vial - Powder for Injection with 10ml Diluent	FVA
7	Clox-01	Cloxacillin Sodium - 250mg - Capsule	FEA
9	Cipr-11	Ciprofloxacin - 500mg - Tablet	FVA
10	Gent-40	Gentamicin - 0.30% - Eye Drop	FVC

Table 1- Partial view of product's category based on the three classification matrix, Adama May 2019

3.2. Pick face creation

Inventory slotting or profiling is the process of identifying the most efficient placement for each stock item in a warehouse or distribution center, considering item popularity, characteristics and

safety aspects. Strategically placing the item in the optimum location allows workers to pick items efficiently, quickly and accurately, and reduces the risk of injuries.

The pick face is the area where the pick occurs and is usually at floor or walkway level, where the health commodities can be easily accessed. As stock is picked from a full pick face, the pick face needs to be replenished. The correct way to do this depends on the design and partly on the operating process. Pick face replenishment must be done as the highest priority activity in the pick cycle. If the pick face is not replenished in time, the result may be a stock shortage at the pick face, delaying the pick process. It is recommended that product should replenished once thirty per cent of the stock has been removed from the pick face.

The below listed points are the prime intents of going through the detail inventory analysis in sorting out by warehousing advantages;

- To create fixed pick-faces for optimization of warehouse operation so as to augment picking accuracy.
- Redesign warehouse lay-out for warehouse operation efficiency
- Helps us in deciding the location of each individual items based on its movement (how frequently issued), value, and vitality tendency. Doing so, the frequently ordered, high value, and vital items will be planned to have a fixed location to the nearest of marshaling areas.
- The volume distributed, and its issue order history will give us an inkling that an SKU might need more than one fixed location.

Once the necessary data have been collected from inventory analysis, slotting rules must be established by setting up constraints and objectives. There are several ways to increase picking productivity with slotting. Placing the fast-moving items close to the shipping dock and on the lower pallet rack levels minimizes picker travel time. Store slower-moving items on higher levels and further away from the dock.

In Adama EPSA hub, FSN classification was used as primary method to locate inventories at fixed ground pick face followed by VEN and then ABC. See the following table

Rack																				
E			F			G			H			J			K			L			M
Location	Code	Matrix	Location	Code	Matrix	Location	Code	Matrix	Location	Code	Matrix	Location	Code	Matrix	Location	Code	Matrix	Location	Code	Matrix	Location
E1	Amox-2	FVA	F1	Clox-02	FVA	G1	Amox-01	FVA													
E2	Amox-2	FVA	F2	Amox-21	FVA	G2	Para-20	FVA													
E3	Amox-20	FVA	F3	Amox-21	FVA	G3	Para-20	FVA	H3	Sutr-20	FVA	J3	Cfce-60	FVA	K3	Metr-30	FVA	L3	Amph-42	FVB	M3
E4	Amox-20	FVA	F4	Omep-02	FVA	G4	Pred-13	FVA	H4	Sutr-20	FVA	J4	Cfce-60	FVA	K4	Amph-35	FVA	L4	Bepl-55	FVB	M4
E5	Metr-01	FVA	F5	Omep-02	FVA	G5	Nife-12	FVA	H6	Mebe-20	FVA	J5	Hyos-33	FVA	K5	Cime-31	FVB	L5	Liad-31	FVB	M5
E6	Metr-01	FVA	F6	Albe-20	FVA	G6	Gent-30	FVA	H7	Tram-1	FVA	J6	Cefr-31	FVA	K6	Tetr-45	FVB	L6	Phen-20	FVB	M6
E7	Cefr-32	FVA	F7	Pram-20	FVA	G7	Tram-30	FVA	H8	Doxy-01	FVA	J7	Fefo-10	FVA	K7	Adre-30	FVB	L7	Fura-56	FVB	M7
E8	Cefr-32	FVA	F8	DW40-34	FVA	G8	Sutr-11	FVA	H9	Spir-10	FVA	J8	Clar-11	FVA	K8		FVB	L8	Atro-30	FVB	M8
E9	Cipr-11	FVA	F9	Pram-30	FVA	G9	Norf-10	FVA	H10	Metf-10	FVA	J9	Cort-30	FVA	K9	Amit-11	FVB	L9	Frus-11	FVB	M9
E10	Cipr-11	FVA	F10	Thia-11	FVA	G11	Rani-10	FEA	H11	Vitb-30	FEB	J10		FVA	K10	Clot-60	FVB	L10	Dopm-10	FVB	M10
E11	Dics-30	FVB	F11	Para-13	FEA	G12	Ceph-20	FEA	H12	Para	FEB	J11	Indo-60	FEB	K11	Cipr-10	NVB	L11	Panc-31	NVB	M11
E12	Dics-30	FVB	F12	Para-13	FEA	G13	Eryt-10	FEA	H13	Epth-10	FEB	J12	Ampi-20	FEB	K12	Kyj4-01	NVB	L12	Aten-11	NVC	M12
E13	ENl-11	FVB	F13	Alms-21	FEA	G14	Muvi-11	FEA	H14	Bisa-10	FEB	J13		FEB	K13	Gris-11	NVB	L13	Xylo-40	NVC	M13
E14	para-61	FVB	F14	Alms-21	FEA	G15	Amcl-20	FEA	H15	Sulp-51	FEB	J14	Pram-21	FEB	K14		NVB	L14	calg-30	NVC	M14
E15	Cpzn-13	FVB	F15	Clox-01	FEA	G16	Eryt-11	FEA	H16	Sali-56	FEB	J15	Sali-14	FEC	K15	Timo-41	NVB	L15	Prom-10	NVC	M15
E16	Salb-20	FVB	F16	Ampi-02	FEA	G17	Penb-37	FEA	H17	Indo-01	FEB	J16	Hydr-30	NVA	K16	Ethn -11	NVB	L16	Amin-30	NVC	M16
E17	Wate-30	FVB	F17	Ibup-12	FEA	G18	Miph-10	FEA	H18	Zinc-50	FEB	J17	Prtu-11	NVA	K17	Tini-10	NVB	L17	Imip-11	NVC	M17
E18	Gent-40	FVC	F18	Dext-22	FEA	G19	Besa-56	FEB	H19	Vitb-10	FEB	J18	Vecu-30	NVA	K18	Pota-30	NVB	L18	Frus-30	NVC	M18
E19	Vitk-31	FVC	F19	Dext-22	FEA	G20	Clot-55	FEB	H20	Keto-10	FEB	J19	Tria-31	NVB	K19	Glib-10	NVB	L19	Mico-60	NVC	M19
E20	Dexa-30	FVC	F20	Ceph-02	FEA	G21	Phen-11	FEB	H21	Cort-56	FEB	J20	Ampi-31	NVB	K20	Prop-33	NVB	L20	Liad-31	NVC	M20
E21	Digo-10	FVC	F21	Ferrous Glu	FEA	G22	Cime-11	FEB	H22	Lora-10	FEB	J21	ENl-12	NVB	K21	Valp-10	NVB	L21	Halo-13	NVC	M21
E22	Pram-11	FVC	F22	Diph-20	FEA	G23	Tetr-56	FEB	H23	Vbbb-30	FEB	J22	Cort-56	NVB	K22	Hepa-31	NVB	L22	Fluo -01	NVC	M22
E23	Xylo-41	FVC	F23	CAF	FEA	G24	Bisa-60	FEB	H24	Azol-11	FEB	J23	Salb-10	NVB	K23	Mann-31	NVB	L23	Fuci -50	NVC	M23
E24	Praz-10	FEA	F24	Alma-10	FEA	G27	Wate-31	NEB	H27	Becp-41	NEB	J24	Clox-02	NVB	K24	Penc-35	NVB	L24	Hyda-11	NVC	M24

Table 2-Paritial view of RDF ground pick face locations, Adama May 2019

Location	Code	Item	Matrix
E1	Amox-2	Amoxicillin - 500mg – Capsule	FVA
E2	Amox-2	Amoxicillin - 500mg – Capsule	FVA
E3	Amox-20	Amoxicillin - 125 mg/5 ml - Oral Suspension	FVA
E4	Amox-20	Amoxicillin - 125 mg/5 ml - Oral Suspension	FVA
E5	Metr-01	Metronidazole - 250mg – Capsule	FVA
E6	Metr-01	Metronidazole - 250mg – Capsule	FVA
E7	Cefr-32	Ceftriaxone - 1g in vial - Powder for Injection with 10ml Diluent	FVA
E8	Cefr-32	Ceftriaxone - 1g in vial - Powder for Injection with 10ml Diluent	FVA
E9	Cipr-11	Ciprofloxacin - 500mg – Tablet	FVA
E10	Cipr-11	Ciprofloxacin - 500mg – Tablet	FVA
E11	Dics-30	Diclofenac Sodium - 25mg/ml in 3ml ampoule - Injection	FVB
E12	Dics-30	Diclofenac Sodium - 25mg/ml in 3ml ampoule - Injection	FVB
E13	ENl-11	Enalapril Maleate - 5mg – Tablet	FVB
E14	para-61	Paracetamol - 125mg – Suppository	FVB
E15	Cpzn-13	Chlorpromazine HCL - 100mg – Tablet	FVB
E16	Salb-20	Salbutamol (Albuterol) - 2mg/5ml – Syrup	FVB
E17	Wate-30	Water For Injection - 5ml – Injection	FVB
E18	Gent-40	Gentamicin - 0.30% - Eye Drop	FVC
E19	Vitk-31	Vitamin K1 (Phytomenadione) - 10mg/ml in 1ml ampoule - Injection	FVC
E20	Dexa-30	Dexamethasone - 4mg/ml in 1ml Ampoule - Injection	FVC
E21	Digo-10	Digoxin - 0.25mg – Tablet	FVC
E22	Pram-11	Metoclopramide - 10mg – Tablet	FVC
E23	Xylo-41	Xylometazoline HCL - 0.1% - Solution Nasal Drops	FVC
E24	Praz-10	Praziquantel - 600mg – Tablet	FEA

Table 3- Partial view of list of pharmaceuticals located at ground pick face of E rack, Adama May 2019

Procedures to establish Pick face

- Take the matrix developed in the previous session and arrange the pharmaceuticals as per the location allocated for each product.

- Allocate location nearest to dispatch area to a product with high frequency of issue data (F), vital (V) and high value (A). That means, place the fastest item in the first rack level-A and continue doing the same for all items
- If the rack level-A isn't enough for all products allocate the very slow-moving items in the next rack level B that allows operators to place the very slow-moving products stock on top of a pallet as the pick face or use half rack

3.3. Re-locate products to its designated location

Once storage method is determined (fixed ground pick face and fluid storage method for storage area as in the case of Adama hub) and paper-based location design is completed, the next and major activities will be palletizing, labeling, wrapping and moving each item to the its designated location. HCMIS functionalities must also update to accommodate product movement between established pick face and storage area.

As part of standardization Adama hub introduced three different colors for labeling different category of commodities. i.e. yellow for RDF, blue for health program commodities and white for products stored on behalf of head office (consignment health commodities). In addition to colour standardization, font style and size of the labels were standardized, see the following figure.

Figure 2-Standaridized labels, Adama May 2019

Adama experience showed allocating a pallet for small volume health commodities (medical supplies, chemical reagents, etc.) is wastage of storage spaces. Therefore, half pallet rack was established to better utilize available space. Half pallet rack created at Adama is being used as follows,

- Half rack L (from 36-to-52) is used for chemical storages
- Half rack L and M are planned for Medical Supplies and Equipment's.

NB; The frequency of issuing health commodities is more or less the same and scheduled. As a result, categorization based on product movement has limited additional value as compared to categorization based on program type. That is why Adama hub arranged health program commodities at pick face by the program type. Example ARV, TB, FH and malaria commodities are stored separately. For RDF, the storage system is fluid system.

4. Improved processes and warehouse operations

4.1. Dock to stock cycle

4.1.1. Receiving

Receiving is the process of identifying, visually inspecting, counting, and recording the receipt of all incoming materials. It is the receipt of stock at a warehouse or holding facility from any supplier. Pharmaceuticals may be received from commercial suppliers, upstream distribution centers or from customers (e.g. returns). Receiving process need preparation and completing actual receipt activities after arrival.

Preparation – receipt of pharmaceuticals is one of the major tasks of warehouses and any products issued from the warehouse must first be received. It is time consuming, requires much attention and should therefore be planned. Any supplier should provide advance notice at least a few days before scheduled shipment. The same requirement applies to upstream Pharmaceutical distribution centers in the same Country. Advance shipping notice should be detailed including quantity and types of items. Based on the information received the warehouse manager need to plan for the staff, material handling equipment, warehouse space, yard space, time, pallets etc. needed for receiving as appropriate preparation helps to optimize utilization of those resources.

Arrival of the shipment- Actual physical receipt starts here. Incoming stock needs to be checked carefully, received correctly, and stacked in a systematic way. The receiving of stock should be

performed according to the Standard Operating Procedure for Receiving of Stock which is compiled for use by the warehouse. Once the product is arrived, the warehouse manager needs to coordinate and complete the following receiving activities:

1. Unloading- Planning unloading can improve efficiency of the warehouse operation. The warehouse manager should inspect the arriving vehicle and the way shipment has been packed in order to determine the most efficient way of unloading. Sufficient staff as well as storage equipment must be available for unloading.

2. Checking stock against documentation- The package, quantities and condition or quality should be verified against the documentation. The documents used to verify the delivery are the original order and the invoice / packaging list that is attached to or included in the package. The supplier compiles this *packaging list* or *invoice* and it gives a detailed description of each item with delivery. Each item in the package is now checked by comparing it with the item ordered and the item reflected on the invoice/packaging list. Always ensure that the stock item complies with set specifications and standards.

3. Check for any discrepancy- A discrepancy is simply a difference on what was physically received versus what was send as per delivery note. It could be product difference, quantity difference, quality difference, batch difference and expiry difference.

4. Deal with discrepancy if any-Discrepancy must be followed and resolved shortly. Formal non-conformance report must be completed and communicated to the supplier. The report should include the details including product description, batch number and expiry, invoice number, date and time of receipt, transporter responsible for delivery, and nature of the discrepancy.

5. Capture data of received stock- If all of the above checks have been done and everything received is correct and corresponds with both the order and the invoice and the quality is acceptable, the person responsible for receiving the order signs and dates the packaging slip or invoice. Products can now be accepted into the stock control system by entering them on your stock card (manual system), or by capturing them on the computerised stock control system where a “goods received note” will be generated.

6. Sort the products and completion- At this point the stock is ready to be taken through the storage warehouse. It signals the start of storage process.

7. Completion and filing of documentation- After all documents have been correctly completed; it must be filed in order to be able to retrieve it easily. Documents may be filed according to date, invoice number, or supplier. This could be based on specific warehouse standard operating procedure for the sequence in which to file the documents. In computerised stock control systems, hard copies of documents may not need to be printed out, and these documents may be filed in the computer software program in specific folders created for this purpose.

Some of the documents used during receiving in EPSA warehouses are Stock transfer voucher, Invoice, Delivery Notes, Waybill, Packing list, Good receiving notification Form (GRNF), Good receiving voucher (GRV), Bin card/stock card, Credit Invoice form, breakdown of local supplier.

Note: Most of the documents have electronic copies in HCMIS

8. Acknowledging receipt- Because time, once delivered boxes have been thoroughly inspected, this transfers the responsibility from the driver or Cargo Company to the receiver. As stated, any damage or discrepancy must be reported to the supplier immediately for corrective action note/invoice or another relevant document (as agreed) must be signed. Usually involves writing the full names, the signature of warehouse manager and affixing the company stamp.

9. *Sampling for quality assurance Purposes-*Products received need to be sampled to verify the quality of products received in preparation for release. Products should meet predetermined compliance specifications using prescribed methods. This can be conducted by physical inspection as well as laboratory testing. Laboratory test of batch samples need to be conducted routinely by using random sample of some batch. Some facilities test "by exception". This means that analyses are conducted only when a supplier or particular product is suspect. The reason for this is that laboratory testing is costly. The Guidelines for laboratory testing might be focus on products that have greatest bio availability and stability problem, products from new or questionable supplier, and products that have been a source of previous compliant.

Inspection- is comparison or checking of quality, forms or size of Pharmaceutical received with the mutually agreed standards or specification. It is an essential part of quality control of all pharmaceuticals received. The quality may be defined as sum of the number of the related

characteristic or properties such as: shape, color, dimensions and weight, composition, strength, etc. warning signs to watch out when inspecting new arrivals

- ***Discolouration*** - If colour is not consistent to all packages could be a sign of deterioration or even counterfeit.
- ***Cloudiness*** – Particles that reflect light in injections.
- ***Packaging*** – If packaging was changed without notification.
- ***Temperature recording devises*** – In case of fridge lines or imports all pallets must have a temperature recording devise so that excursions can be monitored.
- ***Tampering-***Check the general quality of the outer shippers to identify tampering on change of tape.
- ***Damages***- Leakages, discolouring of outer cases due to rain etc.
- ***Labelling of outer shippers-*** Clear identification of the contents of the stock must be visible on each outer case. The label information must correspond with the contents of the boxes.
- ***Batch markings-*** Check if batch numbers appear on outer shippers as well as individual units.

*Documents used for during receiving process- Principal commercial documents (Pictures annexed for reference) that are used for receiving goods include***,**

a. ***Commercial invoice;*** A final invoice attested by the chamber of commerce of the country of the supplier is also among the principal document. One of the principal documents which details Batch No., expiry date, qty per pack…

b. ***Packing lis*****t**

c. ***Certificate of origin*****;** is a certificate which specifies the country of the production of the goods. This certificate is a necessity where a country offers a preferential tariff to India and the former is to ensure that only goods of Indian origin benefit from such concession. A certificate of origin may be required when goods of a particular type from certain countries are banned.

d. ***Order (P/O) or Requisition form*****;** No stock can be received in a pharmaceutical facility without an order being placed by the facility with the supplier. This order

or requisition may be a computer-generated list of items to be ordered, or it can be a list which is compiled manually.

e. **Bill of lading** is the principal document that serves as an evidence of the contract of carriage of goods and signed by a carrier. The Bill of Lading contains the name of the shipper; the name of the receiver; the name of the master of the ship; the name of the ship and the voyage number; the place of departure and destination;the price of the freight; the date of loading; the marks and numbers of the things shipped.

f. **Waybill**; This document is completed by the courier at the start of a delivery. A Waybill is used as the warehouse issuing document, certifying the transfer/release of goods. It is the base document for financial transactions, such as the payment of the supplier/forwarder and the recording of the accounting entries. The Waybill can be also referred to as the carrier document, listing the load, weight, size, final destination, etc. of the goods carried. As such, it is used as the delivery document to be presented to the receiving warehouse.

Auxiliary commercial documents; Some of the documents under this category include;

- Performa invoice (issued by the supplies very important to open L/C)
- Inspections certificate
- Shipping instruction
- Insurance declaration
- Mates receipt
- Regulatory documents
- Regulatory import or export documents are those which have been prescribed by different government organizations. Examples include Bank permit, EFDA

g. **Record of Incoming Goods (RIG);** The purpose of a delivery notes or RIG is to provide a record of:

    - The name and address of the supplier;
    - The name and address of the receiving facility;
    - The date on which the packages were delivered to the receiving facility;
    - The number of packages delivered

- A reference number(s), which could be the requisition number or order number, or the number of each invoice attached to or included in each delivered package.
- indicate clearly if any thermo-labile products or vaccines are included
- The name of the delivery person, the registration number of the delivery vehicle
- For incoming good by Air; Issued by transistor as evidence of handover of items to driver at airport, driver handovers to storekeeper

Discrepancy during receiving -It is simply a difference on what was physically received versus what was sent as per delivery document; all the following will be regarded as discrepancies. It could be quantity difference, batch difference, product difference, product quality, expiry date difference, etc.

4.1.2. Put away

Put away is the process of taking pharmaceutical from receiving area and placing it in the most appropriate final storage location**.** It also called stocking**.** In other words, it is the physical process of taking pharmaceutical from received area and placing them within the warehouse in the locations where they are to be stored. This process includes moving products from the unloading dock, or receiving area, after they are released for storage; and assigning them to their designated storage area (rack, shelf, floor, etc.). It is important that every product moved into or out of the racks, shelves, or any storage area must be correctly recorded on the stock keeping records; an inventory control system helps you manage them. Whether the process is manual or automated, the best practice is to put away products the same day they are received, because not doing so impacts space, causes congestion, increases transaction errors, and make item more susceptible to damage.

Put away activity in the pharmaceutical warehouse includes:

a. Identification of Product/pharmaceutical (segregating by item, batch, expiry etc.)

b. Identification of Storage Location (vacant spaces in the rack, in bulk area, pick face etc.)
c. Moving Products (using forklift transport to the allocated space)

d. Updating Records

Streamlining operations in the warehouse starts with product receipt and put away. The Put-away function affects everything that happens downstream in the order fulfillment process; it is difficult to fill orders if one cannot find the product. For this reason, implementing a zone-restricted put away strategy will yield immediate results during the pick, pack, and ship processes.

If several different line items are packed in one parcel, all items and each of their different batches need to be separated and placed in individual rack/shelves in the warehouse with a bin card. Large quantities of the same product which were not delivered on pallets may require palletizing before put-away. In principle only a single batch of a product should be stored on any pallet and different products or different batches of the same product should not be mixed on the same pallet.

Appropriate pallet load must ensure that stacks are stable during put-away. Cartons must be arranged crosswise to maximize stability during placing. Plywood dividers, fabric placed between layers or horizontally taping cartons significantly increase the stability of stacks. Proper stacking will prevent pharmaceutical from crushed, falling and being damaged and particularly very important when pallets are stored or placed on pallet racks since falling products can cause serious injuries. Pallets can be shrink-wrapped to increase stability and prevent products from falling.

Every batch of small quantities of pharmaceutical should be placed in small containers/tote box for consolidation and furnished with bin card (description of items) before put-away. These small quantities of parcels should be moved to the respective storage areas that is pick face.

Every product must be put-away in the zone with the storage conditions recommended by the manufacturer and indicated on the packaging as well as according to the requirements by national drug legislation.

Types of Put-away

There are four types of put away. This are-

1. ***Direct put away***: stocking directly to an active or reserve storage location.
2. ***Directed put away:*** A Warehouse management system (WMS) determines where to send product for storage. WMS (e.g. HCMIS) identifies location and quantity per location based

on a variety of factors (cube, demand, space available, size, pre-programmed parameters etc.)

3. ***Batch and sequenced put-away***: Sort inbound/incoming product for efficient put away. Sort product by type or some parameter then by location sequence
4. ***Interleaving or continuous:*** Perform both put away (stocking) with retrievals (picking). After completing put away, the stocker is directed to pull product to fill an order to re-warehouse. *Eliminates deadheading = coming back empty handed*

Adama hub put away experience; Steps

1. Empty rack location searching (by warehouse operatives)
2. Labelling (by warehouse manager)
3. Wrapping (by Warehouse operatives)
4. Forklift operator put the products on the assigned location
5. Confirm the put away accuracy (physical vs. on HCMIS)

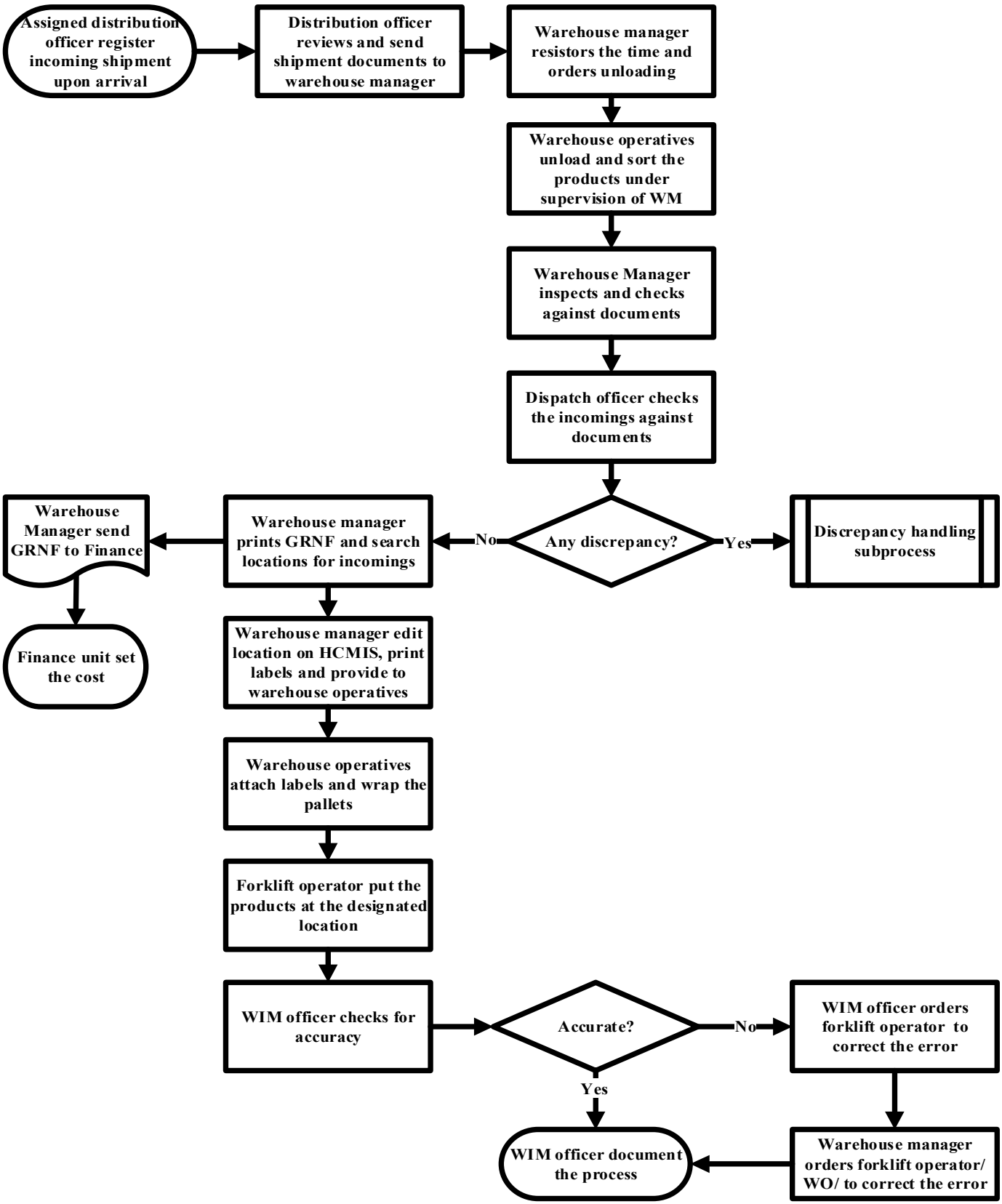

Assigned distribution officer register incoming shipment upon arrival
Distribution officer reviews and send shipment documents to warehouse manager
Warehouse manager resistors the time and orders unloading
Warehouse operatives unload and sort the products under supervision of WM
Warehouse Manager inspects and checks against documents
Dispatch officer checks the incomings against documents
Any discrepancy?
No
Yes
Discrepancy handling subprocess
Warehouse manager prints GRNF and search locations for incomings
Warehouse Manager send GRNF to Finance
Finance unit set the cost
Warehouse manager edit location on HCMIS, print labels and provide to warehouse operatives
Warehouse operatives attach labels and wrap the pallets
Forklift operator put the products at the designated location
WIM officer checks for accuracy
Accurate?
No
Yes
WIM officer orders forklift operator to correct the error
Warehouse manager orders forklift operator/ WO/ to correct the error
WIM officer document the process

Figure 3-Dock to stock process map_Adama experience, June 2019

4.2. Customer order management

Order processing refers to the workflow associated with serving a customer's order, from the receipt of the order, until the goods have been delivered to the customer and properly documented. It consists of complex stages happening in a sequence and supported by other business processes within the organization. The end result of the process is the fulfillment of a customer's order. A consistent order fulfillment process results in customer satisfaction. A typical customer order has sex stages are order preparation, order transmittal, order entry, order filling and reporting.

4.2.1. Order Preparation

This is the stage where a demand for a product becomes a signal for a buyer to place an order. There are several ways to do this: manually, via access to an online ordering system, or using electronic data interchange systems connecting a customer's internal order management system to that of a regular supplier. The use of standardized order forms is essential when ordering.

4.2.2. *Order Transmittal*

Once the order is finalized, the customer transmits the order information to the supplier either manually, sent via email, or clicking a confirmation key when ordering online, or using EDI systems. Once received, the seller or supplier triggers the process in serving the order.

4.2.3. Order Entry

This is the part where the seller/ supplier checks the order for validity before serving the items. Details such as Order Date, Payment Terms, Item, Order Quantity, Unit Price, etc., are checked. Checking also includes stock checking, accuracy checking, credit checking, back ordering, order cancelling, transcription, and billing. The accounts receivable system is a reference for order entry since customer credit or payment status is required to clear the order to be served. Customer feedback is also important especially when the order cannot be served as expected by the customer, for whatever reason: product not available, delivery date not feasible, credit or payment impediments, etc.

4.2.4. Order filling

Once the order is cleared, the preparation process begins and may involve product retrieval, production or purchase. For most finished goods, product retrieval from a warehouse is triggered

by a pick slip, a report used to gather the items that are on a sales order.

4.2.4.1. Picking / order retrieval

Order picking can be defined as the activity by which a small number of health commodities are extracted from a warehousing system, to satisfy several independent customer orders. Picking processes have become an important part of the supply chain process. The picking function in a warehouse can be up to 55% of the operating cost, with travel to, between and from location being up to 50% of that labor involvement. It is seen as the most labor-intensive and costly activity for almost every warehouse, where the cost of order picking is estimated to be as much as 55% of the total warehouse operating expense in general. So, establishing a pick face will enable to facilitate the order picking efficiently. It is also crucial to choose the most appropriate method of picking.

It is the process of selecting products from storage area in the required quantities and at the required time to meet customer orders. The process of selecting products to ship, called order picking, is one of the most critical functions in warehousing, and represents an opportunity for error, damage, or loss if not properly managed. It can also be defined as the retrieval of stock keeping units (SKUs) from a warehouse according to a pick list generated from a customer order, prior to the dispatch of the completed order to the customer.

Order picking efforts should be managed for maximum efficiency by attempting to reduce travel times, mis-picks and product damage while maximizing worker efficiency and reducing time spent on picking.

Products can be transferred in pallet, case, or unit quantities. In the case of pallet quantities, product can be extracted from the reserve storage areas and brought directly to the marshalling area by equipment (e.g. by a reach truck or hand pallet truck and trolleys).

Picking activity is becoming increasingly important in supply chain management. Any underperformance in order picking can lead to unsatisfactory service and high operational costs for the warehouse, and the whole supply chain.

Order picking can be accomplished using paper-based methods, commonly called a “pick list”, or electronic methods using a radio frequency (RF) terminal. In general, picking still tends to be largely a manual operation. However, there are many technology aids in terms of information systems and equipment that may be used to provide high levels of productivity and accuracy. Thus,

whilst advanced 'automated warehouses' like HCMIS can often work effectively without direct operatives in the pallet reserve storage areas, the case and unit picking operations tend to be manually operated with technology assistance.

Picking methods and strategies

Many warehouses continue to pick orders individually, however, there are ways of combining orders to speed up the picking process. Order-picking methods can be manual, power-assisted, automatic, or it may be a combination of these methods. A manual system uses two or four-wheel trucks or cars pushed through the pick line and hand loaded. A powered system uses unguided or guided vehicles to transport and//or elevate the warehouse worker through the pick line. The order picker manually loads pallets, carts, or other containers. An automatic system uses the computer to guide the picker to the pick location, elevate him to the proper pick height, instruct the picker to the pick product, and indicate the proper pick quantity. Automated picking may be any combination of these, accomplished through computer control.

Picking methods can also be zone picking, batch picking, wave picking, or a combination of the three.

Pick by individual order - Line items are collected from all locations by an individual for a specific customer order. Once picked, the operator returns for the next order; in this case instruction can be paper-based systems (pick list), scanners, or voice technology. It is normally a single-stage process unless every order is checked on dispatch. Prone to error if using paper-based system. It is time-consuming. Handling equipment can range from a trolley to a forklift truck.

Zone picking-Zone picking is accomplished by arranging pick lines in zones that handle similar types of items. Zone Picking - as the name implies, order pickers are assigned to a specific and physically defined zone in the pick area. The picker assigned to each zone is responsible for picking all of the SKUs that are located in the zone for each order. In the event that an order requires SKUs that are located in multiple zones, then the order is filled after it passes through each zone. This is typically referred to as "pick and pass" methodology. Additionally, in zone picking there is only one scheduling period per shift. Therefore, there is a cutoff point for orders to be queued into the order picking process and any order received after that cutoff point will get fulfilled during the next shift.

Batch picking-is when a worker picks a group of orders, called a batch, at the same time. If the same product is to be included in more than one order, the total amount of products necessary for the batch are picked at the same time, and then segregated into the appropriate order during the assembly process at the consolidation area. It should be noted that batch picking can result in mistakes, since multiple orders are being considered at the same time. However, this method can also significantly improve worker and warehouse productivity by limiting travel times and maximizing trips to the storage location.

Single order versus batch picking

Single-order picking requires the picker to assemble the total order before moving on to another one or in other words a complete pass through the order-picking area for each order to be picked. Single- ***Advantages of order picking***

- Maintains single-order integrity
- Simplifies the picker's job
- Avoids re-handling or repacking
- Provides fast customer service
- Allows for direct checking and establishes direct error responsibility
- Is highly efficient when the number of SKUs per order is small

Disadvantages of order picking

- Requires full order-picking route travel for all orders
- Doesn't allow for speed-picking of large quantities of an individual item
- Requires the highest number of picking personnel for a given number of orders

Batch picking is selecting of the total quantity of each item for a group of orders. In a breakout area, batches are resorted into the quantities for each order.

Advantages of batch picking

- Reduces travel to pick the total quantities of a group of orders. Picking travel time can be reduced as much as 50%.
- Minimizes picking time for quantities of an item
- Permits volume picking from large quantity or bulk storage, reducing the need for constant restocking of the pick lines.

- Provides a second check of the quantity picked by comparing the batch picked against the individual quantities in each order
- Improve supervision by concentrating the final order-assembly in a smaller area

Disadvantages of batch picking

- A second pick, or a distribution of the picked quantity, is required to fill individual order requirements
- Space is required for the distribution and order-assembly operation. Additional equipment may be required depending on the size of the batch-pick area
- Individual orders are open until the entire batch of orders is complete
- Counting is done twice and difference in count will require reconciliation time

A variation of batch picking is to have the picker first pull the total item quantity and then place the proper quantity in separate slots or tote for each order. The order picker is now doing single order-picking in a batch-picking mode. When combining these two methods of picking, higher skill is needed since the potential for error is increased.

Wave picking involves a worker picking orders one line or product at a time, often resulting in longer order consolidation times and travel distances. The advantage of wave picking is simplicity and order accuracy.

The following are other terms related to order picking

Pick -to-order*:* the simplest form of this is where one picker in one circuit of the picking area collects the items required for one order. This may be appropriate when one order will typically fill the capacity of the picking trolley or truck. An extension of this is when more than one order is picked per circuit, but each of the orders is accumulated into a separate container so that at the end of the picking circuit each order is discrete. Another form of pick-to-order is where pickers each pick part of a customer's order, for example where an order may fill several pallets.

Pick -by -line or pick -to-zero*:* under this concept, the exact numbers of cases or items are presented for picking. For example, they may be brought forward from the reserve storage area or they may be specifically ordered from suppliers for cross-docking. In both cases, the unit load of one product line is picked to waiting customer orders (hence pick-by-line) and the picking continues until that line is exhausted (hence pick-to-zero).

There are a number of factors that need to be considered in determining which of the above concepts to use, for example the product range, the size of order, the picking equipment, and the size of unit load or container into which orders are being picked.

In some situations, it may be appropriate to make use of a combination of two or more of the above picking regimes within one picking system. A typical warehouse order will require just one or two slow-moving products, but a large quantity of fast-moving popular products. In this situation the picking area may be laid out with popular products near the dispatch area to minimize movement, with the less popular products, which require fewer picking visits, further away.

The picking strategies can be the following:

- One item or one line per trip: Big, Sorting or consolidation is needed later
- One order per trip:
- A batch of orders per trip: Sort while pick or sort after
- A portion of an order (zoning): Too big, for faster response, Consolidation while picking or later
- A portion of many orders (batching + zoning): Economy of scale, Higher pick density, Sorting while picking or sort after

Requirements to be effective pickers & picking process

Pickers should fulfill the following requirements to accomplish the picking products in a warehouse effectively and efficiently:

- Pickers should be physically fit
- Picker should be able to walk, bend, kneel, stretch and climb ladders etc.
- Able to read and write and know basic multiplication
- Know how to operate a calculator
- Understand the layout of the inventory
- Pickers must know how to work machinery
- Familiar with the types of medicines
- Know how to operate scanners that they might be required to pick with
- Write neatly to indicate items picked or short on a pick list and not scratch all over the sheet to make it illegible for checking

Some of the most important information that should be considered by pickers is listed below:

- Pickers should know how to pack a pallet so that items on top of pallet is stable and easily checked by security
- Heavy item, glass and bottles of liquids should be placed at the base of a pallet
- The pallet should be drawn slowly on the pallet jack to avoid items falling and be careful of boxes falling off the pallet
- Pickers should not pick in a new area without training and should know where to start their pick
- Pickers should have a pen and clipboard if picking from a paper pick sheet
- Items of the same product should be packed and grouped together on a pallet. Products packed so that easy to count packing of pallets.
- Avoid packing pallets too high
- Do not pick damages onto the pallet
- Pickers should pick within the acceptable range for daily performance
- Picked stock should be placed in the allocated area for checking by the pharmacist or warehouse manager
- Report closed picks to the picking controller for planning purposes

The key to efficient order picking is knowledge of inventory amount and location, including stock keeping unit (SKU), lot numbers and inventory rotation schedules. Warehouse management systems (WMS) can effectively manage the exact location of all products in the warehouse, thereby reducing travel times, pick times and errors. Irrespective of the system in place in a warehouse, an effective stock location program is imperative for streamlined and efficient order picking.

Procedures/process for Picking

Typically, the order picking process involves:

- Clustering and scheduling of the customer orders;
- Assigning stock on locations to order
- Releasing orders to the floor;
- Picking products from the correct storage location;
- Dispatch to the customer of the picked product

After issue orders are communicated to storage warehouse for items to be delivered to a branch/health facility, a picking list/slip is prepared and given to warehouse operatives, for picking items from storage area and move them to the dispatch area. Verification of the items picked against the picking list/slip is carried out on the dispatching area.

Picking SOP- EPSA has developed storage and distribution SOP for picking of products in the warehouse so it is better to be referred this revised SOPs concerning the picking process and how to handle picking tasks.

Usually a Warehouse has a picking controller who:

- Does the daily planning.
- Allocates picks to the respective pickers.
- Monitors performance.
- Checks resources for the workload.
- Allocates MHE to pick full pallets and replenish pick faces.
- Sorts out inventory queries where no stock can be found.
- Ensures that the day's work is completed on time to allow loading of the vehicles.

Picking can be paper driven, or you can pick with a RF scanner that tells you what to pick and where to pick it. Resources are often divided by dept. or sometimes cross trained and mixed.

4.2.4.2. Checking, packing, marshaling, and Dispatching

After the items have been prepared, a shipping confirmation is generated to record how many items were picked and packed for shipment based on the order. Information confirmed at this stage serves as a basis of the details of the shipping documents (e.g. waybill), and final invoice for the customer. ***Checking:*** it refers to the process during which the order is checked against the invoice to ensure that the correct product, quantity, and batch number has been picked or received. It is the act or an instance of inspecting or testing to determine accuracy, quality, or other conditions. Pharmaceuticals can be checked:

- When receiving new products
- During put away
- During picking and packing

- When dispatching and loading pharmaceutical etc.

The Checker will also ensure that the carton labels reflect the correct client and delivery details. Pickers should clearly have marked picks and put picks into the designated area for checking. The checking area should be outside of the store area before the dispatch area. Checker might use a clean check sheet and items checked can be marked or ticked on the actual boxes and also ticked off on the check sheet. Checker should ensure that there are no damages and badly packed pallets should be repacked properly. Checker has to check Code, description, pack size and quantity.

A case count can be done for each pallet and this can be tallied up on the check sheet. Mistakes must be rectified immediately and double checked. The picker should be called to rectify and confirm the mistake in quantity or product. A record of the mistake should be kept by the checker to determine extra training. After final checking the pharmaceutical can be packed and prepared for distribution. Full pallets and loose pallets should preferably be shrinking wrapped. Labels should be applied to ensure the products are issued to the right destination/customer.

Packing*:* it refers to the process during which the order is packed into the correct sized box or boxes or onto a pallet in a manner to prevent damage during transit. It is also referring to wrapping up of a single item into a casing or sealing loose cartons and box orders that have been picked so that pharmaceutical arrive in the target place or service delivery point in a beautiful manner.

The packing facility provides the user with the capability to identify individual parts that need to go through packing procedures. Packing can be a wrap, labelling or any other procedure defined by the user or customer.

Packing material - is needed for packing and it should be light, easily available, and inexpensive as customers do usually not return it.

Packing of picked pharmaceutical in a master carton is the first step in a wider consolidation process of loads for transport. It greatly facilitates handling and increases handling efficiency during transportation. It also increases space utilization, facilitate ease of loading and receipt at destination. Proper packing protects pharmaceutical from light, damage, leakage, water and discourages theft during transport and unloading.

Some of the functions of proper packing of pharmaceutical for transport and storage are the following:

- Consolidating/Combining pharmaceutical to increase space utilization during transportation and facilitation of storage
- Containment/Controlling pharmaceutical to discourage theft during transport & storage
- Facilitation of handling and increase of handling efficiency
- Mechanical protection (crushing, breaking, bending, deformation etc.)
- Environmental protection (from sun, rain etc.)
- Identification of pharmaceutical
- Information (for handlers & carriers etc.)

Packing of stock can be done manually or system directed according to barcode and location sticker.

The supply of items for the customer's order is to be protected and marked to make sure all the following is obeyed:

- All packages must be capable of withstanding road and air transport over long distances and rough terrain/topography
- Packaging must be capable of being moved multiple times unloaded and reloaded throughout metropolitan and rural areas.
- All packages must be capable of being safely lifted on and off transport without rolling, tipping, or sliding around.
- Packaging methods used must ensure safe delivery of products to the site.
- Take in to account the weight and size limits of vehicles that can be transport commodities to sites. (This could vary because of road load weight limits, loading, and unloading equipment available.)
- No employee or contractor is permitted to manually handle an item that may affect his or her health or safety. Packaging should be suitable for lifting with forklift or hand truck.
- For all palletized pharmaceutical, strong, and durable pallets are required for the access and safe lifting with forklift and hand truck.
- Where multiple items are packed on one pallet, heavy items must be packed at the bottom and secured using strong plastic strapping and also shrink wrapped in a way to waterproof the order.
- Securing straps are to be secured so that there is no abrasion or other damage to the items.

- Multiple packages wherever possible, must be either placed in a secure cage or palletized for ease of handling or clearly labeled.

To perform packing, there must be an area dedicated for this activity where picked items can be packed for dispatch, and an area where items can be transferred to the delivery vehicles. An area with large packing tables dedicated to checking, counting, recording and packing consignments, as well as making and labelling of cartons and boxes is also essential. In the packing area, dedicated shelves should be set up for storing packaging material such as tape and empty master cartons as well as packing equipment such as tape dispensers.

Packing process in a pharmaceutical warehouse

In the packing area of the warehouse, the picked pharmaceutical is checked against the STV/DN and then packed. Any packing requirements indicated on customer orders should be considered. Any empty space of cartons is filled with loose pharmaceutical. Some pharmaceutical need Special consideration during packing. Example, packing narcotic and psychotropic products, flammable products, cold chain items, etc. cold chain product and dangerous chemicals must be clearly marked with standard stickers. Handling information such as fragile, protect from water, this side up, don't freeze, don't expose to direct sunlight etc. Should be labelled clearly during packing process.

Cold chain products such as vaccines, certain drug products and single use medical devises (e.g. diagnostic tests) require special cold chain equipment in order to maintain temperature between 2 to 8 degree Celsius throughout transportation and storage. Cold boxes (vaccine cold boxes) are specially designed (insulated) which are lined with conditioned icepacks in order to maintain internal temperature of 2 to 8 degree Celsius for up to 134 hours and are intended for transportation or temporary storage of cold chain loads.

Points to be considered during packing include:

- Neatly and correctly packed starts at receiving of products
- Packing on pallets should be uniform
- Batches of similar products should be sorted
- Same items should be grouped in an area to consolidate similar product
- FEFO to ensure proper stock rotation and avoid expired stock

- Damaged product and boxes should be removed and adjusted off the system
- Aisles should be kept clean
- Pallets can be labeled on the outside to indicate expiry date/batch etc.

Pharmaceutical for customer will be packed and labelled as per the storage and distribution standard operating procedure of pharmaceutical fund and supply agency. As per the revised SOP 2015 edition, the warehouse operatives are responsible for packing and labelling of customer orders to make ready for dispatching and loading.

Marshalling/staging- means combining pharmaceutical or pharmaceutical that contribute to a single order. All pharmaceuticals of single order are brought together and checked the missing of items, the correctness of products, and changed order information if required (updated order information).

Labeling, or staging, marshalling space is an important element of the warehouse for put away and packaging. Proper labeling improves the ability to identify, track, store, and select the correct product for order fulfillment. Once the product has been selected, or picked, it is brought to a staging area for final processing; the loading dock is a hub of activity as products are arriving for storage and being staged for distribution. Effective management of this area is crucial for warehouse success. It is here that cross-docking takes place.

The final stage of warehousing is the transportation facet of delivering and shipping Pharmaceutical.

Dispatching**:** It refers to items being selected from warehouse and then marshaled, documented, loaded, and subsequently delivered to their destination (customers, suppliers, returns to suppliers, users, inspectors, export agents, etc.).

Dispatching of shipments activity performed after marshalling of shipments. Marshalling means combining pharmaceutical that contribute to a single order whereas dispatching the shipments are package orders, prepare shipping documents and load pharmaceutical onto the right vehicle.

For dispatching pharmaceutical packages must be properly marked. The markings should indicate the type of product, destination, gross weight, dimensions, and any special handling instruction and be suitable for easy reading, distinguishable, dark, and bold. The types of items to be dispatched may include pharmaceutical to be distributed; returns; transfers; and to be inspected.

Dispatching activity is a reflection of the Pharmaceutical receipt/receiving activity. For dispatching specifically, the following tasks should be considered:

Ensure that there is room available for any packing, loading into cages, stillage, pallets, etc.

Assemble the Pharmaceuticals in the Pharmaceutical loading/assembly areas (maybe using a template following the floor layout of delivery vehicle).

- Check the order documentation and record each item against the consignment note.
- Check the Pharmaceutical for condition, possible damage and carry out quality checks
- Report discrepancies and inferior condition/quality.
- Establish the correct loading area; ensure that it is safe and suitable for the operation.
- Ensure that the vehicle is safe before loading.
- Load the vehicle.
- Position/fix the security locking system, for example seal(s), with the driver present.
- Obtain the driver's signature.
- Record the departure of the vehicle and note the security locking seal(s) or number(s).

Dispatching process may include adding value activities, such as labelling, tagging, assembly, testing, and packing into cartons.

Documents used in dispatching and dispatch processing

Documents used for dispatching

1. ***Sales Advice Note****:* when the issues to be dispatched are for customers, the issue or order will be made up against a copy of the purchase order provided by the customer. The Information contained in this document includes item name and amount ordered; code number; destination; customers name and address; and special handling or deliver. Example, STV, DV, cash invoice etc.
2. ***Return-to Supplier Note:*** this is used when items are to be sent back to suppliers for reasons such as: damage; non-usage; sale or return agreements and faults. A copy of the return-to supplier note will be held by stores and a further copy will be sent to purchasing as a permanent record of the return.

3. ***Internal Transfer Note:*** this is used when pharmaceutical are being transferred from one part of the operation to another usually in a different part of the country, but within the same organization. It contains details of products to be transferred including code number, amount and destination.
4. ***Loading Sheet:*** This is usually prepared by the transportation/ logistics department. the dispatching personnel are responsible for making-up loads that are economical for lorries

The uses of Loading Sheets are the following:

- Stores will use it to select and marshal Pharmaceutical into the loading bay against the Loading Sheet.
- Drivers will use the loading sheet to check on and off the loads they carry.
- The customer will use the loading sheet to check the delivery in some cases the Loading Sheet becomes the organization's Sales Delivery Note.
- Sales/Marketing Department will use the returned loading sheet as a confirmation of delivery.
- Dispatch will use the returned Loading Sheet as a permanent record of these activities.

The Dispatching Procedures/process

There is no standard procedure, but the chains of activities include but not limited to:

1. ***Production and distribution of documents***- dispatching documents will be sent by the dispatch department to the sections involved such as stores, loading, sales, customers, or Suppliers.
2. ***Selection and marshaling of stock required-***Picked items are placed on dispatch area and arranged by category convenient for count.
3. ***Checking and loading of stock by loading staff-*** Warehouse managers or dispatch officers count the dispatch and verifies against picking slip/issue order and sign on it the picking list. Dispatch checker confirms the correctness of the dispatch count and sign on the picking list and STV/DN.

4.2.5. *Order Delivery*

Shipping documentation and the schedule of delivery is arranged at this point. Shipping logistics agreements and insurance against damage or loss during handling are important considerations for

order delivery. But the most important goal of this process is to meet the delivery schedule agreed with the customer.

4.2.6. Order Status Reporting

It is vital to provide the customer with a status of the order once this has been shipped out. This starts with the tracing and tracking of the order once released from the warehouse. Order tracing/ tracking technologies like laser-beam bar-coding, and GPS applications are being used by some companies. The Invoice, which contains the order details and the charges, are also released at this stage, and Invoice transmittal may be done manually or electronically via email or any online applications.

The elements of Order Processing are complex interdependent steps that need to be performed seamlessly to ensure a smooth delivery of goods to the customer. Each element is supported by separate independent processes happening simultaneously with the order process. An effective order processing system must have a smooth interface with other existing business processes in order to operate optimally. The goal is to fulfill customer orders with consistent reliability, enhancing the customer experience with the company, and bring about customer satisfaction

4.2.7. Adama EPSA's customer order management

Improved EPSA hubs customer order processing at Adma is similar the typical order management process described above. The hub designed clear procedure with designated responsibilities of the performers of each step to make sure that customer order will be tracked at any time in the process. Brief description is given below.

4.2.7.1. *Order preparation*-

It is the responsibility of service deliver points to determine items types and quantities needed by them every month at specified time for program commodities and RDF for selected SDPs based on their consumption trends. SDPs used standardized request and report form to prepare their monthly refill requests. Although determination of items and quantiles for RDF commodities for facilities not selected for piloting monthly distribution is similar, the refill time is not specified and based on the requestor SDPs demand. Because of this difference in time of the two categories of SDPs, the consequent steps will vary.

4.2.7.2. Order transmittal

SDPs submitted completed official RRF to the hub through different methods including, not

limited to, direct in person, through woreda or zonal channels appropriate to them. Upon receival, the hub registers and pass on to distribution team for the next processing steps. SDPs that are not included in the pilot monthly distribution do submit their completed and official RDF request to hub in person and follow their order status by their delegates.

4.2.7.3. Data entry and commercial invoice preparation

Designated distribution clerks review RRF for quality and completeness, and key in to the HCMIS hub edition.

4.2.7.4. Order picking

Order picking process is standardized at Adama hub and the performance of each picker is tracked. See the order management process map for detail.

Figure 4- Partial view of Pick list tray, Adama May 2019

4.2.7.5. Checking, packing, marshaling, and Dispatching

Marshaling experience at Adama hub

- Labelling the products (writing the name of the facility on the carton)
- Wrapping the products
- Placing the product on the outbound rack location (It is outgoing Shipment)
- Loading the products from outbound to vehicle

Figure 5- partial view of marshaling and dispatching area, Adama May 2019

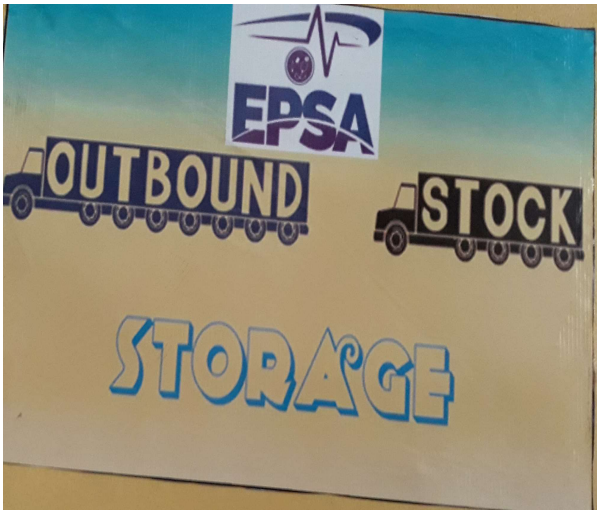


Figure 6-out bond storage area label, Adama May 2019

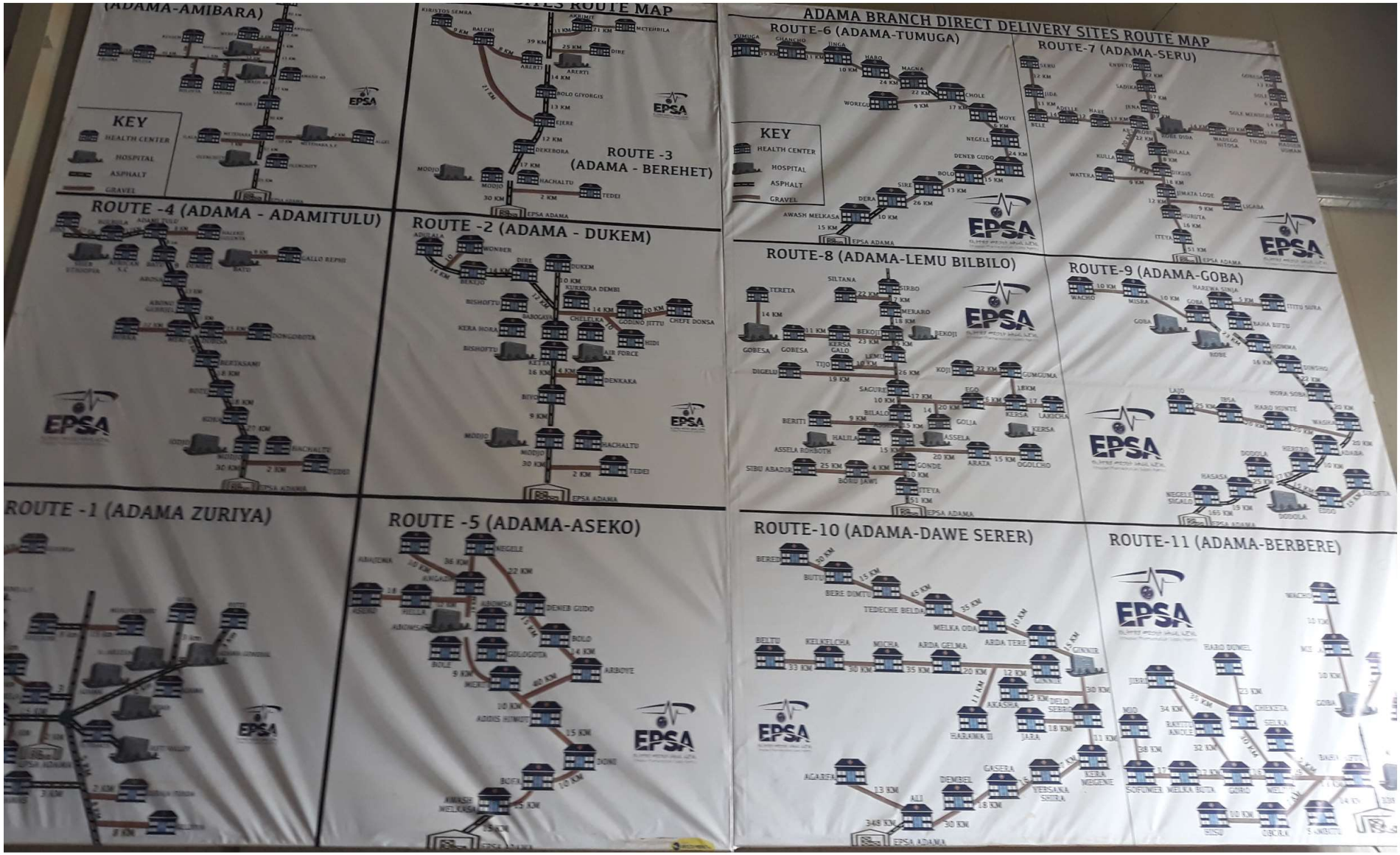


Figure 7- Partial view of SDPs delivery route map, Adama

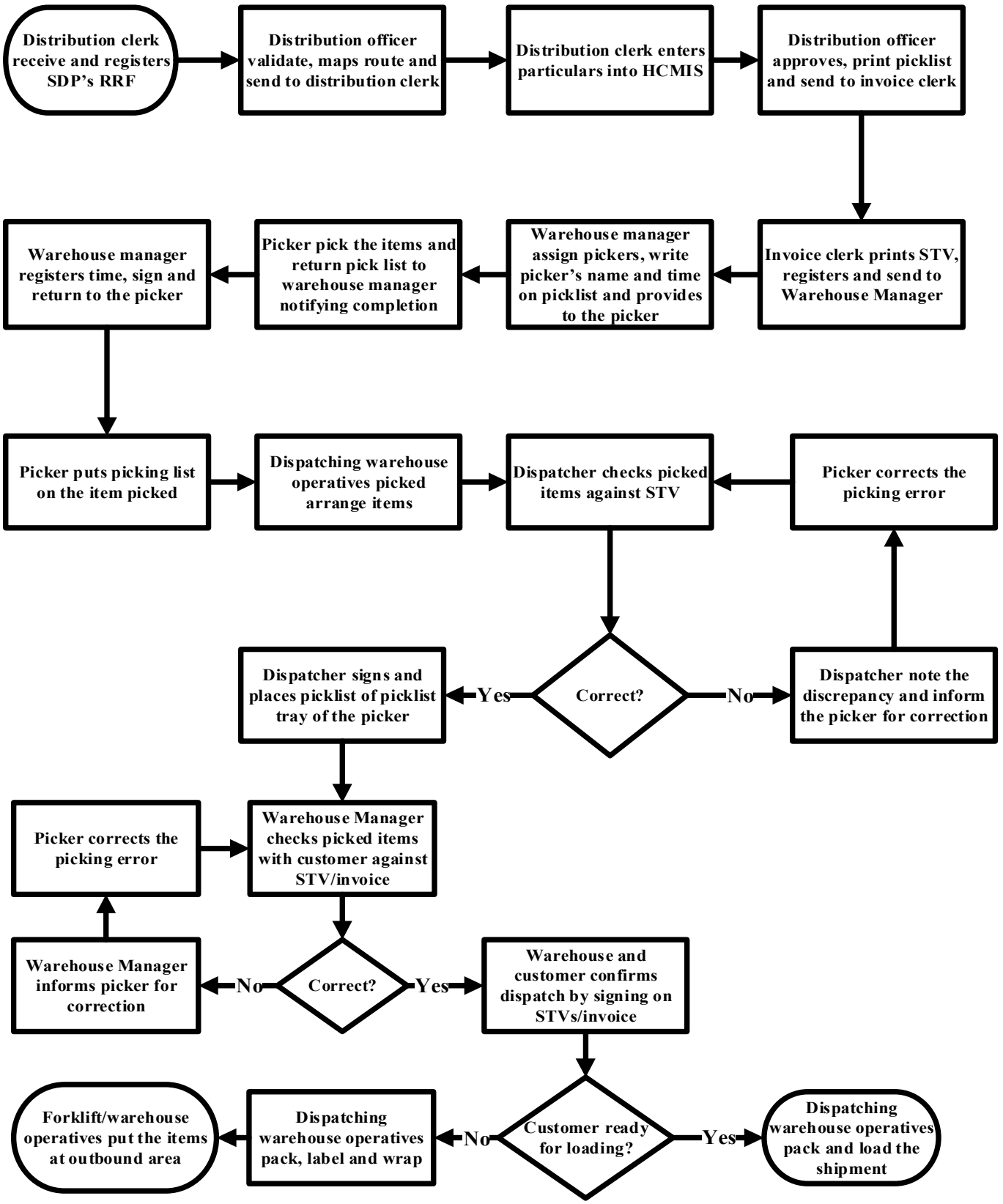

Distribution clerk receive and registers SDP's RRF
Distribution officer validate, maps route and send to distribution clerk
Distribution clerk enters particulars into HCMIS
Distribution officer approves, print picklist and send to invoice clerk
Invoice clerk prints STV, registers and send to Warehouse Manager
Warehouse manager assign pickers, write picker's name and time on picklist and provides to the picker
Picker pick the items and return pick list to warehouse manager notifying completion
Warehouse manager registers time, sign and return to the picker
Picker puts picking list on the item picked
Dispatching warehouse operatives picked arrange items
Dispatcher checks picked items against STV
Picker corrects the picking error
Correct?
Yes
No
Dispatcher signs and places picklist of picklist tray of the picker
Dispatcher note the discrepancy and inform the picker for correction
Picker corrects the picking error
Warehouse Manager checks picked items with customer against STV/invoice
Warehouse Manager informs picker for correction
Correct?
No
Yes
Warehouse and customer confirms dispatch by signing on STVs/invoice
Customer ready for loading?
No
Yes
Forklift/warehouse operatives put the items at outbound area
Dispatching warehouse operatives pack, label and wrap
Dispatching warehouse operatives pack and load the shipment

Figure 8- Program commodities order management process map, Adama June 2019

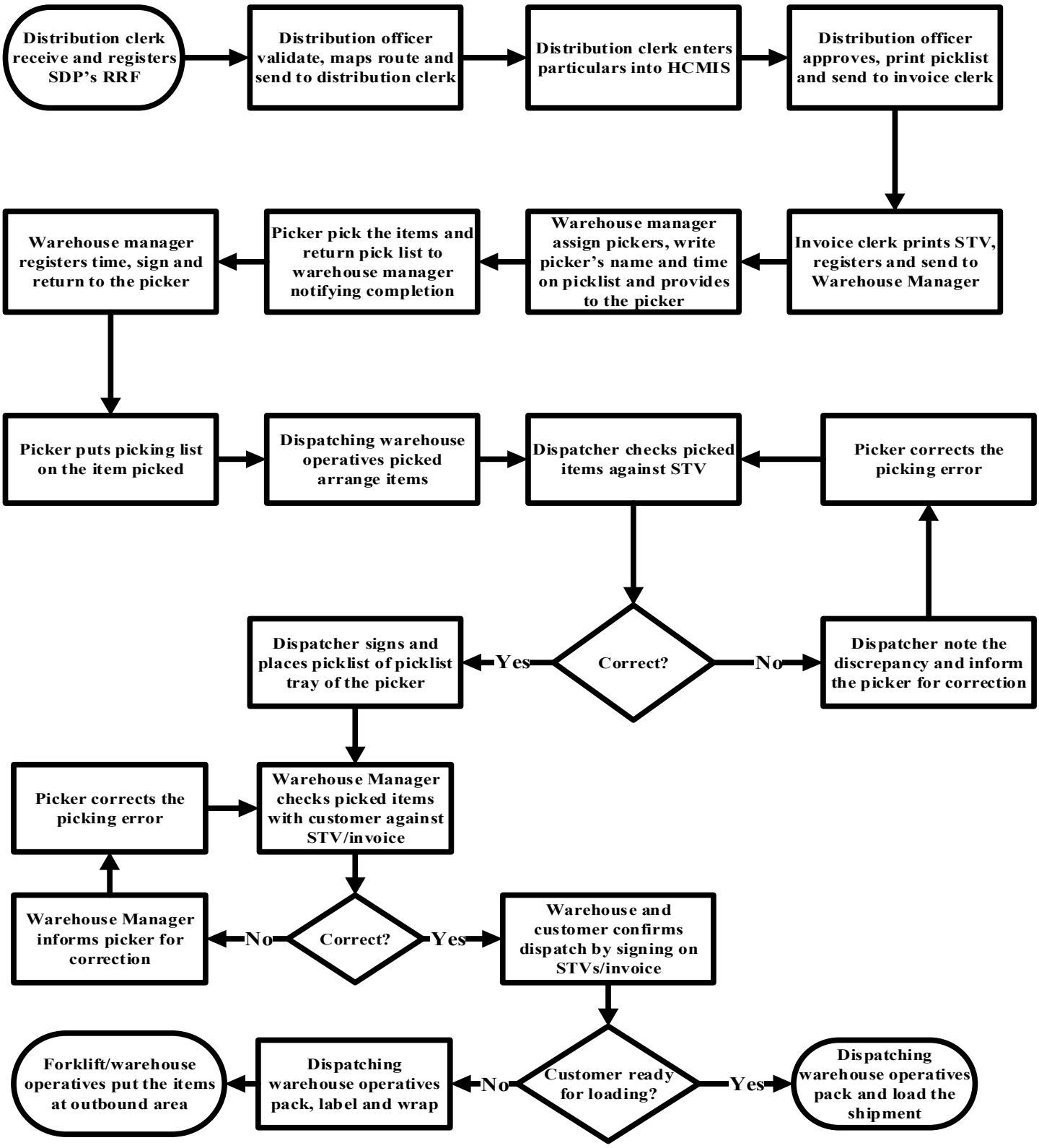


Figure 9-RDF commodities order management process map -Adama, June 2019

4.3. Replenishment

4.3.1. Introduction

***Replenishment*:** It is the movement of pharmaceutical inventory from upstream or reserve product storage locations to downstream or primary storage, picking and shipment locations. It is the process of relocating reserve stock to forward pick location. These can either be loose pick or case picks locations. For example, moving a whole pallet at a time from reserve storage to order picking to ensure that order picking locations do not become empty.

Replenishment is the physical act of moving product from a bulk or storage location to a pick location where the product is selected for shipment to a customer. Some call this process a forward pick or letdown but almost always involves breaking down a full pallet into the selling unit of measurement such as cases or batches as part of the re-stocking process.

It can also be described as placing a replenishment order with the upstream pharmaceutical distribution center and receiving the ordered pharmaceutical to the respective branches or central warehouses. Therefore, stock replenishment can be performed either relocating pharmaceutical stocks from reserve location to pick face location or stocking the order from central warehouse to branch warehouses. Therefore, Stock can be placed either in pick face or reserve stock storage place allocation system.

The purpose of this replenishment is to ensure that all pick locations are adequately stocked in preparation for pick order assembly. Some of the advantage and disadvantage of splitting stocks in to two storage place allocation system includes the following.

Advantages:

- Reduce space needed for the picking face
- Allows placing all batches for order picking at a convenient height
- Reduces travelling distance

Disadvantages:

- Requires replenishment of the picking face
- Difficult to follow FEFO

The purpose of replenishment is to keep pharmaceutical inventory flowing through the supply chain by maintaining efficient order and line item fill rates**.** Proper replenishment and timing is critical to the efficiency of the picking team. Pharmaceutical must be in the directed pick location before a picker reaches the picking location. Waiting for restock causes unwanted delays and/or

extra handling. The replenishment process can be time consuming. It needs to be properly managed to balance picking efficiency gains and replenishment labor. Therefore, maintaining stock availability for order picking is important for achieving high levels of order fill rates.

Replenishment Methods in the pharmaceutical warehouse

There are methods to determine how and when to replenish pick locations and maximize our efficiency. The methods of selecting the proper replenishment are the following: -

1. ***Day or wave demand replenishment method:*** it is used to move only the quantity needed to satisfy the demand for each wave (or day) to the forward pick locations.
   - It works well for unpredictable Stock Keeping Unit (SKU) demand or very slow-moving SKUs
   - It works well when pick locations are small and can only fit the demand quantity
2. ***Opportunistic replenishment:*** replenishment is based on two to four forecasted quantities. It minimizes the number of trips to both the reserve and forward pick locations. It increases productivity. It isn't ideal if picking locations are too small to handle additional volume, the forecast or demand is unpredictable, and if there are a limited number of a forward pick location.
3. ***Top off or lean time replenishment:*** this method utilizes down time (time spent not working or producing) to fill each forward pick location to its maximum cubic quantity.
   - It is used when the picking window is tight, in order to remove the time-consuming effort required to complete the replenishment step just prior to picking
   - It is also used only with faster moving SKUs when time allows
4. ***Combination:*** utilizes a combination of the above methods. A day's demand or minimum quantity usually triggers it.
5. ***Emergency replenishment:*** this method is used when a picker goes to a location that lacks the correct product or quantity.

4.3.2. Replenishment process of Adama hub

Pick face replenishment must be done as the highest priority activity in the pick cycle. If the pick face is not replenished in time, the result may be a stock shortage at the pick face, delaying the pick process.

Trigger point -Triggers for replenishment of pick locations are typically based on minimum-maximum quantities in a location. It is recommended that product should be replenished once seventy per cent of the stock has been removed from the pick face. Always aim to have enough stock on the floor to support that day's picking activity. Replenishment system can be initiated or determined by two ways;

- **System guide or notified replenishment system;**
    - System notifies or guides the need for replenishment by sending message for replenishment officer
    - The responsible person prints the order for replenishment
    - Hand over the printed order to the forklift operator
    - Forklift operator fulfill the replenishment order and report task completion to the replenishment officer
    - Replenishment officer confirm the movement or re-location
    - Update the movement in HCMIS
- **Manual determination**
    - Every day in the morning the replenishment officer visually checks the pick face and note the products that need replenishment (usually the trigger point is if one layer of the product pile remains) and record the item name and location on the tracking sheet.
    - The check the system to determine the product movement or re-location that is suggested by system as per FEFO and write it on the tracking sheet
    - After taking the data from HCMIS the replenishment officer provide the tracking sheet to the forklift operator for product movement or re-location
    - Forklift operator fulfill the replenishment order and report task completion to the replenishment officer
    - Replenishment officer confirm the movement or re-location
    - Update the movement in HCMIS

Let-down for full pallet stock pick

- When an order is received for more health commodities than what are held on one pallet, the less sophisticated operation will pick what stock is available in the pick face. A full

pallet will then be let down. The new pallet will be moved to the pick face. The stock will be confirmed to be available to the WMS. If still more goods are needed to fulfil this order, a further let-down will be required, and further delays will occur.

- The ability to take full pallets of stock as part of an order will prevent these problems. The best WMS logic is to always allocate full pallets first. Only the remaining part of the order is then picked from the pick face. In the above example, only one pallet will be moved to the pick face, while another full pallet will be moved directly to the dispatch area. This is far more efficient and less time-consuming. The replenishment of the pick face is time-critical, as a lack of stock in the pick face halts the picking process.

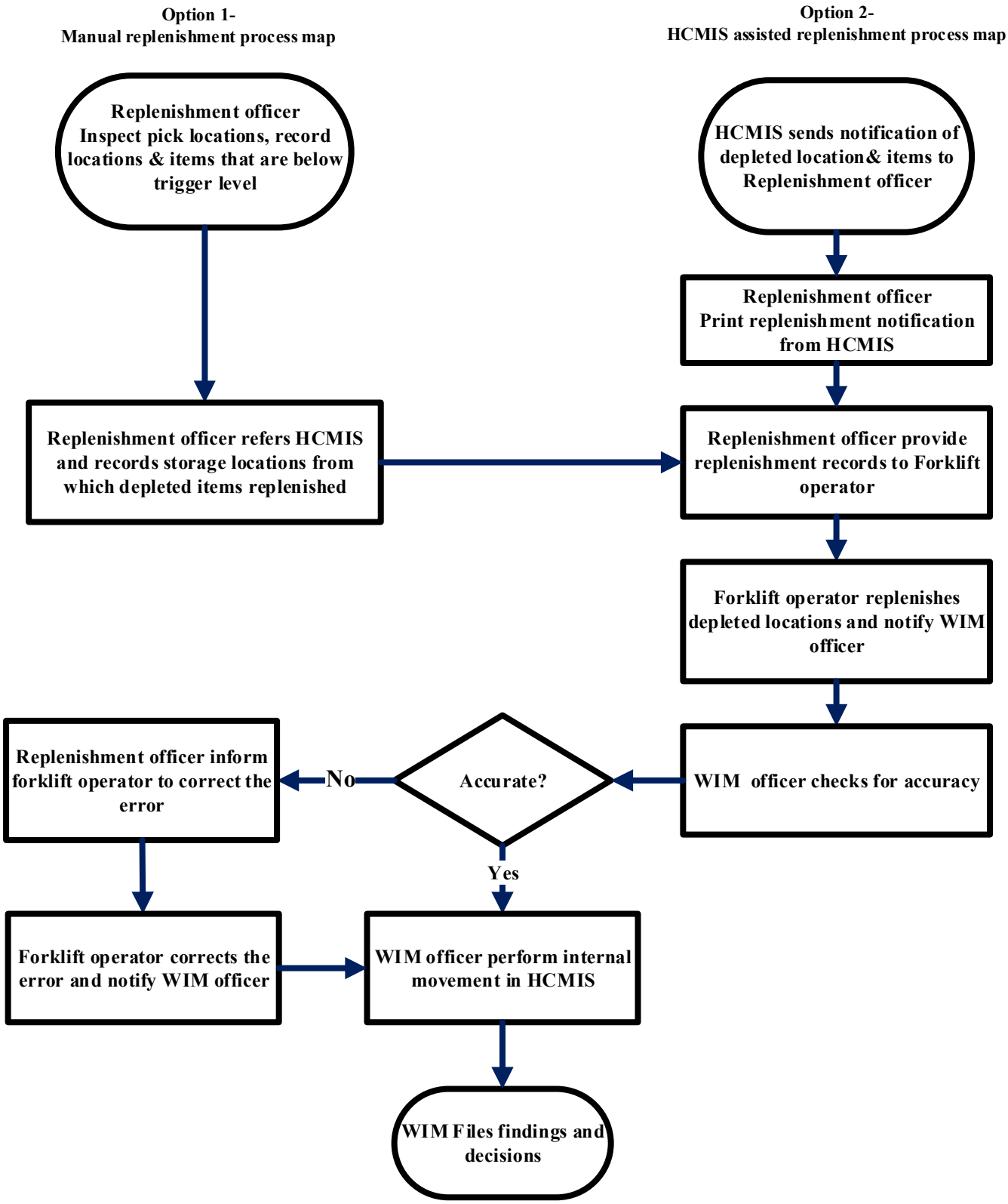


Figure 10- Pick face replenishment process map, Adama June 2019

JOB AID: Replenishment

Task	Conducting a replenishment
Completed by	Replenishment officer, Dispatch officer, warehouse manager (Pharmacist or Pharmacy Technician)
Purpose	• To relocate reserve stock to forward pick location to ensure that all pick locations are adequately stocked in preparation for pick order assembly • To strengthen good storage and distribution practices;
When to perform	• Every day • Any time product should be replenished when seventy per cent (70%) of the stock has been removed from the pick face
Materials needed	Recording sheet, pencil, pen
Actions	1. System guide or notified replenishment system; • System notifies or guides the need for replenishment by sending message for replenishment officer • The responsible person prints the order for replenishment • Hand over the printed order to the forklift operator • Forklift operator fulfill the replenishment order and report task completion to the replenishment officer • Replenishment officer confirm the movement or the re-location • Update the movement in HCMIS 2. Manual determination • Every day in the morning the replenishment officer visually checks the pick face and note the products that need replenishment (usually the trigger point is if one layer of the

	product pile remains) and record the item name and location on the tracking sheet. • Check the system to determine the product movement or re-location that is suggested by system as per FEFO and write it on the tracking sheet • After taking the data from HCMIS the replenishment officer provides the tracking sheet to the forklift operator for product movement or re-location • Forklift operator fulfill the replenishment order and report task completion to the replenishment officer • Replenishment officer confirm the movement or re-location • Update the movement in HCMIS
Select the appropriate action	• Reconcile the physical re-location with HCMIS
The conducting of a replenishment task is complete when:	• Forklift operator fulfill the replenishment order and report task completion to the replenishment officer • The replenishment officer confirms the movement or the re-location • The replenishment officer updates the movement in system/HCMIS

4.4. Perpetual inventory

A perpetual inventory system is a continuous count of the number of items in inventory. Actual physical inventory counts are, however, taken periodically to ensure the accuracy of the perpetual inventory system. The key advantage of a perpetual inventory system is that the managers always know the quantity of products that should be available. As products are issued for use, the quantity of product in storage decreases. When their record keeping is good, managers know the quantity of pharmaceuticals products that should be in inventory all the time. The perpetual inventory

method involves the continual updating of an entity's inventory records. These updates typically include to additions to and subtractions from inventory for such activities as received inventory items, pharmaceuticals issued from stock, returned pharmaceuticals, and items picked from inventory for dispatching to customer.

Perpetual/Cycle counting is used to keep the Warehouse Management (WM) system inventory and physical inventory in sync. Physical Inventory or Physical Count are typically performed once a year to verify all inventory in the warehouse. Perpetual/Cycle counting is used to perform maintenance of the inventory between the physical counts and records. This keeps up to date the HCMIS perpetual inventory through Perpetual Inventory Transactions. Perpetual/Cycle counting involves counting small areas of the distribution center periodically. Unlike physical count, Perpetual/cycle counting does not require freezing locations, so normal operations can continue.

Cycle counting is a perpetual counting method whereby the stock is divided into groups of items and one group is counted e.g. each week or each month until the whole stock has been counted, then the process restarts from the beginning. It can be based on a Pareto analysis (ABC) by family, a random selection or the location of the item (division of the warehouse area into geographic areas). When undertaking cycle counts it is prudent to use an ABC analysis to ensure that the fast-moving and high-value items are counted more frequently than the slow-moving, inexpensive items. It is suggested therefore that fast-moving and high-value items are counted monthly, medium sellers are counted quarterly and slow-moving items either once or twice a year. The following percentages can be used to ensure a comprehensive count:

- A line: Fast-moving lines, or higher value lines are counted more frequently, monthly.
- B lines: Medium movers or medium value lines are counted lesser, which is quarterly.
- C lines: Slow movers or low-value lines are counted even lesser, which is twice a year.

An example of this is as follows:

- A line: 400 items counted 12 times = 4800 counts
- B lines: 600 items counted 4 times = 2400 counts
- C lines: 800 items counted twice = 1600 counts

Total = 8800 counts.

So, if 230 days are available in the year, then 38 counts per day are needed.

For counting to be accurate,

- Counting must be performed before any new picking begins for the day.
- Items received prior to list creation must be put away before counting begins.
- Items received after list creation must not be put away until after counting ends.
- Items picked must be scanned through a shipping station before the list generates each night

When to Count

- The ideal time during the day to conduct perpetual count would be creating a perpetual counting cut-off during a regular business day by using time-of-day

Procedures for perpetual or cyclic counting; Steps

Before physical count takes place, products should be arranged and re-organized by sorting by batch, expiry and wrapped. This should be done during receiving operation and damaged or expired products should also be separated.

- Form a team for perpetual inventory (Cyclic count)
- Prepare physical inventory documents and Print perpetual inventory count sheets
- Select a rack or shelves (select and list commodities); Products are counted on the following schedule: Adama experience on PI schedule is shown below; Within one months' time the whole item in the warehouse will be counted;

S/No	Date	Location to be counted	Program PI Officer	RDF PI Officer
1	5/6/2019	E1A-E10D		
2	5/7/2019	E11A-E20D		
3	5/8/2019	E21A-E30D		
4	5/9/2019	E30A-E40D		
5	5/10/2019	E41A-E52D		
6	5/13/2019	F1A-F10D		
7	5/14/2019	F11A-F20D		
8	5/15/2019	F21A-F30D		
9	5/16/2019	F30A-F40D		
10	5/17/2019	F41A-F52D		
11	5/20/2019	G1A-G10D		
12	5/21/2019	G11A-G20D		
13	5/22/2019	G21A-G30D		
14	5/23/2019	G30A-G40D		
15	5/24/2019	G41A-G52D		
16	5/27/2019	H1A-H10D		
17	5/28/2019	H11A-H20D		
18	5/29/2019	H21A-H30D		
19	5/30/2019	H30A-H40D		
20	5/31/2019	H41A-H52D		

Table 4- Perpetual inventory schedule, Adama May 2019

- Communicate the respective warehouse managers to update the stock record cards
- Undertake physical count;
  - *Note that it is necessary to keep track of the quantity, product condition, location, batch, expiry date and manufacturer of the product available in a perpetual inventory system*.
- Compare physical count with the stock record cards/HCMIS- reconciliation
- Produce report and identify discrepancies, if discrepancy happened
- Investigate the discrepancies and report differences, Update the stock keeping records (manual, HCMIS)
- If the results of the physical inventory differ from the balance on the stock/bin card, update the balance on HCMIS/bin card by adding or subtracting the excess or missing quantities. Separate damaged or expired products found during the physical inventory. For either of

the above, identify, document, and correct the cause of the problem or Investigate the discrepancy and take action.

- Document the findings properly and continue repeating the above steps

JOB AID: Conducting a perpetual Inventory

Task	Conducting a perpetual inventory count
Completed by	Dispatch officer, PI follow-up officer, warehouse manager (Pharmacist or Pharmacy Technician)
Purpose	• To verify physical inventory quantity Vs on bin / stock card at a specific date; • To strengthen good storage and distribution practices; • To control theft; privilege, • To take adjust the system after investigation. • To avoid error and time wastage on annual scheduled inventory
When to perform	• At the beginning of each day or • any time the hub suspect that products have been lost or discrepancies between the quantity of stock on hand and the quantity recorded on the Stock Card have been observed.
Materials needed	Perpetual inventory recording sheet, calculator, pencil, pen
	Note: • During a physical count, all commodities should be counted and recorded on the perpetual inventory sheet using the unit of issue. Example bottles, Tins, Packs etc. • Record all the following parameters; Product quantity, Product condition, Location, Batch, Expiry date and Manufacturer
Actions	Count the usable commodities. For each commodity… • **Count the Fick face-rack A first**; Count the boxes inside the open cartons. If an open carton contains unopened boxes, count the boxes and multiply the

	number by the number of units in a box. This should give you the total number of the units in the unopened boxes • **Then add the quantity obtained from Rack B-F which is found in bulk;** Count unopened/complete cartons first. • Note down quantities of commodities expired and damaged
Select the appropriate action	• Reconcile the count and investigate if there is discrepancy
The conducting of a perpetual inventory task is complete when:	• All cartons, inner boxes, bottles and loose units of each commodity have been counted. • Physical count of all commodities has been recorded on the inventory sheet as well as compared/reconciled with HCMIS data. • Investigate the discrepancies and transaction is updated in HCMIS for all commodities. • Perform error correction on HCMIS after investigation, if discrepancy happens. • Any discrepancy between the physical inventory as per count sheets and HCMIS stock records must be investigated and explained by the PI officer. The PI officer in charge for inventories in coordination with the Warehouse Manager must conduct Physical Inventory Verification again for items that have discrepancies. • **Note that**; If there is a high inventory turnover in the operation, the implementation of more frequent inventory verifications is recommended.

Table 5- Perpetual count Job aid

PI Trucking Sheet							
Date	Total no of location counted	The Same (HCMIS & PHYSICAL) in number of location				No of corrections made	Remark(Type of Correction)
		Locatoin	Quantity	Expiry	Batch no		

Table 6- Perpetual cycle count tracking sheet, Adama May 2019

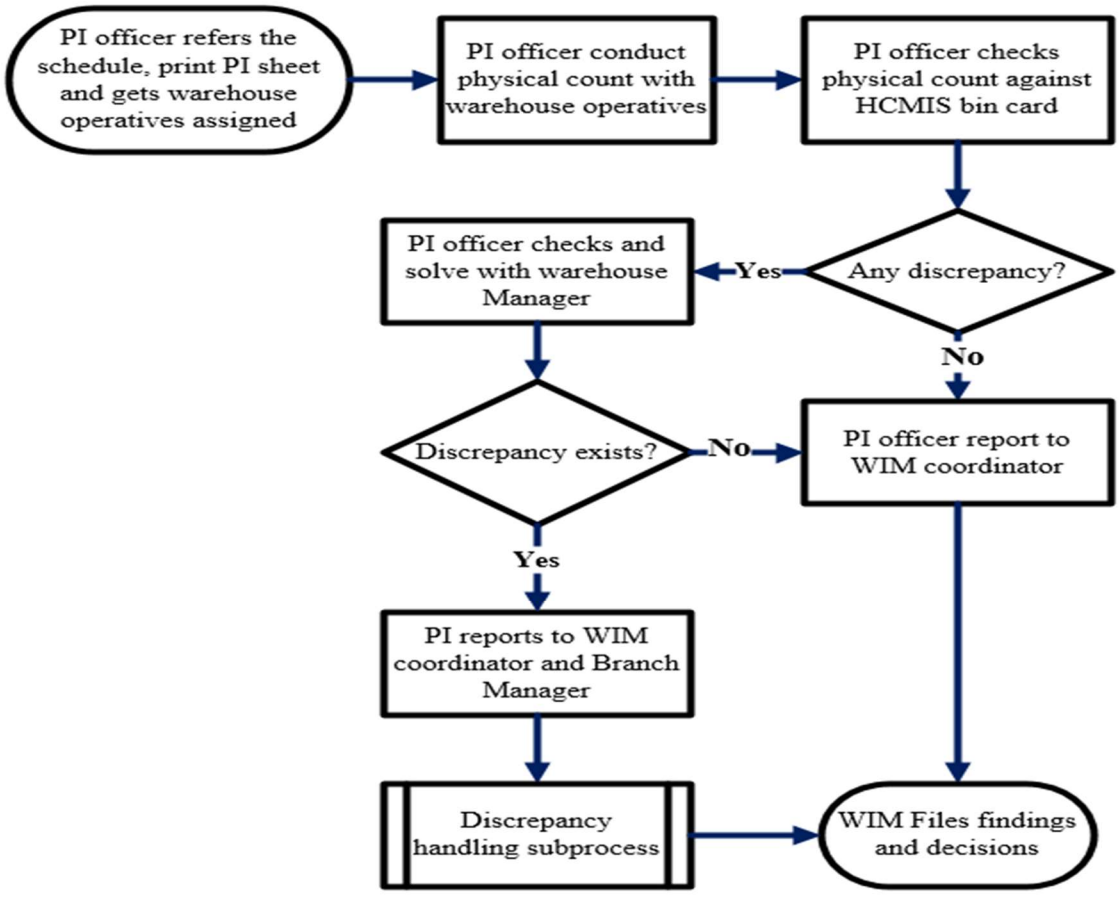


Figure 11-Perpetual inventory process map- Adama experience, June 2019

5. Customer management

Customer service is an important aspect of any business. Traditionally, service provisions have been based on very broad assumptions of what customers want, rather than considering the real requirements of customers or at least customers' perceptions of what they require. Customer service and customer service requirements can and will differ not just between industries and companies but additionally between the markets segments a business might serve.

Everyone who works in logistics must remember that they select, procure, store, or distribute products to meet customer needs. Storekeepers do not store drugs just for the purpose of storing; they store products to ensure that commodity security exists for every customer to obtain and use the health commodities when they need them. In addition to serving the needs of the end customer—the customer seeking health services—each person in the process is also serving the needs of more immediate customers. Storekeepers provide customer service when they issue medicines to the health facility, and the central medical stores provide customer service when they issue commodities to the district. The logistics system ensures customer service by fulfilling the six rights. Each activity in the logistics cycle, therefore, contributes to excellent customer service and by ensuring commodity security. Customer service is a powerful tool that helps managers to focus on their services provided to customers, or clients, according to their needs/wants.

5.1. Customers' needs and customer service standards

Customers' needs- If you hold the common misunderstanding that customer service is only providing customers what they ask for, you are mistaken. If you expand your description of service to include a large number of less obvious, and undeclared, customer needs – such as being helpful and considerate – you will never come across a time when you can't provide your customers with some level of service.

Factors that make customer service outstanding are-

- Friendliness
- Understanding and compassion
- Fairness
- Organized
- Dependability

- Knowledge
- Easy to do business with
- Professional

Some additional qualities that are needed when the customers don't exactly get what they need are:

- Options
- Empathy
- Apology
- Information

Customer service standards –

a. ***Courtesy -***Employees of the company must be trained in the service standards of the Company, so that will show customer friendly service skills and be knowledgeable, professional, and considerate in meeting the needs of customers.

b. ***Confidentiality-***All information gathered or held regarding the personal or business affairs of the customers will be held in strict confidence, for the sole use of the company in meeting its stated objectives. No information will be released to other customers, partner organizations, or any other third party in a format that will allow identification, except with the express consent of the provider or as may be required by law.

c. ***Communication-***Customer can be reached by post, phone, fax, and e-mail. All correspondence will be responded to in a clear, concise, and timely manner. Our aim is that all correspondence, from date of receipt, will receive a response within 24 hours; more complicated issues will receive an acknowledgement within the response time, and continuous updates on the progress of the case until a resolution can be achieved.

d. ***Consistency***-As part of its commitment to upholding professional standards, organizations have to implemented and constantly review policies to ensure that its application of examination and accreditation guidelines is consistent

e. ***Handling complaints***-Fair, justifiable and prompt solutions should be provided when possible to any complaints and appeals. All such issues should be directed to the Relevant Department in the first instance, where they will be acknowledged and directed to the attention of the appropriate person

f. ***Access to information***

5.2. Types of customer and good customer service characteristics

Types of customer - Customers are individuals with whom we have established a relationship within an organization. There are 3 types of customers: -

a. ***The Inner customer-*** The inner customer is you. You must know and understand yourself, before you can understand somebody else. You must know what your goals are and how you want to achieve them. You have to be committed and honest to yourself. You have to know your positive attributes as well as your negative ones.

b. ***The Internal Customer-***Internal customers are your fellow employees. In a work environment, we should all understand our Agency's mission statement and ensure that we live it every day. (A mission statement of PFSA might for example be: "Avail affordable and quality pharmaceutical sustainably to all public health facilities by using revolving drug fund".) Also, know each other's weaknesses and strengths. This can come in very handy when performing normal tasks as well as when it comes to dealing with customers. We all differ in personality and sometimes it is easier for people. For example, those who have the same hobbies can get along and complement each other.

c. ***The External Customers-***External customers deal with our warehouses on a daily basis. The external customer can be a RHB, Health facility, or a corporate client/customer such as a company, school, prison etc.

Good customer service characteristics

- Good customer service in an organization establishes a reputation that goes far and wide;
- Good customer service keeps everyone happy;
- Good customer service encourages more sales and bigger turnover as well as attracting new customers and also increases revenues for the business;
- Bigger revenues and more customers translate into more stock and more employees needed to handle the demand;
- Good customer service is a positive act that ensures long term growth.

Good customer service doesn't cost a lot, just some like:

- Politeness;
- Efficiency;
- Deliver promise;
- Give the customer what they want, when they want, in a condition or color that they want it and at the price that they saw it at…….;
- If you don't do this……;
- The customer will tell to10 other customers about bad service;
- Few customers won't come back if they perceive the service provide to them is bad and sometimes doesn't even bother to complain but will take their business elsewhere – the competitor; o You will lose years of potential revenue.

Customers provide us with the best feedback about what needs to be changed in our customer service policy, procedure and products. It is very important to know how to handle a difficult customer. Being in business, the worst part of any day is when a customer enters or phones and explodes with frustration, because of a poor service experience. Naturally, our first reaction is that the customer is inconsiderate and wrong etc. etc. etc.… WRONG! Every business receives complaints, and they are a source of valuable information.

All of this starts with changing our own mindset so that realizing and resolving a customer's query or complaint in a satisfactorily manner is an integral part of good customer service. By doing so we are on our way to turning our customers into "regulars" (customers that will place an order again). Remember that when dealing with people there will always be conflict. Conflict is a part of every person's daily life and it is not necessarily the conflict situation that causes the biggest uproar, but the way that we are handling the conflict!

All sorts of factors outside of our control – including sales material, company policy, previous experiences, and personal style – contribute to customer's expectations. The only expectations you control are the ones that you set and manage.

One way to do this is to give realistic deadlines for the delivery of service, products, and information. Some specifics to keep in mind are:

- Make sure you understand the customers' query clearly;
- Assist the customer to the best of your ability;
- Be open and friendly towards the customer;
- Know your subject / job and do it willingly and effectively;
- Consider the emotional state of the customer;
- Refer customers to the appropriate office / person / department if you cannot assist.

To avoid making an already difficult situation worse, avoid the following phrases:

- You need to calm down;
- That's not my department;
- I can't do that;
- It's not my fault;
- I'm busy right now;
- You need to talk to my manager.

Communication is the golden thread that runs through it all!!Always ***acknowledge*** customer, it doesn't matter how busy you are. The worst thing that you can do is to ignore a person. To let a phone ring, unanswered, is ignoring a customer! When dealing with a customer, give undivided attention to the customer and make him/her feel that you are really concerned about them and their needs. We all know about the "difficult" customer. If we can fulfil the most "difficult" customers' needs – we are going to have delighted "normal" customers. Ensure that you listen to the customers and understand their emotions.

5.3. Developing a customer service plan and improving customer service

Developing a customer service plan - Written guidelines can be a useful means of disseminating services, procedures as well as concerns and serve as a reference in the field. A customer service plan is equally important as a reference for logistics staff. Services outlined in a customer service plan as well as their quality are the benchmark by which performance can be monitored. This will

allow a more objective evaluation of quality of services than relying on a large number of customers all of which may have different expectations. A customer service plan is a written document which states the services that customers can expect and includes pre-transaction, transaction, and post transactions elements.

a. ***Pre-transaction elements-*** These are customer service factors that arise prior to the actual transaction taking place. They include:

- Frequency of meetings with health program managers.
- Contact details (departments, persons, addresses, electronic communications, telephone, hotlines for emergencies).
- Response time to inquire and requests from customers.
- Procedures for ordering.
- Procedures for emergency orders.
- Updated information on stock list.
- Regular and updated information on available stocks.
- Stocks of replacements parts for health care equipment.
- Location, contents, and quantities of contingency stocks.
- Contents of acknowledgment of customer orders (available stocks, lead time etc.).

b. ***Transaction elements-*** These are the elements directly related to the physical transaction and are the most commonly encountered concerns with distribution and logistics. These would include:

- Information on order size constraints (supplier packaging quantities).
- Target stock availability of stock items (customer service level).
- Target order lead time for contingency stock items.
- Target order lead time for stock items.
- Target order lead time for non-stock items.
- Measures in case of stock outs.
- Possibility for expediting consignments (fast track)
- Labeling of consignments (language).
- Documentation provided with consignments (packing list, quality certificates)
- Capacity for distributing cold chain loads.

- Insurance

c. ***Post-transactions elements*** **-** These elements occur after delivery and include:

- Information on claims procedures.
- Provision of data on past orders (for analysis by health program managers).
- After sales services for health care equipment (installation, training, maintenance, repair).
- Providing information on installation, maintenance, servicing, and repairing equipment.
- Health care equipment for which reverse logistics services are provided.
- Provision of temporary replacement of health care equipment.
- Services for disposal of unwanted health care goods.

The contents of the stock list validated by health program managers is one of the most important elements of customer service plan and must be widely disseminated not only among staff members of the organization but also among managers and health professionals (particularly pharmacists) at assisted health care facilities.

How to improve customer service

- Good customer service is built on soliciting and using feedback from clients;
- Feedback can be obtained through various surveys or questionnaires that are carefully constructed to ask pertinent questions;
- By getting client feedback enables to know more about the factors that affect their satisfaction;
- Use information to improve services and increase the satisfaction of all clients in the process;
- Using feedback information – convert the information into action steps, letting clients and staff know about the changes, and evaluating the effects of the new changes;
- Customer service personnel should follow up on all client queries and customer service complaints or issues;
- Remedy customer service queries as soon as possible in the best manner.

Role modelling customer service helps staff to show respect, consideration, and attentiveness that are expected by clients; Examples of ground rules:

- Every client will be addressed as “Sir or Madam”;
- Every staff member shall courteously greet whoever s/he comes across;
- The customer is always right;
- The customer is the reason we have a job;
- Always do your best to meet or exceed customer expectations;

Once standard operating procedures have been developed that incorporate customer service approaches, staff and supervisors can be trained to use customer service in their work and in all their dealings. It is also important to train staff, since training will provide time for staff to review basic concepts of customer service, including a definition of customer service, a discussion of their client’s rights to receive quality services, staff accountability, and the benefits that can result from implementing customer service; Good customer service should be a way of life and inbred into all frontline client facing staff.

6. SOP Implementation

A Standard Operating Procedure (SOP) is a set of written instructions that document a routine or repetitive activity followed by an organization. Detailed, written instructions to achieve uniformity of the performance of a specific function. The development and use of SOPs are an integral part of a successful quality system. Generally, the benefits of implementing SOPs in pharmaceutical supply agency warehouse include;

- Minimizes variation
- Promotes quality. It provides individuals with the information to perform a job properly
- Consistent implementation of a process and procedure. It facilitates consistency performance in the quality and integrity of an end-result
- Permanent and temporary changes in personnel do not affect implementation of operation
- Can be used as a personnel training program
- Minimizes opportunities for miscommunication
- Can address safety concern

How to use the SOPs (Procedures)

- Review and reinforcement by management is required.
- Provide training for staffs daily (Daily toolbox)
- Current copies of SOPs should always be readily accessible and available to relevant staffs in the work areas for reference
- Let all staffs Sign the '*Read and Understood'* form after training on the SOP has been completed. Let EPSA write letter to individuals to implement the specific SOP.
- Prepare compliance monitoring mechanism (tracking sheet) and apply immediately
- Review and evaluate the performance of the implementation in weekly basis
- Periodic review of staff activities can be done as part of support supervision.
- Identify difficulties/challenges in Implementation and prepare intervention plan and communicate to management to act accordingly.

List of SOPs that will be implemented during center of excellence implementation include;

Process level KPI

1. Receiving SOP
2. Put away SOP
3. Replenishment SOP
4. Perpetual inventory taking SOP
5. Picking SOP
6. Checking, packing and dispatching SOP
7. Customer order processing SOP
8. Warehouse cleaning SOP
9. Warehouse security and safety SOP

Individual Level KPI

1. Picking accuracy
2. Put away accuracy
3. SRM tracking
4. Etc.

7. Monitoring and Evaluation of CoE

Monitoring and Evaluation (M&E) is a critical function of management in any organization. It starts right from the planning stage of the program cycle. In organization aimed at addressing key social and economic issues through a combination of macro-micro interventions require a comprehensive multi-level M&E system to ensure an effective policy implementation, efficient delivery of services with intended outcome and sustainability of program benefits to community leading to change envisaged in the plan. To ensure these, a systematic monitoring of input/output and processes and periodic evaluation of outcome and impact at various levels should be done. Concurrently, making an effort to document the experience, conduct operational research and develop conceptual basis of interventions to create new knowledge on issues will play vital role on the effectiveness of the M&E system.

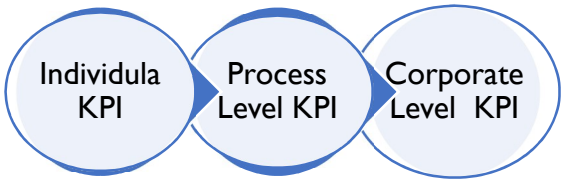
Moreover, M&E is an essential process of organizational basic support system that could provide valuable information on the ongoing operations of the organization and on relevant program issues for the management to make accurate and timely decisions. Effective M&E system is expected to synthesize and collate information, from different units and levels of the supply chain to come up with analysis and conclusions for use in planning and quality decision-making by the organization.

7.1. Performance Monitoring, Reporting and Feedback of CoE Activities

EPSA's M&E framework will apply result-based performance monitoring approach in which progress of results (i.e. individual, process and corporate level performance) is tracked using key performance indicators (KPIs) against the targets and standards (BPR standards). Thus, performance monitoring systems will be established to capture, analyze and present performance data at individual, directorate/unit, sub-national (hub and cluster) and at national/agency level. This section will describe the three major performance monitoring mechanisms: supportive supervision, review meeting and reporting.

Performance data will be aggregated and reported monthly/quarterly/biannually, as outlined under the performance indicator reference sheet (PIRS) of each KPI. Data should flow from the lower level SDPs through each level of the supply chain management (SCM) to the central EPSA.

Moreover, there shall be information sharing/reporting system with other stakeholders at national and sub-national (regional and zonal level).



7.2. Performance Review Meetings

As outlined in the EPSA M&E framework the Agency uses result-based approach to monitor and evaluate individual, unit/team and organizational performance at various levels, Review meeting is one of performance appraisal approaches used to track activities and results of CoE initiatives. Review meeting activities with level of implementation and schedule are presented in the table below.

Table 1: Performance Review Meeting

Performance Review/Review Meeting	**Level**	**Frequency/ Schedule**
Tool Box (Quality Circle)	Team/department	Weekly
Weekly PRT/task force meeting	Branch	Weekly
Monthly performance Review meeting	Branch	Monthly
Quarterly Performance	Agency	Quarterly
Cluster Review Meeting	Cluster/Ageny wide	Quarterly
Bi-annual Review Meeting	Agency	Bi-annual
Annual Review Meeting	Agency	Annual

7.3. Supportive Supervision

Similarly, supportive supervision activities will follow result-based performance tracking mechanism and approach. The SS is intended to guide, help and encourage staffs in improving their performance so that they can meet the defined standards or target set for KPI. It is a routine and scheduled activity in which experts from higher level transfer their knowledge and skill (technical and problem-solving skills) to employees working in the lower level of the system, with aim of improving performance of the SCM system.

Remote monitoring? By the supervisors – to be added

1. **Table 1Supportive Supervision**

Supportive Supervision	**Supervisee**	**Supervisor**	**Frequency/ Schedule**
Team -1 (GHSC-PSM + EPSA)	Mekelle Hub,		Monthly
Team 2 (GHSC-PSM + EPSA)	Bahir Dar, Dessie		Monthly
Team -3 (GHSC-PSM + EPSA)	Jimma, Nekemt		Monthly
Team -4 (GHSC-PSM + EPSA)	Hawassa, Dire Dawa		Monthly

Reporting:

1. Baseline report by hubs (with indicators with Data)
2. Every two weeks – reported to PRT and reported to center together with the biweekly proceeding for compilation and management update
3. Monthly Supervision Report – with Biweekly report and minutes
4. Mid Term progress evaluation

5. Final Evaluation (after six month)
6. Further expansion to other hubs -

annexes

1. SRM tracking sheet
2. Picklist tracking sheet
3. Model-19 collection tracking sheet
4. Receiving and put away monitoring template
5. Picking monitoring template
6. PI tracking sheet
7. Order turnaround time office
8. Order turnaround time warehouse