FUNDAMENTALS OF PURCHASING AND INVENTORY CONTROL FOR CERTIFIED PHARMACY TECHNICIANS
A Knowledge Based Course

By

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Course Cost: $13.00 (to be paid at time of testing)

Average time to Complete: Approximately six hours including testing

Course Value: Six Contact Hours

Reading: 51 Pages

Final Exam: 50 Questions

Completion Requirements: Answer 70% of questions correctly. Eval.
OBJECTIVES

At the end of this course, the reader should be able to meet the following objectives:

1. Discuss why inventory control is important for pharmacies.
2. Understand the objectives of inventory control within a pharmacy.
3. Become familiar with some of the more common purchasing concepts.
4. Become familiar with some of the methods for controlling inventory.
5. Discuss purchasing policies and their value within the pharmacy.
6. Discuss some of the different models for inventory control.
7. Having a working knowledge of some of the most common receiving and storage policies.
WHY INVENTORY CONTROL IS IMPORTANT?

Among the many pharmacy management functions performed in a pharmacy, few have more direct impact than purchasing policies and inventory control. Sound purchasing and inventory control are closely interrelated because one cannot be effective without the other. Purchasing requires knowing the right quality and quantity to buy, when to order, at what price, and from what sources. Inventory is simply the result of this buying. Some kind of inventory control system is essential to carry out the purchasing function effectively. For example, one must know how much of a given item is in stock at a given time in order to decide whether it is time to reorder.

A pharmacy’s inventory represents its single, largest investment. Consequently, no other asset has the potential to devastate a pharmacy as much as poorly controlled inventory. In an average pharmacy, cost of goods sold account for approximately 68% of total expenditures. For every 1% change in an average pharmacy’s costs of goods, profits may increase or decrease by slightly more than 20%. Thus, the sheer magnitude of dollars involved make seemingly minor inefficiencies in purchasing and inventory control matters of great importance to both cash flow and profitability.

Despite the highly visible nature of purchasing and inventory control, they seldom are given the quality of attention they deserve. As a daily activity, purchasing commonly is viewed more as a routine buying process than an investment process with far-reaching consequences. And the mundane nature of inventory control makes it one of the more frequently deferred activities of pharmacy technicians.

Ironically, the sophisticated and efficient purchasing programs offered by many wholesaler suppliers have perhaps contributed to the lack of attention. Supplier systems
are designed to relieve the time-consuming but routine aspects of purchasing and
inventory control, while simultaneously providing valuable data to help make more
knowledgeable purchasing and inventory control decisions.

Unfortunately, many pharmacies see these systems as vehicles for minimizing the
time spent on the whole realm of purchasing and inventory control rather than a way to
reallocate time to their more fundamental responsibilities.
INTRODUCTION

The objective of an inventory control system is to make inventory decisions that minimize the total cost of inventory. This is not to be confused with minimizing inventory. It is often more expensive in a pharmacy to run out of an item than to simply keep more units in stock. For example, in a retail pharmacy, if a customer is unable to obtain their medication, they may go somewhere else and the pharmacy may lose future purchases. In a hospital pharmacy, if you run out of an item, you might be required to obtain it by a more expensive method (over-night delivery, hot-shot, etc.).

Most pharmacy inventory decisions involve replenishment – how much to order and when to order. In this course we will look at several models for minimizing the total cost of inventory, including the popular method of Economic Order Quantity (EOQ). This particular method attempts to balance the carrying cost inventory with the cost of running out. As we look at each of the inventory control models, it is important to keep in mind the different types of cost associated with pharmacy inventory: (1) carrying costs, (2) shortage costs, and (3) replenishment costs. Each of these costs is discussed later in the course.

Many of the models we will discuss make certain assumptions that do not hold within the operations of a hospital pharmacy. For instance, the “costs” associated with running out of a drug product used in critical care might involve increased morbidity and mortality, which is not an acceptable situation. Given that, the basic concepts of these inventory control models can be applied to hospital pharmacies when appropriate.
INVENTORY CONTROL

Inventory control is the process of managing inventory in order to meet customer demand at the lowest possible cost and with a minimum of investment. Unlike many factors in pharmacy, inventory is controllable. The pharmacy decides how much inventory investment to make, when to reorder, and in what quantities.

A successfully implemented inventory control program takes into account such things as purchasing goods commensurate with demand, seasonal variation, changing usage patterns, and monitoring for pilferage. The challenge of productive inventory management is to support an upward trend in sales while keeping the investment at the lowest level consistent with adequate customer service.

There are several objectives of inventory control:

- Minimization of the inventory investment.
- Determination of the right level of customer service.
- Balance of supply and demand.
- Minimization of procurement costs and carrying costs.
- Maintenance of an up-to-date inventory control system.

Unfortunately, it may be impossible to achieve these objectives concurrently. For example, to best satisfy the needs of patients, a pharmacy may have to carry a wide range of both prescription items and front-end merchandise. In a hospital pharmacy, prescribers may want the pharmacy to stock several therapeutically equivalent drugs. This cannot be achieved by minimizing inventory investment. This is one of the contradictory demands made upon the inventory control system. Other include:
1. Maintaining a wide assortment of stock – but one should not be spread too thin on the rapidly moving ones.

2. Increasing the inventory turnover – but one should not sacrifice service level.

3. Keeping stock low – but one should not sacrifice service or performance.

4. Obtaining lower prices by making volume purchases – but one should not end up with slow moving inventory.

5. Having an adequate inventory on hand – but one should not get caught with obsolete items.

Successful inventory management involves simultaneously attempting to balance the cost of inventory with the benefits of inventory.
What to Control

Despite the importance of inventory control in the overall management of a pharmacy’s assets, there is no denying that this activity can be time-consuming and expensive. And it is not uncommon to find even the most adamant supporters of inventory control spending more for control than they would lose by having a less efficient system. Normally, however, it is more likely that inventory is not being controlled to the extent that it should, and money is being lost.

A preliminary step in the process of inventory control is to determine the approximate costs of carrying inventory. These costs include such expenses as storage costs, inventory risks, and the loss-of-opportunity costs associated with tying up capital. Obviously, many of these costs are difficult to determine precisely. Nevertheless, it is possible to approximate most of these for decision making purposes.

The costs of capital and opportunity are the most important of those associated with holding inventory. By investing in inventory, other uses for money are lost – uses which could provide greater returns. The most commonly used benchmark for measuring the costs of capital is the prevailing interest rates. Ideally, this measure should be for an investment of comparable risk, but that is seldom possible. Consequently, some nearly risk-free investments, such as treasury bills, are often used instead.

Closely related to the costs of capital are the opportunity costs of using space for one type of product rather than another. At times the difference between these costs may appear insignificant. Yet, the costs of capital represent the fundamental decision as to whether to invest in inventory, while the opportunity costs concern what types of inventory are held.
Irrespective of what the actual costs are of holding specific items in inventory, there is little doubt that some items need to be controlled more than others. Some cost more, and therefore represent a greater financial investment. Some are dated and have only a relatively short shelf life, and others may be important for other reasons (such as critical life-saving drugs used in a hospital).
PURCHASING CONCEPTS

Now that we have identified “what” and “why” of inventory control. We should take a look at a few of the concepts surrounding purchasing.

ABC Classification System

The ABC classification system groups items according to annual sales volume, in an attempt to identify the small number of items that will account for most of the sales volume and that are the most important to control for effective inventory management.

In this system, inventory can be labeled as being $A$, $B$, or $C$ products. This gives recognition to the varying importance of different types of pharmacy inventory. Consequently, classifying merchandise into A, B, and C items allow the pharmacy to better identify and control items of greater importance. For example, approximately 20% of the inventory items should receive much greater attention than the remaining 80% since they may account for 90% or more of inventory investment. Loss of control over a few of these items is considerably more serious than loss of control over a large number of other items.

Table 1

<table>
<thead>
<tr>
<th>Class</th>
<th>% of Dollars</th>
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<tbody>
<tr>
<td>A</td>
<td>70 – 80</td>
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<tr>
<td>B</td>
<td>15</td>
</tr>
<tr>
<td>C</td>
<td>5 – 10</td>
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</tbody>
</table>

$A$ items would be considered the most important to control, where as $C$ items would be considered the least important to control, and not worthy of the more elaborate system used to control $A$ items. $B$ items would be somewhere in the middle and their control would depend on the actual cost of inventory control.
Lead Time

The Lead Time is the interval between placing an order and having it ready for dispensing. When calculating lead times in a pharmacy, you must consider the amount of time to stock the shelves, compound, or mix.

Safety Stock

Safety stock is the extra units of inventory carried as protection against possible stock-outs. The safety stock must be carried when the pharmacy is not sure about either the demand for the drug or the lead time or both. In the case where the demand is uncertain, safety stock is the difference between the maximum usage and the average usage multiplied by the lead time. For example, assume that a pharmacy is faced with an uncertain usage of Lisinopril. Lead time is constant at two days. Normal daily usage is 7 bottles but it can go as high as 10. The store would compute the safety stock as follows:

- Maximum daily usage: 10 bottles
- Average daily usage: 7 bottles
- Excess: 3 bottles
- Lead time: x 2 days
- Safety Stock: 6 bottles

Reorder Point

The reorder point is the inventory level at which it is appropriate to replenish stock. The calculation is as follows:

Reorder Point = Average Usage Per Unit X Lead time + Safety Stock

First, multiply average daily (or weekly) usage by the lead time in days (or weeks) yielding the lead time demand. Then add safety stock to this to provide for the variation in lead time demands to determine the reorder point. If average usage and lead
time are both certain, no safety stock is necessary and should be dropped from the 
formula.

Example:

Demand = 1,000 vials per year
Store open 311 days/year
Daily demand = 1,000/311 = 3.2154 vials per day
Lead Time = 2 Days
\( R = dL = (3.2154)(2) = 6.43 \) rd, 7 vials per day

Inventory Turnover Rate

One method of assessing the effectiveness of an inventory control system is the 
turnover rate. The inventory turnover rate represents the average number of time the inventory is sold and placed during a given period (usually a year). In general, a high turnover rate indicates that product usage is “good” relative to the average amount of inventory kept in stock. A low turnover rate indicates that products are not being used at a proper rate relative to average inventory.

Inventory turnover rate is calculated by dividing the inventory cost into annual purchases. The average pharmacy’s inventory turnover rate does not exceed 10 turns. Most pharmacies average between 8-10 turns per year. A pharmacy purchasing $100K per month will save $20,000 in on-hand investment dollars (or cash flow savings) with each single digit increase in the inventory turnover rate.

Example:

\[
\text{Inventory Turnover Rate} = \frac{\text{Annual purchases at cost}}{\text{Avg. On-hand Inventory}}
\]

\[
\frac{1,200,000}{\$150,000} \text{ (}$100K \times 12\text{)} = 8 \text{ inventory turns per year}
\]
An increase form 8 to 9 turns will drop the average on-hand inventory from $150,000 to $130,000 or a cash flow savings of $20,000.

\[
\frac{1,200,000}{130,000} = 9.2 \text{ inventory turns per year}
\]

A pharmacy that purchases $50,000 per month or $600,000 per year in purchases will save $10,000 for each single digit increase in inventory turns.

This reduction in the on-hand inventory investment is the equivalent of an interest free loan to the pharmacy.
The Economic Order Quantity

One of the best known models for inventory control is the economic order quantity (EOQ). The purpose of this model is to answer two important questions: (1) When should an item be reordered (resulting in replenishment cost), and (2), What quantity should be ordered (resulting in carrying cost)? The model can thus be used to determine how much inventory needs to be carried to meet demand, but not so much that excess costs are incurred.

*Procurement costs* (replenishment costs) include costs of making requisitions, writing orders, receiving and inspecting goods, completing the purchase transaction, and maintaining inventory records. These costs are normally fixed, regardless of the size of the order.

*Carry costs* include such items as interest, insurance, taxes, deterioration, spoilage, obsolescence, handling, and warehousing. Interest payments in particular can be major cost items if the inventory stock has large sums of money tied up in it. Because a significant portion of a pharmacy’s working capital is tied up in inventory, a small reduction in inventory investment may result in a significant increase in working capital and reduce the amount of money needed to borrow. Even if a pharmacy does not borrow to finance its inventory, it would be advantageous to reduce inventory levels since the money can be invested elsewhere.

We will take a deeper look at these costs a little later in the course.

The EOQ model is based on three basic assumptions: (1) the firm knows with certainty the annual usage of a particular item of inventory; (2) the rate of usage of inventory does not vary over time; and (3) orders placed to replenish the inventory are
received at exactly the point in time when inventory is zero. These highly restrictive assumptions greatly limit the usefulness of the EOQ formula. A useful feature of the model is its determination of a basic optimal reorder quantity that the inventory manager may adjust according to his or her personal knowledge of demand fluctuations, delivery delays, and other variables.
What Does Inventory Actually Cost

Carrying Costs (K Cost)

The carrying cost of inventory is the cost of maintaining your average inventory investment of inventory in your pharmacy. What costs do you incur in carrying inventory?

1. Cost of putting away stock receipts and moving materials within the pharmacy.
   
   In other words, the cost of paying someone to do these activities.

2. Rent and utilities for the portion of the pharmacy used to store inventory.

3. Insurance and taxes on inventory. You have to insure your inventory and except for tax exempt hospitals, it will probably be subject to taxes.

4. Physical inventory and cycle counting (discussed later).

5. Inventory shrinkage and obsolescence. Most drugs have an expiration date.

6. Opportunity cost of the money invested in inventory. What could you be doing with the money you have invested in the inventory? For example, in a retail pharmacy you could spend more on advertising. In a hospital pharmacy you might use that money for added services.

The carrying cost percentage is calculated by dividing the sum of these expenses (along with opportunity cost) by the average inventory value. It is the amount of money it takes to maintain on dollar’s worth of inventory for an entire year. To calculate the carrying cost in your pharmacy, you must answer the following questions:

1. What was the average inventory value over the past 12 months (sum of month-ending inventory values divided by 12)?
2. What was your total labor expense (wages, taxes, and benefits) during the past 12 months (including the expense of inspections, putting away the stock, moving from bin to bin as necessary)?

3. How many square feet in your facility?

4. How many square feet in the pharmacy?

5. What were the utilities over the last 12 months?

6. What was the value of written-off inventory last year? (expired or unusable meds)

7. What was the value of inventory shrinkage last year?

8. How much of the current inventory is in excess of a 12-month supply (a value equal to monthly demand x 12)?

9. What was the cost of insuring your inventory?

10. What was the cost of inventory taxes last year?

11. If additional labor was necessary to conduct physical counts of your inventory, what was the cost of this labor (including taxes and benefits)?

12. If you borrow money to finance your inventory, what was the average outstanding balance over the past 12 months? What was the annual interest rate?

13. If you paid cash for your inventory purchases, what interest rate could you expect to receive if you invested that money in a relatively safe income-producing investment?

Determining your pharmacy’s actual carrying cost is very difficult to do in a reasonable amount of time. For this reason, you might find it more reasonable to use a rule of thumb such as “current prime rate plus 20%”.

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1 Some pharmacies will also include the cost of compounding and IV admixture.
While you may not have the time to calculate your exact carrying costs, you should be aware that they exist. The economic order quantity formula is designed to calculate the lowest total cost reorder quantity based, in part, on the cost of carrying inventory. If it costs you less to maintain inventory in your warehouse, you will tend to stock more. If your carrying costs are high, you will probably want to keep just enough inventory in your pharmacy to protect customer service.

**Shortage Cost**

The shortage cost is what is lost if the stock is insufficient to meet all demand. This cost can be the most difficult to measure and is often handled by establishing a “service level” policy. For example, a certain percentage of demand will be kept in reserve or “safety stock”. One of the methods evaluated for computing shortage costs is based on the item’s average acquisition price, since this is the minimum measure of how much a pharmacy is willing to spend to avoid a shortage. Shortage costs are also computed using the cost to operate a pharmacy. This method is based on the assumption that the value of a pharmacy’s capabilities is equivalent to the amount of money the pharmacy is willing to spend to operate. There are several other mathematically intensive, time weighted methods for calculating these costs, but the point to remember is there is a cost for running out of items in your pharmacy and you should consider those costs as you seek to control your inventory.

**Replenishment Cost (R Cost)**

The replenishment cost is the cost of issuing, receiving and paying for a line item on a vendor purchase order. The cost of reordering inventory (also known as the “R” Cost) includes:
• Deciding what products need to be replenished
• Issuing the purchase order
• Expediting the purchase order (if necessary)
• Processing the receiving paperwork for shipment
• Approving the vendor’s invoice for payment
• Processing the vendor’s payment

The cost of reordering is calculated by dividing the total annual cost of purchasing stock line items by the number of purchase order line items for stock products issued by the past year:

Annual Cost of Issuing Purchase Order Line Items
====================================
Purchase Order Line Items Issued in the Past Year

Note that the cost of reordering is not calculated for a whole purchase order or each piece purchased. The R cost is expressed per purchase order line item. The theory is that it probably takes the same amount of time and effort to purchase a product regardless of whether you by 10, 50, or 1,000 pieces. Even so, the cost per piece drops rapidly as the quantity purchased increases. For example, if the cost of reordering is $5.00 per line item and we buy one piece, that one piece has to “absorb” the entire $5 R Cost. But if five pieces are ordered, each piece only has to absorb $1 of the $5 R Cost.
**Methods for Controlling Inventory**

There are various methods for controlling inventory and each has advantages and disadvantages. The **open-to-buy (OTB) budget method** limits purchases to a specific amount of funds available for purchasing pharmaceuticals during a specified period. The emphasis of the OTB method is financial control of the pharmacy inventory. Although it is useful in monitoring and adjusting the dollar value of the inventory, it should be combined with other methods for a total inventory control system.

The primary emphasis of the **short-list method** is to provide accurate and timely inventory information to the person responsible for order placement. The short list identifies the items that are in short supply. It is the most common feedback and control mechanism in use, but it is best suited for settings where duplicate or reserve stock is maintained and monitored by more rigorous methods.

The main objective of the **minimum and maximum method** is to determine when and how much to order of each item. It also provides limited dollar control. The major disadvantage of this method is the time it requires to establish the minimum and maximum levels and to update them regularly to reflect changes in demand.

The **stock record card method** is used to record information on the movement of goods in and out of the storage area. Stock cards can also be used to monitor inventory levels and facilitate order initiation. It is probably the optimum method to be used alone.

The most effective system of inventory control is one employing a combination of these methods tailored to meet the institution's needs and available resources.
Purchasing Policies

Purchasing policies should be flexible and reflect the pharmacy’s objectives and plans. They must leave room for discretion to allow the pharmacy to respond to unanticipated events such as unusual demand fluctuations and special price incentives offered by suppliers.

When developing a purchasing policy, it might be helpful to consider the questions in Table 1-1.

Table 1-1

<table>
<thead>
<tr>
<th>* Assessing Purchasing Policies and Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Have you ever reviewed existing purchasing procedures to see if they meet your needs?</td>
</tr>
<tr>
<td>• Do you have specific policies and procedures regarding who is authorized to purchase goods or services? Receive salespersons’ calls? Place requisitions? Process records?</td>
</tr>
<tr>
<td>• Have you ever discussed your purchasing function with other pharmacies or with professional organizations to obtain suggestions or techniques?</td>
</tr>
<tr>
<td>• Have you ever visited or investigated your existing or potential vendors to verify that they can meet your requirements in terms of price, quality, quantity, and service?</td>
</tr>
<tr>
<td>• Does your volume of purchasing for any particular item warrant your dealing directly with its manufacturer?</td>
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<tr>
<td>• Do your vendors have regular and competent sales personnel?</td>
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<tr>
<td>• Have you had problems with suppliers in regard to shortages? Backdoor selling? Delivery delays? Unsolicited favors and gifts?</td>
</tr>
</tbody>
</table>
Selecting Vendors

The objective of careful vendor selection is to find the one most satisfactory source, or a number of alternative sources with adequate comparable qualifications. Thus succeeding orders for the same item can be placed with these same suppliers with confidence in the original selection. In other words, the decision as to a source of supply contemplates a continuing relationship.

Several criteria should be considered in selecting vendor sources, including:

- Reliability. Will the vendor fulfill all promises?
- Price and quality. Who provides the best product at the lowest price?
- Order-processing time. How fast will a delivery be made?
- Functions provided. Will the vendor provide storage, market information, and other functions, if needed?
- Guarantee. Does the vendor stand behind the products?
- Financing. Does the vendor provide credit?
- Long-run relations. Will the vendor be available over an extended period of time?
- Innovativeness? Are the vendor’s product lines innovative?
- Risk. How much risk is involved in dealing with the vendor?
- Investment? How large are total investment costs?

The real test of vendor selection is the test of experience, or satisfactory performance by the vendor once the order has been placed.
Working With Wholesalers

Selecting and working with capable wholesalers is a significant function of purchasing. Probably no one is more important to the operation of a pharmacy than the wholesaler. Yet many pharmacies have not recognized that good supplier relationships result in wholesaler goodwill. Instead, wholesalers are often treated in a suspicious and even ill-mannered fashion. It is mutually advantageous to have a positive buyer-seller relationship. There have been numerous instances when an unexpected problem or emergency was solved with the help of a friendly wholesaler.

The question of how many wholesalers to use has no definitive answer. It depends on many factors. Many buyers have found it advantageous to spread purchases among many wholesalers to gain the advantage of the most favorable prices and best delivery schedules. Another reason for relying on several wholesalers is that it gives buyers an opportunity to continually evaluate alternative sources of supply, to have greater assurance of supply reliability, and to keep wholesalers competitive with one another.

On the other hand, several distinct advantages of concentrating purchases from one wholesaler can also be cited. For example, the argument for doing the bulk of buying from a single wholesaler is that in times of shortages, the primary vendor will take better care of its customers. Other possible advantages include receiving more attention and help from a wholesaler who know it is receiving most of the pharmacy’s business; having a smaller inventory investment; having larger purchase orders; which may permit larger discounts; and simplifying credit problems. These advantages are convincing arguments
as to why it is often better for a pharmacy to concentrate its purchases and work closely with a few wholesalers.

Purchasing policy in most pharmacies traditionally requires at least two supply sources for each item as being in the best interest of the company. Whether there should be more than two, and how many, is a matter of purchasing judgment. It depend partly on the importance of the item, on competitive conditions in the industry, and on the quantities involved, which might make it practical to divide the business among several vendors.
**Purchase Timing Decision**

Decisions concerning the timing of purchases must closely coincide with demand and minimize the amount of inventory investment. One means of doing this is to establish stock levels at which new orders must be placed. The stock levels are called *reorder points*. Determining reorder points depends on the length of order lead time, usage rate, and the amount of safety stock to be kept on hand. *Order lead time* is the time span from the date an order is placed to the date the merchandise is received and put on the shelf. *Usage rate* refers to average usage per day, in units. *Safety stock* is the amount of extra inventory kept on hand to protect against running out of stock owing to unexpected demand and delays in delivery. Safety stock should be planned in accordance with the pharmacy’s policy toward running out of merchandise. The formula for when to reorder, assuming the pharmacy incorporates safety stock into its planning, is:

\[ \text{Reorder point} = (\text{usage rate} \times \text{lead time}) + \text{safety stock} \]

Ideally, orders should be placed at the precise point in time at which usage during the order lead time will have depleted the inventory on hand, so that no safety stock is needed. Unfortunately, “ideal” conditions seldom, if ever, occur.

To establish effective safety stock policies, it is necessary to make a trade-off between two opposing factors: the cost of carrying safety stock and the cost of being out of stock. Normally, inventory carrying cost is easier to measure than the cost of running out of inventory. It includes (1) capital costs (inventory investment and investment in assets required by inventory), (2) inventory service costs (insurance and taxes), (3) storage space cost (warehousing costs), and (4) inventory risk costs (obsolescence, damage, pilferage).
Out-of-stock costs are the costs incurred by the pharmacy when an item is demanded but is not immediately available. The cost of a stock-out is determined by the reaction of the customer (patients, prescribers).

Another dimension of the timing issue in purchasing is whether buying will be conducted at random points in time or restricted to defined periods. Left unrestricted, purchasing can become a daily activity conducted in bits and pieces, and hurriedly on a time-available basis. As such, purchasing control tends not to be very stringent, as no consideration is given to monetary investments in inventory or the trade-offs in the use of limited purchasing dollars.
**Purchase Terms Decisions**

Pharmacies must negotiate the best deal they can with each supplier to improve profit. Five factors are especially important in supplier negotiations: (1) quantity discounts, (2) cash discounts, (3) trade discounts, (4) promotional discounts, and (5) return goods policies.

Unfortunately, not all deals may be worthwhile. The quality of a cash or quantity discount, for example, depends on the amount of discount being offered, the carrying cost of holding inventory, the price charged for the item, and the time it takes to turn the merchandise into sales. Most important, a deal can only be profitable when the sale, not the purchase, is completed. Thus, a 25% discount on an item that will not be used is not much of a deal. On the other hand, a 1% discount on merchandise that is sold and replaced weekly may represent a very good deal for the pharmacy.

*Quantity Discounts* are reductions in price allowed for buying certain quantities. They are generally expressed in terms of total dollars purchased. Another variation of quantity discounts is cumulative discounts. They represent discounts calculated at the end of specified time periods. For example, a 10% discount may be offered if a pharmacy’s purchases total over a certain dollar amount. These discounts tend to build loyalty to a single supplier.

The disadvantages of taking quantity discounts, however, must be considered. Larger purchases increase the risks of loss resulting obsolete products – expired because it could not be sold with reasonable speed. Additionally, large purchases serve to increase the dollar investment in inventory. If the pharmacy faces cash flow problems, these can be critical problems.
Deciding on Models of Inventory Control

Although inventory control systems can and should be developed to suit the specific needs of a particular pharmacy, they can be conveniently classified as being *visual, periodic, or perpetual systems*. Each can be used effectively in a pharmacy, depending on the particular situation.

*Visual System*

The least expensive and generally the least effective system of inventory control is the visual system. With this system, one simply looks at the number of units in inventory and compares them with a listing of how many should be carried in stock. Shelf stickers can be coded for this to make the process easier. When the stock on hand falls below the number desired, an order for more merchandise is placed. Generally, this type of system is used for the less expensive and least important items in the pharmacy, i.e., the *C* items referred to earlier.

The primary advantages of the visual system of inventory control are that it is relatively inexpensive, takes little time, and does not have to be conducted by personnel who have special skills. Often lacking the formality of other systems, visual inspections can be made when convenient and in very short periods of time, thereby keeping the costs very low.

Despite these advantages, there are some serious drawbacks to the use of a visual system. Because of its tendency to informality, the system is not used as frequently or with the precision it requires. Perhaps even more important, visual systems commonly focus on impending stock-outs rather than on excess inventory. It is much easier to spot empty places on the shelves, than it is to identify slow-moving merchandise or excess
inventory. Furthermore, visual systems focus on unit levels only. They do not consider dollar investments in inventory.

However, even with these potential problems, this system is commonly used in pharmacies since technicians use the stock and thereby conduct visual inspections frequently. Furthermore, replacement stock typically can be obtained quickly. So long as the inventory manager reevaluates minimum quantity levels with reasonable frequency and determines EOQs in advance, this system is a low-cost, somewhat trouble-free means of keeping loose control over some inventory. Nevertheless, it ordinarily will not provide sophisticated controls or produce data necessary for optimal efficiency.

Periodic System

A more elaborate means of inventory control is through a periodic system. With this inventory control process, as its name suggests, stock on hand is counted at predetermined intervals and compared to the minimum desired levels. If the stock is below the minimum desired, an order is placed. Evaluation of inventory levels is made on a more formal basis than with a visual system, so the system tends to be more precise. Additionally, stock control cards (or stock record cards) are sometimes used to keep records on how many units have been used and how many are on order. With this system, then, analysis can be made of fast- vs. slow-moving items, and the dollar investment in inventory. Accordingly, it tends to be much better than visual systems for control of more important inventory when conducted at least semiannually. While periodic systems are more accurate, they are also more expensive than visual systems, and accordingly tend to be used mostly for B and sometimes A items.
Ordinarily, one will find periodic systems to be cost-justifiable. The most serious limitation of such systems, however, is their measurement at a single point in time. Thus, one could have significant variations in inventory levels which would not be evident from a periodic audit. Additionally, the timing of review may affect inventory levels, depending on how much usage fluctuates on a seasonal basis. Because of this, some pharmacy owners use intermittent visual audits between more formal, semiannual, periodic inventory audits.

*Perpetual System*

The most elaborate and accurate basic inventory control system is the perpetual system. With this system, inventory is monitored at all times. In this way, it is possible to determine at a moment’s notice how many units of each item are in stock. This type of system provides the best opportunity to control both the number of units and the dollar investment in inventory. Certainly, the greatest drawback of perpetual systems is that they are the most expensive to maintain. Furthermore, they generate inordinate amounts of data – far more than one is likely to use. Some pharmacies become overwhelmed by the mass of data that they tend to ignore the data altogether.
**RECEIVING AND STORING PHARMACEUTICALS**

Receiving is one of the most important parts of the pharmacy operation. A poorly organized and executed receiving system can put patients at risk and elevate health care costs. For example, if the wrong concentration of a product was received in error, it could lead to a dosing error or delays in patients’ receipt of therapy. Misplaced products or products not in stock also jeopardizes the patients’ care and increases health care costs. To avoid these unfavorable outcomes, pharmacy technicians should become familiar with the process for receiving and storing pharmaceuticals.

**The Receiving Process**

When orders arrive from either the manufacturer or the wholesaler, they should be accompanied by either an invoice or a packing slip that lists what the pharmacy is being charged for. As you remove the items from the box and place them into inventory, it is critical that you check them against this list; otherwise, the pharmacy may not receive everything it will be asked to pay for.

Also be sure to follow any internal pharmacy procedures concerning the receipt of inventory. For instance, you may need to confirm receipt of the order in the pharmacy computer system, either through manual entry or by bar-coding the incoming items. Unless you let the computer know that the order has been received, it will reflect an incorrect inventory level and may keep trying to order more product even though an adequate amount is on hand.
The Storing Process

Once the product has been properly received it must be properly stored. Depending on the size and type of pharmacy operation, the product may be placed in a bulk, central storage area or into the active dispensing areas of the pharmacy. In any case, the expiration date of the product should be compared with the products currently in stock. Products already in stock that have expired should be removed. Those products that will expire in the near future should be highlighted and placed in the front of the shelf/bin. The newly acquired products will generally have longer shelf lives and should be placed behind packages that will expire before them. This technique is referred to as stock rotation. Stock rotation is an important inventory management principle that encourages the use of products before they expire and helps prevent the use of expired products.

Product Handling Considerations

Pharmacy technicians usually spend more time handling and preparing medications than pharmacists. This presents pharmacy technicians with the critical responsibility of assessing and evaluating each product from both a content and labeling standpoint. It also provides the technician with an opportunity to confirm that the receiving process was performed properly.

Since pharmacy technicians handle so many products each day, they are in a perfect position to identify packaging and storage issues that could lead to errors. The three main issues to pay close attention to are:
• Look-alike Products. Stocking products of similar color, shape, and size could result in error if someone fails to read the label. All staff members should be alerted to look-alike products.

• Misleading Labels. Sometimes the company name or logo is emphasized on the label instead of the drug name, concentration, or strength.

• Product Storage. Storing products that are similar in appearance adjacent to one another can result in error if someone fails to read the label.

It is essential to alert other staff members to products that fall into one of these categories.

**Drug Recalls**

Pharmaceuticals will occasionally be recalled by a manufacturer and/or the Food and Drug Administration (FDA) for reasons such as mislabeling, contamination, lack of potency, or other situations affecting the product as packaged or labeled. It is imperative that a pharmacy have a system for a rapid removal of all products affected by recalls.

Recall notices are sent in writing to pharmacies by the manufacturer of the product or by drug wholesalers. These notices indicate the reason for the recall, the name of the recalled product, and instructions on how to return the product to the manufacturer. Upon receipt of the recall notice a pharmacy staff member, usually a pharmacy technician, will check the pharmacy and the institution to determine if recalled products are in stock. If none of the recalled products are in stock, a note indicating “none in stock” is written on the recall notice and filed in a recall log to document that the recall was properly addressed. If a recalled product is in stock, all products should be gathered, packaged, and returned to the manufacturer according to the instructions on the recall.
notice. The package should be reviewed by the pharmacist in charge prior to sending it. If patients have received a recalled product, the pharmacist in charge must take the recommended action. Upon completion of all activity regarding the product recall, a summary of actions taken should be written on the recall letter and filed in the pharmaceutical recall log. Keep in mind that it may be necessary to order more stock to compensate for those items that were recalled. In some instances, the recall may encompass all products and it will not be possible to order replacement stock.

**Controlled Substances**

Controlled substances have specific ordering, receiving, storage, dispensing, inventory, record keeping, return, waste, and disposal requirements established under the law.

There are two principles regarding controlled substances that the pharmacy technician should know: ordering and receiving schedule II controlled substances requires special order forms and additional time (1-3 days), and these substances are inventoried and tracked continuously. This type of inventory method is referred to as a perpetual inventory process. Pharmacists and, in some institutions, pharmacy technicians work with pharmacist to manage inventory, dispense, store, and control narcotics and other controlled substances.

**Expired Drugs**

The most common reason drugs are returned to the manufacturer is because they are expired. The process for returning drugs in the original manufacturer packaging is straightforward and not particularly time consuming if done routinely. Returning expired products to the manufacturer or wholesaler prevents the use of these products,
while enabling the department to receive either full or partial credit for them. To return products, pharmacy personnel must complete the paperwork required by the manufacturer/wholesaler and package the products so that it may be shipped. Technicians often perform these duties under the supervision of a pharmacist. Some pharmacies contract with an outside vendor that completes the paperwork and coordinates the return of these products for an agreed upon fee.

Pharmaceuticals compounded or repackaged by the pharmacy department cannot be returned and must be disposed of after they have expired. It is important to dispose of these products for safety reasons. Proper disposal prevents the use of sub-potent products or products where sterility can no longer be guaranteed. The precise procedure for disposal is dependent upon the type and content of the products.
CONCLUSION

The movement of pharmaceuticals into and out of the pharmacy requires an organized, systematic, and cooperative approach. The pharmacy technician plays a vital role in maintaining the functionality of these systems. Pharmacy technicians’ familiarity with product conditions and uses puts them in a position to identify quality and care issues that can strengthen the purchasing and inventory control system.

An effective purchasing and inventory control system requires all pharmacy staff to understand and actively participate in the system, however, certain staff are responsible for managing the pharmacy inventory and purchasing system. As the primary handlers of medication in the pharmacy medication preparation system, pharmacy technicians’ performance is critical to the success of the purchasing and inventory control system.

The job of any manger in the business sector is to create an environment in which the financial and human resources of the firm are used to generate profit. Even in a small pharmacy, considerable financial resources are invested in the goods for sale. With drug prices being as high as they are, several hundred thousand dollars are tied up in the inventory, equipment, and fixtures of each pharmacy.

As a worker whose job handling your pharmacy’s inventory, you can help make the best use of this investment. In addition, in hospital pharmacies and larger community stores, some technicians specialize in purchasing; they spend the majority of their time checking inventory levels, placing orders, and following up on items not received.
# Glossary of Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of Goods Sold (COGS)</td>
<td>The pharmacy’s acquisition cost - what is paid to buy the product. For the purpose of this text, COGS is the replacement cost.</td>
</tr>
<tr>
<td>Cycle Stock</td>
<td>Working inventory. The portion of inventory that creates a service level. Cycle stock does not include safety stock or stock purchased as a result of forward buying opportunities.</td>
</tr>
<tr>
<td>Days Inventory on Hand</td>
<td>The number of selling days covered by inventory before an out-of-stock occurs.</td>
</tr>
<tr>
<td>Economic Order Quantity (EOQ)</td>
<td>The precise amount of a product needed to cover demand without tying up cash in unnecessary inventory.</td>
</tr>
<tr>
<td>Formulary</td>
<td>A list of drugs stocked in a hospital or managed care pharmacy, or a list of drug products from which managed care physicians select an appropriate medication for patient treatment. There are two types of formularies. In an open formulary, all products are covered. In a closed formulary, only drugs on the formulary are covered.</td>
</tr>
<tr>
<td>Forward Buying, Investment Buying</td>
<td>Purchase of a larger quantity of a product than required for current needs in anticipation of a price increase. Can also apply when taking advantage of a special discount or free-goods offer.</td>
</tr>
<tr>
<td>Free Goods</td>
<td>Products supplied without charge on an order for a specified amount of merchandise. Free goods are usually obtained by sending the invoice to the manufacturer.</td>
</tr>
<tr>
<td>Gross Margin Dollars, Gross Profit Dollars</td>
<td>Amount of profit earned between the pharmacy’s cost of goods and selling price before rebates, discounts, returns, etc.</td>
</tr>
</tbody>
</table>
GLOSSARY OF TERMS

**Gross Margin Percent**

Typically referred to as Gross Margin. Gross Margin is profit expressed as a percent of sell.

*Example:* Item sells for: $1.00  
Cost of Item $0.80  
Profit ($) $0.20  

\[ GM = \frac{\text{Profit}}{\text{Sell Price}} = \frac{0.20}{1.00}, \text{therefore, } GM = 20\% \]

**Inventory Accounting Methods**

Different ways of valuing the pharmacy’s inventory as it leaves the pharmacy for the customer. The three methods most commonly used are FIFO (first in, first out), LIFO (last in, first out), and NIFO (next in, first out). A description of how these methods affect inventory follows in the example below.

*Example:*  

<table>
<thead>
<tr>
<th>Inventory Unit</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>$1</td>
</tr>
<tr>
<td>Two</td>
<td>$1</td>
</tr>
<tr>
<td>Three</td>
<td>$1</td>
</tr>
<tr>
<td>Four</td>
<td>$1</td>
</tr>
<tr>
<td>Five</td>
<td>$2</td>
</tr>
</tbody>
</table>

FIFO (first in, first out): The product on the shelf cost the pharmacy $1. A week later the manufacturer had a price increase to $2. The pharmacy has four units that it purchased at $1 and one unit that it purchased at $2. As the product goes out the door to the customer, the pharmacy will charge $1 plus mark-up until it reaches the inventory that cost $2. Then it will charge $2 plus the mark-up.

LIFO (last in, first out): Using the same scenario as above, all parameters are the same; except when the product goes out the door, the pharmacy charges $2 plus the mark-up even if the product was acquired at $1. This means we use the last acquisition price to the pharmacy for all units of inventory.
# GLOSSARY OF TERMS

**Inventory Accounting**

**NIFO (next in, first out):** Again, using the same scenario as in the above example, all parameters are the same except the manufacturer has announced a price increase to $3, to occur thirty days from now. When the product goes out the door, the pharmacy charges $3 plus mark-up even though it acquired the product at $1 and $2. This means the pharmacy uses the next acquisition price (replacement cost) for all units including those purchased for $1 and $2.

**Methods (cont.)**

**Inventory Turn**

A turn describes how often inventory moves out or “turns over.” Inventory turns are calculated by:

\[
\text{Cost of Goods Sold} / \text{Merchandise Inventory} = \text{Turns}
\]

Merchandise inventory is inventory available for sale.

**Item Ranking**

A system to rank items by demand either by dollars or by units.

**Just-In-Time**

A method of inventory management where orders are placed so those new goods arrive as the last units from the prior shipment move out.

**Landed Cost**

The total cost of product after taking into account all discounts, allowances, advertising dollars, promotional moneys, etc.

**Lead Time**

A factor used in ordering, based upon the number of days from the time an order is placed to the time it’s available in inventory.

**Mark-Up**

Also known as cost-plus. Mark-up is the percentage added to the cost of a product to determine its selling price. Mark-up is also profit, expressed as a percentage of cost.

**Example:**

<table>
<thead>
<tr>
<th>Item sells for</th>
<th>$1.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of item</td>
<td>.80</td>
</tr>
<tr>
<td>Profit ($)</td>
<td>.20</td>
</tr>
</tbody>
</table>

Mark-up = Profit / Cost (.20 / .80), therefore, Mark-up = 25%
GLOSSARY OF TERMS

Net Inventory
Total merchandise inventory less accounts payable.

Order Point
A level of product in unit and days on which buyers base purchasing decisions. When on-hand and on-order are below the order point, an order must be placed.

Example: Order Point = 100
On-hand = 50, On-order = 49,
Total = 99; order is placed.

On-hand = 50, On-order = 51,
Total = 101; order is not triggered until the sum of on-hand and on-order is at or below 100

Overstock
Inventory on-hand in excess of the order point.

Owned Inventory
The same as net inventory. The total merchandise inventory, less the accounts payable suppliers.

Payment on Consignment
Payment to the supplier due only after merchandise has been sold.

Payment Terms
The time limit for paying an invoice and the cash discount allowed, e.g., 2% 30 days, net 31 days. There are many different payment terms.

Some examples of terms used are:

Semi-monthly: The pharmacy pays one-half of its receivables on the first half of the month and the remainder during the second half of the month.

Invoices dated 1st - 15th Due: 25th
Invoices dated 16th - EOM Due: 10th

Weekly terms: Invoices for any given week are due on a defined day the following week.
### GLOSSARY OF TERMS

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Price Protection</strong></td>
<td>The protection of existing inventory obtained from the manufacturer against loss by price reduction. Typically given in the form of a rebate. This should always be sought on new generic equivalent drugs.</td>
</tr>
<tr>
<td><strong>Safety Stock</strong></td>
<td>Supply of an item kept on hand to compensate for variations in lead time and item demand.</td>
</tr>
<tr>
<td><strong>Standing Order</strong></td>
<td>An order containing the same products to be shipped each time during the cycle. Shipped on the time frame established by the pharmacy: weekly, bi-weekly, monthly, etc.</td>
</tr>
<tr>
<td><strong>Stock Keeping Unit</strong> (SKU)</td>
<td>Each item is identified by a separate SKU.</td>
</tr>
</tbody>
</table>
References:


Final Exam

1. A pharmacy’s ________________ represents its single largest investment.
   a. Equipment
   b. Insurance
   c. Inventory
   d. Lunch budget

2. For every 1% change in an average pharmacy’s cost of goods sold, profits may increase or decrease by slightly more than _____.
   a. 1%
   b. 20%
   c. 10%
   d. 15%

3. The objective of an inventory control system is to make inventory decisions that:
   a. Minimize the total cost of inventory
   b. Minimize inventory
   c. Maximize inventory
   d. Minimize labor cost

4. Which of the following is not a cost of carrying inventory:
   a. Carrying cost
   b. Shortage cost
   c. Replenishment cost
   d. Directive cost

5. A successfully implemented inventory control program takes into account such things as:
   a. Purchasing goods commensurate with demand
   b. Seasonal variations
   c. Changing usage patterns
   d. Monitoring for pilferage
   e. All of the above
6. Successful inventory management involves simultaneously attempting to balance the _______ of inventory with the __________ of inventory.

   a. Size, cost
   b. Cost, benefits
   c. Demand, cost
   d. Benefits, demand

7. Despite the importance of inventory control in the overall management of a pharmacy’s assets, there is not denying that this activity can be time-consuming and expensive.

   a. True
   b. False

8. Irrespective of what the actual cost are of holding specific items in inventory, all items should be managed the same.

   a. True
   b. False

9. In a typical pharmacy, approximately 20% of the most expensive inventory items may account for ___ or more of the inventory investment.

   a. 20%
   b. 50%
   c. 10%
   d. 90%

10. ____________ is the interval between placing an order and having it ready for dispensing.

    a. ABC Classification System
    b. Lead Time
    c. Safety stock
    d. Reorder point
Final Exam

11. __________________ is the extra units of inventory carried as protection against possible stock-outs.
   
   a. ABC Classification System  
   b. Lead Time  
   c. Safety Stock  
   d. Reorder Point

12. __________________ is the inventory level at which it is appropriate to replenish stock.
   
   a. ABC Classification System  
   b. Lead Time  
   c. Safety Stock  
   d. Reorder Point

13. In general, a high turnover rate indicates that product usage is “good” relative to the average amount of inventory kept in stock.
   
   a. True  
   b. False

14. If a pharmacy purchases $200,000 per month and keeps an average of $500,000 on-hand, what is the inventory turnover rate for this pharmacy?
   
   a. 9.2 inventory turns per year  
   b. 4.8 inventory turns per year  
   c. 8.4 inventory turns per year  
   d. 6.0 inventory turns per year

15. The Economic Order Quantity Model answers what question?
   
   a. When should an item be reordered?  
   b. What costs are associated with an item?  
   c. What quantity should be ordered?  
   d. Both a and c
Final Exam

16. The EOQ is based on which of these assumptions?
   a. The pharmacy does not know with certainty the annual usage of a particular item of inventory (demand).
   b. The rate of usage of inventory varies greatly over time.
   c. Orders placed to replenish the inventory are received after the point in time when inventory is zero.
   d. None of the above.

17. Approving a vendor’s invoice for payment is an example of what type of cost?
   a. Carrying costs
   b. Shortage costs
   c. Replenishment costs

18. Inventory shrinkage and obsolescence is an example of what type of cost?
   a. Carrying costs
   b. Shortage costs
   c. Replenishment costs

19. The cost of putting away stock receipts and moving materials within the pharmacy is an example of what type of cost?
   a. Carrying costs
   b. Shortage costs
   c. Replenishment costs

20. The cost associated with not having sufficient stock to meet demand is known as what type of cost?
   a. Carrying costs
   b. Shortage costs
   c. Replenishment costs

21. Issuing a purchase order is an example of what type of costs?
   a. Carrying costs
   b. Shortage Costs
   c. Replenishment costs
22. Which method of controlling inventory is the optimum method to be used alone?

a. Open-to-buy-budget method  
b. Short-list method  
c. Minimum and maximum method  
d. Stock record card method  

23. The inventory control method that is best suited for settings where duplicate or reserve stock is maintained and monitored by more rigorous methods?

a. Open-to-buy-budget method  
b. Short-list method  
c. Minimum and maximum method  
d. Stock record card method  

24. Which inventory control method’s main objective is to determine when and how much to order of each item?

a. Open-to-buy-budget method  
b. Short-list method  
c. Minimum and maximum method  
d. Stock record card method  

25. Which method of controlling inventory limits purchases to a specific amount of funds available for purchasing pharmaceuticals during a specific period of time?

a. Open-to-buy-budget method  
b. Short-list method  
c. Minimum and maximum method  
d. Stock record card method  

26. Once purchasing policies are established in a pharmacy, they should be strictly adhered to and never deviated from.

a. True  
b. False
Final Exam

27. Which of the following is not a criteria for selecting a vendor?
   a. Reliability
   b. Price
   c. Risk
   d. All of the above
   e. None of the above

28. Selecting and working with capable wholesalers is a significant function of pharmacy purchasing.
   a. True
   b. False

29. It is a hard and fast rule that you should use only 1 wholesaler.
   a. True
   b. False

30. Purchasing policy in most pharmacies traditionally requires at least ___ supply sources.
   a. One
   b. Two
   c. Three
   d. Four

31. Determining reorder points depends on:
   a. Order lead time
   b. Usage rates (demand)
   c. Safety stock
   d. All of the above

32. To establish effective safety stock policies, it is necessary to make a trade-off between two opposing factors:
   a. Capital cost and risk costs
   b. Inventory service cost and storage space cost
   c. The cost of carry safety stock and the cost of being out of stock
   d. None of the above
Final Exam

33. Which of the following is not a factor in supplier negotiations?
   a. Drug recalls
   b. Quantity discounts
   c. Promotional discounts
   d. Return goods policies

34. _______ _______ are reductions in price allowed for buying certain quantities.
   a. Promotional discounts
   b. Trade discounts
   c. Cash discounts
   d. Quantity discounts

35. There are disadvantage to taking quantity discounts.
   a. True
   b. False

36. Which is not a classification of inventory control system?
   a. Stock cards
   b. Perpetual
   c. Visual
   d. Periodic

37. The least expensive and generally the least effective system of inventory control is:
   a. Visual system
   b. Periodic system
   c. Perpetual system

38. The most elaborate and accurate basic inventory control system is:
   a. Visual system
   b. Periodic system
   c. Perpetual system
Final Exam

39. The “C” items in a pharmacy are generally managed using which inventory control system?
   a. Visual system
   b. Periodic system
   c. Perpetual system

40. The most serious limitation of the ________ system is the measurement at a single point in time.
   a. Visual
   b. Periodic
   c. Perpetual

41. With the _______ system, the inventory is monitored at all times.
   a. Visual
   b. Periodic
   c. Perpetual

42. Since most wholesalers use robotics and bar coding, it is no longer necessary to check in your order.
   a. True
   b. False

43. Moving products with the soonest expiration date to the front of the bin or shelf is referred to as:
   a. The receiving process
   b. The storing process
   c. Stock rotation

44. Products of similar color, shape, and size which could result in errors are referred to as:
   a. Look-alike products
   b. Misleading labeled product
   c. Controlled substances
   d. Expired drugs

45. What actions should be taken if the pharmacy receives a drug recall notice?
a. Check to see if the recalled products are in stock  
b. Gather and package any recalled products  
c. Write a summary of actions on the recall letter  
d. File the recall letter  
e. All of the above

46. Which inventory system should be used with controlled substances?
   a. Visual  
   b. Periodic  
   c. Perpetual

47. The most common reason drugs are returned to the manufacturer is:
   a. Order errors  
   b. Shipment errors  
   c. Expired drugs  
   d. Mislabeled

48. Pharmaceuticals compounded or repackaged by the pharmacy department can be returned to the manufacturer or wholesaler.
   a. True  
   b. False

49. A method of inventory management where orders are placed so those new goods arrive as the last units from the prior shipment move out is referred to as:
   a. Visual  
   b. Just In-Time  
   c. Perpetual  
   d. Periodic

50. Inventory on-hand in excess of the order point is referred to as:
   a. Net inventory  
   b. Owned inventory  
   c. Overstock  
   d. Free goods