Inventory Management

Introduction to Inventory Management

"Healthcare Inventory Management is a systematic process. It overseas and control the availability, storage, tracking and utilization of medical supplies, equipment and consumables within a healthcare facility".

Low Inventory
Increase probability to stock out

Full Inventory- No stock out

Purpose of Inventory Control

Determine how much stock should be ordered/issued
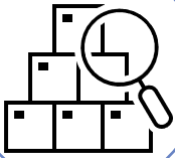
Determine when stock should be ordered/issued

Maintain an appropriate stock level of all products, avoiding shortages and oversupply.
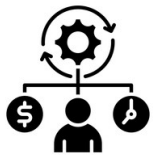
Why Inventory Management

To avoid stock outs and shortages.

To avoid overstock (too much).

To ensure that medicine are efficiently utilized.

For planning and budgeting.

Receiving of Medicines

- When receiving the medicine stock at the facility check for:

✓ Right Drugs

✓ Right quantity

✓ Right Dosages form

✓ Right Strengths.

✓ Right Expiry

Check the 5 "R's" of medicines

✓ **Right Drug**
Is it the medicine you ordered?
(e.g. Paracetamol, not Ibuprofen)

✓ **Right Quantity**
Count the number of strips, bottles, or vials. Do they match what was ordered/delivered?

✓ **Right Dosage Form**
Is it in the correct form?
(tablet, syrup, injection, cream, etc.)

✓ **Right Strength**
Is the dose correct?
(e.g. Paracetamol 500 mg tablets, not 650 mg)

✓ **Right Expiry**
Check that the medicine is not close to expiry

- There is no visible evidence of damage or tampering.
- There are no defects (check for spots, pits, chips, breaks, uneven edges, cracks, embedded or adherent foreign matter).
- Parenteral solutions are clear.
- No leaking containers (bottles, vials etc.).
- The issuing store should be notified of any discrepancies, including missing items, incorrect items (not ordered), incorrect quantities or damaged, broken or poor-quality items.

# Factors contributing to inaccurate stock records

- High volume, repetitious entries

- Drugs names and descriptions are similar

- Duplicate entries for receipts or issues

- Spoiled or junk stock destroyed but not written off

- Theft produces inaccurate records, except when deliberately altered to conceal the theft

- Physical count rarely or never taken, or records not reconciled after stock count

Inventory control tools and techniques are methods used to ensure that stock (medicines, consumables, or other goods) is available in the right quantity, at the right time, and at the right place without overstocking or stock-outs. They help balance availability, cost, and efficiency.

❖ Different inventory control tools used for managing and monitoring inventory:

- Stock Registers & Bin cards
- Stock Ledger / Daily Stock Statement
- Physical Stock Verification
- FEFO

❖ Different inventory control techniques used to regulate stock levels are:

- VED Analysis
- FSN Analysis

Vital

VED Analysis

Desirable   Essential

FSN ANALYSIS
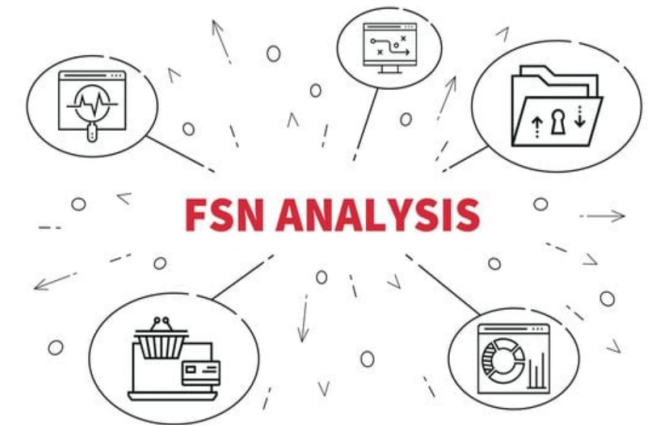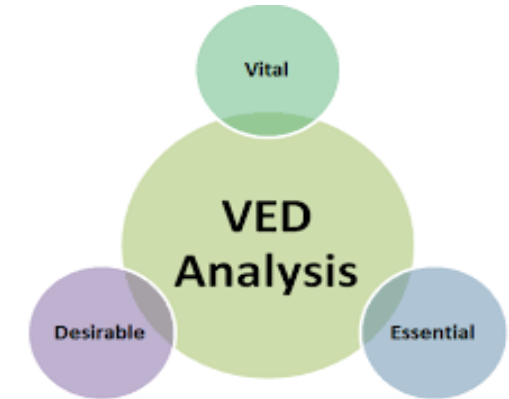
Maintain Proper Inventory Records

- ❖ Bin Card:
- • Simple, heavy weight cards
- • Kept for each item in stock room

- ❖ Stock Book (Register)
- • Contains listing of all items in stock room
- • Updated monthly after physical count
- • Uses information from stock cards
- • May be electronic or paper for monthly stock management

Format of Bin Card

Drug Name ....

Date	Medicine Came From or Dispense To	Batch No.	Expiry Date	Receipt	Issue	Balance	Signature
Date of receipt or issue	Name of supplier/ Patient		DD/MM/YYY	No. of units received in the stock	No. of units issued	No. of units left in the stock	Person who record the movement

Physical inventory: Physically counting the stock that the total number of units of each health commodity in a drug store at any given time

Stock on hand can be gathered from Stock keeping records (stock register) and e - LMIS (e-Aushadhi).

➢ Why it is important:-

- It is important to carry out stock counts, both for reordering purposes and for determining the inventory value.
- It should be done Periodically.

Assess the stock status

Stock on hand (quantity we have now)	←	Physical counting/stock register/ e-aushadhi
=		Month of stock (How long the supply with last)
Average monthly consumption of that particular product	←	Consumption records

FEFO (First Expiry, First Out)

A stock rotation principle where medicines and consumables with the earliest expiry date are issued/used first, regardless of the date of receipt.

- Ensures timely use of medicines before expiry.
- Prevents wastage of drugs and consumables.
- Aligns with quality assurance in patient care.
- Should be followed during storage and distribution.

Example:

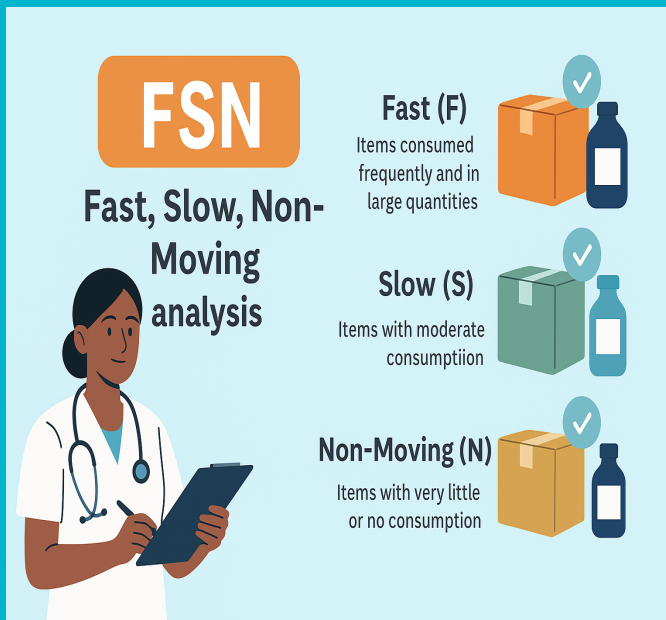| Medicine	Batch No.	Expiry Date	Action (as per FEFO)
Paracetamol 500 mg	B1	Nov 2025	Issue first
Paracetamol 500 mg	B2	Feb 2026	Issue after B1
Paracetamol 500 mg	B3	Jul 2026	Issue after B2

VED (Vital, Essential, Desirable) analysis

In this analysis medicines are classified by their importance to the facility's operations

- Vital (V): Items essential for patient survival and uninterrupted services.

  E.g.- Adrenaline injection, Atropine injection, Oxygen gas, Snake venom antiserum, Anti-rabies vaccine, Insulin injection etc.

  Their absence causes major disruptions

- Essential (E): Important items, but alternatives or substitutes may be available.

  E.g.:- Paracetamol, Ibuprofen, Amoxicillin, ORS, Hydrocortisone, Diazepam etc.

  Their absence affects service but is not life-threatening.

- Desirable (D): Items whose shortage or absence does not critically affect hospital operations.

  E.g:- Multi-vitamin tablets, Levofloxacillin, Cefadroxil, Antacids etc.

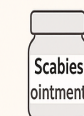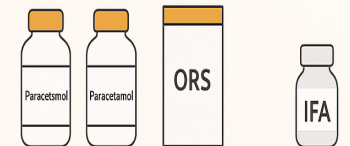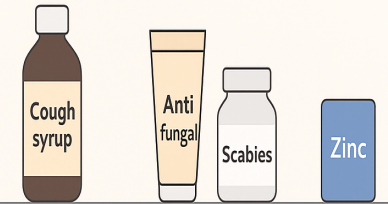 Their absence not critically affects service.

FSN (Fast, Slow, Non-Moving) Analysis

FSN

Fast, Slow, Non-Moving analysis

Fast (F) — Items consumed frequently and in large quantities

Slow (S) — Items with moderate consumptiion

Non-Moving (N) — Items with very little or no consumption

❖ Fast (F): Items consumed frequently and in large quantities.
- Maintain big safety stock
- Medicines used daily or very frequently

❖ Slow (S): Items with moderate consumption.
- Maintain sufficient safety stock
- Medicines used sometimes, but not every day

❖ Non-Moving (N): Items with very little or no consumption over a defined period.
- Minimum safety stock.
- Medicines rarely used, or not used for month
- Must be periodically reviewed to prevent expiry & obsolescence

SHELF ARRANGEMENT

S SLOW-MOVING

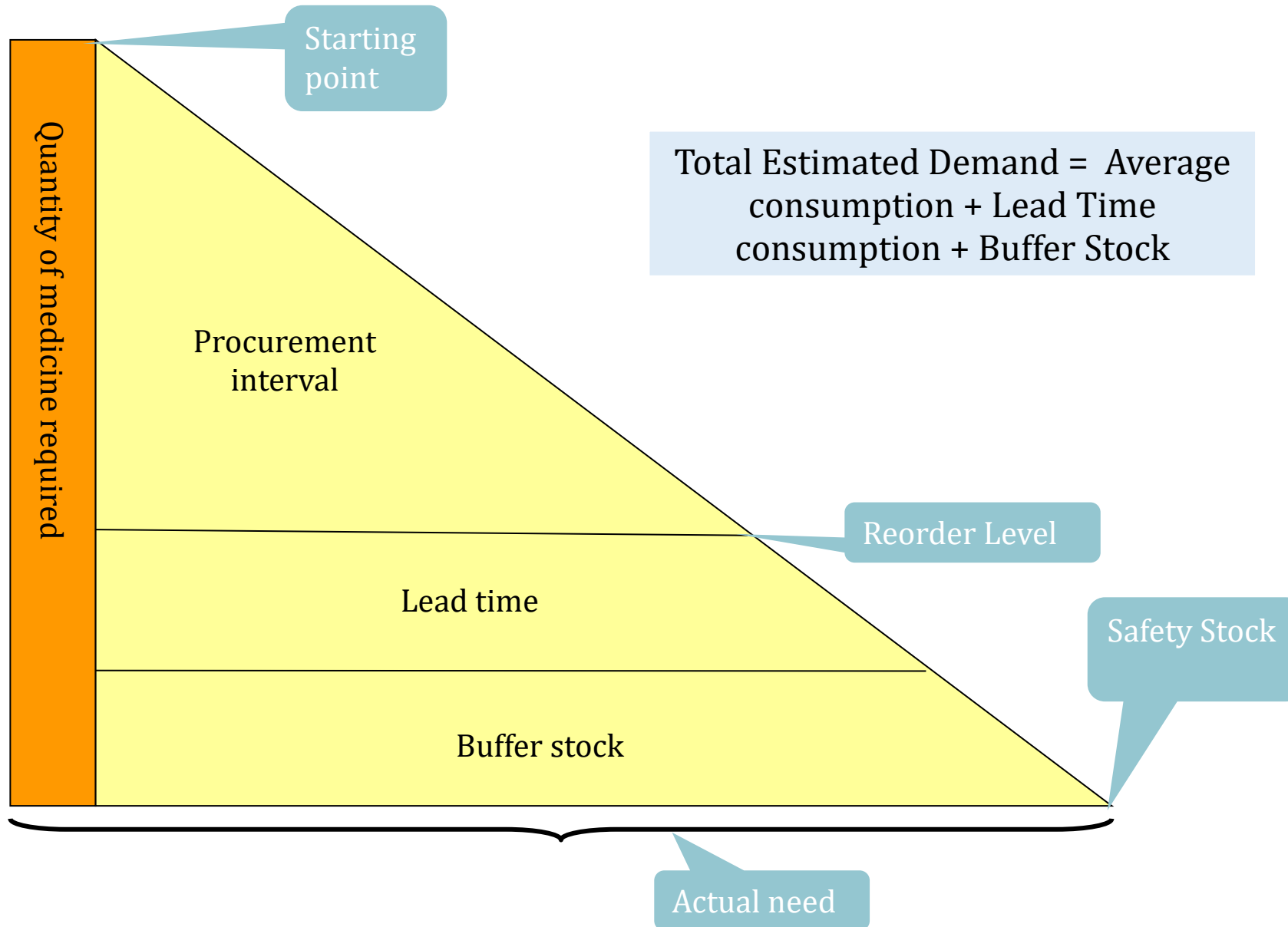Cough syrup | Anti fungal | Scabies | Zinc

F FAST-MOVING

Paracetsmol | Paracetamol | ORS | IFA

N NON-MOVING

Scabies ointment

FSN (Fast, Slow, Non-Moving) Analysis

			Example: FSN Analysis Sheet		
Medicine Name	Total number of units received	Units Consumed in Quarter (E.g. Jul–Aug)	Percentage of Total Consumption (Units Consumed / Total Units) x 100)	FSN Category	Category
Paracetamol	2500	1,500	60% (1,500 / 2,500 x 100)	F (Fast-moving)	High usage – reorder every 2–3 weeks to avoid shortages.
Amoxicillin	2500	600	24% (600 / 2,500 x 100)	S (Slow-moving)	Moderate usage – check stock monthly and reorder as needed.
Albendazole	2500	2000	80% (2000 / 2,500 x 100)	F (Fast-moving)	High usage – reorder every 2–3 weeks to avoid shortages.
Levocetirizine	2500	400	16% (400 / 2,500 x 100)	N (Non-moving)	Low usage – check for expiry and consider smaller orders or returning.
Midazolam	2500	200	8% (200 / 2,500 x 100)	N (Non-moving)	Very low usage – avoid overstocking; consider alternative suppliers if demand rises.

Quantification and Demand Estimation

Starting point

Total Estimated Demand = Average consumption + Lead Time consumption + Buffer Stock

Quantity of medicine required

Procurement interval

Reorder Level

Lead time

Safety Stock

Buffer stock

Actual need

Average consumption adjustment that accounts for any time that the item was unavailable.

Lead time - The time between when the drugs are ordered and when they are available to the patient.

Safety stock/Buffer Stock - A reserve quantity of stock maintained at a health facility to ensure uninterrupted supply, prevent stock-outs during demand fluctuations or supply delays.

Question - In an AAM Sub Health Center, medications are delivered quarterly. The total usage of Aspirin tablets in the previous quarter was 5,000 tablets over 70 working days, but Aspirin was out of stock for 20 days. The time from ordering to receiving supplies is 10 days. A safety stock of 150 tablets is kept to handle fluctuations in demand and supply. There are currently 50 tablets in stock at the time of ordering. Estimate the demand for Aspirin tablets for the upcoming quarter, which includes 80 working days.

Solution:

Average Daily Consumption (ADC) : $\dfrac{\text{Consumption During Last Quarter}}{\text{Working Days – Stock out Days}}$ = $\dfrac{5,000}{70 – 20}$ = $\dfrac{5000}{50}$ = 100 Tablets

Lead Time Consumption (LTC) : Lead time x Average Daily Consumption = 10 x 100 = 1000 Tablets

Buffer Stock (BS) : 150 Tablets

Available Stock (AS) : 50 Tablets

Estimated Demand For Coming Quarter : {(ADC x Working days in the coming Quarter) + LTC + BS} – AS

{(100 x 80) + 1000 + 150} – 50 = {8000 + 1000 + 150} - 50

= 9150 – 50 = 9100 Tablets

- There should be specified place to store medicines in the facility.
- Store the supplies in Heavy Duty shelves, with heavy items at lower shelves/ racks.
- Do not place any boxes on the floor and near the wall
- Use Refrigerator to store heat sensitive drugs and vaccines.
- Do not open refrigerator unnecessarily.
- Record the temperature and ensure enough space around the refrigerator for free air movement.
- Look Alike and Sound alike medicines are stored separately in patient care area and pharmacy
- Store near expiry/expired drugs in a separate area/shelve.
- Drugs and consumables are stored away from water and heat sources, direct sunlight
- Fragile items are not stored at the edges of the shelves.
- High alert medicines are stored separately away from the patient care area.
- No loose drugs , strips lying in open.
- Oxygen Cylinders are properly labeled, and pressure is updated regularly.

Terminologies in Inventory Control

Lead Time:- Lead time in inventory management is the total time elapsed between placing an order and receiving the stock ready for use or sale. It includes all the steps involved from the moment an order is confirmed until the goods are delivered and available in inventory.

Order Date — Invoice Date — Delivery Date — Payment Date

Lead Time
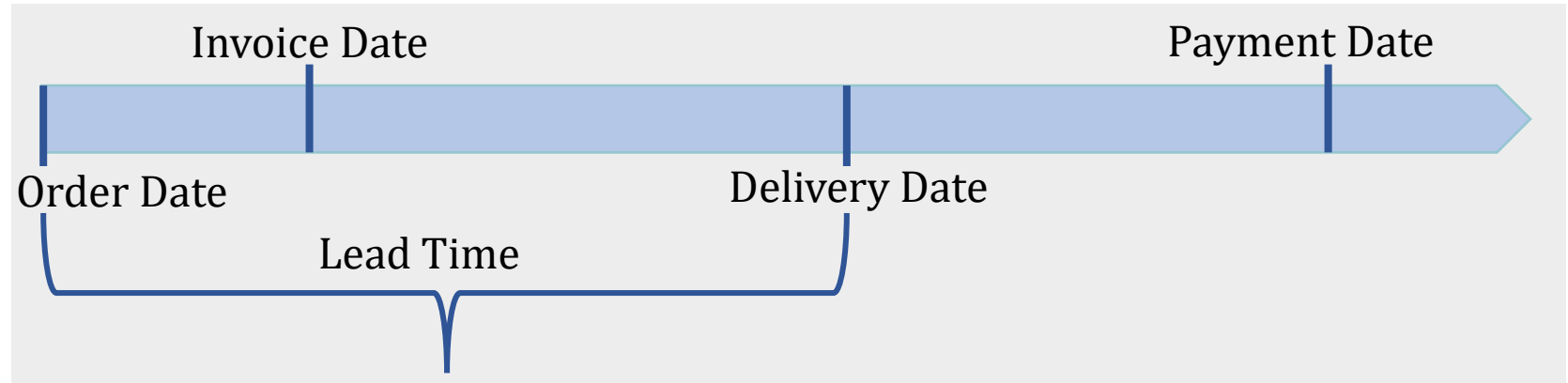
Average Daily Consumption:- Refers to the typical quantity of an item used or consumed per day over a defined period. It helps in estimating regular usage and planning replenishment.

Maximum Daily Consumption:- Represents the highest quantity of an item used or consumed on any single day within the reviewed period.

❖ Assess Consumption Trends:
- Review the past 3-6 months consumption of essential medicine & consumable
- Calculate average monthly consumption (AMC) for each item.

❖ Define Buffer Stock Level:
- Buffer stock is usually 1 months of AMC.
- Example: If average use of paracetamol = 300 tablets/month and lead time = 1 month, keep 600 tablets (1 month working stock + 1 month buffer)

❖ Set Re Order Level (ROL):
- ROL = (AMC × Lead time) + Buffer stock.
- Indent supplies when stock falls to this level.

❖ Maintain Accurate Records:
- Use stock registers / drug inventory registers or digital tools if available (e.g., e-Aushadhi, DVDMS).
- Update every issue/receipt immediately.

❖ Regular Monitoring:
- Weekly or bi-weekly physical stock check to avoid expiry and pilferage.
- Rotate stock using FEFO (First Expiry, First Out) principle.

❖ Bin Card
- Note the expiry date of each batch while entering stock in the drug register / inventory software.

❖ Apply FEFO Principle (First Expiry, First Out)
- Always issue medicines with the nearest expiry first, even if a newer batch is available.
- Arrange stock physically on shelves accordingly (older expiry in front, newer at the back).

❖ Routine Monitoring
- Conduct monthly stock review to identify medicines nearing expiry (within 6 months).

❖ Redistribution of Near-Expiry Drugs
- Coordinate with PHC/CHC to redistribute medicines that may not be consumed before expiry.
- Ensure transfer at least 3–6 months before expiry.

❖ Segregation of Expired/Near Expiry Stock
- Keep expired/near expiry medicines in a separate box, clearly labeled "Expired – Not for Use" or "Near Expiry Drugs".

❖ Documentation & Reporting
- Maintain an "Expired Stock Register" recording item name, batch no., expiry date, and quantity.

❖ Safe Disposal
- Dispose off expired drugs as per guideline prescribed for disposal of drugs

❖ Reorder Level (ROL): The stock level at which a new order should be placed to replenish the stock before it runs out.

Reorder Level (ROL) = {Maximum Daily Consumption × Maximum Lead Time (in days)} + Safety Stock

❖ Minimum Stock Level : The minimum quantity of a drug that must be available in stock to avoid stock-out situations.

Minimum Stock Level = ROL – (Average Daily Consumption × Average Lead Time)

❖ Buffer Stock (Safety Stock): The extra stock kept to prevent stock-out due to unforeseen delays or increased usage.

Buffer Stock = (Maximum Daily Consumption – Average Daily Consumption)× Average Lead Time

Exercise- Consumption Pattern of 5 Medicines are given for 5 Medicines

Question - If average lead time is 1 day and maximum lead time is 3 Days, calculate Total Consumption, Average Daily Consumption, Maximum daily consumption, Reorder Level, Minimum stock level and no. of days of buffer stock to be kept of each of these medicines.

Name of Medicines	Safety Stock	Day-1	Day-2	Day-3	Day-4	Day-5	Day-6	Day-7	Day-8	Day-9	Day-10
Paracetamol	180	100	120	130	112	115	125	130	140	115	120
Amoxicillin	300	115	200	250	270	280	300	320	117	340	290
Metformin	450	300	340	400	420	430	440	450	500	520	530
Atenolol	450	320	330	380	410	440	450	460	400	600	490
Diclofenac	200	300	320	120	115	118	120	113	230	240	250

As mentioned in the Question We have to calculate:

a.   Total Consumption

b.   Average Daily Consumption

c.   Maximum Daily Consumption

d.   Reorder Level

e.   Minimum Stock Level

f.   Number of Days' Buffer Stock to be Maintained

Solution: To understand the calculation for points "a to f", let's take an example of Paracetamol to proceed further.

a.   Total Consumption = Sum of Consumption (from Day 1 to Day 10 as mentioned in the Table)

$$= 100 + 120 + 130 + 112 + 115 + 125 + 130 + 140 + 115 + 120$$

$$= 1207 \text{ Tablets}$$

b.   Average Daily Consumption: $\dfrac{\text{Total Consumption}}{\text{Total no. of Days}} = \dfrac{1207}{10} = 120.7 \text{ Tablets}$

Solution: To understand the calculation for points "a to f", let's take an example of Paracetamol to proceed further.

c. Maximum Daily Consumption: Highest consumption entry in the data of a particular medicine over the total number of days for which it is analyzed.

For Example, Here we are calculating the consumption for Paracetamol (as mentioned earlier) based on the data provided in the question.

   The Maximum Daily Consumption of Paracetamol was on Day 8 = 140 Tablets

d. Reorder Level: {Maximum Daily Consumption × Maximum Lead Time (in days)} + Safety Stock

   {140 x 3} + 180   =   420 + 180
                        =   600 Tablets

e. Minimum Stock Level: Reorder Level – (Average Daily Consumption × Average Lead Time)

   600 – (120.7 x 1)   = 600 – 120.7
                        = 479.3 Tablets

f. Number of Days' Buffer Stock to be Maintained: (Maximum Daily Consumption – Average Daily Consumption) x Average Lead Time

   (140 – 120.7) x 1   =   20.7 x 1
                        =   20.7 Days

Answer

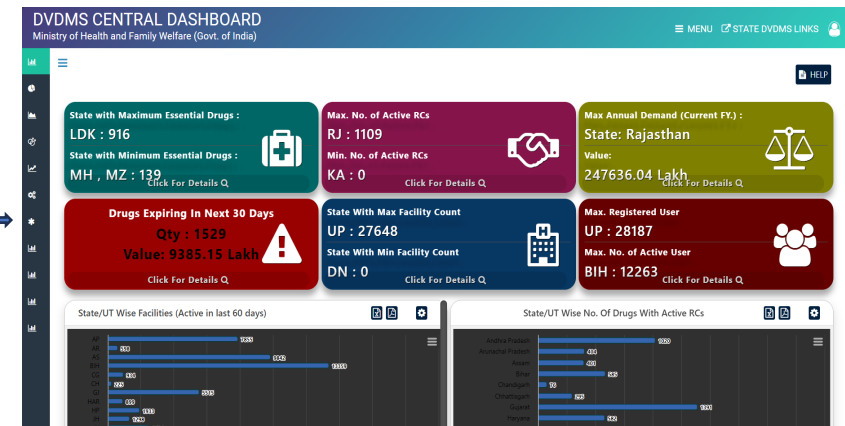| Name of Medicines	Total Consumption in a Month	Average Daily Consumption	Maximum Daily Consumption	Reorder Level	Minimum Stock Level	Buffer Stock
Paracetamol	1207	120.7	140	600	479.3	20.7
Amoxicillin	2482	248.2	340	1320	1071.8	91.8
Metformin	4330	433	530	2040	1607	97
Atenolol	4280	428	600	2250	1822	172
Diclofenac	1926	192.6	320	1160	967.4	127.4

❖ Indenting and stock monitoring of medicines can be efficiently carried out through the DVDMS mobile application. This application allows healthcare facilities to:

- Raise indents for medicines and consumables based on their requirements.
- Track stock levels in real time, ensuring that shortages or overstocking are minimized.
- Monitor consumption patterns to improve planning and utilization of resources.
- Facilitate transparency by digitally recording all stock movements (receipt, issue, return, and consumption).
- Enable quick decision-making at the facility level by providing instant visibility of available stock.

Indenting by using mobile application

❖ At the National level: The overall stock position across all states and facilities is monitored through the DVDMS Central Dashboard, which provides a comprehensive and real-time overview of medicine availability throughout the country.

THANK YOU