Warehouse Management Manual

Gujarat Medical Service Corporation Limited
(A government of Gujarat Undertaking)

Prepared by: Logistics and supply Chain Branch

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1. Foreword

It gives me immense pleasure to present the *Warehouse Manual* for Pharmaceutical Supply Chain in the State of Gujarat. This manual represents the collaborative effort of Gujrat Medical Service Corporation Ltd. (GMSCL), Govt. of Gujarat employees across the state.

The objective of this *Warehouse Manual* is to improve the management of all drug warehouses & depots of the supply chain in Gujarat. It aims to provide a fundamental understanding of the activities performed at the warehouse guided by a set of instructions for better management at depot. The manual is designed to guide the work of those managing the supply chain from the Regional Warehouse. It seeks to build an individual and organizational capacity and capability of all involved in supply chain management system at warehouse in an effective manner.

The steps outlined in the Warehouse manual represent the holistic understanding of supply chain cycle – from receive to issue. It encompasses work duties of staff personnel, streamlining the activities performed, reporting the details and smart inventory control for better management of drugs at warehouse. The document enables to capture essential data for decision-making which is used to not only guide smart indenting, but also strategic forecasting and procurement. Further, each step builds on best practices for storage to prevent damage, wastage, or theft. Finally, at the core of this *Warehouse Manual* is to provide the knowledge and skills to GMSCL warehouse personnel for applying the learnt for the effective management. In this way we will be able to ensure a consistent and sufficient flow of goods to our clients.

This *Warehouse Manual* has a huge scope of improvement. Suggestions for improvements in the procedures described in this manual should be informed for incorporation to GMSCL, Logistics & Supply chain division.

I express my sincere gratitude to all the team of GMSCL for the collaborative effort and hard work.

Dr.Vipul Aggarwal
Managing Director,
Gujarat Medical Services Corporation Limited
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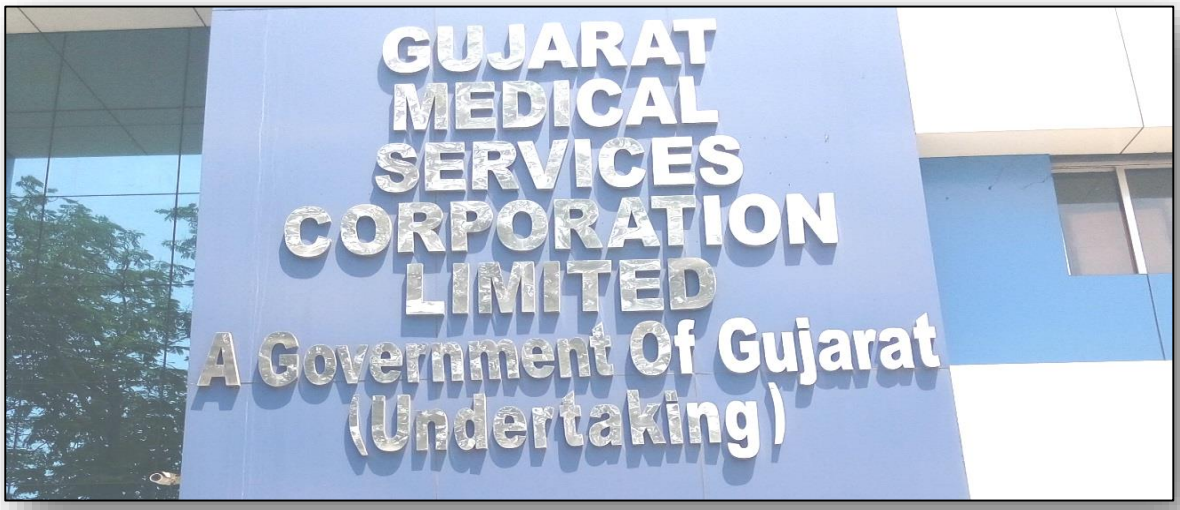
2. GMSCL – An Introduction



Vision and Mission

The Central Gujarat Medical Services Corporation Limited (GMSCL) was constituted in 1978, a government of Gujarat undertaking as a centralized procurement agency for systematic procurement of generic medicines, surgical & diagnostic equipments for all the health care institutions under Govt. Of Gujarat.

The Main Functions of GMSCL are:

- Procurement of essential, life saving quality medicines, surgical goods & Insecticides and their timely availability by creating highly decentralized storage capacity & distribution network.
- Procurement of quality medical equipment/Instrument and its maintenance for entire product life cycle.
- Development and implementation of strategic work plan to carry out drug warehouse developments, construction, renovation, up gradation and maintenance for effective drug distribution system.
- Establishment of Diagnostic Medical Service Centre for early diagnosis & ease of treatment for beneficiaries.
- To provide advice, support and guidance to the Organizations of State Government on drug distribution management, hospital management, equipment procurement and stores management and to work in public interest.

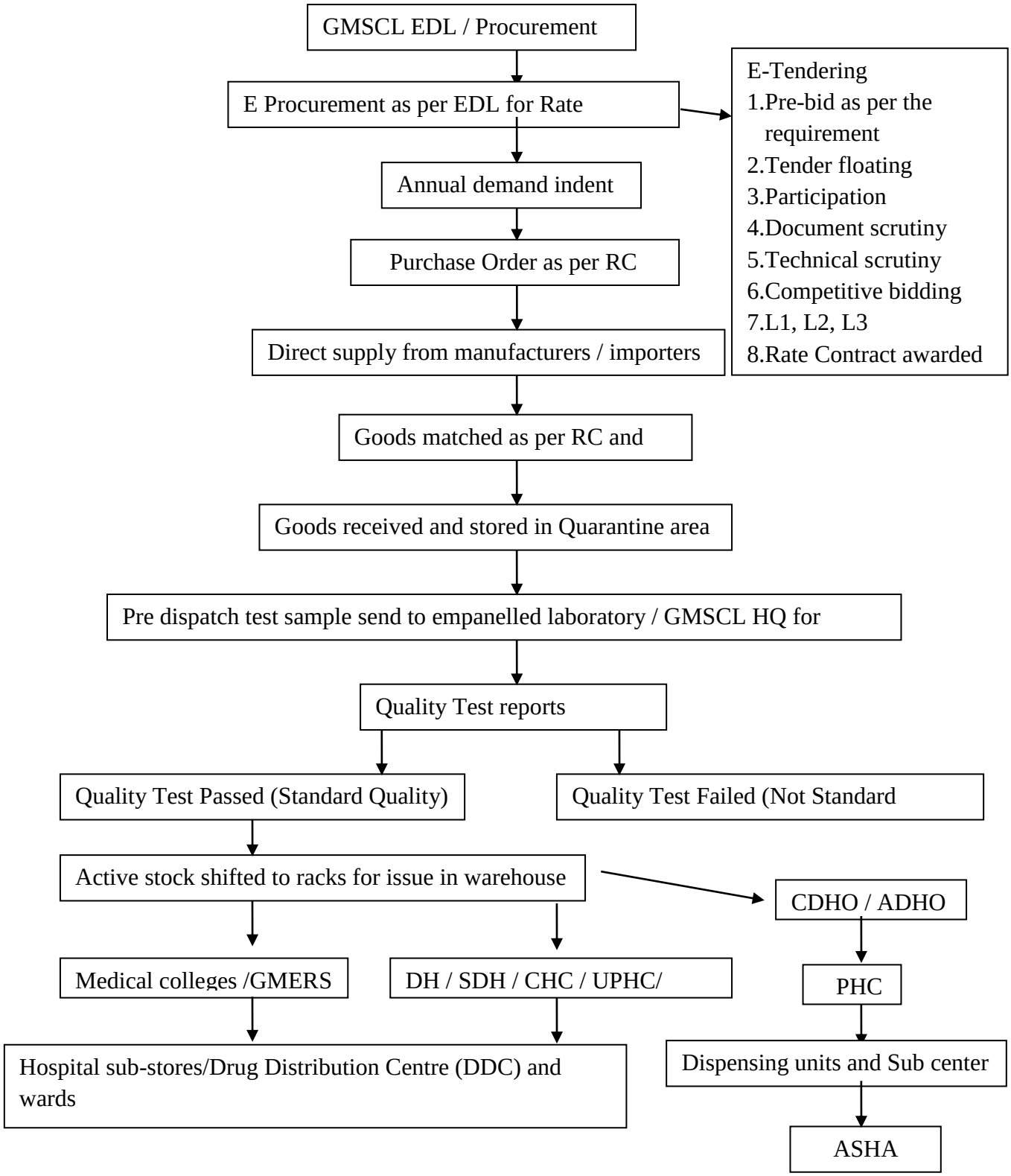
Technical and managerial improvements brought through establishment of corporation

- Free of cost medicine availability

Three Tier storage system

Tier I (State Level)	GMSCL	Procurement
Tier II (District Level)	11 DWH	Storage
Tier III (Institution level)	1820 DDO's	Distribution

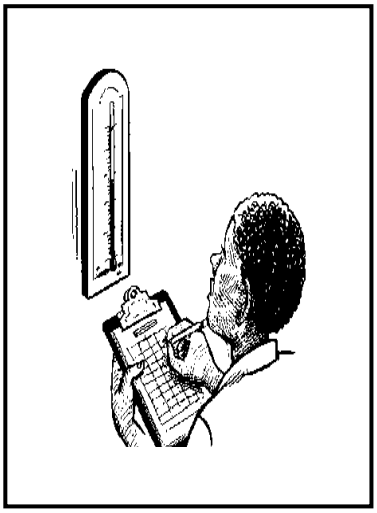
Supply chain flowchart



3. Warehouse Management

The warehouse is a key component of the supply chain for storage of health commodities. In this resource poor environment, it becomes essentially important to have a programmatic and systemic approach for strengthening a warehouse. This results in a well managed warehouse. A well managed warehouse acts as a buffer against the uncertainties and breakdowns faced in the supply chain. Therefore an effort has been made to give a holistic view of the facility, incorporating all the aspects, techniques, designs etc that will help to meet the present challenges and requirements.

Activities performed at the warehouse daily



1. Monitor drug storage conditions.
2. Clean receiving, storage, packing, and shipping areas.
3. Sweep or scrub floors with disinfectant and remove garbage.
4. Ensure that aisles are clear.
5. Ensure adequate ventilation and cooling.
6. Ensure that products are protected from direct sunlight.
7. Monitor store security and safety.
8. Contact DDO for next day supply / day supply, specify specific demand if any.
9. Contact transported for next day supply / day supply as per the route plan.
10. Check the store roof for any water seepage, especially in rainy season.
11. Send samples to empanelled laboratories / GMSCL headquarter for Pre Dispatch Testing.
12. Visually inspect the quality of goods and its packaging essentials.
13. Ensure that products are stacked correctly (are the lower cartons being crushed?).
14. Ensure drugs are issued as per the route plan.
15. Issue goods as per FEFO (First Entry First Out).
16. Monitor staff punctuality and discipline.
17. Conduct demand Vs supply analyses for major institutions for supply of commodities.
18. Daily reporting to GMSCL headquarter.

Activities performed at the warehouse weekly

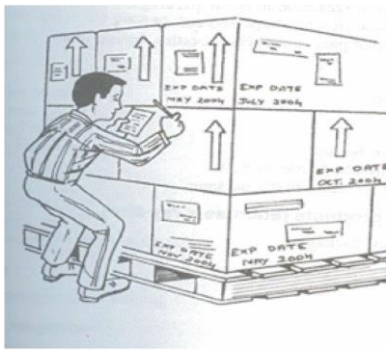
1. Complete and revise the stock records as per E-Aushadhi.
2. Separate expired drugs and move to secure area.
3. Quantity of corrugated boxes available for packing.
4. Received bills certification and send to GMSCL headquarters.
5. Written notification of any damage in goods received or details not in compliance to the rate contract and purchase order placed.
6. Revise near expiry drug list (180 days / 6 months)
7. Weekly internal warehouse meeting.
8. Warehouse maintenance related or other issues at the warehouse to respective department at GMSCL headquarter.
9. Oiling or charging of warehouse equipment

Activities performed at the warehouse monthly

1. Assess stock situation.
2. Determine issue quantity institution wise and drug wise.
3. Determine short supply, excess supply, near expiry, reorder level drugs and inform GMSCL headquarter.
4. Store drugs using correct procedure, rearrange commodities, follow FEFO (First Entry First Out)
5. Monthly reporting to GMSCL head quarter.
6. Use the generator to ensure it is working correctly and check the fuel requirement.
7. Check for signs of rodents, insects, or roof leaks.
8. Clean warehouse premise and remove unwanted waste.
9. Inspect the storage structure for damage, including the walls, floors, roof, windows, and doors.
10. AMC / CMC of equipments at warehouse. Update your AMC / CMC equipment calendar.
11. Participate in monthly review meetings at state level

Activities performed at the warehouse every 3 months

1. Cyclic physical stock verification and document update.
2. Check the fire extinguishers, functional or not, perform demonstration with staff members.
3. Report one innovative activity done at the warehouse for improvement to GMSCL headquarters.



Cyclic and annual stock verification

Activities performed at the warehouse every 6 months

1. Revise your own warehouse action plan progress made.
2. Conduct periodic fire drills and review fire safety procedures.

Activities performed at the warehouse yearly

1. Service disaster management equipments such as fire extinguishers, smoke detectors, alarm system.
2. Conduct complete physical inventory and update stock keeping records.
3. Conduct assessment of stock level, minimum or maximum and make adjustments if required.

4. Do's and Don'ts in a Warehouse

Always remember to do in a warehouse

1. Always physically verify the documents and then let the transport entering the warehouse.
2. Always receive and stack goods on pallets in a warehouse.
3. Always separate goods in quarantine from the active stock for issue in a warehouse.
4. Always acknowledge the goods on the same day of goods received in E- Aushadhi.
5. Always take samples from each batch within the 24 hours of goods received.
6. Remember to send the samples within 48 hours of goods received to empanelled laboratory / GMSCL headquarters.
7. Always remember to see near expiry item list before packing goods for issue
8. Store fast moving items at prime location with easy accessibility.
9. Store tablets capsules, powder, ointment on upper racks, liquids and injectable at middle and surgical and laboratory items at lower rack
10. Always follow FEFO (First Expiry First Out) at the time of arrangement of goods while receiving and issuing goods while dispatching them.
11. Always keep cold storage doors closed and restrict entry.
12. Remember to take a supervisory round of the warehouse morning and evening daily.
13. Always inform depot in charge in advance for personal or casual leaves at warehouse preferably a written application.
14. Always keep your tools and equipments updated and functional.
15. Always maintain the decorum of the warehouse.

Always remember not to do in a warehouse

1. Never store heavy, bulky items on the upper shelves of the racks.
2. Never issue goods in lose boxes.
3. Never let unknown visitors enter the storage area of the warehouse.
4. Do not spit, eat or smoke inside the storage area of the warehouse.
5. Never sit or sleep on the cartons stored at the warehouse.
6. Never leave the warehouse during the working hours or without permission in case of emergency.
7. Never use abusive language or actions while on duty.
8. Do not take the warehouse commodities for your personnel use.
9. Do not leave edible waste inside the warehouse before leaving.
10. Never use broom for warehouse cleaning, whereas use wet mop with disinfectant solution.

Warehouse staff should not sit or sleep on the corrugated boxes.


Keep storerooms dry, well lit and well-ventilated
Keep products sealed in their cartons
Use curtains, blinds or shade the windows to keep out sunlight
Use air conditioners or ceiling fans for ventilation
Keep fire safety equipment available, accessible, and functional
Service fire equipment regularly
Train staff in fire equipment use
Keep equipment, aisles and emergency exits accessible at all times
Strictly prohibit smoking or use of open flames in the storeroom
Keep flammable products in a separate building, if possible
Maintain cold storage and cold chain
COLD
HOT
Move received commodities into cold storage as soon as possible
Minimize opening of cold storage
Monitor temperature – check three times a day
Use alarm-linked thermometers to indicate cold chain failure
Stack cartons according to best practice
≤ 3.5 m
30 cm
30 cm
Cartons should be stored:
- At least 10 cm off the floor
- 30 cm away from the walls and other stacks
- No more than 3.5m high
Store health commodities away from other supplies
Keep health products away from insecticides, chemicals, and any other non-medicinal products
Isolate damaged and expired commodities
QUARANTINE
Remove from inventory immediately
Dispose of these products using established procedures
Clean and disinfect storeroom regularly
Prohibit the consumption and storage of food and drink in storerooms
Follow sanitation and pest control regulations
Provide waste bins
Protect storeroom from water penetration
Repair leaking roofs and windows
Keep doors and windows closed to prevent rain penetration
Use pallets and shelves to keep products off floor
Perform regular maintenance of water pipes, taps and sprinklers
Follow storeroom cleaning procedures
Store latex products away from electric motors, fluorescent lights and direct sunlight
Keep latex products in their cartons as they degrade when exposed to light and heat
Limit storage area access to authorized personnel
Lock up controlled substances
Limit access to keys to storerooms
Maintain a register recording access
Maintain up-to-date stock cards
Exp. Date Labels
Store cartons with arrows pointing up
Identification labels, expiry dates, and manufacturing dates should be clearly visible
If space is an issue, consider organizing cartons by expiry date and mix batches
EXPIRES 3rd
EXPIRES 2nd
EXPIRES 1st
Stock and manage commodities according to First Expired, First Out (FEFO)
Write expiry dates clearly on cartons, boxes and stock cards and ensure they are visible
Place products that expire first in front or on top of products that will expire later
Always issue products that will expire first
Monitor expiry dates monthly as part of your stock count
Return excess stock to central warehouse

5. Work Duties

Work Duties of a Depot Manager (DM)

1. He/she is the In-charge and custodian of DDW and accountable for all internal arrangement at DDWs.
2. Daily dispatch and receive of all the communication pertaining to the Depot will be handled by DM.
3. The Depot Manager will be responsible for disposal of all important letters or communication received. Also will be responsible for submission of various reports and returns to the GMSCL and other authorities before the due date.
4. Organizing Human resource:
   I. Allocation of work to warehouse employees.
   II. Cooperative work culture and learning environment.
   III. Daily address and discuss grievances relating to the employees of the depot warehouse.
   IV. He/she shall act as an interface to bring up the issues of staff officials or other warehouse issues to GMSCL headquarters and give suggestions for the same.
5. Meetings and discussions:
   I. Prepare agenda & conduct weekly meetings to discuss warehouse issues and plan actions accordingly.
   II. Participate in state warehouse meetings, give inputs for the central purchase of goods and implement the changes discussed.
   III. The Depot Manager will be responsible for dissemination & systematic implementation of all the actions communicated from the centre, GMSCL.
6. Depot Manager should preferably be a competent person who understands the rate contract specifications for effective supervision while the goods are received at warehouse.
7. Billing:
   I. All the letters/communications/bills etc will be passed on to the concerned employee for processing and will be duly approved by Depot Manager.
   II. The Depot Manager will precisely check each and every detail (stock register page number, date of delivery, quantity delivered, item name, penalty if any, and supportive document) before the invoice bills are certified and send to the centre for processing.
8. Pre Dispatch Testing of goods: The depot manager will ensure that the pre dispatch samples are send within 24hours for testing. The records for PDT will be maintained in system by Depot Manager.
9. Receive goods: The Depot Manager will monitor the goods received are in compliance with the purchase proposal and according to the tender specification.
10. Storage of goods:

I. He/she should ensure all active and quarantine goods are separately managed.
II. He/she should monitor the goods arrangement such as alphabetically, ABC or VED wise in the depot racks and store. Ensure all rakes or pallets are 10 cm above the ground, 30cm away from wall, <3mts in height.
III. He/she should ensure that all tablets, capsules, powder, ointment could be stored in upper racks, middle racks are occupied with liquids and injectable, lower racks with surgical and laboratory items.
IV. Keep check for loss of any commodity, shortage or negligence or observe any discrepancy or due to unavoidable causes like wastage, shrinkage, spilling etc. or due to improper storage condition.
V. All psychotropic, narcotic etc drugs should be arranged in separate room with restricted entry. Programme related drugs could be kept separately from the regular supply.
VI. All inflammables and corrosive items to be kept separate from each other and stored away from the regular supply.

11. Temperature monitoring: Temperature for vaccines, expensive drugs, injectable and all other goods to be monitored regularly. All goods, rubber items should be kept away from direct sunlight.
12. Issue goods:
    I. The depot manager will practice rationalizing the demand as per the consumption pattern of institutions before issuing goods. This will helps in equal distribution of goods to all the DDOs.
    II. The Depot Manager will ensure the drugs are issued as per the FEFO (First Expiry First Out) principle.
    III. He/she will crosscheck the goods issued at the warehouse. The goods are counted well, item and quantity is as per the DDOs and is same in the delivery challan.
    IV. All goods supplied should be according to the route plan schedule.
    V. All goods supplied should be according to the route plan schedule.
    VI. He / She will also perform monthly analyses of short expiry drugs (6 months) to the institution demand for their prompt supply to the demanding institutions.
13. Inventory of goods:
    I. He/she shall constantly monitor the flow of supplies IN and OUT of the warehouse. In the case if any drug is at reorder level or short supply observed, same shall be brought into the notice well in advance to the LSS branch, GMSCL to place purchase orders for the drugs at reorder level or by other means like by procuring the stock of non moving drugs or surplus stock from other institutions, if any.
    II. Depot Manager will perform monthly analyses to identify fast moving, slow moving or non moving drugs at their depot.
    III. In case there is any complaint about the supply or quality of drugs supplied from the receiving institution, He/she shall communicate the same to the LSS branch, GMSCL for further instructions.
    IV. He/she will recommend to the LSS branch, GMSCL to transfer any stagnant or non moving drugs wherever it is required.

V. The Depot Manager will perform weekly analyses of fast moving drugs and prepare list of drugs with reorder level.
VI. The Depot manager will define the institutions with high consumption patter to ensure uninterrupted supply of goods as early as the goods are received at the warehouse.

14. Warehouse safety:
    I. He/she shall keep the warehouse prepared for managing any disaster at all the time at depot. Firefighting equipment must be kept ready for use at all times.
    II. Conduct monthly mock drills for disaster management.
15. Cyclic & Periodic Stock verification:
    I. Conduct cyclic physical verification of each molecule in compliance with stock in position. Each molecule should be verified at least once every year.
    II. Apart from the cyclic verification of store, He/she shall conduct annual physical verification as on March 31st every year. The verification should be conducted in presence of Depot Managers with their signature on the final stock position of the depot.
16. Expiry and near expiry drugs:
    I. Report the expired stock details to the higher authority so that concerned action could be taken. He/she will only conduct the disposal of expired goods at warehouse in presence of a Notified Gazette Officer.
    II. Ensure whether the sub standard goods, banned drugs and expired item are kept separately with clear tag / label.
17. The Depot manager will prepare a contingency budget plan in advance for rational utilization of the funds provided.
18. Documentation and record update:
    I. The Depot manager will verify and check for update of all the warehouse registers weekly.
    II. He/she will weekly monitor the condition of the warehouse equipment, out of order equipment, non-functional items and inform the concerned person (maintenance branch, GMSCL or suppliers service centre) telephonically / in written when required for the issue faced.
19. Warehouse maintenance and cleanliness
    I. He/she will monthly assess the condition of the warehouse, identify the gaps related to maintenance and inform the concerned department, GMSCL telephonically as well as in written for the issue faced.
    II. He / She will monitor and take actions for keeping the premise clean. Supervise cleaning of the warehouse twice a day. One should inspect for waste management, insect infestation, pest management, burrows and other sites for maintaining hygiene inside the warehouse and unnecessary waste in the warehouse premise.
20. Good Practices and Innovation:
    I. He/she may give innovative ideas for improved management of warehouse depots.
    II. He/she should appreciate good practices exercised at the warehouse depot, document them and share with other warehouses and LSS branch, GMSCL.

III. He/she should take initiatives for adapting good practices exercised at other depots or elsewhere that could bring improvements in the present system.

Work duties of Senior Pharmacist

1. Senior pharmacist will act as a technical assistant of the warehouse depot on matters related to goods storage and their distribution, billing and testing of goods.
2. He/she will actively participate in various programme implementation, meetings and discussions at local as well as state level, policy designing, stock verification and warehouse management.
3. Primarily responsible for receiving goods in compliance to the rate contract and purchase order, storage of goods and record management for the goods received.
4. He/she will monitor the storage condition of received goods and their management at the warehouse.
5. Planning and quantifying the goods to be issued according to the stock in hand and the demand placed through Direct Demanding Officers.
6. He/she will identify non moving drugs, report the details of the problem to depot manager or to the higher authorities in time.
7. He/she will supervise the distribution or issue of goods at the warehouse is in proper order and accounted well by the junior pharmacist.
8. Ensure whether the sub standard goods, banned drugs and expired item are kept separate and with clear tag on it.
9. Report the expired stock details to the higher authority so that concerned action could be taken. He/she will be present during the disposal of expired goods at the warehouse.
10. He/she will conduct the physical stock verificationin the presence of the depot manager or in the presence of an officer authorized by the concerned department.
11. Keep check for loss of any commodity, shortage or negligence or observe any discrepancy or due to unavoidable causes like wastage, shrinkage, spilling etc. or due to improper storage condition.
12. He/she will inform the supply chain manager at state to transfer any non moving drugs wherever it is required.
13. He/she will give guidelines for the maintenance of various stock registers, documents and record management at the warehouse.
14. He/she will convene the meeting of Pharmacist periodically in order to co-ordinate, motivate and to strengthen their professional skills.
15. The senior pharmacist should be through with the rate contract specifications and purchase orders placed for effective implementation of the same while the goods are received at warehouse.
16. He/she will ensure that the pre dispatch samples are send within 24hours for testing. The records for PDT will be daily maintained, manual as well as in system.

17. He/she will practice rationalizing the demand as per the consumption pattern of institutions before issuing goods. This will helps in equal distribution of goods to all the DDOs.
18. He/she will ensure all supplies are according to the route plan schedule.
19. He/she will ensure the drugs are issued as per the FEFO (First Expiry First Out) principle.
20. He/she will precisely check each and every detail (stock register page number, date of delivery, quantity delivered, item name, penalty if any, supportive document) for the invoice bills certification then and send to the centre for processing.
21. Initiate the correspondence file for the receive goods not found in accordance to the purchase order and rate contract. Send the file to the GMSCL head with all the penalty clause and details for further verification and approval.
22. He / She will also inform depot manager for short expiry drugs (6 months) to be supplied on priority bases to the demanding institutions.
23. He/she shall constantly monitor the flow of supplies IN and OUT of the warehouse. In the case of short supply or any item falls below the buffer stock level, same shall be brought into the notice well in advance to the LSS branch, GMSCL to place purchase orders for the drugs at reorder level or by other means like by procuring the stock of stagnant, surplus, slow moving drugs from other institutions, if any.
24. In case there is any complaint about the quality of drugs from the receiving institution, He/she shall communicate the same to the depot manager/ LSS branch, GMSCL for further instructions.
25. He/she should ensure all active and quarantine goods are separately managed.
26. He/she should monitor the goods arrangement such as alphabetically, ABC or VED wise in the depot racks and store. Ensure all rakes or pallets are 10 cm above the ground, 30cm away from wall, <3mts in height.
27. He/she should ensure that all tablets, capsules, powder, ointment could be stored in upper racks, middle racks are occupied with liquids and injectables, lower racks with surgical and laboratory items.
28. All psychotropic, narcotic etc drugs should be arranged in separate room with restricted entry. Programme related drugs could be kept separately from the regular supply.
29. Temperature management for vaccines, expensive drugs, injectable and all other goods to be monitored regularly. All goods, rubber items should be kept away from direct sunlight.
30. He/she shall follow the guidelines in stocking the inflammable items.
31. All inflammables and corrosive items to be kept separate from each other and stored away from the regular supply.

Work Duties of a clerk

1. He/she will attend to all inward correspondence and inform the depot manager about the same.

2. He/she will manage all outward correspondence as per the instructions from depot manager and pass on to the GMSCL head office.
3. He/she will receive all items other than drugs at warehouse depot. Check and verify the items according to the rate contract and purchase order specifications before receiving.
4. He/she will receive and certify the bills of all the items other than drugs received at warehouse depot. The details of the bills are verified such as bill number, date, suppliers name, accept date, register page number where entry is done etc and send for approval to depot manager / in charge and then to GMSCL for processing.
5. He/she will maintain all the warehouse records for outward & inward correspondence, equipment receive & service files, pre dispatch test laboratory bills, truck letters, daily attendance, leave file and all other documents.
6. He/she will maintain and update dead stock ledger for the items received at warehouse other than drugs and consumables.
7. He/she will make necessary communication to the related departments, GMSCL as per the instructions from depot manager / depot in charge related to civil work and warehouse equipment maintenance.
8. He/she will prepare minutes of the meeting or other related documents under the guidance of depot manager / in charge for the meetings held at warehouse depot.
9. He/she will be responsible for the display of important emergency contact details, IEC or other important notices at the warehouse depot under the guidance of depot manager / in charge at the warehouse.

Work duties of the finance assistant

1. He/she will receive and certify the bills of all the items other than drugs received at warehouse depot. The details of the bills are verified such as bill number, date, suppliers name, accept date etc.
2. He/she will do the payment of approved bills through warehouse account (as per the conditions applied) or send for approval to concerned department in GMSCL.
3. Maintains all records & documents for the payment made under the contingency fund and also for the bills send to head office, GMSCL for payment.
4. He/she will inform the depot manager / in charge of each and every transaction made or received in the warehouse account daily.
5. He/she will be responsible for refilling of the diesel twice a month. He/she will maintain record for the date, quantity and amount of the diesel filled.

Work duties of Data Entry Operator

1. Make all E – Aushadhi software entries.
2. He / she will provide supportive role in certification of drug bills received such as finding the PDT reports for the test samples send on daily bases and inform concerned

staff, prepare forwarding letter for bills payment at headquarter, separate bills for certification everyday and other processes related to drugs billing.

3. Generate need based reports and timely online reporting to state headquarters.
4. Maintaining records for all medicines and supplies as per the deployed e-aushadhi software.
5. Compiling daily/weekly/monthly and yearly reports and send to state headquarter.
6. Typing work /making power point presentations and other computer based work as assigned by office in charge or supervisor.
7. Supervise & Co-ordinate with sub- store & DDC Operators.
8. Communicate software related issues, hardware problems or other system related problems to the Depot Manager of in charge in position.

6. Warehouse Assessment

A warehouse depot is much more than a storage facility. It should be designed to receive, store, issue and manage goods in a manner that health commodities are available in time for supply to various institutions and service delivery points.

The categories identified for warehouse assessment are:

A. Signage
B. Location and Infrastructure
C. Warehouse space requirement
D. Receive, issue and arrangement of goods
   - Standard Operating Procedure for critical warehouse activities
E. Inventory management
F. Quantification
G. Forecasting
H. Temperature management
I. Warehouse equipment
J. Security and safety

A. Signage

A warehouse depot is a large facility, a high traffic area for trucks and transport to bring or supply goods. It is also a place with large, heavy commodity, equipment, staff etc that need specified assistance in directions. In this complex domain, a system of wayfinding and directions provide an effective warehouse management.

There are three tools in way finding that are Signage, Pictorial Representation and Help Desk. This document helps us to prepare a warehouse based way finding methodology that could be easily implemented.

Signage comprise of following elements (EPI i.e. Easy to understand, People centric and Informative):

- **Language:** Main signage should be in English and State's official language.
- **Patient Centric:** it should be positively framed to provide reassurance and reinforce desired behaviours (e.g. enforcement of "No-Spitting" policy in the warehouse).
- **Information Hierarchy**: it should follow logic: information presented either in order of importance or sequential order such as alphabetical arrangement of drugs.
- **Material**: The selection of right material to display critical information is important because in public health institutions durability and low maintenance cost of signage is required. Vinyl Sheets, Acrylic Sheets, Mild Steel Sheets or concrete can be used as described below:

MS (Mild Steel) Sheet - These sheets are made of metallic components. MS sheets can be used outdoors for directional and instructional signage. '16 gauge' is the ideal thickness for such kind of signage.

Concrete - Cemented triangular boards are ideal for directional signage placed outdoors. This is a low maintenance board since it is all-weather resistant.

Vinyl Sheets - Self-adhesive vinyl sheets are pre-coloured. Text and graphics can be pasted directly at designated areas. It can be used in well illuminated areas.

Acrylic sheets - Signage need acrylic sheets that are white in colour and translucent so that this could be used for backlighting. It is suggested to use sheets of thickness 2 to 3mm for this purpose. It can be used in low lit areas.

Placement of signage

Scientific placement of signage in terms of size, area demarcation and numbers plays an important role in ensuring professional wayfinding in warehouse. Height of letters for signage required for varying viewing distance has been mentioned below for further reference.

Area of placement	Placement details
At the entrance to City	All warehouses are located either inside the hospital premise or nearby industrial area therefore the boards should be respectively placed.
At the turning point to warehouse main road	A board should be placed at all turning points to Main Road of the warehouse denoting the distance and direction. It should be visible from all directions.
At the Entrance to the warehouse	A board should be placed at the entrance of the facility denoting the name of the facility in state's official language in fluorescent.
A Layout Map of the warehouse at entrance	It can be displayed with clearly defined areas and sections in the warehouse for location.
Arrows denoting directions, demarcating areas and naming them	Issue area, receiving area, quarantine area, sections, administrative block, restricted entry, No smoking, direction and others, naming them

Standards of height of letters and minimum size of symbols as per viewing distance.

'HEIGHT' OF LETTER FOR VARYING VIEWING DISTANCE

Required viewing distance (M)	Minimum height of letters (MM)
2	6
3	12
6	20
8	25
12	40
15	50
25	80
35	100
40	130
50	150

B. Location & Infrastructure

B.1. Location and building

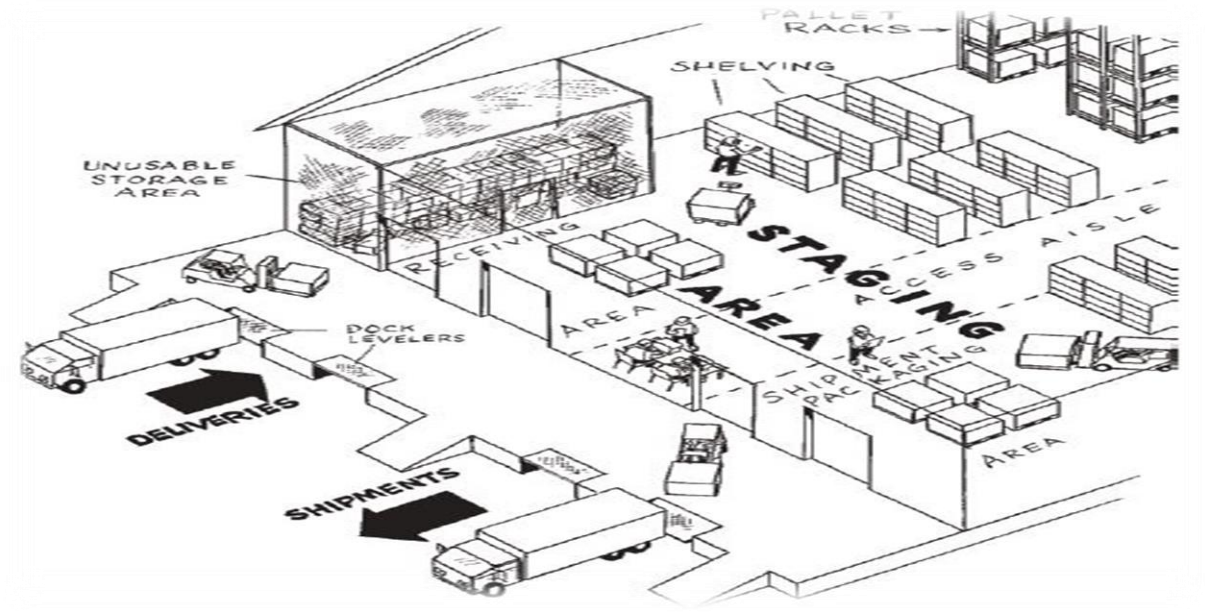
A warehouse must be accessible to all the health institutions and units to be served. Preferably a warehouse should be build by itself on a separate plot of land to enhance security and transport congestion. It should have adequate road access for large transport movement.

1. Entrance to the warehouse premises: The entry gate and angles must be maintained such that large and huge vehicles could enter, move and get park in the warehouse premise without any difficulty.
2. Warehouse boundary: The warehouse must have a boundary with plantation of large canopy trees to maintain the surrounding temperature. If snakes are an especially difficult problem in your area, you can construct a snake-proof fence around the perimeter of the facility. The fence should be made with heavy, galvanized screen with 6 mm wire mesh. The fence should be 90 cm tall with the lower end buried at least 10-16 cm in the ground. The above ground portion of the fence should be slanted at a 30° angle outward from the base and away from the building, using supporting stakes inside the fence.
3. Lightening: plan the warehouse with as much natural light, indirect sunlight during the day, as possible. Florescent lighting emits ultraviolet rays, which can harm certain products. Incandescent bulbs emit heat. At the same time, ensure that the products themselves are not in direct sunlight. Solar panels for lights in premise could also be an option for security at night.
4. Drainage: build the warehouse on a raised foundation to allow rain water to drain away from the warehouse. If possible, locate the warehouse on higher ground that is not prone to flooding or drainage problems.
5. Flooring: Warehouse floors must meet stress and strength requirements; otherwise, they may fail because of pressure from loaded racks. A qualified engineer can help.
6. Roof & ceiling: Consider the slope of the roof and the placement of roof support columns, and their impact on height clearances for rack configuration and other warehouse operations. Avoid using non-insulated galvanized steel metal sheeting for the roofing because it will get very hot. If unavoidable, create as much airflow as possible by using ventilation fans and tiered roof sections.
7. For optimal use of space and protection from heat, the best choice is a building without an internal ceiling. Insulated roofing panels are highly recommended; for example, galvanized steel sheeting with a polyurethane insulation, which is available in 40 millimeter (mm)–100 mm widths; for the best performance, it should have a

reflective powder-coated white paint or light gray. This is more efficient than an internal ceiling because it blocks the heat before it can enter any part of the building.

8. Power: install a diesel / solar panel generator or alternative supply of electricity for cold rooms and refrigerators. If the generator is not solar-powered, maintain a stock of fuel to run the generator for at least a few days. Run the generator regularly, at least once a month—to ensure the system is working properly. It is advisable to maintain three phase electric current supply to prevent overloading.
9. Windows: To reduce the need for air-conditioning, place windows high and wide enough for adequate ventilation. The height of the windows should ensure that shelves will not block them; install wire mesh and grating to keep out insects and to deter burglars. All window glasses should be laminated and adequate exhaust fans should be placed for air circulation.
10. Doors: Plan the dimensions of the doors / metal shutters to ensure they are wide enough to allow for the free and easy movement of product and handling equipment. Make sure the closing ends of rolling shutters meet jointly to the adjacent floor level to prevent entry of animals and insects inside the warehouse. Ensure doors are strong and reinforced for adequate security.
11. Trees: plantation of shade trees along the boundary wall will help reduce internal warehouse temperatures. You should regularly check their condition. Cut down any weak trees and trim others to avoid falling branches on the building. Ensure that tree roots are not damaging the building's foundation.

C. Warehouse space requirement



Warehouse is an infrastructure for storage of large commodities. Standardized infrastructure requirement based on continuous research for improvement has been provided by renowned organizations for idealizing a warehouse as critically as possible. The methodologies provided could be customized based on the overall inventory and work activities performed in the arena.

S.No	Area	Specification
1.	Truck docking	If trucks dock at 90° angle, no space is required. Otherwise, a triangular area measuring 4.25 meters wide (at the entrance to the warehouse) × 3 meters × 3 meters will be required for each docking space.
2.	Leveling for loading / unloading	If leveling devices are used, each device will require an area approximately 3 meters deep × 3 meters wide.
3.	Maneuvering for loading / unloading / receiving / issuing	for manual material handling equipment, an area 2.5 meters deep by the width of the designated receiving/ shipping area is required. For motorized material handling equipment, an area 3.5 meters deep may be required. Two staging areas (for receive & issuing) one on either side of the warehouse are separated by an access aisle.
6.	Dispatching	If the warehouse does not have a dedicated walled office to house the dispatcher and dispatching computer(s), an area 2.5 meters × 3.5 meters is usually required.
7.	Storage of empty pallets	An area 2.5 meters × 1.25 meters is usually required.

Truck docking are for loading unloading of goods

Storage of empty pallets at warehouse

C.1 Estimate shipping and receiving staging requirement

Three methods are used to estimate the space requirements for staging:

1. Complete data estimation methodology: Based on complete data on receipts and issues being available for at least the past year (preferably more). The data must include enough information on each shipment received or issued to completely identify the commodities received or issued, the number of cartons received or issued, and the volume of these cartons.

2. Partial data estimation methodology: When complete data on receipts/issues are not available, but data on overall amounts issued or received during the year are, or can be, readily estimated for all medium-to high turnover items. To use this method, estimate the dimensions for most of the cartons and the approximate number of individual receipts and issues that took place during the year.

3. Data-less estimation methodology: When you must guess the space needs because you have little or no information available to make a decision.

1.a Complete data estimation methodology

When data are complete or nearly complete on shipments received and shipments issued, you can accurately estimate the staging space requirements. The information includes:

- Date of receipt or issue done
- Identity of commodities received/issued
- Volume (width × length × height) of the packaging used (e.g., carton, bundle, wooden crate)
- Contents of each package (items per package)
- Number of packages in the shipment.

Step 1.

- First gather all shipment lists for the past year (or two years, if available).
- Review the receipts to identify the date on which the warehouse received and also issued the largest shipment by volume.
- Use the combination of the largest receipt(s) and largest issue(s) to simulate the largest surge the warehouse can expect.

Note: If the size of the largest shipment and/or largest receipt is expected to grow significantly in the near future, incorporate this information when estimating the needs for the surge period. The issue details here are the Delivery Challan (DC) with highest volume of commodity supplied.

Step 2.

- Use the data from step one to calculate the total volume of the receipts/issues expected during the surge period.
- Table1 shows how to calculate the total volume if you only have one receipt with three commodities and one issue with two commodities during the surge period. An actual exercise would probably include one or perhaps two receipts that contain numerous commodities and several issues, with each containing many commodities.

Step 3.

- After you determine the total volume in cubic meters of shipments received/issued during the surge period, you can estimate the number of pallets that will be required to hold the commodities, simultaneously, in the staging area.
- The number of pallets will be equal to the number of cubic meters, because each pallet typically holds about one cubic meter of goods.
- Thus, the area required to stage these commodities is equal to the number of pallets (given in square meters).
- It would be prudent to add a few extra square meters to the overall estimate of space required for staging; because not all pallets are exactly one square meter in size, and some space must be left between the pallets.

Table1. Sample Worksheet for Estimating Shipment Receiving and Staging Space Requirements: Complete Data Method

Type of Transaction	Date of Transaction	Commodity	Total Amount	Amount per Carton	Number of Cartons	Size of Carton	Carton per One Cubic Meter	Number of One Cubic Meter Pallets Required
Receipt	4 October 2017	AmitriptylineTablet, 25 mg	2,000,000	20,000	100	.5 m x .25 m x .25 m	32	4
Receipt	4 October 2017	Erythromycin,Tablet, 250 m	5,000,000	25,000	200	.5 m x .5 m x .25 m	16	13
Receipt	4 October 2017	Chloramphenicol,Vial, 1 gm	10,000,000	25,000	400	.5 m x .5 m x .25 m	16	25
Issue	4 October	Amitriptyline,Tablet,	200,000	20,000	10	.5 m x .5 m x	8	2

	2017	25 mg				.5 m		
Issue	4 October 2017	Erythromycin,Tablet, 250 mg	1,000,000	25,000	40	.5 m x .5 m x .25 m	16	3
Total	4 October 2017	47	Total	-	-	-	-	47
Note: Number of one-meter pallets required must be rounded up to next highest number.								

C.1b Partial data estimation methodology

You can estimate, with reasonable accuracy, the space requirements for staging if detailed information on receipt and issue shipment contents is not available, but overall amounts of each (or most) commodity received and issued is known or can be estimated.

This method requires the following information:

- Total numbers given in tablets, pieces, vials, etc. received and issued during the past year (or two, if possible) for most or all commodities kept in the warehouse during this period. It is especially important to include high-turnover items.
- Capacity and dimensions of the standard packaging for each of these items e.g. 50,000 tablets in a carton .5 meters × .5 meters × .25 meters. These numbers are on the current packaging used in the warehouse.
- Estimate of the total number of shipments received and the total number of shipments issued during the appropriate workdays.
- These volumes can be aggregated to produce the overall volume that would have to be staged on an average issuing day that happens to fall on the same day that an average-sized shipment is received.
- Table 2 shows how the overall volume was calculated in a case where the average receipt contained three commodities; and the average number of issues, on a given day, was one issue with two commodities. An actual exercise would probably include one (or perhaps two) receipt(s) containing numerous commodities and several issues or DCs, each holding many commodities.
- After calculating the total volume in cubic meters, you can estimate the number of pallets that will be required to hold the commodities, simultaneously, in the staging area.
- The number of pallets will be equal to the number of cubic meters, because each pallet usually holds about one cubic meter of goods. Thus, the area required to stage these commodities will be equal to the number of pallets given in square meters. It may be prudent to add a few extra square meters to the overall estimate of space required for staging, because not all pallets can be stacked perfectly or placed exactly adjacent to one another.

Table2. Sample Worksheet for Estimating Shipment Receiving and Staging Space Requirements: Complete Data Method

Type of Transaction	Commodity	Total Yearly Amount Received / Issued	Average number of Receipts / Issues per year	Average quantity in a receipt / issue	Amount per Carton	Number of Cartons	Size of Carton	Cartons per One Cubic Meter	Number of One Cubic Meter Pallets Required
Receipt	Amitriptyline Tablet, 25 mg	10,000,000	5	2000,000	20,000	100	.5 m x .25 m x .25 m	32	4
Receipt	Erythromycin, Tablet, 250 m	25,000,000	5	5,000,000	25,000	200	.5 m x .5 m x .25 m	16	13
Receipt	Chloramphenicol, Vial, 1 gm	30,000,000	3	10,000,000	25,000	400	.5 m x .5 m x .25 m	16	25
Issue	Amitriptyline,	8,000,000	40	200,000	20,000	10	.5m x .5m x .5	8	2
Issue	Erythromycin, Tablet, 250 mg	20,000,000	20	1,000,000	25,000	40	.5 m x .5 m x .25 m	16	3
Total									47
Note: Number of one-meter pallets required must be rounded up to next highest number.									

C.1c Using data less estimation methodology

In general, the warehouse staging area should take up at least 10 percent of the warehouse's total space, but never more than 40 percent.

Estimating the amount of space to allocate in these situations will depend on how much control you have over the carrier arrivals: i.e., to what degree can the warehouse specify exactly when a truck carrying incoming commodities can deliver its load? In these cases, use the guidelines in table 3 to estimate space requirements.

Note: It is important to maintain, at all times, an aisle space somewhere within the shipment and receiving staging area. This space provides access from the dock to other parts of the warehouse—most important, the storage area. The width of this aisle depends on whether traffic will be unidirectional (one way) or bidirectional (two way). Because commodities should be placed in the staging area from one end and removed from the opposite end, a unidirectional aisle should be sufficient. The width of this aisle should be about 2.5 meters, if you use manual material handling equipment; and at least 3.5 meters, if you use motorized material handling equipment.

Table3. Estimation of Staging Space Requirements

Degree of control of arrival	Percentage of warehouse for staging
Complete control	10 to 20
Some control	20 to 30
No control	30 to 40

C.2 Other space requirements associated with shipping and receiving

The dispatching section of the receiving/shipping area should require a minimum area of approximately 2.5 meters × 3.5 meters.

In addition to the dispatching area, you may need to allocate a set amount of space to hold empty pallets. The number of empty pallets should only slightly exceed the number of empty rack locations. Consequently, to hold empty pallets, you should allocate a minimum area of 2.5 meters × 1.25 meters of the receiving/shipping area.

C.3 Determine Space Requirements for an Ideal Layout for Storage and Retrieval

The most difficult task in layout planning is the estimation of storage space. The details required are:

- **Define the commodities to be stored**
  - Description of the commodity—code & name; it is also necessary to define a stock keeping unit: e.g., paracetamol 500 mg, bottle of 1,000 tablets.
  - Number of stock keeping units per standard packing unit: e.g., 25 bottles per box.
  - Volumetric dimensions of standard packing unit: length × width × height.
  - Number of standard packing units per one cubic meter pallet.
  - Number of pallets required for storage of the commodity.

- **Establish a material storage method for each commodity**
  - All fixed and liquid system for storage needs to be first identified.
  - The identified system will specify the location as well as the racking mechanism.

- **Estimate the total volumetric requirements for each commodity**
  - Estimating the total number of pallets required for bulk.
  - If data are available on average monthly issues and the average inventory level for each commodity is either known or has been set by some authority, you can divide the average inventory level given in cartons by the number of cartons that can be stored on a single cubic meter pallet to estimate the number of pallets required for each commodity.
  - This number can then be added to determine the total number of pallets to be stored in the warehouse.
  - If desired, this total value can be multiplied by some factor representing the expected increase in volume due to increased warehouse issues, over some period of time in the future.
  - See table 4 for an example of a warehouse that holds only three items.

- The warehouse storage area can be from 60 to 90 percent of the warehouse's total space.

Table4. Sample Worksheet for Estimating Bulk Storage Space Requirements Based on Complete Data

Commodity	**Average monthly issue (includes expected increase)**	**Average or desired inventory level (in months of stock)**	**Average or desired inventory level**	**Number of carton**	**Size of carton**	**Cartons per one cubic meter**	**Number of one cubic meter pallet required**
Amitriptyline Tablet, 25 mg	10,000,000	6	9,000, 000	450	.5 m x .25 m x .25 m	32	15
Erythromycin, Tablet, 250 m	25,000,000	3	7500,000	300	.5 m x .25 m x .25 m	16	19
Chloramphenicol, Vial, 1 gm	30,000,000	5	15,000,000	600	.5 m x .25 m x .25 m	16	38
Total							72

- Identify physical warehouse constraints to actualizing, completing, and finalizing storage/retrieval layout
- Map out all the obstacles such as staircase and other for identifying the actual space required.

D. Receive , Issue and arrangement of goods

D.1. Receiving health commodity at warehouse please take the following points in account:

1.	Please verify the goods as per the item rate contract as well as purchase order of the product.
2.	Check product name, expiry date, manufacture date, drug test report and other details.
3.	Physically inspect goods for any physical, chemical or manufacturing damage.
4.	Ensure there is sufficient storage space.
5.	Prepare and clean the areas used for receiving and storing the product.
6.	Inspect packages for damaged or expired products.
7.	If the product is found damaged or expired separate them from the other product.
8.	If the transport has not left, return the product and inform supplied about the details of damaged goods.
9.	If transporter has left, inform supplier of the details of damaged goods and separate them from other.
10.	If the product is not damaged accept the commodities and make necessary entries in E-Aushadhi as well as daily goods register.
11.	Store goods in quarantine till the quality test reports are received and quality passed.

Please follow the details provided in the standard operating procedure for receive for reference.

Monitoring quality of product at Depot warehouse at the time of receive.

Category	Checkpoints
Light sensitive products (such as x-ray film)	Torn, ripped packaging
Latex products	Dry Brittle Cracked
All products	Broken or ripped packaging (vials, bottles etc) Missing, incomplete and unreadable labels
Liquids	Discoloration Cloudiness Sediment Broken seal on bottles Cracks in ampule bottles and vials Dampness or moisture in packaging
Lubricated latex products	Sticky packaging Discolored product or lubricant Stained packaging Leakage of the lubricant (dampness or moisture in packaging)
Tablets	Discoloration crumbled pills Missing pills from blister pack Stickiness (especially in coated tablets) Unusual smell
Injectable	Liquids do not return to suspension after shaking
Sterile product (including IUDs)	Torn ripped packaging Missing parts Broken or bend parts Moisture inside the packaging Stained packaging
Capsule	Discoloration Stickiness Crushed
Tubes	Sticky tubes leaking content Perforation or holes in tube
Foil packaging	Perforations in packaging
Chemical reagent	discoloration

GMSCL logo on received carton

carton label as per RC):

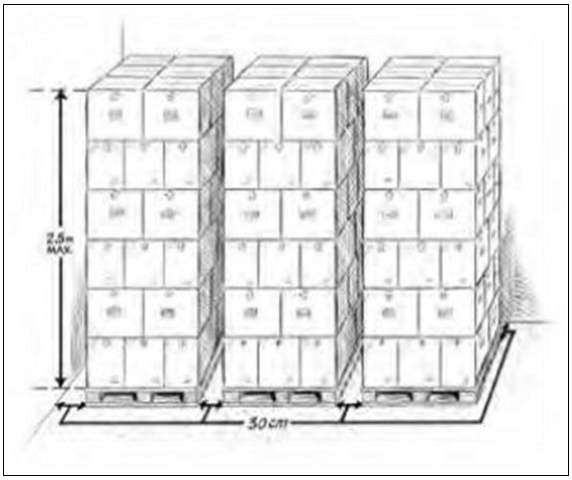
Reject goods if not as per the packaging standard/ may accept with penalty if non – critical in nature.

1. Item name &quantity, manufacturing date, expiry date, IV/IM/SC clearly printed
2. GMSCL logo & tag "For the use of govt. of Gujrat. Not for sale" in English & Guajarati both. Dimensions of 15*10cm of label on corrugated boxes
3. MRP not written/not visible
4. Check item content as per PO
5. Manufactured as per GMP & IP/BP/USP standards printed.
6. Every box should be strapped with two parallel nylon carry straps (should also intersect). No lose boxes supplied.
7. Paediatric box always supplied with dropper. A measuring cap with markings.
8. All plastic jars above 450gm/ml should carry an inner plastic lid.
9. Flip of seal on all injectable vials. Ampules with ampule foil.
10. Standardized corrugated box that are 5 or 7 layered are used for supply.

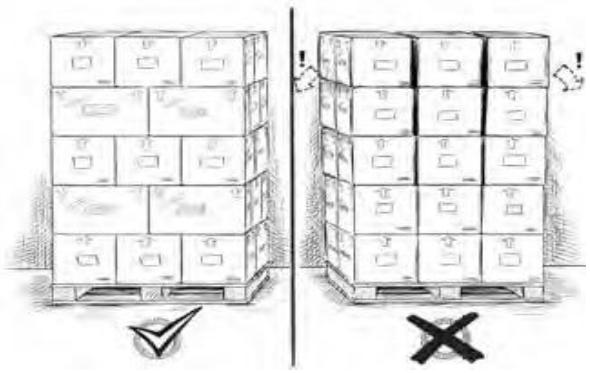
D.2a. Arrange goods using pallets and racks:

At least 10cm (4 inches) off the floor.

At least 30 cm (1 foot) away from the walls and other stacks.



Arrange goods in bonded fashion



No more than 2.5 m (8 feet) high.

D.2b. For all storage:

1. Follow the manufacturer or shipper's directions when stacking, and follow labels for storage conditions.
2. Place liquid products on the lower racks or on pallets for storage.
3. Store products that require cold storage in appropriate temperature controlled zones.

4. Store high security/high value products in appropriate security zones.
5. Separate damaged or expired products from the usable stock without delay, and dispose of using established disposal procedures. (See section on Waste Management.)
6. Always store all commodities in a manner that facilitates FEFO policy for stock management.
7. Arrange cartons so arrows point up and identification labels, expiry dates, and manufacturing dates are visible. If this is not possible, write the product name and expiry date clearly on the visible side.

D.2c. Stock rotation

1. When issuing products, it is important to follow the FEFO policy.
2. Always issue products that will expire first, ensuring they are not too close to or past their expiration date. The shelf life remaining must be sufficient for the product to be used before the expiry date.
3. To facilitate FEFO, place products that will expire first in front of products with a later expiry date.

4. Write expiry dates on stock cards, so stocks can be sent to facilities at least 6 months before they expire.

D.2d. Orderly arrangement of essential medicines

Some common systems for arranging medicines include-

Alphabetical order by generic name: Often seen in both large and small facilities. When using this system, the labeling must be changed when the Essential Medicines List is revised or updated.

Therapeutic or pharmacologic category: Most useful in small storerooms or dispensaries where the storekeeper is very knowledgeable about pharmacology.

Dosage form: Medicines come in different forms, such as tablets, syrups, injectables, and external use products such as ointments and creams. In this system, medicines are categorized according to their dosage form. Within the area for each form, a fixed, fluid, or semi-fluid system is used to store items. Any of the other methods of categorizing can be used to organize the items more precisely.

System level: Items for different levels of the health care system are kept together. This works well in stores at a higher level when storage of kits is required.

Frequency of use: Frequently used products that move quickly or often through the store should be placed in the front of the room or closest to the staging area. This system should be used in combination with another system.

Random bin: Identifies a specific storage space or cell with a code that corresponds to its aisle, shelf, and position on the shelf. This system requires computer automation.

Commodity coding: Each item has its own article and location code. This system has the greatest flexibility, but it is also the most abstract. Stores staff do not need any technical knowledge of the products to manage this system because the codes contain the information needed for storing products properly, such as temperature requirements, level of security, and flammability. This system works well in computerized inventory control systems.

***Size methodology*:** heavy and bulky items could be stored as close to floor as possible.

D.2e. Managing drugs

The methods available for managing health commodities available at warehouse are-

1. **ABC analyses**
2. **VED analyses - Vital, Essential and Desirable**
3. **FSN analyses - Fast moving, Slow moving, Non moving**
4. **FEFO – First Expiry First Out**

ABC METHODOLOGY

In warehouses about 75 percent of the through put is attributable to 15 percent of items (often called A items), another 15 percent of throughput is attributable to 15 percent of items (often called B items), and the remaining 10 percent of throughput is attributable to 70 percent of items (often called C items).

ABC methodology states that A items should be located in an area of the warehouse with the most productive material handling; A items should be placed as close as possible to the staging area and should be easily accessible. All C items should be placed in the back of the store or in two-deep pallet racks, if they are available.

Note: Although A items should be placed closest to the staging area, they should not be placed so close together that congestion from picking results. Space all items as evenly as possible.

VED ANALYSES

Another method of classification of drugs or materials is grouping them according to criticality in patient care.

"V" Items are vital drugs, without alternatives, forming about 10% of the total drugs whose absence cannot be tolerated. Every attempt is to be made, at whatever cost, to avoid the Out-Of-Stock position of these drugs.
"E" Items are the Essential items that constitute 40% of the items and their absence can be tolerated for the short stretch of time. They could be made available in a day or two or the alternative medicine can be made available.
"D" items are the desirable items which are the remaining 50% of the drugs and their non-availability can be tolerated for longer period. They may be required for chronic and less serious patients.

Combination of ABC and VED Analysis can be explained in the following way V E D A AV AE AD Category I 15% Items B BV BE BD Category II 40% Items C CV CE CD Category III 45% Items

- **Category I are either Vital or expensive** and should be managed with maximum attention. Consumption and its stock should be continuously monitored and safety stock should be kept at low to reduce the carrying cost.

- **Category II consists of drugs, which are essential, and of average cost.** They can be managed with little less priority and can be managed with middle level managers.

- **Category III consists of the drugs which are desirable and inexpensive and thus lowest in the hierarchy of priority.** They should be purchased periodically and buffer stocks can be high managed by lower level of management.

F S N ANALYSIS

In this analysis the quantity and rate of consumption is studied and categorized accordingly

- F Items are fast moving items that have large consumption
- S Item are slow moving item
- N Item are non moving items

Items are to be arranged as per their consumption keeping F items closer to dispatch area and easily accessible. Non moving items which are in stock and notconsumed over a long period lock up space and fund and may have to be condemned because of time barred or obsolete. Such items are to be identified and disposed off if not of standard or expired and care to be taken so that they are not ordered ordinarily.

Programme drugs that are commonly shipped together should be stored near each other. For family planning programs, this might mean that contraceptives should be stored in a similar location within the warehouse.

FEFO – First Expiry First Out: the drugs with first expiry to be issued first as a rule.

D.2f. Special Storage Conditions

Some products need storage in an access-controlled environment. It is important to identify products that are at risk of theft or abuse or have the potential for addiction, and to provide increased security for those items.
This will probably include storing the products in

a) A separate locked room
b) Or a locked wire cage within the storage facility.
c) Ideally a warning light or bell will be activated if the products are accessed improperly.
d) Restrict entry to most senior pharmacist or one other staff member.
e) Limit the number of keys made for the controlled location and keeps a list of people who have keys.
f) Cold Storage for specific health commodities.

1. Cold Storage

Most public health warehouses need to have cold storage for certain products. If the warehouse already has stand-alone or walk-in refrigerators or cold rooms, or if cold storage will be installed, ask the following questions:

a. Is the size of the cold store facilities adequate for the inventory?
b. Does the equipment have a maintenance schedule? Is it being followed?
c. Are the refrigerators or cold rooms properly maintained?
d. Long-term, setting up regularly scheduled maintenance visits could save money from costly repairs.

e. Does the electricity shut off regularly?
f. Is there a backup facility for cold storage?

g. Are enough cold packs available for transporting the drugs to institutions while maintaining their temperature?
h. Budget for extra fuel for the generator.
i. Are the refrigerators/cold rooms dispensing too much heat into the warehouse?
j. Are they taking up too much room and are they interfering with the other storage?Consider relocating refrigerators/cold rooms to auxiliary rooms off the main warehouse, this will remove the heat from the larger storage area and allow for better material handling flow in the main warehouse.
k. Is the cold room temperature regularly monitored?

2. Flammables

a) Some flammable liquids commonly found in health facilities include acetone,anaesthetic ether, alcohols (before dilution), and kerosene.
b) Store large supplies of flammables in a separate location away from themain storeroom, preferably outside the main storeroom but on the premises and not less than 20 m away from the other buildings.
c) Fire fighting equipment should be easily available.
d) Large supplies of flammables should never be stored in the same areas as medicines.
e) A small stock of flammables may be kept in a steel cabinet in a well-ventilated area, away from open flames and electrical appliances.
f) Mark the cabinets to indicate that they contain highly flammable liquids, and display the inter-national hazard symbol.
g) In addition, the shelves of the cabinet should be designed to contain and isolate spillage.
h) Always store flammables in their original container.
i) Flammable liquids each have a flash point, which is the minimum temperature at which the liquid gives off vapour in sufficient concentration to form an ignitable mixture with air near the surface of the liquid.

The flash point indicates the susceptibility to ignition.
Acetone and anaesthetic ether have a flash point of –18°C.
Undiluted alcohols have a flash point of 18° to 23°C.
The flash point for kerosene is 23° to 61°

It is very important to store them in the coolest location possible and never in direct sunlight. It is important to control the evaporation rate and avoid the build-up of pressure.

3. Corrosives:

Corrosive or oxidant substances commonly found in hospitals or other high-level health facilities include tri-chloracetic acid, glacial acetic acid, concentrated ammonia solutions, silver nitrate, sodium nitrate, and sodium hydroxide pellets.
Always store corrosive substances away from flammables and ideally in a separate steel cabinet to prevent leakage. Use appropriate industrial-type protective gloves and eyeglasses when handling these items.

Storage of flammables in steel boxex, with alert signage, handle wearing personal protective atire and store them separate from corrosives, in cool place

Standard Operating Procedure (SOPs)

Issue of goods

Purpose	Issuing is a supply chain process of packaging and dispatching goods as per the institutions annual demand received.
Scope	This SOP is applied to all Drug Warehouses & Depots

Employees and designation:

1. Depot Manager	2. Junior Pharmacist	3. DEO
4. Packers	5. Sweeper	

Activities performed

S.No	Activities performed	Person responsible
1.	As per the route schedule, inform the institutions for the tomorrow supply and also ask for their monthly demand if any.	DM
2.	A copy of the DDO (Direct Demanding Officer) chitti / indent from E-Aushadhi is taken.	Jr. Pharmacist
3.	The status of stock in hand is checked in E-Aushadhi. The good that have passed the quality standard are now in active phase ready for issuing to the respective institutions.	Jr. Pharmacist
4.	Near expiry drugs report (for 180 days) is checked in E-Aushadhi for early supply of such goods.	Jr. Pharmacist
5.	**Packing of goods:** •Goods are packed according to the FEFO rule i.e. first expiry first out. •Rationalizing the demand as per the consumption pattern of institutions. This helps in equal distribution of goods to all the DDOs. •If enough quantity available, supply the requested demand. •An Issue list with the drugs name, batch number (FEFO) & quantity is prepared while packing. •If there is an urgent requirement for the goods not in supply, the process of NOC is initiated.	Jr. Pharmacist & packers
6.	All packed cartons are numbered before stacked on the pallet (with a colour marker pen).	Jr. Pharmacist
7.	Maintaining the cold chain for temperature sensitive goods: Use of cold boxes for transportation of drugs. Ice packs are lined on the inner wall of cold boxes. Wait till the water droplets start to appear. The drugs are arranged in the cold box. Remember not to keep the drugs in direct contact with the ice pack. The temperature monitor is kept inside the cold box. The cold boxes should be closed air tight for transportation. Maintain temperature at 2-8 degree Celsius, less than 2 degree Celsius or 8 degree Celsius as per the specification while transportation.	Jr. Pharmacist

8.	The drugs packed are arranged on pallets in bonded fashion, all arrows pointing upward, and all cartons with DDO name in written.	Packers
9.	The item name, batch (FEFO), near expiry list & quantity are crosschecked. The goods are now ready for issuing for next day.	DM
10.	The Direct demanding officers are informed in advance for the packed supply.	DM
11.	According to the issue list, 3 copies of Delivery Challan (DC) are generated. One for the ware house, one for transporter & one submitted at the receivers end.	DM
12.	3 copies of the Truck letter (TL) generated by E-Aushadhi, one for the warehouse, for transporter and for the institution.	DM
13.	All DC & truck letters signed by the DM	DM
14.	Drugs while loading in the transport are rechecked against the DC list.	DM & Jr. Pharmacist
15.	A signed gate pass is given to the transporter which is submitted at security check before leaving the warehouse premise.	DM

Forms / register maintained

S.No	Name of the forms/software / register maintained	Key information in forms/software / register maintained	Duration	Person responsible	Person to verify
1.	Delivery Challan	Item name, quantity, batch number, signature of DM	Daily	Jr. Pharmacist	DM
2.	Outward register	item name, code, batch no. quantity issued, manuf. date, expiry date, no. of cartons, quantity, total quantity	Daily	Jr. Pharmacist	DM
3.	TRL truck letter (E-Aushadhi)	Truck number, number of cartons, distance in *km.*, date of issue	Daily	Jr. Pharmacist	DM
4.	Gate pass	Truck number, number of carton, name of person received & designation, signature of staff official, DM	Daily	Jr. Pharmacist	DM

Prepared by **Approved by**

Logistics & Supply chain Branch
GMSCL Managing Director, GMSCL

ACTIVITY LAYOUT

Check supply route schedule & DDO list of today. Confirm with transporter for the transport. Contact the institution for supply and ask for any specific demand.

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Take a copy of the DDO (Direct Demanding Officer) chitti / indent from E-

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Check Stock in hand and near expiry report (for 180 days) in E-Aushadhi

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As per the checked details rationalize the demand for institutions (equal distribution of

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Packing of goods:

- Follow FEFO rule (first expiry first out only).
- Equal distribution of goods to all the DDOs.
- If enough quantity available, supply the DDO demand completely.

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Maintaining the cold chain for temperature sensitive goods:

1.Use of cold boxes. 2. Ice packs are lined on the inner wall of cold boxes.
3.Do not to keep the drugs in direct contact with the ice pack.
4. The temperature monitor is kept inside the cold box.
5. The cold boxes should be closed air tight for transportation.

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Write DDO name and box number manually on each box for

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Arrange goods on pallets and transfer them to issue area

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Count issue goods carton and quantity in correspondence to the issue list

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Prepare Delivery challan (3 in no.) from E-Aushadhi duly signed by Depot

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Call & inform DDO for the goods ready for

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Prepare Truck Letter (3 in no.) from E-Aushadhi duly signed by Depot

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Prepare Gate Pass duly signed by Depot Manager for dispatch of goods

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Make entry for dispatched goods (name,quantity,batch,amount,number of boxes,DDO receive) in issue register

Receiving of goods

Purpose	The process of receiving goods in Supply Chain constitutes to acknowledge, physically inspect & verify and unload the goods to their respective position
Scope	This SOP is applied to all Drug Warehouses & Depots

Employees and designation:

6. Depot Manager	7. Senior Pharmacist	8. Junior Pharmacist
9. DEO	10. Packers	11. Sweeper

Activities performed

S.No	Activities performed	Person responsible
16.	As the transport enters the warehouse premise, a copy of **Purchase Order (PO), Invoice Copy (3 in no.) and pre dispatch test report** of the supplier is checked.	Sr. Pharmacist
17.	The details are verified with the **Rate Contract (RC)& the PO** copy in e-aushadhi: • PO number • Item name • Item quantity • Manufacturing date • **Expiry date** details are checked and delays mentioned if any (the goods should have 2years (or as per RC conditions) of expiry which may be supplied in 1/6th i.e. 4months period. A minimum of 16 months expiry from the date of delivery of goods could only be accepted with penalty charges. The drugs expired in such condition could be returned back to firm after confirmation. Drugs under statutory provisions must follow the maximum period according to scheduled "P") • **Delivery date** details are checked and delays mentioned if any (8 weeks i.e.59 days for all items & 10 weeks i.e. 75 days for injectable & sterile items/ as per RC from the next working day of PO received. Penalty for each week is ½% and 10% after 30 days)	Sr. Pharmacist
18.	**Physical verification of the stock** (please check for each box): Annexure44	Sr. Pharmacist
19.	**Packaging of drugs (item label as well as carton label as per RC):** Reject goods if not as per the packaging standard/ may accept with penalty if non –critical in nature. 11. Item name &quantity, manufacturing date, expiry date, IV/IM/SC clearly printed 12. GMSCL logo & tag "For the use of govt. of Gujrat. Not for sale" in English & Guajarati both. Dimensions of 15*10cm of label on corrugated boxes	Sr. Pharmacist

	13. MRP not written/not visible 14. Check item content as per PO 15. Manufactured as per GMP & IP/BP/USP standards printed. 16. Every box should be strapped with two parallel nylon carry straps (should also intersect). No lose boxes supplied. 17. Peadiatric box always supplied with dropper. A measuring cap with markings. 18. All plastic jars above 450gm/ml should carry an inner plastic lid. 19. Flip of seal on all injectable vials. Ampules with ampule foil. 20. Standardized corrugated box that are 5 or 7 layered are used for supply.	
20.	**Counting of goods:** • Count unopened/complete boxes first. • Multiply the number of boxes by the number of units in the box. • Count the packets inside the open boxes. • If an open box contains unopened packets, count the packets and multiply by the number of units in a packet. • This will give you the total number of the units in the unopened boxes. • Count all individual units that are in loose boxes. • Numbering of each carton and writing of expiry date	Sr. Pharmacist
21.	**If damaged items:** items are returned & not accepted. If transport has left, supplier is informed of the damage quantity and process of replacement starts.	Sr. Pharmacist
22.	Details of damaged quantity are entered in invoice copy and also in E-Aushadhi.	Sr. Pharmacist
23.	Goods found as per the RC are **acknowledged** in E-Aushadhi.	Sr. Pharmacist
24.	A copy of delivery challan/invoice duly signed & stamped of GMSCL is given to the transporter.	Sr. Pharmacist & DM
25.	Entry of all goods found as per the RC is made in Daily Goods Register (DGR)	Sr. Pharmacist
26.	Unloading of items by daily wages laborers on pallets in a bonded fashion.	Jr. Pharmacist
27.	The goods received are kept in quarantine area for Pre Dispatch Testing (PDT) and quality certified for active use.	Jr. Pharmacist
28.	**Shelving of active goods:** • Shifting of active goods from quarantine to active area. • Remember to keep all carton expiry dates on the visible sides of pallet, all arrows pointing upward,2.5-3 mts in height, 10cm off the ground & 30cm away from wall	Jr. Pharmacist section wise
29.	3 invoice copy received from supplier at warehouse (Two for account dept. and one for the record at warehouse)	Sr. Pharmacist
30.	Daily reporting of the total budget for the goods received.	DM
31.	Cleaning of the receiving area and quarantine area after the goods have been shifted and arranged in racks	sweeper

Forms / register maintained

S.No	Name of the forms/software / register maintained	Key information in forms/software / register maintained	Duration	Person responsible	Person to verify
5.	E Aushadhi	Acknowledge the details filled in by the supplier, mention any damaged quantity and enter the details	Daily	Sr Pharmacist	DM
6.	Daily goods register DGR (section wise i.e. injectable, surgical, tablets and miscellaneous, Reagents)	Batch no., item code, item name, name of supplier, order no. & date, Delivery challan/retail invoice no., no. of carton, quantity, total quantity	Daily	Sr. Pharmacist	DM
7.	Stock register (for quality test passed items only)	Receive date, order no. & date, suppliers name, invoice no. & date, batch no., manf. Date, expiry date, rate per packing as per RC, amount in total inclusive taxes, issue details such as month, quantity*, amount	Weekly	Sr Pharmacist	DM

*Only the acknowledged quantity and not the damaged goods will be entered in the stock register.

Prepared by **Approved by**

Logistics & Supply chain Branch
GMSCL Managing Director, GMSCL

ACTIVITY LAYOUT

Check for supply receive: 1. Purchase Order (PO) 2. Pre dispatch test report 3. Invoice

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The details are verified with the **Rate Contract (RC)& the PO** copy in e-aushadhi:

1.PO number
2.Item name
3.Item quantity
4.Manufacturing date

5. Delivery date: 8 weeks (59 days) for all items,
10 weeks (75 days) for injectable & sterile item or as per RC.
Penalty for each week is ½% and 10% after 30 days)

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Packaging of drugs (item label as well as carton label as per RC): Reject goods if not as per the packaging standard/ may accept with penalty if non –critical in nature.

1. Item name
2. Quantity
3. Manufacturing date
4. Expiry date
5. IV/IM/SC clearly printed
6. GMSCL logo
7. GMSCL tag "For the use of govt. of Gujrat. Not for sale" in English & Guajarati both
8. MRP not written/not visible
9. Check item content as per PO
10. Manufactured as per GMP & IP/BP/USP standards printed.
11. Every box should be strapped.
12. Paediatric box with dropper & measuring cap with markings.
13. All plastic jars above 450gm/ml should carry an inner plastic lid.
14. Flip of seal on all injectable vials.
15. Corrugated box 5 or 7 layered are used for supply.

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Physical verification of goods

a) **Physical damage:** Ensure no crushing, tearing, rubbing or ripping
Tears, perforations, water/oil/ broken or crumbled tablets, broken bottles
b) **Chemical damage:** Ensure no change in colour or consistency or smell
c) **Manufacturing defects:** Ensure labelling is correct, batch no. And expiry are stamped

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Count the quantity received

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Acknowledge only the goods as per PO & RC
Note: If damaged, inform the supplier and note in invoice for penalty clause

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Make entry in Daily Goods Register (DGR)

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Receive invoice copy (3 in no.) duly signed by Depot Manager and Sr.

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Keep goods in quarantine area for PDT and clean the receiving area

Pre-Dispatch Testing of received goods

Purpose	The process of testing is performed to assess, maintain and assure the continuum of quality of goods while receiving, transporting or supply. The assessment of goods is performed against the standards defined in the rate contract.
Scope	This SOP is applied to all Drug Warehouses & Depots and empanelled laboratory

Employees and designation:

1. Depot Manager (DM)	2. Junior Pharmacist	3. Data Entry Operator

Activities performed

S.No	Activities performed	Person responsible	Supervision done by
32.	Check the pre dispatch test report sent by the supplier with the transporter while receiving goods at warehouse	Jr. Pharmacist	DM
33.	Physically inspect goods for (also check as per the rate contract of GMSCL terms & conditions): (Refer GMSCL site) **A) Physical damage:** • Ensure no crushing, tearing, rubbing or ripping • Signs like tear, perforation, water, oil or broken crumbled medicines, broken bottles. **B) Chemical damage:** • Ensure no change in color, consistency or smell **C) Manufacturing defect:** • Ensure labeling is correct, manufacture and expiry date are written and stamped	Sr. Pharmacist	DM
34.	Do not accept and return goods as it is if physically damaged and mention reasons in retail invoice/delivery challan if the transport is still in the warehouse.	Sr. Pharmacist	DM
35.	If damaged goods found after the transport have left, separate it from other goods and dispose according to the state policy.	Sr. Pharmacist	DM
36.	Label the goods as damaged on each carton & also in the bin card.	Jr. Pharmacist	DM
37.	If goods are as per the rate contract enter the sample details in e-ausadhi as received.	Sr. Pharmacist	
38.	Withdraw sample for Pre Dispatch Test: randomly select sample from carton as per sample sent request in e-aushadhi.	Jr. Pharmacist	DM

39.	Remove (or black ink mark) all the details of sample such as manufacture name, manf. Date, expiry date, drug name and others.	Jr. Pharmacist	DM
40.	Label the sample with secret code and generic name only.	Jr. Pharmacist	DM
41.	Send the sample to centre GMSCL for quality testing from empanelled laboratories.	Jr. Pharmacist	DM
42.	Keep the goods in quarantine area till results awaited.	Jr. Pharmacist	DM
43.	If standard passed then shift the goods to active area or if found Not of Standard Quality (NSQ) inform office head quarter of the batch and quantity NSQ goods.	Jr. Pharmacist	DM
44.	Maintain records in e-aushadhi as well as PDT register	Jr. Pharmacist	DM

Forms / register maintained

S.No	Name of the forms/software / register maintained	Key information in forms/software / register maintained	Person responsible	Person to verify
8.	E- Aushadhi	Drug supplied batch no, drug name, manufacture details, date of expiry, sample quantity, report	DEO	DM
9.	PDT register	Drug name, batch number, quantity per batch, manufacture name, manuf. Date, expiry date, secret code, result/TR number, sample sent date, report receive date	Sr. Pharmacist	DM

Prepared by **Approved by**

Quality Control Branch
GMSCL Managing Director, GMSCL

ACTIVITY LAYOUT

Goods are received and stored in quarantine

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Check the sample send request send in E-Aushadhi **everyday** (sample name, quantity, batch and laboratory name, secret code)

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Take the sample and prepare it for testing:

1. Remove the identity of the sample
2. Mark the secret code on the sample taken

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Inform the laboratory/GMSCL for the samples ready for

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Send the sample to the laboratory/GMSCL with in 48 hours of sample send request received

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Check the Test Report in E-Aushadhi. The days for receiving are

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Record the Test Report receive date in PDT

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Penalty in case of delay in test report:

Non sterile items	Sterile items
14-16 days: 2.5%	25-29days:2.5%
17-18 days: 5%	30-35days: 5%
19-21 days: 7.5%	36-40days: 7.5%
Above 22days: 10%	Above 41days: 10%

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Inform state in cases of Not of Standard Quality or delays in test

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Quality pass goods are active for

SOP for Managing Goods at District Drug Warehouse

Purpose	The process of managing goods in supply chain is racking of goods, arrange them on pallets and storage in a standardized fashion.
Scope	This SOP is applied to all Drug Warehouses & Depots

Team of employees involved as per the designation assigned:

1. Depot Manager/ manager In charge	2. Senior Pharmacist	3. Junior Pharmacist
4. Packers		

Activities performed

S.No	Activities performed	Person responsible
5.	Goods that have passed the quality standards are transferred from quarantine area to racks and shelves in warehouse for storage.	Jr. Pharmacist
6.	Arrange goods on pallets. Arrange pallets on shelves / racks and store goods.	Jr. Pharmacist
7.	Stacking of goods on pallets: 1. Arrange all goods at the base of pallet first 2. Arrange other goods in layers (in bonded manner) over the base. 3. All goods should be 10cm (4 inch) off the floor, 30cm (1 foot) away from wall/ other stacker & not more than 2.5 mt (8 feet) in height on pallets.	Jr. Pharmacist
8.	Racking/ shelving of goods: 1. Upper racks: Tablets capsules, powder, ointment 2. Middle rack: liquids and injectable. 3. Lower rack: surgical and laboratory items 4. If the items are divided into sections such as injectable, sterile, tablets and miscellaneous then sub divide the sections into fixed, fluid or semi fluid system. 5. Place fast moving items at prime location with easy accessibility then slow moving & non moving items 6. The fast moving fluids could be stacked on pallets and stored at prime location. 7. Arrange goods in alphabetical order by generic name and label them. 8. Change labels when list is revised. 9. Always follow FEFO (First Expiry First Out to be kept in front) for goods arrangement	Sr. Pharmacist
9.	Storage of goods: 1. Commodity coding: each item has its own article and location code for storage. 2. Cold storage: maintain vaccines at the recommended temperature	Sr. Pharmacist & Jr. Pharmacist

	and monitor it twice in a day. 3. Keep narcotics, psychotropic drugs, opioids & analgesics in restricted entry zone. 4. Flammables (acetone, anaesthetic ether, alcohol, kerosene etc) store away from medicinal storage. Avoid direct sunlight and build up pressure. Store them below the **flash point** such as: Acetone & anaesthetic ether = -18 *C Undiluted Alcohol = 18 – 23 *C Kerosene = 23 – 61 *C 5. Corrosives (trichloracetic acid, glacial acetic acid, conc. Ammonia solution, silver nitrate, sodium hydroxide etc). Store corrosives away from flammables. 6. Store rubber items away from direct sunlight and excess heat.	
10.	Never pack goods in sunlight. Store goods away from direct sunlight.	Jr. Pharmacist
11.	Always separate expired or not of standard goods from active stock and label them for identification.	Jr. Pharmacist

Prepared by

Logistics & Supply chain Branch
GMSCL

Approved by

Managing Director,
GMSCL

ACTIVITY LAYOUT

Check the goods that have passed quality standards in the system

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Arrange goods on pallets. Arrange pallets on shelves / racks and store

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Stacking of goods on pallets:

1. Arrange all goods at the base of pallet first
2. Arrange other goods in layers (in bonded manner) over the base.
3. All goods should be 10cm (4 inch) off the floor, 30cm (1 foot) away from wall/ other stacker & not more than 2.5 mt (8 feet) in height on

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Racking/ shelving of goods:

1. Upper racks: Tablets capsules, powder, ointment
2. Middle rack: liquids and injectable.
3. Lower rack: surgical and laboratory items
4. If the items are divided into sections such as injectable, sterile, tablets and miscellaneous then sub divide the sections into fixed, fluid or semi fluid system.
5. Place fast moving items at prime location with easy accessibility then slow moving & non moving items
6. The fast moving fluids could be stacked on pallets and stored at prime location.
7. Arrange goods in alphabetical order by generic name and label them.
8. Change labels when list is revised.
9. Always follow FEFO (First Expiry First Out to be kept in front) for goods

↓

Storage of goods:

1. Commodity coding: each item has its own article and location code for storage.
2. Cold storage: maintain vaccines at the recommended temperature and monitor it twice in a day.
3. Keep narcotics, psychotropic drugs, opioids & analgesics in restricted entry zone.
4. Flammables (acetone, anaesthetic ether, alcohol, kerosene etc) store away from medicinal storage. Avoid direct sunlight and build up pressure.
   Store them below the **flash point** such as: Acetone & anaesthetic ether = -18 *C
   Undiluted Alcohol = 18 – 23 *C
   Kerosene = 23 – 61 *C
5. Corrosives (trichloracetic acid, glacial acetic acid, conc. Ammonia solution, silver nitrate, sodium hydroxide etc). Store corrosives away from flammables.
6. Store rubber items away from direct sunlight and excess heat.

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Never pack goods in sunlight. Store goods away from direct sunlight.

Billing of received goods

(SOP for billing of goods at District Drug Warehouse)

Purpose	The process of billing in supply chain is to certify the bills of goods that have passed the quality test. The bills are further processed for payment.
Scope	This SOP is applied to all Drug Warehouses & Depots

1. Depot Manager/ manager In charge	2. Senior Pharmacist	3. Data Entry Operator (DEO)
4. Clerk/ Finance Manager in position	5.	6.

Team of employees involved as per the designation assigned:

Activities performed

S.No	Activities performed	Person responsible
1	Goods that are active in E-Aushadhi system (goods that have passed the quality test) are entered in stock register.	Sr. Pharmacist
2	The invoice details in compliance with the stock details in warehouse are certified for further processing. Points that are checked for certification are: 1. Purchase order number & date 2. Purchase order 3. Invoice number& date 4. Suppliers name 5. Receiving date 6. Item number 7. Batch 8. Quantity per batch 9. Quality Test Passed from GMSCL (Test Report) 10. Manufacturing date 11. Expiry date 12. Rate per pack as per Rate Contract 13. Amount in total (including taxes)	Sr. Pharmacist
3	In case of damaged goods, suppliers are asked for a new bill submission. The new bills should include only the acknowledged goods.	Sr. Pharmacist
4	The retail invoice are certified using a certificate stamp. A certification stamp is placed on two invoice copies, one for in house and one for accounts department. Details in the certificate to be filled: 1. Receiving date and quantity 2. Accepted date and quantity 3. Stock register page number where entry of goods is done 4. Signature of Sr. Pharmacist & Manager	Sr. Pharmacist
5	A forwarding letter for the bills to be passed for the payment is prepared	Sr.

	with the certified invoices and is send to GMSCL for further action.	Pharmacist
6	The forwarding letter is signed by the accounts dept. at GMSCL and is send back to the warehouse as the bills received.	JSS Manager

Forms / register maintained

S.No	Name of the forms/software / register maintained	Key information in forms/software / register maintained	Duration	Person responsible	Person to verify
1	Stock register (for quality test passed items only section wise)	Receive date, order no. & date, suppliers name, invoice no. & date, batch no., manf. Date, expiry date, rate per packing as per RC, amount in total inclusive taxes, issue details such as month, quantity*, amount.	Weekly	Sr Pharmacist	DM
2	Certificate stamp	Goods receive date, accepted date and page no. of stock reg. with goods entry, signature of designated authority.	Weekly	Sr Pharmacist	DM
3	forwarding letter	Addressed to DGM (Finance & Accounts), Subjected for bills to be passed, submitted by LSS Manager.	Weekly	Sr Pharmacist	LSS Manager
4	Retail invoice	Delivery address, invoice number, order number, purchase order number & date, rate contract number & date, item name, batch, quantity, total amount & signature.	Weekly	Sr Pharmacist	DM
5	Correspondence file	Details of the issues identified in the received quantity are put up in the file and submitted to Head Of The Dept. for further action for the process of billing.	Weekly	Sr Pharmacist	DM

*Only the acknowledged quantity and not the damaged goods will be entered in the stock register.

Prepared by

Logistics & Supply chain Branch
GMSCL

Approved by

Managing Director,
GMSCL

ACTIVITY LAYOUT

Check the invoice bills for payment

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Check the status of the invoice item in E-Aushadhi (Item and batch should be active)

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Check the item details in stock register for certification. Points that are checked for certification are:

1. Purchase order number & date
2. Purchase order
3. Invoice number& date
4. Suppliers name
5. Receiving date
6. Item number
7. Item batch number
8. Quantity per batch
9. Quality Test Passed from GMSCL (Test Repor
10. Manufacturing date
11. Expiry date
12. Amount in total (including taxes)

↓

If ok certify the bills. Certificate details stamped and written on invoice are

1.Receiving date and quantity
2.Accepted date and quantity
3.Stock register page number with item entry
4.Signature of Sr. Pharmacist & Depot Manager

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In case a new bill required only for the items verified and quality passed, contact & inform suppliers. Receive new bill.

←

In case penalty clause: Details of the penalty & issues identified in the received quantity are put up in the file and submitted to Head Of The Dept. for further action for the process of billing.

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Prepare forwarding letter for all the certified bills for payment.

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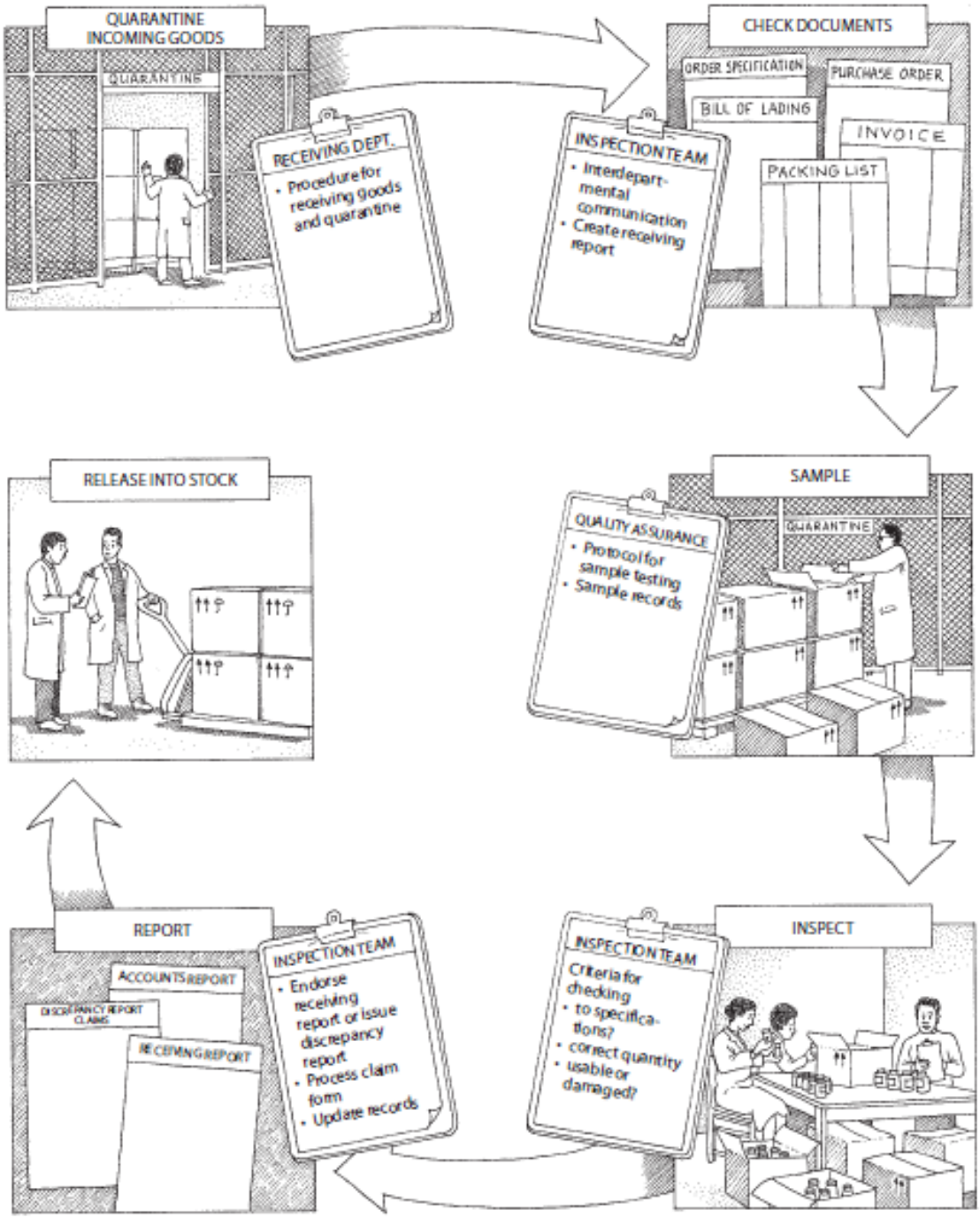
Send the bills with forwarding letter to GMSCL Accounts branch for payment

E. Inventory management

Logistics is defined here as the "science (and art) of getting the right amounts of right things to the right places at the right time" (Foster 1990, 207). Inventories are one of the major components for logistics and supply chain system. Inventory management is the management of routine order processes. It can be defined as the sum total of those related activities essential for the procurement, storage, sale, disposal or use of material. It ensures the product is available at the right place, at the right time, at the right quantity and is available to the right customer.



Seven basic issues must be considered for effective, efficient inventory management:

- The supply system's purpose and the type of distribution system
- The records and reports that will provide the foundation for inventory management
- The selection of items to be stocked
- The balance between service levels, including stockout costs, ordering costs, and stock-holding costs
- The policy on when to order.
- The policy on how much to order and methods for determining reorder quantities or reorder intervals.
- The control of costs associated with inventory management (ordering, stockout, and stock holding)

How the inventory management system operates?

There are two factors to determine how the inventory management system supports the supply chain process. A system in which the agency or client orders finished products from a supplier or the system supports primarily internal manufacturing, thus on this depends the system is an **independent demand system or dependent demand system**.

Independent demand system: applicable to the firms or organizations like GMSCL, to the procurement and distribution of finished goods. The order quantities are derived from forecasts or demand based on historical consumption by Direct Demanding Institutions, including the expected changes in consumption pattern. Inventory levels are set to provide a defined level of services to the institutions, at an acceptable cost.

The other factors that determine the inventory management context is whether the distribution system is **a push system or a pull system**.

E.1. Stock records and its management

Records and documents are the bases of the organization for planning and improvising the system to bring quality in work that we do. Computers are essential to manage an inventory of any size with perpetual purchasing. Moreover, a good software program properly used makes information retrieval and reports much easier than a manual system. **The key point about stock records, either manual or computerized, is that they must be current and accurate.** It is impossible to manage the reordering process well if stock movement cannot be tracked. It is important to maintain at least two system stock records. Another method of record management is manual stock update in registers and ledger files.

All the registers maintained at warehouse are listed below with the description of key information contained in it.

Table: List of registers maintained at warehouse with details of information contained in them.

List of registers	Key Information
Daily Goods Register	Batch no., item code, item name, name of supplier, order no. & date, Delivery challan/retail invoice no., no. of carton, quantity, total quantity
Attendance Register	Name of the staff, date, signature, reporting time, leaving time, leave details
Stock Register	Receive date, order no. & date, suppliers name, invoice no. & date, batch no., manf. Date, expiry date, rate per packing as per RC, amount in total inclusive taxes, issue details such as month, quantity*, amount
Pre Dispatch Register (PDT)	Drug name, batch number, quantity per batch, manufacture name, manuf. Date, expiry date, secret code, result/TR number, sample sent date, report receive date
Issue Register	Details of the item, issued quantity, issued amount, date of issue, batch number, institution details
Contingency Register	Date of fund utilization, purpose, check number and other details, amount, signature for verification
Inward Register	The details of all the post received, receiving date
Outward Register	The details of all the post send, send date
Security Register	Company name, company bill / challan details, number of box or cartons, vehicle number, gate pass received
Truck Letter Register	Details of item issued, quantity in boxes, truck details and company name, issued to institution
Card file for PDT reports	All the Pre Dispatch Test reports received for the sample send for testing.
Card file for all bills	All the drug bills received are maintained in a card file

E.1a Bin Card system

File cards are physically kept at the stock location. This system makes the visual checks easy. It is an in hand tool for all the records of the commodity in place such as item name, batch, manufacture and expiry details, issue receive details, minimum or maximum stock level, reorder level, reorder quantity, closing stock, opening stock are the parts of bin card.

Bin card is a record of receipt and issue of materials Quantity of store received is entered with receipt column and the quantity of store issued is recorded in the issue column of Bin Card. Balance of quantity of stores is ascertained after every receipt or issue. It shows the balance of the stock at any moment of time. Bin Card is maintained by the store-keeper. Bin card is able to find out any difference between physical store and the balance shown.

Thus Bin Card does not only record the receipt an issue of the stores but also assist the store keeper for control of the stock. For each item of stores minimum level, maximum level, and ordering level are shown in the part of the Bin Card.

E.1b Stock counts

There are two types of stock counts named as **cyclic / periodic stock count or annual stock count.**

Cyclic counting / continuous counting / perpetual inventory: the entire inventory is divided in to counting goods and each group is counted every week, with reconciliation of inventory, another group counted the next weeks and so forth. All items should at least be counted once in a cyclic year for all inventory verification and correction of the recorded errors.

Another method of cyclic counting is to assign the counting frequency and timing by ABC category. Counting A category thrice, B category twice and C category once.
The stock count could be planned day wise in every week such as Saturday or Friday, so that daily warehouse activity is least affected.

Cyclic counting is an effective process for correction of discrepancies occurring in the stock record in a continuous manner further reducing the chances of cumulative mistakes to occur.

Annual stock count: it is advisable to conduct periodic cyclic counts weekly or monthly coupled with an annual stock count for reconciliation of the discrepancies observed. It will occur once in a year in presence of state officials
corrective measures taken before the starting of the next financial year.

E.1c Routine reports and monitoring documents (Refer Annexure .....)

Storage facility should report on:

1. Stock status in terms of receives and issue, their amount details, average inventory holding cost.
2. Drugs at reorder level and related details.
3. Expiry status of drugs in inventory and estimate of how much stock is likely to expire before it can be used.
4. Quantity and value of obsolete stock waiting for disposal and stock destroyed or junked.
5. Pre Dispatch Test sample send and reports received details
6. Temperature monitoring for special items.
7. Payment of all the bills, drug bills, truck / transporters bills, water electric phone bills and other related details.
8. Any discrepancy noted and corrected.
9. Issues related to staff members, civil work, administration related issues and requirements if any.
10. Innovative or best practices observed at warehouse level.
11. Consumption pattern of all stock items.

Monitoring checklist includes:

1. Staff details with respect to availability, training and regularity in work.
2. Availability of basic civil work at the warehouse.
3. Inventory management such as physical stock verification, stock details in record, receive & supply issues, quality check for drugs in practice, rationalization of supply and other details.
4. AMC or CMC of equipments available at the warehouse.
5. Meeting with Direct Demanding Institutions and addressing their problems.
6. Actions taken for correction and suggestions made.

Why inventory management is important?

- ***To ensure availability of stock:*** In the typical drug supply system, it is impossible to forecast demand with complete accuracy or to be certain about supplier's performance. Inventory absorbs fluctuation in supply and demand and reduces the risk of stock-outs.

- ***To maintain a reliable system:*** If there are regular stock-outs, patients and staff lose confidence in the system and patient utilization drops for both curative and preventive services.

- ***To reduce the unit cost of drugs:*** Ordering drugs in bulk allow quantity discounts from suppliers and reduces transport costs.

- ***To avoid emergency purchases cost:*** If emergency orders are needed to cope with stock-outs, the unit cost is likely to be much higher than for a regular order. Also, when a drug sales program is operating, stock-outs mean lost revenue, as patients go elsewhere for drugs.

- ***To minimize ordering costs:*** Purchasing costs increase when items are ordered frequently. These costs include salaries and benefits for purchasing and accounting staff, office space costs, utilities, supplies, and other costs associated with tenders and regular orders.

- ***To minimize transport costs:*** Drugs can be delivered less frequently, enabling transport resources to be used more economically.

- ***To allow for fluctuations in demands:*** changes in demands for specific drugs are often unpredictable and an adequate inventory allows the system to cope with demand fluctuations.

It seems evident that drug supply systems need to hold a certain level of inventory; however, holding high stock levels has disadvantages. There are several tools available as discussed above as ABC analyses, VED analyses, FEFO and FSN analyses for managing stock at a warehouse.

Service level

It is important to maintain stock at all levels at any point of time to provide uninterrupted supply to demanding institutions. A balance has to be maintained between the cost of holding additional stock and the cost incurred due to stock out. Service level thus

The service level in its most representative form is the percentage of individual items of ordered from supplier or warehouse that is issued form stock on hand. This is measured by counting the total number of items issued and divided by the total number of items requested.

Service level = (# items issued ÷ items requested) X 100

For an example if 20 products are listed on a request, ten units of each product are requested, 200 items are on the order. If only 170 items are issued, the service level is 85%.

The effect of safety stocks can also be measured in terms of the service level. This is defined as the percentage of requests that can be filled from stock-in-hand. For example, a 85% service level means that a specific drug is in stock 85% of the time on average. The companion to this concept is the stock-out frequency. A 85% service level corresponds with a stock-out frequency of 15%.

Safety stock

Safety Stock is the stock that should always be on hand to prevent stock outs.
When lead time and consumption are predictable and stable, the reorder level and the safety stock level may be the same, however, when consumption patterns and lead times are highly variable, additional safety stock will be needed.How to calculate safety stock (SS)?

The parameters required are-

1. **Lead time (LT):**This is the time between initiation of a purchase order and receipt at the warehouse from the selected supplier. If there is a distinct trend in that supplier's performance, the average should be weighted toward recent performance with a moving average.
   Average lead time for each item from the current supplier.
2. **Average consumption (C_a):**Sometimes called demand, the average consumption expected in the next purchasing cycle is the key variable that determines how much stock should be ordered.
   If stockouts occurred, adjust them in the consumption calculated.
   It is also important to consider warehouse storage capacity.

   $SS = LT \times C_a$

   For an example, if the average lead time is two months (60 days) and the average monthly consumption is 1000units for an item, the minimum safety stock would be 2000 units.

   Cases with varying consumption and lead time:
   1. Adding an arbitrary multiplier to the basic formula for safety stock like with 1.5 for vital items, to protect against stock out.

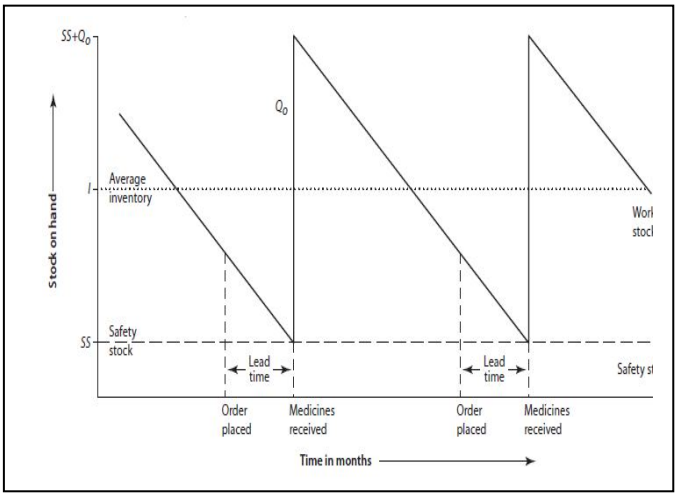
2. Review a one-year period time and determine the maximum quantity consumed during the average lead time period for the current supplier for the item and the average quantity consumed during that same lead time period.
   In such cases if the highest consumption was 3000 units during the average lead time, the safety stock calculated would be added with 1000 units more.

   Adjusted SS = SS + additional units consumed during average LT
   = 2000 + 1000 units of an item

Inventory control models and reorder frequency

In the ideal inventory control model, items are issued in response to the demand received, but stockouts are not permitted, the stock on hand steadily declines until the point at which an order must be placed.The stock on hand consists of two components, the working stock and the safety stock.

In an ideal model, average working stock is half of the order quantity-



Average working stock = ½ Q_o

The average inventory (I) or average stock on hand is the safety stock plus the average working stock

I = SS + ½ Q_o

The relationship shows that to reduce the average inventory both, working stock or safety stock should be reduced. This reduces the inventory-holding cost but this may also lead to stock out. Other methods of better store keeping and finance management could help in reducing the inventory cost.

Any inventory control model used to manage purchasing must address three issues:

1. Reorder quantity: the number of units specified when an order is placed.
2. Reorder frequency: the period the of time between each order for an item (also known as the procurement period)
3. Safety stock how much stock will be kept in reserve to prevent stock-outs.

Reorder level

The reorder level is the quantity of working stock that should trigger a reorder of the item. The minimum-maximum ordering system, this is called the minimum stock level. The standard way to set the reorder level in a basic purchasing formula is to multiply the average

lead time by the average quantity consumed during the lead time. This stock level may or may not be as same as the safety stock level.

Reorder level= Consumption Average X Average quantity consumed during Lead Time

Maximum stock level

In most reordering formulas, this is the target stock level, which is the stock needed to satisfy demand until the next order after this one is received.

Stock in position: Stock position is the sum of stock on hand (working and safety stock) and stock on order, minus any stock back-ordered to clients. Overstocks may occur if there is already several months' worth of stock on hand or on order when a new order is placed. Stock out may result if significant quantities from an upcoming order are on back-order to lower level facilities and this is not factored into the reorder quantity.

Procurement period: The procurement period covers the time until the next regular order will be placed. In a scheduled system, this might be in multiplies of one month; in a perpetual system, it could be counted in days or weeks for the purposes of forecasting. Note that the quantity ordered plus the safety stock must cover the time until the next order is received, which is the procurement period plus the lead time.

Standard reordering formula

There are two approaches to the question of how much to order:

1. Minimum and maximum stock level
2. Consumption based reordering formulas

Minimum and maximum stock level formula

This formula is often used in scheduled purchasing, with set order intervals. Using this approach, one defines a theoretical maximum stock for each item to provide sufficient, but not excessive, stock to last from one order to the nest, as well as a minimum stock level or reorder level that determines at what point an order should be placed. Safety stock may be included in the minimum stock level, or an additional quantity may be assigned to project against variations in consumption and supplier performance.

Some supply system managers set the minimum and maximum stock levels arbitrarily for all items, but better inventory control is obtained with flexible calculation for each item, based on standard reorder parameters

1. Average monthly consumption, adjusted for stock-out = C_A
2. Supplier lead time = LT
3. Procurement period, time until the next order will be placed = PP
4. Safety stock-additional stock to cope with variability in consumption and lead time = SS
5. Stock on hand in inventory = S_I

6. Stock now or order from a supplier but not yet received = S_O
7. Quantity of stock back-ordered to lower levels = S_B

The basic formula for setting the minimum stock level is the average consumption multiplied by the lead time, plus any additional safety stock. Time periods are usually expressed in months, and stock quantities, in basic units. The equation for calculating the minimum stock (S_{MIN}) is

Minimum stock (S_{MIN}) = (LT x C_A) + SS

Maximum (target) stock level (S_{MAX}) can be calculated as the minimum stock plus the procurement period multiplied by the average consumption, the equation is:

S_{MAX} = S_{MIN} +(PP x C_A)

Example
If lead time for amoxicillin capsules is two months, the average monthly consumption (adjusted for stock outs) is 1000 capsules and the additional safety stock allocated is 2000 capsules for a procurement period of 12 months, the following minimum and maximum quantities would be set.

S_{MIN}= (2 X 1000) + 2000= 4000
S_{MAX}= 4000 + (12 X 1000) = 16000

Suppose there are 3000 amoxicillin capsules in stock and another 2000 on order. Since the amoxicillin has been in stock, there are no back orders to health facilities. The quantity to order would be calculated as:

Quantity Ordered = (S_{MAX} + S_B) (S_I + S_O)

Quantity Ordered = 16000-(3000+2000) +0=11000

Some of the inventory control models in supply chain are:

- ***Annual purchasing:*** the model where annual purchases are made based on the demand received.
- ***Scheduled purchasing*****:** the model where purchase are made at a scheduled interval such as weekly, monthly, quarterly, biannual bases.
- ***Perpetual purchasing:*** a model in which stock levels are reviewed each time stock is issued and orders are placed whenever stock falls below a minimum level.

F. Quantification

Quantification is the process used to determine how much of a product is required for the purpose of procurement. Quantification do not only signifies the estimation of the products required but also the financial means to purchase those products. It is the projection of the future needs for a product beyond the next purchase order.

Why is it important to quantify?

1. Round the clock availability of medicines without any stock outs.
2. To prevent the cost of excess inventory holding and wastage.
3. To provide the best of the available resources in a cost effective manner through the process of central purchasing.

Steps of quantification:

1. **Step1:Identify the team and a nodal person**
   Identify a nodal person for the process completion at the institution level as well as at the level of procuring organization. The central store pharmacist, sub store pharmacist, a doctor pharma, matron or a staff nurse and supply chain manager are the key person in the process of procurement.

2. **Step 2: Identify actual weekly consumption.**
   All wards and drug dispensing counters prepare an indent on weekly. Identify the consumption pattern for each drug with a 10 percent safety margin added. Practice the method for a month or two. Once the system is in place the projected requirement for the next week and so for the month could be easily calculated. The nursing staff will only need the send the opening balance; the sub store pharmacist will supply the drugs accordingly.

3. **Step 3:Select at least two methods of quantification**
   Along with the consumption patter method, it is important to have a one more process in places for accurate projections. Refer the methodology discussed further in the manual.

4. **Step 4: Annual Action plan**
   Prepare a time bound action plan for the annual demand of the institution. It is extremely important to note the upcoming or expected changes such as any transfer of medical specialist from that institution, changes related to national or state programs, starting of any new medical service in the hospital etc.

5. **Step 5: Submission**
   The projected demand must be discussed with all the team members as well as with the Medical superintendent or the head or in charge of the hospital or of the programe related supply in charge before the final submission to the state. Submit the demand at least a month before the end of the financial year.

6. **Step 6: State level identification of health problems to be treated, tested for and prevented at health facility in the district**
   Decide which health problems are to be catered at each level of care is a matter of health policy and must be decided taking into account national guideline. The drug and therapeutic committee and supply chain committee should coordinate with the working group to come up with such a list.

7. **Step 7: Compilation of the demand**
   An essential drug list is prepared. The demand is compiled and allocation of budget is done according to the revised rates by the state.

8. **Step 8: Evaluate the quantification process.**
   Evaluate the methodology and results, identify the changes required, make corrections, discuss and inform the team members and implement the process.

9. **Step 9: Feedback**
   The quantification is effective if the results and feedback are shared with the district management.

10. **Step 10: Strengthen the process further**
    The gaps identified should be address, improve the planning, provide training to the related staff members and repeat the process [Plan - Do – Check – Act]

Methods for quantification:

1. **Consumption method**
2. **Morbidity method**
3. **Proxy consumption method**

Consumption method

The method uses records of past consumption of individual medicine (adjusted for disease incidence, stockouts and projected changes in medicine use) to project future needs. It is the most précised method for forecasting.

Morbidity method

The method estimates the need for specific medicines based on the prevalence and incidence of common diseases and treatment patterns for the disease considered.

Proxy consumption method

The method uses data on consumption of medicine, medicine demand and use, disease incidence, medicinal expenditure from a “standard” supply system, based on population coverage or service level to be provided.

Centralized or decentralized quantification

Decentralizing quantification is-
The responsible office or facility compiles its own estimates, based on a Essential Drug List available.
The list is sent directly to the logistics and supply chain branch, which compares the list with past consumption, clarifies any questions directly with the client, and compiles the master list for procurement.
The procurement branch prepares for scheduled procurement.
For the programe procurement, reviews at the district levels before submission the Director (Public Health) or Principal &Controllers of Medical Colleges to procurement office may increase the validity and ownership of estimates, at the cost of adding time to the process. It is important to make sure that consumption is not double counted.
The process of procurement should start by the end of December and all the procurement processes must complete two month before the starting of new financial year keeping in account the lead time of at least two months for the supply of goods.
To produce more accurate results, it is preferable to perform computerized procurement. The method is fast and easy to conduct.

1. Consumption method

The following steps are involved:

1. ***Step 1: Prepare a list of drugs to be quantified.***
   The list of drugs is prepared in the order that will best facilitate data collection. The essential drug list prepared is distributed to those officials and facilities that will enter consumption data.

2. ***Step 2: Determine the period of time to be reviewed for consumption.***
   If it is an annual procurement, the consumption data for the past twelve months should be reviewed (if a full year's useful data are available). Twelve-month review may also be used for a procurement covering six months, but if there are significant seasonal variations may be better to use the same six-month period from the preceding year. A short review period such as three months is inadequate to plan a procurement to cover twelve months.

3. ***Step 3: Enter consumption data for each drug.***
   For each drug on the list, enter the following details:
   a. The total quantity used during the review period, in basic units
   b. The number of days in the review period that the drug was out of stock (if it is impossible to determine the number of days out of stock with accuracy, the estimated number of months out of stock during the period can be entered).
   c. The lead time for the last procurement.

Consumption = Opening stock + Drugs received - Closing Stock

It is important to use the most accurate and current records available. The likely sources for consumption and lead-time data are:

- Stock records and distribution reports from a central distribution point
- Stock records and reports from regional or district warehouses
- Invoices from suppliers
- Dispensing records from health facilities.

If projected pricing data are available at this stage, it may save time to enter prices while entering consumption data.

4. ***Step 4: Calculate the average monthly consumption.***

The simple approach is to divide total consumption by the number of months reviewed. If there were stock-outs during the period, the average must be adjusted to include the consumption that would have occurred if stock had been available.
Adjust consumption for stock-outs. For stock-outs longer than 30 days (1 month) an adjustment should be made. Theformula for correction is:

Consumption adjusted = Recorded consumption X Period in calculation (in day's months)
Period in stock (in days, months)

For example consider entry for ampicillin 250mg capsule (the second item in Table 2. The total consumption for a six month review period was 89,000 capsules. The drug was out of stock for thirty four days in the six month period. Therefore, the average monthly consumption (CA) adjusted for stock-outs is:

Consumption adjusted = 89,000 X 6 months
for stock outs (6-1)

5. ***Step 5: Calculate the safety stock needed for each drug.***

Safety (Buffer) stock is needed to prevent stock-outs. The preferred method is to calculate the safety stock based on the average consumption and the expected lead time.

The average monthly consumption (in step 4) is multiplied by the average lead time.

Safety Stock = LT X C_A

Using this formula, the safety stock for Ampicillin 250mg capsules in the example is 18,218X3 months = 54,654.

For vital items, it may be necessary to adjust the safety stock to cover variations in consumption or lead-time. The simplest method multiplies the basic safety stock by an adjustment factor.
For example, an adjustment factor of 1.5 would increase the safety stock of Ampicillin 250mg capsules to 81,981 capsules. If this sort of adjustment is done for all items, the cost of safety stock will increase substantially; therefore, adjustments should be made only when there is true uncertainty about the lead-time or consumption.

6. ***Step 6: Calculate the quantity of each drug required in the next procurement period.***

The suggested formula for calculating the quantity to order is shown below:

Qo = CA X (LT+PP) + SS - (S1 + So)

Where
Qo = Quantity to order
CA = Monthly consumption adjusted for stock-outs
LT = Average lead time in months
PP = Procurement period in months
SS = Safety stock
S1 = Stock now in inventory
So = Stock now on order

The calculation is done in three main steps.	
a.	First, the average consumption is multiplied by the sum of the lead time and the procurement period, yielding the total needs before considering safety stock, stock on hand, or stock on order.
b.	The second step is to add the quantity needed for safety stock.
c.	Finally, the quantity of stock on hand and the stock on order are added together, and then subtracted from the previous total.

Using the example of Ampicillin 250mg capsules, the quantity to order is:
Qo = 18,218 x (3+6) + 54,654 - (81,000+58,000) = 79,616.

7. ***Step 7: Adjust for expected changes in consumption pattern.***

Using the example of Ampicillin 250mg capsules, if it is expected that utilization will increase by 5 percent in the coming year, it would be reasonable to adjust the six-month forecast by 2.5 percent, this would raise the expected need by 1990 capsules, bringing the total to 81,606 capsules (or eight -two hundred strips of 100).

Some changes in consumption may be independent of trends in overall patient utilization. One example is predictable seasonal variation in the consumption of cough and cold remedies. A potential spike in an epidemic disease such as cholera is another example. If this is anticipated, it would be sensible to increase estimates for drugs such as ORS, parenteral solutions, and some antibiotics, the need for all drugs will not increase by the same factor.

8. ***Step 8: Adjust for losses***

To avoid stock-outs, it is necessary to adjust quantification estimates to allow for losses. If the supply system averaged 10 percent per year in losses, and this was applied to Ampicillin 250mg capsules, the allowance would add 8160 capsules to the estimate from step 7, bringing the total purchase quantity to 89,766 (or nine hundred boxes of 100 capsules).

9. ***Step 9: Compile decentralized quantifications (if applicable)***

In a decentralized quantification, staff at each facility or storage point enters their own consumption quantities and stock-out information, and the estimates of the individual facilities are totalled and compiled on the master quantification list.

10. Step 10: Estimate costs for each drug and total costs.

In order to estimate procurement costs, multiply the quantities estimated for each drug by the most accurate prediction of the expected next purchase price. After the estimated procurement value has been calculated for each drug, the final step in the basic quantification process is to add up the estimated procurement values for all drugs to obtain the total expected cost for the procurement.

11. Step 11: Compare total costs with budget and make adjustments.

If the total expected procurement cost exceeds the available budget, there are really only two choices, either obtain more funds or reduce the number of drugs and / or the quantities ordered.

2. Morbidity Method

The method requires a list of common health problems, an essential medicine list, and a set of standard treatment guidelines for quantification purpose.

The basic formula for calculating morbidity is:

Quantity of the drug specified for a standard course of treatment	**X**	**Number of treatment episodes of the health problem**	**=**	**Total quantity of a drug required for a given health problem**

The number of treatment episodes specified for particular health problem defined to the diagnostic capacity and of specific standard treatment should be calculated. Also categorize the list for adults and pediatric patients (less than or12 years) as their treatments markedly differ. A treatment episode is a patient contact for which a standard course of drug treatment is required.

Number of times the patient visits for drug treatment is counted at an individual episode.

3. Proxy consumption method

Many supply systems face a serve information deficit, which limits accurate quantification. When neither consumption nor morbidity methods are feasible, the best option is extrapolating from consumption data from another region or health system. The adjusted consumption method uses known consumption data from one system, called the standard, to estimate the drug needs in a similar or expanded system, known as the target.

This method can be population based, defining drug use per 1,000 Population. A complete quantification may use a combination of the two methods, with different denominators for different products.

Steps involved in proxy consumption are:

1. ***Step 1: Select the standard system for comparison and extrapolation.***
   The region or country should closely resemble the geography and climate, patient population served, morbidity pattern, prescribing practices, standard treatment guidelines, essential medicine list, and pharmaceutical supply status. An effort should be made to find the best reliable data source.

2. ***Step 2: Develop medicine list.***

3. ***Step 3: establish the period to be covered in the review.*** Describe the month, year duration worth of data to be reviewed.

4. ***Step 4: Review records from the standard system to compile contract or population data.*** If the information is not available, a survey of standard facilities can be done to determine the number of patients contacts during the period established.

5. ***Step 5: Establish the denominator for extrapolation.*** This could be the population catered in that area or the number of patients contact, depends upon the data obtained in the previous step.

6. ***Step 6: Determine the consumption rate in the standard system.*** For each medicine, produce an adjusted average monthly consumption. Multiply it to twelve to obtain annual consumption.

   Adjusted annual consumption = Average monthly consumption X 12

   Consumption Rate = Adjusted annual consumption / number of contacts or inhabitants X 1000

7. ***Step 7: Extrapolate the standard system's consumption rate to the target system***

   Consumption Rate in the target system = Consumption Rate X Number of thousands of contacts or inhabitants in the target system

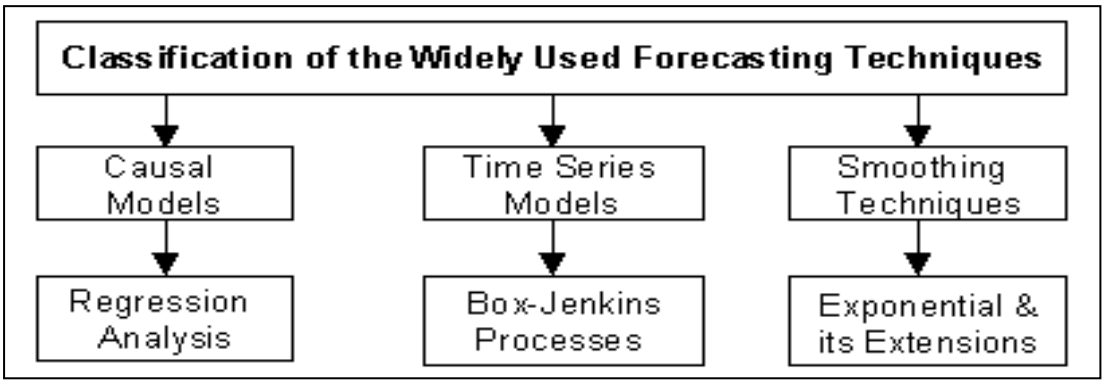
8. ***Step 8: Adjust for expected losses:*** Add for the known percentage of losses if information is clear and accurate.

9. ***Step 9: Estimate cost for each medicine and total costs and make adjustments:***

   Projected Consumption Rate for each medicine X Rate per medicine

G. Forecasting in Supply Chain

Forecasting is the projection of future demand to prevent stock outs. It is essential for making supply chain decision. Four different methods can be used for forecasting demand-



- **Projective:** forecasts using past consumption to predict demand.
- **Causal:** forecasts based on external factors such as market conditions, epidemics, changes in health system size and structure.
- **Judgmental:** forecasts based on subjective estimates of purchasing staff and advice from other staff. (the least demanding method and often the least accurate)
- **Morbidity:** forecasts based on the incidence of disease and the use of standard treatment guidelines.

The methods are known with different names also such as ***qualitative techniques, time series analyses and causal forecasting***.

Generally the reordering formula should be based primarily on projective forecasting, derived from average monthly consumption. Unfortunately the past demand is the best source of information, a stable pattern or trend may not exist. A time series analyses may show:

1. Base rate: demand that may be stable from month to month
2. Trend: a steady pattern of increasing or decreasing demand, for example, increased usage caused by gradually increasing patient attendance.
3. Seasonality: relatively predictable changes, such as increase in demand for malaria drugs during the rainy season.
4. Cyclic trend: demand that ebbs and flows, for example, with a country economic cycle.
5. Random noise: unexplained variations in demand, for example, in one month, 100 bottles of amoxicilline suspension were consumed, with a pattern of thirty, ten, eighty and twenty bottles in succeeding months, with no obvious reason for variation.

ABC & VED methods for analyses in forecasting

ABC

Description of the method

As explained earlier, in warehouses about 75 percent of the through put is attributable to 15 percent of items (often called A items), another 15 percent of throughput is attributable to 15 percent of items (often called B items), and the remaining 10 percent of throughput is attributable to 70 percent of items (often called C items).

How to conduct ABC analyses

1. List all the essential drug list for the last one year purchase has been made for.
2. Now enter the details of the consumption for the drugs purchased in the last one year.
3. Make entries for the unit cost of each listed drug.
4. Calculate the consumption value in total by multiplying the unit cost of goods with the quantity consumed.
5. Calculate the percentage for the total value consumed.
6. Arrange the prepared list of items in descending order of the total value calculated.
7. Add the percentage found for each item till the last drug value. This is the cumulative percentage of all the drugs.
8. Define the cut-offs such as 75% for A druga, 15% for B and 10% for C category drugs

Practical implementation

- The drugs in category A could be placed in more slabs for annual purchase.
- More extensive market survey could be conducted for finding the alternatives.
- The drugs that are bulk in quantity could also be managed by scheduling the supply as per the storage space available at warehouse depot.
- Arrangement of drugs at the depot considering the safety and security of much expensive goods, arrangement of bulky items close to the floor and maintain consistent supply as per the ABC analyses.
- Timely report the reorder level for expensive items and monitor the supply of drugs.

VED

Another method of classification of drugs or materials is grouping them according to criticality in patient care.

“V” Items are vital drugs, without alternatives, forming about 10% of the total drugs whose absence cannot be tolerated. Every attempt is to be made, at whatever cost, to avoid the Out-Of-Stock position of these drugs.
“E” Items are the Essential items that constitute 40% of the items and their absence can be tolerated for the short stretch of time. They could be made available in a day or two or the alternative medicine can be made available.
“D” items are the desirable items which are the remaining 50% of the drugs and their non-availability can be tolerated for longer period. They may be required for chronic and less serious patients.

How to conduct VED analyses

List all the essential drugs as Vital, Essential and Desirable as per the consumption pattern as well as the importance of the drug availability at the hospitals.

Combination of ABC and VED Analysis can be explained in the following way V E D A AV AE AD Category I 15% Items B BV BE BD Category II 40% Items C CV CE CD Category III 45% Items

- **Category I are either Vital or expensive** and should be managed with maximum attention. Consumption and its stock should be continuously monitored and safety stock should be kept at low to reduce the carrying cost. [AV, AE, AD, BV, CV]

- **Category II consists of drugs, which are essential, and of average cost.** They can be managed with little less priority and can be managed with middle level managers. [BE, CE, BD]

- **Category III consists of the drugs which are desirable and inexpensive and thus lowest in the hierarchy of priority.** They should be purchased periodically and buffer stocks can be high managed by lower level of management. [CD].

Implementation of ABC and VED

  - Inventory management of category I drugs is essentially important at all levels such as state, district and institution.
  - It is also important to reduce or eliminate the wastage of funds on category III drugs.
  - Consistent supply and purchase for category II drugs.

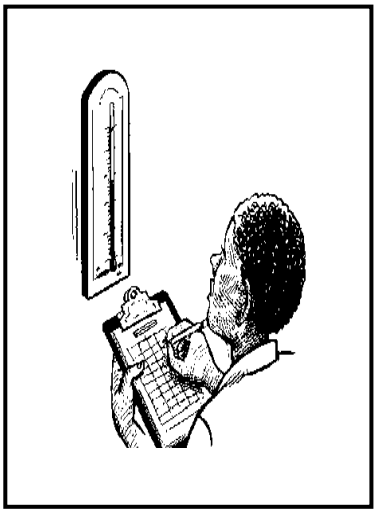
H. Temperature management

Cold room

It is important that drugs maintain their quality, potency and efficacy throughout their shelf life when stored under specified storage conditions. Special conditions of storage vis-à-vis shelf life of many drugs are given under Schedule-P of Drugs & Cosmetics Rules 1945 and drugs which are not included in Schedule-P they are required to be stored at room temperature. These storage conditions necessarily appear on the labels of the formulations and all concerned personnel's responsible for storage of drugs and distribution thereof are required to follow these storage norms in strict terms to ensure availability of quality drugs with desired potency, safety, bioavailability & efficacy.

Shelf life of a drug means that it can be used till its Expiry Date which necessarily appears on labels of each drug formulation and often written in terms of month & year. The potency of the drug should be maintained throughout its shelf life.

Further the general requirements of keeping the drugs in dark place, away from direct sun light etc. are often meet out in warehouses.



Storage temperature requires special attention for which storage places can be broadly classified into three categories:

1. Cold Place
2. Cool Place
3. Normal Room Temperature

Cold Places / Storage: means a place having temperature not exceeding 8^0 C. Label direction on such drugs normally

appears reading as “To be stored in cold places at 2º C to 8º C.

In larger facilities, it is more efficient to use cold rooms while in smaller one’s freezers or refrigerators can be used. Ideally, larger facilities should have one room for frozen products (-20ºC) and another room with a positive but cold temperature (2º-8ºC) for products requiring refrigeration.

Cool Places: means a place having temperature between 10º C to 25º C. Label direction on such drugs normally appears reading as “To be stored in cool places”.

Normal Room Temperature: Wherever conditions of storage are not specified they may be stored at Normal Room Temperature.

The following details for storage of drugs have been developed:

Cold places

Drugs under this category are required to be stored maintaining cold chain all throughout their shelf-life. This can be achieved with the following measures:

1. Ensure maintaining cold chain during transport of such temperature sensitive drugs. The drugs could be received through cold-chain vehicles or in cold-chain containers or with a temperature thermometer along with the received goods. Check if there are in built temperature monitoring device on label (Just like Vaccine Vial Monitor (VVM) in Oral Polio Vaccine)
2. Such drugs should be immediately shifted in cold places i.e. ILRs,Walk-in- Coolers, refrigerators etc. where temperature is maintained at 2º C to 8º C.
3. All walk in coolers and such devices must have a stem thermometer on wall at several places, digital system for temperature display. Temperature log book should also be maintained for each such place or equipment.
4. Temperature recording be done at least thrice a day, once preferably during high temperature peak hours of 12 PM to 2 PM. Number of break downs should also be noted.
5. Take suitable measures whenever there is any rise of temperature towards upper permissible limit such as adjusting thermostat knob or replacing ice-bags.
6. All transportations of medicines from DDW to receiving institutions should follow the principles of cold chain maintenance using ice-packs, thermal boxes & vaccine carriers.
7. Electricity back up at the time of power cut such as diesel generator sets, dedicated inverter is to be installed at all drug warehouses for uninterrupted electric supply.

Cold room temprature at 4.9 degree celcius

Cool places

Temperature control between 10ºC to 25ºC be maintained at these places. Following steps be taken for maintaining proper conditions in this area

1) ACs are provided to DDWs which are to be exclusively used for maintaining the cool place temperature between 10º C to 25º C for storing the drugs which are recommended to be stored at cool place.
2) A totally separate room must be identified for this, which should not be used for any other purpose.
3) A room with effective temperature control between 10º C to 25º C can be dedicated for this purpose.
4) Air tight doors with proper door-closures should be provided in this room and doors should be kept locked and should be opened only for inward or outward shifting of the medicines from this area.
5) Provide temperature reading devices, thermometers etc. in this cool room and temperature log book be maintained.

Cool Place drugs: Drugs which are required to be stored in cool place at temperature 10º C to 25ºC in Air-Conditioned Room.

All heat sensitive & thermo labile drugs viz. Vitamins, Antibiotics Tablets, Capsules, dry powder, injectable should be stored in cool place.

Cool place temperature maintained at 12 degree celcius.

Normal room temperature

1) Doors: ensure all doors are kept closed at drug warehouse and opened only for transfer of medicines.
2) All window glasses should be laminated. Any broken window should be repaired timely.
3) The temperature could also be regulated by using ceiling fans, exhaust fans and plantation of large canopy trees surrounding the warehouse.

4) Periodic monitoring of the cool room temperature either by digital monitoring device or in register from stem thermometer.
5) Check for humidity, it should be less than 60 percent.

Room temperature drugs: Drugs on the labels of which 'store in cold place or cool place' are not mentioned may be stored at room temperature.

All drugs should be packed inside the warehouse away from direct sunlight.

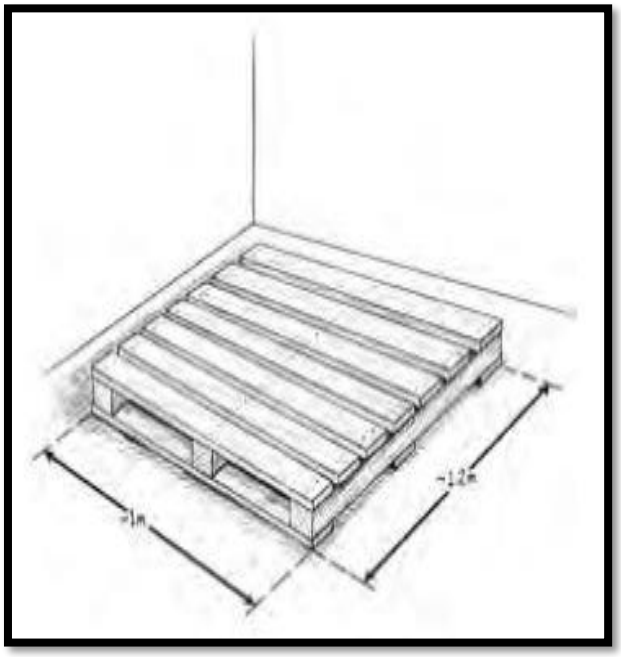
Fans installed at appropriate places in the warehouse for air circulation.

I. Warehouse Equipment

Hydraulic Pallet Truck

Semi electric Stacker

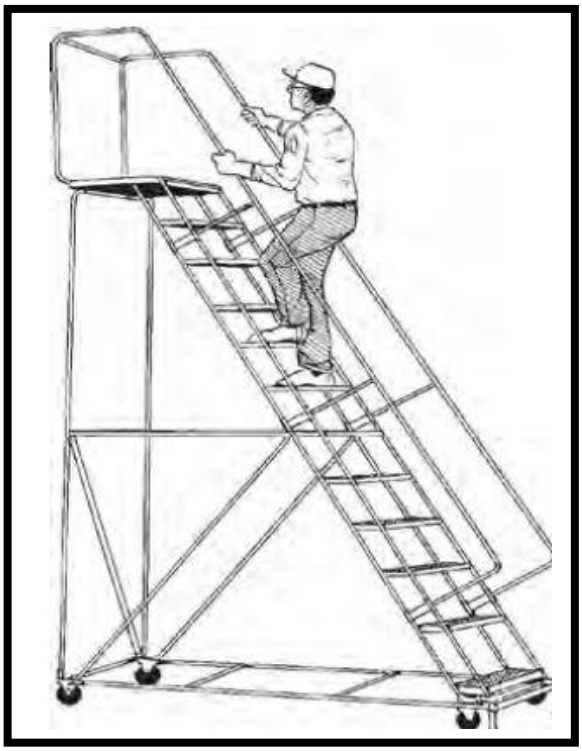
Pallets for goods arrangement



Heavy duty racks for warehouse

Stripping machine

Ladder



Manual warehouse cleaner

J. Security and safety

Drug Warehouses often take place in economically and physically difficult environments. Often, they are areas with extreme heat or high humidity. Care must be taken so that the commodities remain healthy and secure. Prevention of incidents and accidents begins with good housekeeping. Good housekeeping leads to a safe warehouse environment. To keep a warehouse safe requires awareness, anticipation and common sense. The warehouse manager should ensure:

Safety:

• Maintenance of clutter-free environment: walking areas inside the warehouse and its surroundings are free of boxes, materials, electric cords, tools, and equipment against which people may stumble and fall

• Removal of garbage, debris, dirt, and oily materials that are a potential fire hazard. There should be enough trash cans inside and outside the warehouse for easy disposal of such items.

• Daily emptying of trash cans in covered outside bins

• To the extent possible, the warehouse is kept free of rodents and other pests to protect warehouse workers and stored commodities

• Prohibition of smoking in the warehouse; **post no-smoking signs**

• A clean washroom available to all staff and workers should be required to wash their hands before handling commodities, particularly if they are engaged in re-bagging activities.

Protection against Fire

- Make standard fire extinguishers available in every storage facility per national regulations.
- Visually inspect fire extinguishers every 2-3 months to ensure that pressures are maintained and the extinguisher is ready for use.
- Service fire extinguishers at least every 12 months.
- Place smoke detectors throughout the storage facility and check them every 2-3 months to ensure that they are working properly.
- Strictly prohibit smoking in the store.
- Conduct fire drills for personnel every 6 months.
- Clearly mark emergency exits and check regularly to be sure they are not blocked or inaccessible.
- Display fire precaution signs in appropriate places in the storage facility (especially locations where flammables are stored).
- Use sand to extinguish fires where there are no fire extinguishers
- Place buckets of sand near the door.

Protection against Pests

- Prevent moisture.
- Maintain a clean environment to prevent conditions that favor pests. For example, store garbage in covered garbage bins. Regularly clean floors and shelves.
- Do not store or leave food in the storage facility.
- Keep the interior of the building as dry as possible.
- Paint or varnish wood, as needed.
- Use pallets and shelving.

- Prevent pests from entering the facility.
- Inspect the storage facility regularly for evidence of pests.
- Packaging and shipping cartons can be treated to prevent pest infestation. For example, cartons can be shrink-wrapped or non-toxic desiccating (dehydrating) agents can be added.

SECURITY

• The warehouse is provided with a first aid kit and that assigned employees have a basic knowledge of how to use it

• The warehouse is equipped with fire extinguisher(s) (see more below)

• The warehouse is regularly visited by a safety inspector who provides a written report and that the inspector's recommendations are promptly addressed

• To the extent possible, each warehouse has multiple exits and that visible exit signs are posted in the warehouse for staff to recognize where they can exit in case of emergency

• Emergency phone numbers are posted and visible to all warehouse staff

Prevention outside the warehouse

- Regularly inspect and clean the outside premises of the storage facility, especially areas where garbage is stored. Check for any rodent burrows, and be sure that garbage and other waste is stored in covered containers.
- Check for still or stagnant pools of water in and around the premises, and be sure that there are no buckets, old tires, or other items holding water.
- Treat wood frame facilities with water sealant, as needed.
- Use mercury vapor lighting where possible, and locate lighting away from the building to minimize the attraction of pests.
- If the facility has space between the ceiling and the roof, cover all the openings with fine wire mesh to prevent birds or bats from entering the storeroom.
- For flying pests, the best prevention is to keep all doors and windows of the storage facility closed or screened off from the outside. Make sure there are no holes in the walls, floor, or ceiling
- For reptiles, most snake species are innocuous and can be managed with noisemakers and by keeping the outside of the facility clear of bushes. Construct a snake-proof fence around the perimeter of the facility. The fence should be made with heavy, galvanized screen with 6 mm wire mesh. The fence should be 90 cm tall with the lower end buried at least 10-16 cm in the ground.
- Termites/structural pests: There are two primary treatments for subterranean termites, but both are expensive and require a specialist. The first treatment involves injecting a

termiticide into the soil in the ground beneath the facility. If the problem is severe, or if the first treatment is not feasible, the building must be fumigated. All stored goods must be removed from the site during fumigation. Replace wood severely damaged by structural pests.

Protection against theft

1. During Transport

- Verify documents.
- Ensure packing seals are used.
- Use strong boxes/containers.
- Provide reliable/well-maintained vehicles.
- Ensure drivers are reliable.

2. At Storage facilities

- Limit access to only designated staff.
- Limit the number of keys made for the facility; keep a list of people who have keys.
- Secure all locks and doors.
- Make unannounced spot checks.
- Provide independent stock count/inventory control.

3. Monitor selected products.

- Monitor items that are fast moving, chronically in short supply, in high demand by customers, expensive, lifesaving, and easy to hide or disguise.
- Select medicines likely to be stolen or misused (e.g., antibiotics, narcotics, psycho tropics, antiretroviral).
- Check inventory records for stock on hand. Then, conduct a physical inventory (physically count the quantities on hand) and compare the results.
- Check the inventory records to determine the consumption during a specified period and compare this figure with the stock issued from the storage area.

Safety for Flammables

Some flammable liquids commonly found in health facilities include **acetone, anesthetic ether, alcohols (before dilution), and kerosene.**

- Store large supplies of flammables in a separate location away from the main storeroom, preferably outside the main storeroom but on the premises and not less than 20 m away from the other buildings.
- Firefighting equipment should be easily available.

- Large supplies of flammables should never be stored in the same areas as medicines.
- A small stock of flammables may be kept in a steel cabinet in a well-ventilated area, away from open flames and electrical appliances.
- Mark the cabinets to indicate that they contain highly flammable liquids, and display the international hazard symbol.
- The shelves of the cabinet should be designed to contain and isolate spillage.
- Always store flammables in their original container.
- Flammables must be kept in the coolest location possible and never in direct sunlight. It is important to control the evaporation rate and avoid the build-up of pressure

Cabinet for flammables storage

7. Annexures

Annexure 1

Daily reporting Format for Warehouse Depot, Gujarat □□□□□□□□□□ □□□□□□□□ □□□□□□□ □□□□□□□□ □□□□□					
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6.	Give details of not of standard quality goods as: □□□□ □□□□□□□□ □□□□□ □□□□□□□ □□□□□		
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E.Temperature			
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Annexure 2

Monthly reporting Format for Warehouse Depot, Gujarat □□□□□□□□ □□□□□□ □□□□□□□ □□□□□ □□□□□□ □□□□□	
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Total number of good bills send to GMSCL for payment □□□□□□□ □□□□ □□□□□□□□□□□ □□□□□□ □□□ □□□ (□□□□□□□□)	

Last month contingency bills send to GMCSL for processing. (Please specify yes/no) □□□□□□□□□□□□ □□□□□ □□□□□□□ □□□□□□□ □□□□ □□□□□□ □□□ □□ □□□□□□□□□□ □□□ (□□/□□ □□□□□□□)	Name of the bills □□□□□□ □□□	Yes/No □□/□□
	1. Electric □□□□□□□ □□□	
	2. Water □□□□	
	3. Transport □□□□-□□□□□□□	
	4. Stationary □□□□□□□□	
	5. Others specify □□□□ (□□ □□□ □□□, □□ □□□□□□□)	

F. Problems / Issues □□□□□□		
S.No □□ □□	Problems to be corrected □□□ □□□□□□ □□□□□□	Problems solved at warehouse □□□□□□ □□□ □□□□ □□□□ □□□□□
G. Innovation □□□□□□		
S.No □□ □□	Describe Innovation done or best practices at warehouse followed □□□□ □□□□□□□□□ □□□□□	
1.		

Annexure 3

Gujarat Medical Service Corporation Limited				
Monitoring Check list for Regional Drug Warehouses/Depot				
Name of the warehouse:		**District:**		**Date:**
Name of the districts supplied under the warehouse:				
Name of the major institutions:				
Name of the visit officer with designation:		**Name of warehouse in charge:**		
Part A – Human Resource (HR)				
Availability of HR at the depot sanction /in position :	**In No.**	**Yes/ No**	**Personnel informationto be filled after discussion with depot manager**	**Remark**
Depot manager/Assistant Depot Manager		Yes/ No	Have all employeesreceived training for correct warehouse management?	Yes/ No
Senior pharmacist		Yes/ No	Have all employees received training in E-Aushadhi?	Yes/ No
Junior pharmacist		Yes/ No		
Packers		Yes/ No	Total Attendance (verify Attendance Sheet physically)	Yes/ No
Data entry operator		Yes/ No		
Finance assistant/clerk		Yes/ No	Are the employees too many/too few /adequate (write your response in no.)	
Sweeper		Yes/ No		

Guard(24*7)		Yes/ No	Is employee morale high/low	Yes/ No
Peon		Yes/ No		
Total number of employee				
Part B – Warehouse Building and Premise				
Is Warehouse built on a raised platform?		Yes/ No	Is there a recognizable board with facility name in the entrance?	Yes/ No
Is there a basic civil work in place?		Yes/ No	Does the entrance have enough space for entrance of large & heavy vehicles?	Yes/ No
Is there parking for staff & other vehicle?		Yes/ No	Is there closed drainage system for depot	Yes/ No
Is premise clean/without junk material?		Yes/ No	Is there a dustbin outside the warehouse premise to discard depot waste	Yes/ No
Is there boundary with wall with fencing?		Yes/ No	Are there enough lights in premise for security purpose?	Yes/ No
Do Warehouse shutters completely close with floor level?		Yes/ No	Is there seepage through ceiling inside the warehouse	Yes/ No
Is there a separate room for administrative work		Yes/ No	Gender sensitive toilets for staff & others (functional)	Yes/ No
Separate room for DM/ADM		Yes/ No	Store room cum utility room	Yes/ No
Drinking water facility		Yes/ No	Is there a functional Diesel generator? (last diesel refill date)	Yes/ No
Separate issuing & receiving area		Yes/ No		
Part C – Receiving				
Is the gate entry register maintained? (mention the last date entry)				Yes/ No
Are the goods & document (PO, invoice, Test Report, Truck letter) physically verified with the related documents (PO) before receiving?				Yes/ No
All cartons are numbered and expiry date written at the time of receives.				Yes/ No
All reports and documents are recorded at the time of receive.				Yes/ No
All received goods are kept in quarantine area?				Yes/ No
Total number of invoices/bills received for the month				
How many consignees received late than the due date				
Part D – Pre Dispatch Sampling				
Sample for every batch is taken within 24hrs of goods received as per the sample send request in E-Aushadhi for PDT. (physically check for yesterday or same day sample)				Yes/ No
Are all samples taken sent within 3days to the respective laboratories?				Yes/ No
Is D &C sampling conducted at least once in a month? (mention in number)				Yes/ No
Do they have PDT register with sample details: name, batch no, date of receive, sample send date, report date updated & well maintained				Yes/ No
Are the delivery bills promptly certified and send for processing to GMSCL (check only for the drugs quality passed)				Yes/ No
Total no. of sample send & report received				
Total no. report received				
Are there any batches that did not pass the QC?				
If yes, write batch number and the quantity not of standard.				
Part E – Issuing				
Are the goods supplied according to the route plan?				Yes/ No
Scheduling/ micro plan for distribution of drug prepared (esp. for medical colleges & DH).				Yes/ No
Is the packing done after the transporter arrived? (check for regular supply)				Yes/ No

Is the demand rationalized before issuing goods for equal distribution?	Yes/ No
Is FEFO (First Expiry First Out) followed for issuing drugs? (physically check for the day supply)	Yes/ No
How many hospitals were supplied in the last month	
What was the cost of supply to major hospitals	
Part F- Order / Inventory	
Conduct random stock verification for 5 items and record the details.	
Ask for monthly short expiry item list with 6 months of shelf life	
Ask for the list of goods in excess as per the demand received?	
Does a back log of order exist?	Yes/ No
If yes, is the management informed of the fact?	Yes/ No
Are there expiry drugs in the ware house?	Yes/ No
Are the expiry drugs disposed in last month at warehouse?	Yes/ No
Was the GMSCL informed for the disposal of expiry?	
Is all documentation update & complete? (randomly select and verify the register)	Yes/ No
Part G- Goods Storage	
Are active and quarantine goods kept separate and area wise?	Yes/ No
All supplies received on pallets, no goods on floor	Yes/ No
Are stored materials adequately and accurately marked for proper identification and easily located through a warehouse layout map?	Yes/ No
Goods arranged in bonded fashion (z order) on pallets	Yes/ No
Are cartons numbered, expiry written bold letters visible, arrows pointing upward.	Yes/ No
Racks are kept 90 cm away from the wall	Yes/ No
Racks /pallets are 10 cm above the ground, 30cm away from wall, <3mts in height	Yes/ No
The upper racks are occupied with tablets, capsules, powder, ointment	Yes/ No
The middle racks are occupied with liquid, injectable	Yes/ No
The lower racks are occupied with surgical & laboratory items	Yes/ No
Narcotics/vital drugs/costly items/scheduled drugs are kept separately under lock	Yes/ No
Corrosives &Inflammable items i.e. Surgical spiritetc are kept separate from each	Yes/ No
Reagents kept away from medical stock	Yes/ No
All the dosage form/strength of one drug is kept at one place but demarcated	Yes/ No
The rubbers item are kept away from sunlight/direct light	Yes/ No
Part H- Temperature Management	
All glasses are laminated	Yes/ No
Is there cold storage facility available?	Yes/ No
Are Cold Storage Equipment's Functional (verify stem thermometer reading monitored daily)?	Yes/ No
Is there a list of items stored at less than 2 degree& 2-8 degree (Ask for the list)	Yes/ No
Cold room has a temperature monitoring checklist for thrice a day	Yes/ No
Are all A/C in rooms functional?	Yes/No
Are A/C rooms utilized only for injectable and surgical items	Yes/ No
All store rooms (rooms A/C non A/C) have ceiling fans for air circulation	Yes/ No
The floor/roof/wall are moisture & humid free	Yes/ No
Plantation of large trees surrounding the warehouse	Yes/ No
Part I – Equipment	

Are racks utilized to maximum?	Yes/ No	Computer	Yes/ No
Are racks adequate in number?	Yes/No	Printer (as per the need)	Yes/ No
Are pallets adequate as per the need?	Yes/ No	Photocopy machine/ scanner	Yes/ No
Are all pallets of standard size(2.5*1.25mt)	Yes/ No	Air conditioner in staff rooms	Yes/ No
Stacker(functional)	Yes/ No	Hydraulic pallet truck	Yes/No
Strapping machine Availability?	Yes/ No	CCTV camera (functional)	Yes/ No
Cold chain devices i.e. Walk in chamber/ freezer / ILR(functional)	Yes/ No	Central audio system (functional)	Yes/ No
Tap water supply available	Yes/ No	Bio metrics system installed and functional	Yes/ No
Source of drinking water(specify)	Yes/ No		
Functional lifts	Yes/ No	All lights functional	Yes/ No
Internet/broadband (functional)	Yes/ No	Cleaning cart	Yes/ No
Is there any equipment out of order since last month?			Yes/ No
If yes please specify?			Yes/ No
Is GMSCL informed of non-functional equipment? (physically verify)			Yes/ No
If yes in how many days problem was addressed?			
Is the equipment installation, down time, repair service details maintained?			Yes/ No
Are preventative maintenance inspections and lubrication made on each item weekly?			Yes/ No
Part J – Disaster management			
Disaster plan in the case of emergency?			Yes/ No
Are fire safety equipment installed in of warehouse (fire extinguisher, water sprinkler, alarm, sand buckets, exit route displayed)			Yes/ No
Are the workers trained in using fire safety equipment?			Yes/ No
Are mock drills practiced every month?			Yes/ No
"No Smoking" warning displayed?			Yes/ No
Part K – Signage's &IEC			
Did the visit officer face any difficulty to identify depot?			Yes/ No
Is the depot name & district name been clearly written in the front gate			Yes/ No
Depot opening & closing timings displayed			Yes/ No
Display of phone no. like for police, ambulance, fire fighter, Depot manager phone no.			Yes/ No
Board with list of drug with available quantity is displayed for each day			Yes/ No
Is there a SOP followed in the depot			Yes/ No
Display of drugs according to their alphabetical arrangement section wise			Yes/ No
Display of daily route plan.			Yes/ No
Display for restricted entry, biohazard, attention, no smoking zone etc in warehouse.			Yes/ No
Part L – Cleanliness			
Rakes, cupboards, medicines are clean of dust	Yes/ No	Is there a certified pesticide and anti-termite treatment done?	Yes/ No
Daily wet mopping of floor is done	Yes/ No	Is roof, windows, cupboard free of dust and cobwebsetc.	Yes/ No
All warehouse workers wear head cap and mask while working in the depot	Yes/ No	Staff having lunch inside the warehouse	Yes/ No
Part M – Record Keeping (Please check availability and write last date entry)			
Stock register	Yes/ No	PDT (Pre Dispatch Test) register	Yes/ No
DGR (Daily Goods Register) / inward register	Yes/ No	Attendance register	Yes/ No
Issue/ Out ward register	Yes/ No	Gate pass	Yes/ No

Expiry date register	Yes/ No	Temperature monitoring register	Yes/ No
Truck register	Yes/ No	Visitors register	Yes/ No
Contingency funds) available with the ADM timely	Yes/ No	Prior contingency plan prepared for budget utilization	

Part N – Monitoring	
Do Depot Manager/In charge plan and schedule work for daily weekly & monthly activity?	Yes/ No
Is Depot Manager/In charge aware of all the activities performed at warehouse?	Yes/ No
Is daily meeting held with key operating personnel to discuss warehouse problems and overall planning of warehousing activities?	Yes/ No
Is the supervisor able to take effective measure for warehouse management?	Yes/ No
Are employee grievances addressed at depot or if not, informed at state level?	Yes/ No
Periodic Cyclic stock verification plan and its implementation on daily bases.	Yes/ No

List top 5 critical issues needed to be solve on priority:

1 **2**

3 **4**

5

Issues identified	**Best possible solution according to depot manager/ officials**
HR & Training	
Infrastructure & Maintenance	
Supply of goods	
Issue goods	
Quality control	
Goods management	
E- Aushadhi Software	

Cleanliness	
Monitoring	
Communication coordination & support from periphery and GMSCL	
Feedback for good functioning of depot	
Personal interview with depot manager, senior. Pharmacists, junior. Pharmacists, packers, clerk, peon, financial assistant, helpers about their problems and feedback be written on a blank paper	
Visit officer : List the number of problems solved at the time of visit	