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معاً للتميز في رعاية المريض

The Importance of Inventory Management in Pharmacy Settings

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Lecturer





Disclosure

“Farah A. Chehimi” declares to meeting attendees that there are no financial relationships with any for-profit companies that are directly or indirectly related to the subject of this presentation

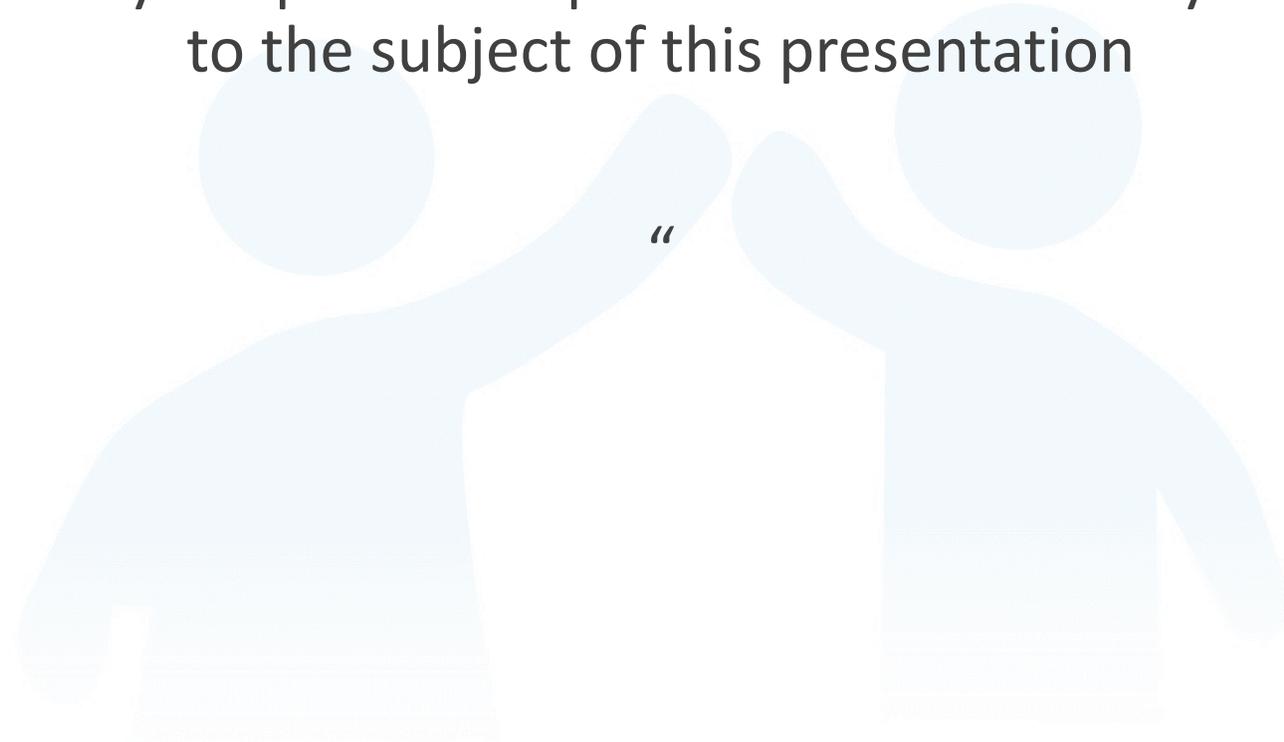




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Inventory

- Inventory is referred to as the stock of pharmaceutical products retained to meet future demands.
- It represents one of the largest current and liquid assets in the pharmacy.
- Its value continues to rise, because of the constant growth in variety and costs of pharmaceutical products.
- It embodies a cost to its owners; retailer, manufacturers or a wholesalers.
- Therefore, the basic goal of research is to maintain a level of inventory that provides the optimum stock at the lowest cost.



Inventory Management

- Inventory management is defined as a recurrent process of planning, organizing and controlling inventory to achieve a balance between the quantity supplied and demanded at a minimal investment level.

- It helps pharmacists and pharmacy managers decide about:
 1. The quantity of a good to re-order
 2. The time to re-order the good
 3. The frequency of orders to minimize stock outs



Purpose of Inventory Management

- Ensuring adequate stock of medications
- Minimizing the occurrence of unexpected stock-outs
- Decreasing carrying costs of maintaining inventory
- Lowering the costs of ordering medications from wholesalers
- Ensuring minimal time is spent ordering medications
- Preventing costs associated with damage and expiration of inventory
- Decreasing total costs to the pharmacy and overall health care organization



Why is Inventory Management Important?

- Among the essential roles of pharmacists the are described by the WHO and IPF, resource management is a key to professional success on individual and organizational levels.

- Three perspectives emphasize the importance of inventory management in pharmacy practice:
 1. Financial perspective
 2. Operational perspective
 3. Pharmacy Business perspective



Financial Perspective

- Efficient inventory management :

1. Enhances gross profits and net profits by reducing procurement and carrying costs
2. Improves cash flow by saving on purchasing and storing less costly products
3. Creates an opportunity of paying for operational expenses, or re-investing in other services



Operational Perspective

- Effective inventory management ensures meeting the demands of patients and prescribers.

- The unavailability of products leads to:
 1. Patient or customer dissatisfaction and loss
 2. Prescriber inconvenience
 3. Adverse effects on the patients in case of lifesaving products



Pharmacy Business Perspective

- Inventory mismanagement may lead to deleterious effects on patient's safety in the following cases:
 1. The availability of expired, counterfeit, substandard or spoiled products
 2. Unavailability of essential products
 3. Unclaimed prescriptions
 4. Outdated formularies

- Therefore, to enhance safety it is recommended to conduct a stock review on weekly basis to check the quantities, and on monthly basis to search for near-expiry or expired products.



Inventory Associated Costs

- There are four types of costs associated with inventory in pharmacy practice:
 1. Acquisition costs
 2. Procurement costs
 3. Carrying costs
 4. Shortage costs





Acquisition Costs

- Refer to the total amount of money that is used on the medications
- According to the ASHP (2008), four factors to determine the acquisition cost of medication inventory, and are responsible for the growth in the value of a pharmacy's inventory:
 1. Price
 2. Utilization
 3. Mix
 4. Innovation



Acquisition Costs: Price

- Price here refers to the cost of individual medications.
- It can be driven down with the use of generic medications.
- It is an important consideration because medications are getting more expensive.
- Take the case of the EpiPen[®], since 2010, the cost of this medication has increased to five times what it was (Lipton & Abrams, 2016).



Acquisition Costs: Utilization

- Utilization is the quantity of medications demanded.
- In the past 12 years, the number of people taking more than five medications has risen from 8% to 15% (Dennis, 2015).
- With the demand for medications increasing dramatically, pharmacies must maintain a higher amount of medications on their shelves, which increases the acquisition costs as well as holding costs.



Acquisition Costs: Mix

- Mix refers to the case where newer medications are developed that are typically better and more expensive than the medications in which they replace
- This type of cost is usually associated with older medications coming off of patents, and being replaced with updated versions, such as a long acting form or combination product.
- This make it essential for pharmacies to carry more than different medications each with several dosages.



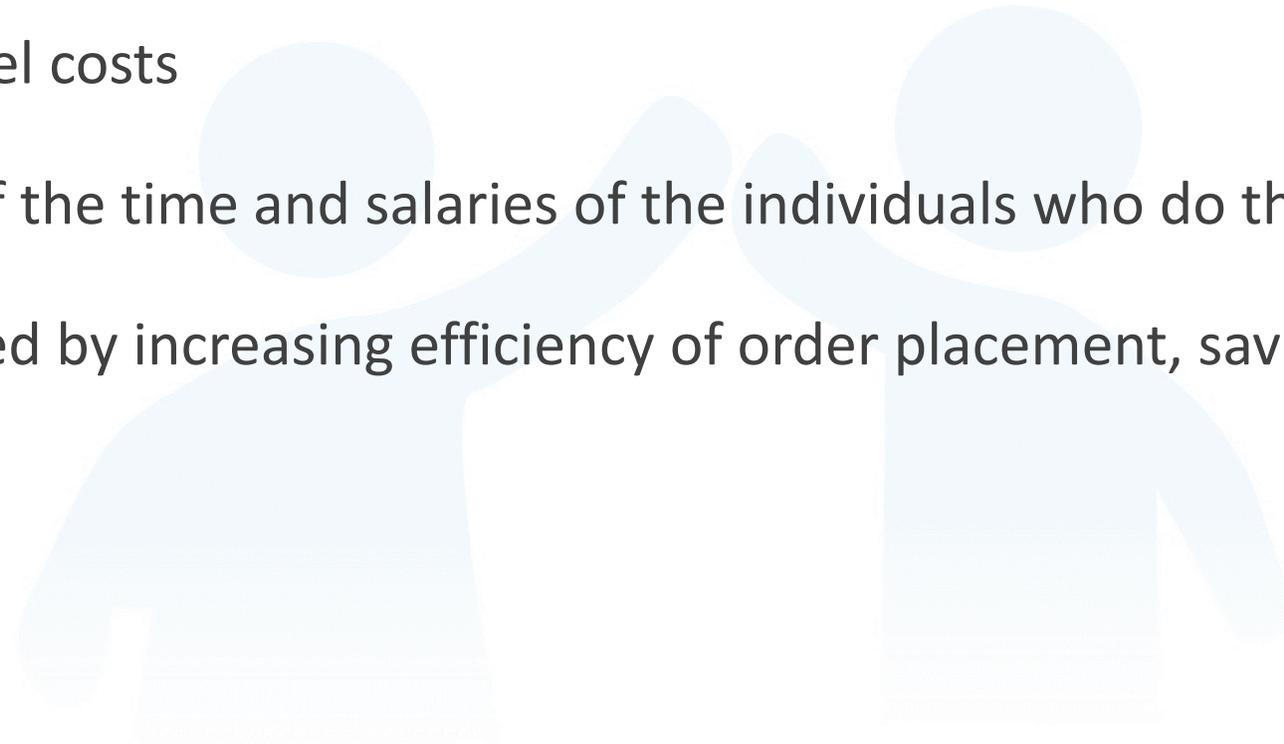
Acquisition Costs: Innovation

- Innovation refers to the cost of medications used to treat a condition that was previously untreatable (ASHP, 2008).
- Innovative costs are a combination of utilization and mix costs (ASHP, 2008).
- Perhaps one of the most obvious examples of this was when Viagra[®] (Sildenafil) was first released to treat erectile dysfunction.
- All of these costs are tied into the acquisition cost of medications (Ali, 2011), most of which is unavoidable.



Procurement Costs

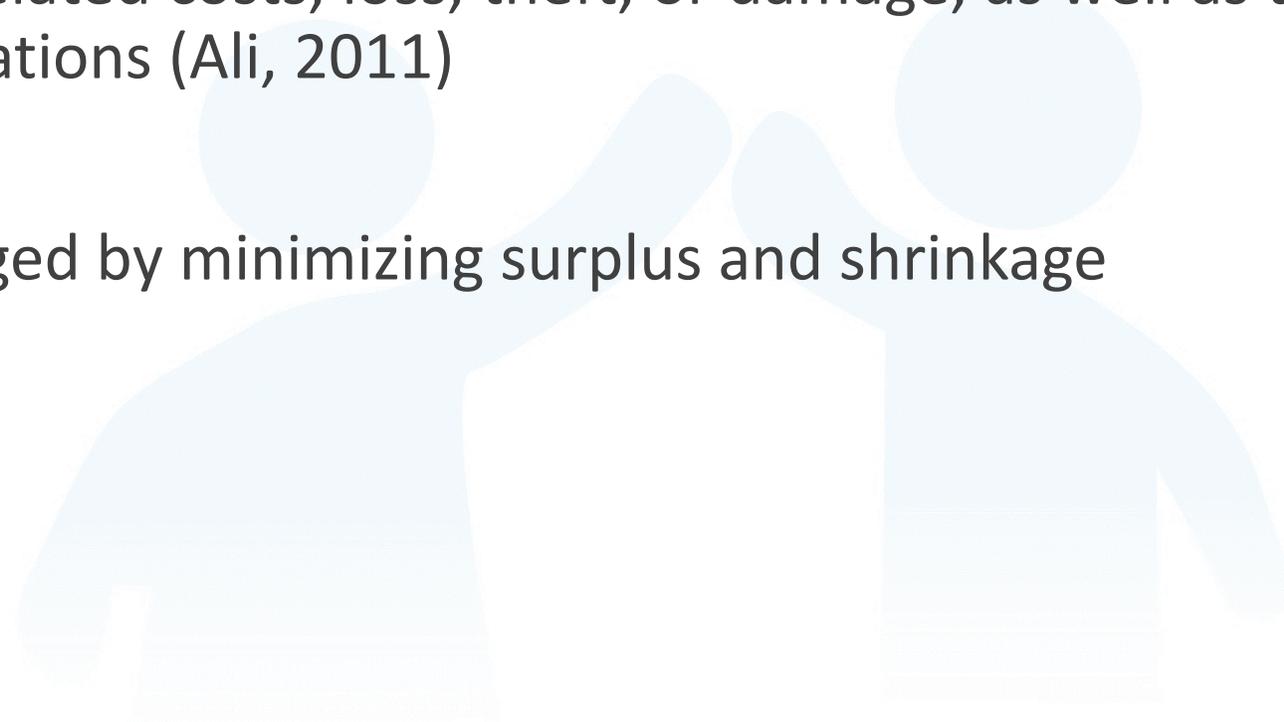
- Are the costs involved in purchasing medications such as managing or placing orders and stocking shelves once the medications arrive (Ali, 2011)
- Include personnel costs
- Are a function of the time and salaries of the individuals who do these tasks
- Are best managed by increasing efficiency of order placement, saving time and resources





Carrying Costs

- Incurred as a result of having the inventory
- Include crisis-related costs, loss, theft, or damage, as well as the cost of expiring medications (Ali, 2011)
- Are best managed by minimizing surplus and shrinkage





Shortage Costs

- Also referred to as stock-out costs
- Are difficult to put a monetary value on
- May be due to rush orders
- Include:
 1. The cost of a lost customer
 2. The physical health deterioration of a patient as a result of a stock outage (Ali, 2011)



Pareto Principle

- The Pareto Principle can determine the best way to allocate resources and help plan inventory (American Society for Health-System Pharmacists, 2008).
- The Pareto Principle states that 20% of inputs result in 80% of the results (Lavinsky, 2014).
- In this case, the Pareto Principle implies that 20% of inventory items result in 80% of budget.
- The ABC Analysis takes this principle and applies it slightly differently.



ABC Analysis

- The ABC analysis is suited for pharmacies that are trying to reduce inventory costs and identifying areas for improvement.

- It divides the inventory into A, B, and C items (WHO, 2012):
 1. A items represent 10–15% of the inventory or 70–80% of the total costs
 2. B items represent 20–25% of the inventory or 15–20% of the budget
 3. C items represent 60–70% of the items account for only 5–10% of the budget
(Devani, Gupta, & Nigah, 2010)

- Any cost reduction of the “A” items yields significant and immediate impact on inventory costs, while the “C” items will have a minimal and relatively insignificant impact on cost savings.



Vital, Essential, Non-Essential Categorization

- Another way to differentiate medications is to use the VEN system (Vital, Essential, Non-essential), which is useful in cases of NGOs or countries with significant budget constraints on their medications.
- The classification for each of these medications is highly subjective.
- The “V” medications are those that have very high stock out costs such as life saving medications or the ones with severe withdrawal side effects, thus they must be available all the time.
- The “E” medications are not as critical. They may be rarely used or have substitutes or alternatives that do not degrade patient outcomes.
- The “N” category are the medications that are fine to have, but can be survived without (WHO, 2012) (Devani et al., 2010).



Sample VEN Guideline

Characteristic of Medicine or Target Condition	Vital	Essential	Non-essential/Desirable
Occurrence of target Condition			
Persons affected (Percent of Population)	>5	1-5	<1
Persons Treated (number per day at average health center)	>5	1-5	<1
Severity of Target Condition			
Life-Threatening	Yes	Occasionally	Rarely
Disabling	Yes	Occasionally	Rarely
Therapeutic effect of medicine			
Prevents serious Disease	Yes	No	No
Cures serious disease	Yes	Yes	No
Treats minor, self limited symptoms/conditions	No	Possibly	Yes
Has proven efficacy	Always	Usually	Possibly
Has un-proven efficacy	Never	Rarely	Possibly

Table 1. Source: WHO (2012)



ABC-VEN Matrix Analysis

- This is performed by assigning each medication an “A,” “B,” or “C” from the ABC analysis and a “V,” “E,” or “N” resulting in nine categories.
- These categories are then divided into Category I, II, and III.
- This is important because with this model, the acquisition costs are not the only basis for categorizing the medications. The VEN method takes into account the intangible shortage cost to the patient or society, if they cannot get the medication immediately.

Category	ABC-VEN Classification
I	AV,AE,AN,BV,CV
II	BE,BN,CE
III	CN

Table 2. Adapted from Devani et al. (2012)



Methods of Inventory Management

- Pharmacies have three basic approaches of managing inventory: visually, sometimes referred to as “looking it over,” periodically or “physical inventory”, and continuously (Ali, 2011) (Elements, 2013.)

- The three major methods used to manage inventory in pharmacy settings:
 1. The Visual Method
 2. The Periodic Method
 3. The Perpetual Method



The Visual Inventory Management Method

- It involves visual inspection each item, and once it falls below a certain level, it will get reordered .
- In this system, the pharmacist will often have a “want book,” which is a notebook where the pharmacy staff keeps track of medications that need ordering throughout the day.
- Some of the benefits of this system include low cost of implementation, convenience, and informality (Bouldin et al., 2011).
- This is an ideal system for a small pharmacy without much inventory; however there is a huge risk of stock outs due to oversight or missing an order.



The Periodic Inventory Management Method

- It is very similar to the visual inventory method, except that inspection of inventory occurs at preset time periods such as weekly or monthly.
- It is even possible to have multiple periods, fast moving items might be re-ordered daily, while slower moving items only weekly or monthly.
- This method is more formal than the visual, which allows for some data to be generated. With this data, the manager can do minimal analysis.
- The benefits are that it is also inexpensive to implement(Bouldin et al., 2011).
- The disadvantages are the time investment needed, as well as the risk of stock outs.



Perpetual Inventory Management Method

- Is the most efficient method
- Computer based and tracks inventory at the level of sale, where and a real time quantity can be known
- Provides detailed analyses of the data collected, such as average inventory, variations in demand or seasonality (Bouldin et al. 2011), financial statements, turnover rates, and forecasting (Ingersol, 2015)
- Reduces the work spent walking the shelves and entering reorder information (Willard, 2012) → decreasing personnel costs
- Disadvantage: cost



How Much to Order?

- The quantity of inventory to be ordered can be determined using :
 1. Economic Order Quantity (EOQ)
 2. Joint Ordering Strategy





Economic Order Quantity

- EOQ is a mathematical solution to minimize costs associated with ordering and holding inventory.
- At larger order quantities of an item, carrying costs will increase due to the increased inventory. However, the procurement cost will decrease due to decreased orders.
- The EOQ takes these two costs and determines the quantity to order at which the total cost of managing inventory is the lowest (Bouldin et al., 2011).
- The limitations of the EOQ method include assumptions of continuous use and prices without fluctuations (Bouldin et al., 2011).



Joint Ordering Strategy

- The purpose of joint ordering is to take a group of coordinated items and order them in as one whole unit.
- Items with a large set-up cost or a high fixed cost per order are combined in one order resulting in significant savings (Pantumsinchai, 1992).
- The reorder point is dependent on the amount of risk the pharmacy is willing to take, as well as the holding and shortage costs of the items.



Re-order Point

- Determining when to reorder an item largely depends on the amount of safety stock needed or amount of risk of stock out management would like to assume.
- The demand during lead-time is also important in determining when to reorder.
- Service level is the probability that an item will not run out of stock in an order cycle and it is used to manage the risk of stock outs.
- Having a higher service level comes at a cost; more inventory is required, which means paying more holding cost.



Evaluation of Inventory Management

- Evaluating how well a pharmacy is managing its inventory is important, because of the amount and cost of resources invested in inventory management.

- There are two approaches used for inventory management evaluation:
 1. Inventory Turnover Rate (ITOR)
 2. Percent Net Profit (PNP)



Inventory Turnover Rate (ITOR)

- The inventory turnover ratio is an effective measure of how well a pharmacy or a pharmaceutical organization is turning its inventory into sales.
- The ratio also shows:
 1. How well inventory related costs are managed
 2. Whether they are buying too much inventory or too little
 3. How well the company sells its goods
- $ITOR = \text{Cost of Goods Sold} \div \text{Average Inventory (during a time period)}$
- The higher the inventory turnover, the better → It means a company is selling goods very quickly and that there's demand for their product.
- BUT if inventory turnover is very high, they might not be buying enough inventory and may be missing out on sales opportunities.



ITOR Example

- Example

For the year ended December 2017, a pharmaceutical company reported annual sales of \$485.14 billion, year-end inventory of \$43.04 billion, and an annual cost of goods sold of \$361.25 billion.

Inventory turnover for the year equals:

$$\$361.25 \text{ billion} \div \$43.04 \text{ billion} = \mathbf{8.39}$$

Its **days inventory** equal:

$$(1 \div 8.39) \times 365 = \mathbf{43 \text{ days}}$$

➔ This company sells its entire inventory within a 43-day period!



PERCENT NET PROFIT (PNP)

- PNP is used to determine the relationship between the net profit and the inventory turns.
- $PNP = \text{net profit} / \text{average inventory} \times 100 \%$
- Higher PNP values indicate that the products being sold have higher markups (profit).
- If the ITOR is high while the PNP is low during the same period, this means that more products were sold but with lower profit.



Factors Affecting Inventory Management

- Pharmacists should consider the following factors when evaluating their pharmacy inventory management:
 1. Product type (brand/generic)
 2. Inventory size
 3. Returned product policies
 4. Unclaimed prescriptions
 5. Inventory shrinkage
 6. Use of formularies





Factors Affecting Inventory Management

- Brand versus generic : generic products have lower acquisition costs → minimize inventory costs
- Inventory size: basic product lines carry smaller inventory size in comparison with full product lines, which reduces their investment in inventory
- Returned product policy: providing credit for future orders, product replacement, or cash back that should be benefited from before products' expiration
- Unclaimed prescriptions: pharmacists should monitor these prescriptions and remind the patients/caregivers about them
- Shrinkage: due to theft and shoplifting
- Use of formularies: carrying one therapeutic equivalent product within a class of medications reduces overall inventory costs



Key Takeaways

- From financial, operational and business perspectives, efficient inventory management is essential in guaranteeing the presence of an adequate stock of medications that satisfies patients' needs and increases the profitability of the pharmacy.
- Pareto principle and the ABC analysis are among the best strategies to allocate resources, help plan inventory at a reduced cost, and identifying areas for improvement.
- The most efficient inventory management method is the perpetual one, which is computer-based. It provides detailed analyses of the data collected, including average inventory, financial statements and turnover rates.



Takeaways

- An effective measure of how well a pharmacy or pharmaceutical organization is managing its inventory and turning it into sales is Inventory Turnover Rate (ITOR).
- Percent Net Profit (PNP) is used to determine the relationship between net profit and inventory turns.
- Pharmacists should not under-estimate the deleterious impact of inventory mismanagement on patients' safety and on the pharmacy's profitability and growth.

THANK YOU

