Chapter 6: Inventory Management for the Pharmacy Technician

4 Contact Hours

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Learning objectives

After completing this continuing education program, the pharmacy technician should be able to:

- Discuss the technology available to help pharmacies manage inventory, including computer systems, perpetual inventory systems, and automatic dispensing systems.
- Describe the automatic dispensing machines available to help pharmacies manage their inventory, including how errors can occur with these machines.
- Recognize the concepts of availability, expiration dates, and turnover rates, and their application in managing inventory.
- Discuss the process of ordering medication for a pharmacy, including terminology associated with ordering, where medications may be obtained from, automatic and manual ordering procedures, and special ordering considerations.

- Summarize the process of receiving medication orders, including receiving regular orders, medications with special storage conditions, controlled substances, and new products as well as paying invoices and what to do if an order is incorrect or damaged upon receipt.
- Describe the procedures for returning medications that are outdated, damaged, recalled, or overstocked, including controlled substances, and when it is appropriate to destroy medications that cannot be used.
- List five reasons for repackaging medications from bulk bottles into unit dose packages and the labeling requirements for repackaged medications.
- Recall the temperatures required for medication storage at room temperature as well as refrigeration and freezing.

Introduction

In the pharmacy environment, inventory refers to all of the medications and medical supplies used in daily operation of a pharmacy. The management of inventory comprises a large portion of the pharmacy technician's responsibilities. It is essential to ensure there is an adequate stock of medications and supplies to serve the needs of the patients a pharmacy serves, and careful inventory management can also increase the profitability of a pharmacy.

The level of pharmacy technician involvement in inventory management varies based on the facility, and can range from basic ordering and restocking in a retail pharmacy to purchasing and maintaining the inventory of all medications for a hospital. Despite the variety in responsibility level and location-specific considerations, the general principles of pharmacy inventory management remain the same.

This course will review basic inventory management terminology and procedures for the pharmacy technician.

Purpose and goals of inventory management

Ensuring there is adequate stock of medications is only one of the many reasons to carefully manage a pharmacy's inventory. Other reasons include:

- Minimizing the occurrence of unexpected out-of-stocks to decrease the impact on patient care.
- Decreasing the carrying cost of maintaining an inventory.
- Lowering costs of ordering medications from wholesalers.

- Ensuring minimal time is spent ordering medications and purchasing tasks.
- Preventing costs associated with damage and expiration of inventory.
- Decreasing total costs to the pharmacy and overall health care organization by focusing on purchasing products with the lowest cost.

There are two main goals to keep in mind when managing an inventory for a pharmacy. The first is to ensure medications are available when patients need them. The products that are regularly kept in stock are based on the needs of the pharmacy and its customers. While some rarely used, extremely expensive or cumbersome products may be ordered in as needed, efforts should be made to keep the medications used regularly in stock and available for use – not outdated or damaged.

The second goal of inventory management is to keep medication costs at a minimum. Many pharmacies have preferred wholesalers to order

from or contract pricing with specific drug companies to decrease the cost of purchasing medications. The pharmacy technician should make an effort to use preferred delivery systems to try to keep acquisition costs as low as reasonably possible.

Preventing profit loss is also a contributing factor to controlling medication costs. Properly managing stock by using medications before they expire and processing returns regularly can help keep medication costs down.

Inventory management computer systems

Computer systems are used in both hospital and retail pharmacies to assist with the maintenance of inventory as well as processing prescription orders and maintaining patient files. Wholesalers often have computer programs that they allow pharmacies to use to access information in the wholesaler's computer system. This function can allow the pharmacy staff to order medications directly through the wholesaler's website and check stock at the wholesaler's facility as well as look up specific information on the products the wholesaler carries.

Users of pharmacy computer systems are generally limited to pharmacy staff members, who are given usernames and passwords to use to access the system. This allows the employer to prevent unauthorized access to protected health information and keep a record of who performed each task in case an error occurs. Pharmacy staff should protect their usernames and passwords and avoid giving them out to unauthorized individuals.

Backup and maintenance of pharmacy computer systems are essential to the continued function of the system. Ensuring the computers are clean and free of dust or moisture is a task the pharmacy technician should complete regularly to ensure continued operation of vital systems.

Checking reports for errors after information is entered into the computer system is an important step in making sure information is recorded correctly. A simple data entry error, such as missing a zero or a decimal point, could result in severely incorrect information.

Perpetual inventory systems

Most pharmacies use a computerized perpetual inventory system to maintain the stock of medications in the pharmacy. A perpetual inventory system is a method of recording the quantity of a particular medication continuously as prescriptions are filled. After each prescription is filled and dispensed to the patient, the amount of medication used for the prescription is removed from the inventory to ensure the quantity on hand in the computer is always current. Deliveries and returns are also recorded, often automatically, as they occur.

Federal law requires the use of this inventory system for Schedule II controlled substances, but using this system for all medications ensures an accurate reflection of the current stock in the computer system.

There are several tools used in the management of a perpetual inventory system. The inventory is generally managed through a computerized inventory management system (although Schedule II controlled substances are required to be managed on paper as well). The computer system is designed to automatically update on-hand quantities as prescriptions are filled and generate automated and manual reports to allow pharmacy staff to analyze and monitor the inventory. In general, the computer system can often track turnover rates, predict future drug needs, notify pharmacy staff when possible

errors are detected, and even order more medication based on set reorder points.

In a perpetual inventory system, many pharmacies use reorder points, or periodic automatic replacement (PAR) levels, to automatically order more medication when levels are low. These points can be set in the computer system for each medication, which allows the user to set a maximum amount of medication that the pharmacy would like to have at any point in time and a minimum level that should be maintained at all times.

When a medication stock level in the perpetual inventory system is reduced to the pre-set minimum level, the computer system can automatically order enough medication to reach the maximum level again. This allows for a simplified ordering system and decreased workload for the pharmacy technician.

Handheld devices for order entry also may be used to help maintain a perpetual inventory in a pharmacy. These portable devices allow the user to walk around the pharmacy and scan the barcode or enter the ID number for a medication that needs to be ordered. These devices can also be used for updating on-hand quantities as well as performing other functions, such as recalls or outdates.

Automatic dispensing systems

There are many different machines available to help pharmacies fill prescriptions in both the community and hospital setting. They range from simple machines that pills are poured through for counting to elaborate robotic machines that can print labels, count pills, and put them in prescription vials.

Maintenance of automatic dispensing systems is an important part of the pharmacy technician's responsibilities in facilities that have these

machines. Because the machines can be very elaborate and require a lot of user input to work correctly, there are many different ways errors can occur. The pharmacy department should have a written safety plan to ensure the machines are properly filled and maintained, and technicians should ensure these regulations are followed closely.[2]

Automatic dispensing in a community pharmacy

In the community pharmacy setting, there are several types of machines available to assist with the filling of prescriptions. The Kirby Lester® machine is a simple machine that the user pours pills into from the top, and it uses lasers to count pills as they pass into a tray at the bottom of the machine. It is a small device that can sit on a countertop and allows for quicker counting of medications by pharmacy staff. Users must be sure to pour medications into the machine at a reasonable speed, because pouring medications too quickly can result in an error.

Newer versions of this machine are coupled with barcode technology that allow the pharmacy technician to scan the prescription label and the pill bottle being used for counting to make sure they match, and new machines can even estimate the pill bottle size that should be used for the counted pills.

> **Tech alert!** Because the Kirby Lester® uses lasers to count pills, certain types of pills cannot be counted accurately, such as clear gel caps like docusate sodium and benzonatate.

Baker Cells® is another type of machine that can be used in community pharmacies to count medications. This is a much larger machine than the Kirby Lester® and has many different cells filled with medications. When an order is sent to the machine, it counts out the necessary number of pills of the ordered medication and holds them in a segregated area from the rest of its stock for the technician to put into a bottle.

The pharmacy technician is responsible for refilling the machine's cells with medication. Errors are common when refilling this type of automatic dispensing machine, so it is very important to ensure the correct medication is poured into the correct cell, and a pharmacist should check each medication before the technician refills the machine. Technicians must also keep a record of lot numbers and expiration dates for medications used to fill Baker Cells®.

ScriptPro® and Parata® are two types of robotic dispensing systems available to high-volume community pharmacies. They have robotic capabilities that include label printing, pill counting, pouring pills into the bottle, and even applying the label to the prescription bottle. Like Baker Cells®, the pharmacy technician must refill these machines regularly under the supervision of a pharmacist, and care must be used when filling the cassettes to prevent potentially dangerous errors. A log of the expiration dates and lot numbers of medications added to each container must also be kept to trace medications in case of recall or expiration.

These elaborate machines can contain cells for hundreds of different medications, so care must be applied when refilling cells and replacing them in the machine to prevent incorrect medications from being dispensed to patients. These machines are much more expensive than the previous systems, but their cost is often justified in very busy pharmacies.

Automatic dispensing in a hospital pharmacy

Hospital pharmacies also have several options for automated dispensing systems that are different from retail pharmacy machines. The Pyxis® and Omnicell® machines are commonly used to maintain stock of prescription medications on the hospital floors to assist the nursing staff with the medication needs of their patients.

The machines are comprised of many drawers and cabinets that have pockets or trays that hold preset levels of a variety of common medications. They may also be used to hold controlled substances and patient-specific orders, generally in locked boxes or cubes within the machine. Because medications used in the hospital setting are often packaged in unit doses so each tablet is labeled, the dispensing machines have accounted for this in their design.

Once an order for a medication has been created by a doctor and reviewed by a pharmacist, the order is sent to the machine on the patient's floor. Nurses can then sign into the machine with their fingerprint or ID number and password and select the patient for whom they are trying to obtain medication. Patient files have a list of medications that have been prescribed to them, and so nurses can select the medication they wish to take out of the machine from a patient's file.

This will prompt the drawer containing the selected medication to open so the nurse can remove the ordered medication from the machine for administration to the patient. Once the nurse removes the medication, the computer system deducts this medication from the machine's inventory. This process allows for a more streamlined medication dispensing system as well as increasing the pharmacy's ability to track users of the system and the items they add or remove. It also prevents errors from picking the wrong medication for a patient and allows for more accurate billing of medications used.

Because all users of Pyxis® and Omnicell® machines must enter their fingerprint or ID number and password, the machine tracks every user of the machine and what medications they were authorized to add or remove. This data can then be used to print reports of who accessed the machine, what medications they accessed, and how much was removed from the machine at a particular point in time. These reports

are particularly useful when trying to resolve discrepancies in stock levels and research how errors may have occurred.

Pharmacy technicians are often responsible for maintenance and refilling of these computerized machines. Automatic dispensing machines in the hospital setting are often refilled on a daily basis, or less frequently, depending on its location in the hospital and usage level. These machines commonly utilize PAR levels to automatically determine when a particular medication needs to be refilled. When the stock level for a specific product goes below a pre-set level, the medication is added to a list of medications that need to be refilled, along with the quantity needed to reach the maximum level again.

When it is time to refill the machine, a list of all of the medications needed to restock the machine is printed and used to pull medications in the pharmacy department. The pharmacy technician is responsible for pulling the correct medication and quantity off of the pharmacy shelves or out of the pharmacy's carousel and arranging the list of medications for verification by the pharmacist. After the pharmacist verifies that the medications and quantities match what the machine needs, the technician takes the medications to the floor where the machine is. After logging in with a fingerprint or ID number and password, the technician can refill it using a refill function on the machine's computer system.

Pharmacy technicians should be aware of potential errors that can occur when refilling automatic dispensing machines in patient-care areas. While there are many steps in the process that are automated or verified by barcode technology or a pharmacist, there are still times when errors can slip through and potentially affect patient care.

For example, if a medication is put into the wrong pocket of a drawer in an automatic dispensing machine, a nurse could pull the wrong medication out of the machine and give the incorrect medication to a patient. Pharmacy technicians should exercise caution when refilling these machines to prevent errors.

Some hospital pharmacies use automatic carousels to store bulk medications and track their usage. These computerized machines can

store hundreds of medications and use barcode technology to track the removal of medications from the machine's stock. These machines increase the ability of the pharmacy to track medication usage and increase efficiency.

Some pharmacies for large hospitals have their lists of medications needed to refill their automatic dispensing machines filled by an outside company, such as a wholesaler. In this system, the wholesaler fills the list of medications needed by a particular machine and sends the completed list and medications to the pharmacy. Then the medications simply need to be checked by a pharmacist before the pharmacy technician can refill a particular machine. This process streamlines and simplifies the work of a pharmacy technician in large hospitals.

Non-automatic dispensing systems in a hospital pharmacy

Some hospitals do not have automatic dispensing systems on their floors or use automatic systems only for certain drugs and not the patient's entire medication list. These hospitals must use a different means of storing and dispensing medications for patient use.

Carts are often used to hold cassettes or drawers filled with each patient's medications. These may be filled by pharmacy technicians and are designed to hold unit dose medications for one or several days, depending on the institution. Although they are less secure and more prone to errors, they are much less expensive than automatic dispensing systems and more applicable to hospitals that are not very busy.

Barcode technology

Many medications have barcodes on their packaging to allow for easy identification of the product in a computer system. The barcode generally includes the product's NDC number, which tells the computer the name and package size of the product. Barcode technology is useful in both the retail and hospital settings.

In the hospital setting, medications can be scanned out of the pharmacy and into machines for storage on the nursing unit. Depending on technology available at the facility, barcodes can even be used to verify the prescription before nurses give medications to patients. Systems are available that allow nurses to scan their ID badges followed by the patient's ID bracelet, then the medications they want to give to the patient to ensure the correct medications are being given at the right time.

The outpatient pharmacy setting also has barcode technology available to ensure the correct medication is used to fill prescriptions. After a prescription is typed into the computer system, stock bottles have barcodes that can be scanned to create the label for a patient's prescription vial. This allows the computer to check that the bottle picked off the shelf matches the product that was selected in typing the prescription to ensure the correct medication is used to fill a patient's prescription. Barcodes are also available on paperwork that accompanies the prescription to ensure patients receive the paperwork that corresponds to their prescription bottle.

Tech alert! Barcode technology is an error-prevention strategy that should not be bypassed unless absolutely necessary. Regularly bypassing barcode checkpoints is associated with increased errors!

Concepts to consider when ordering and managing inventory

Availability
Availability of certain medications can be affected by several different external factors. These include issues with manufacturing, recalls, decreased availability of raw materials, and higher demand than usual. Availability in the hospital setting can also be affected by changes in the facility's formulary.

Drug availability should be kept in consideration when ordering medications, and pharmacy technicians should be prepared to consider alternative options and communicate this information to patients, caregivers, nurses and hospital staff when specific medications are unavailable.

Expiration dates
Medications all have dates after which they may no longer be used, called an expiration date. After a set amount of time, the chemical structures of medications may change to decrease the potency of medication or change it into an entirely different product. Medications must be pulled off the shelf when this date approaches, because it is unsafe to dispense medication after the expiration date has passed.

It is important for the pharmacy technician to consider expiration dates when ordering medications. For example, epinephrine has a relatively short expiration date, generally no longer than a year after its receipt at the pharmacy. The pharmacy technician should ensure that the pharmacy does not ever order more epinephrine than it could reasonably use before it expires, because if it cannot all be used before it expires, it can result in a potential loss of profit.

Turnover rate
When managing inventory, it is important to consider the turnover rate of medications. This term refers to the time it takes to use up a particular product in the pharmacy's inventory. Technicians should focus on ensuring there is enough stock of medications with a high turnover rate to fill prescriptions until the next order delivery day. Drugs with a low turnover rate should be kept at minimum stock levels, to ensure the medication is used up before the expiration date approaches.

Therefore, it is important to be aware of which medications are used more than others to ensure that fast-moving medications are always in stock and that slow-moving medications are not overstocked.

Some medications have much faster turnover rates than others, which can differ based on the location of the pharmacy. A pharmacy next to a pain clinic would be expected to have a much higher turnover rate of methadone than a pharmacy located next to a pediatric hospital because methadone is not used in children.

Turnover rates can also change based on the time of year. For example, Tamiflu, an antiviral medication used to treat influenza, may have a much higher turnover rate in December during flu season than in June, when flu season is essentially over. Pharmacy technicians should be aware of the needs of their pharmacy and apply this knowledge when ordering medications.

Other inventory management strategies

The 80/20 Rule:
In this inventory management strategy, it is assumed that 80 percent of the drug costs of a pharmacy are spent on 20 percent of the pharmacy's stock. In this rule, it is therefore important to focus on close management of the inventory of the top 20 percent of medications carried. Detailed reports can be used to determine which medications

fall into the top 20 percent of the pharmacy's inventory. Reports can also be used to review the purchasing history of the top 20 percent of medications to appropriately manage future stock levels of these products.

ABC analysis:
This inventory management strategy is a process of classifying medications into three classes, based on their usage and cost. The A class consists of 20 percent of products that account for 80 percent of the pharmacy's annual drug costs. The B class consists of 15 percent of the pharmacy's medications that account for 15 percent of the pharmacy's annual drug costs. The C class consists of 65 percent of products that account for 5 percent of the pharmacy's annual drug costs. This system focuses on tight control of the medications that have high costs to the pharmacy while focusing less on low-cost products in order to balance profitability with inventory control.

ORDERING MEDICATIONS

Terminology

Invoice
An invoice in the pharmacy setting is a list of goods that has been delivered to the pharmacy and the cost of each of these products. The invoice also includes the total cost of the order as well as the purchase order number and contact information for the organization ordering and the wholesaler.

Purchase order
A purchase order is a form used to order medications from a wholesaler. It is assigned a number, or purchase order number, to track the order until it is received by the pharmacy. The form also includes the name and contact information of the facility ordering products, the date of the order, the wholesaler's name and address, description, quantity and price of items ordered, and the total price of the order.

Just-in-time ordering
This term refers to ordering products as they are needed. In this inventory management strategy, products are ordered as requested, which minimizes the number of products in the pharmacy and ensures that money is not tied up in products that could potentially sit on the shelf for a long period of time.

Ordering

Where to obtain pharmaceutical products
There are several different sources used to obtain medications for use in a pharmacy. Wholesalers are one of the most commonly used sources to obtain medications for the pharmacy. Because there are hundreds of manufacturers of medications, it would be an extremely time-consuming process to order medications from the individual drug manufacturers. Wholesalers simplify the ordering process by ordering large quantities of medications from the manufacturers to supply to pharmacies, and then pharmacies can purchase various products from many drug manufacturers at once.

Many wholesalers make the ordering process even easier by using electronic ordering systems, delivering more frequently, and maintaining a wide selection of frequently and infrequently used medications. Large chain retail pharmacies use wholesalers to supply medications that are needed on an emergency basis or before their next warehouse delivery. Smaller independent pharmacies may order all of their medications from a wholesaler if they do not have a warehouse.

Many large companies own warehouses, which essentially function like wholesalers. The warehouse purchases medications from manufacturers to deliver to many stores, and supplies the pharmacy with most of its medications. This system allows the pharmacy to obtain most of the medications it uses all at once and is less expensive than using a wholesaler, though deliveries generally occur only once or twice a week.

Drug manufacturers can sell products directly to pharmacies. Because wholesalers are widely used, medications that are ordered from drug manufacturers are generally those that the wholesaler does not carry because of low demand, high cost, or specific storage conditions. Drug manufacturers often take longer to deliver medications to pharmacies than wholesalers, and should only be used if the wholesaler cannot supply a particular product.

How to order medications

Ordering medications is one of the most important inventory management tasks a pharmacy technician is required to complete, because the pharmacy is continuously depleting its stock of medications and supplies. Ensuring the pharmacy is adequately stocked with medications to serve its customers' needs must be balanced with preventing overstock of medications that could expire before they are used. Although a lot of the ordering process is now computerized and automated, ordering must be manually checked and confirmed, and occasionally edited as needed.

Ordering generally takes place on the computer through an online ordering system. This system contains a list of all medications that can be ordered, including the drug's name, item number, and package size. Some wholesalers offer the use of their online ordering system in the pharmacy. This allows the pharmacy staff to see exactly what is in stock at the wholesaler's facility and the quantity available, as well as giving pharmacies the ability to see a more detailed description of the product, including package size and even pictures of the item.

Orders for medications can be generated manually or automatically. Pharmacy technicians can manually start an order if they see a particular product that is needed is out of stock. There are several methods for manually determining which medications need to be ordered. Some facilities have a technician walk around the pharmacy with a portable order entry device, visually checking the stock of each item and scanning products that need to be ordered as they go.

Other facilities have an order card located with each medication, and as filling is taking place, if an item needs to be ordered, the card is taken away from the medication and put into a reorder box. Once the items come in, the card is put back with the fresh stock of medication.

Lastly, some pharmacies use a sticker method of ordering. Some wholesalers have stickers for each medication with the price and item number listed on it. When the stock is getting low, the sticker is removed from the medication and added to an ordering sheet of items that are low or out of stock. The ordering sheet is then used to order more medication for the pharmacy.

Manual orders also may be necessary under certain circumstances for particular products. Medications that are used infrequently or only by one patient may need to be special ordered each time they are used. Medications that are needed on an emergency basis can also be ordered in as they are requested.

The time of year also comes into play when ordering medications. The fall and winter seasons bring the cold and flu season, increasing the use of antiviral medications to treat the flu as well as antibiotics used for common infections associated with colds. The summer season may be associated with less cold and flu medication, but more allergy medication and sunburn relief products. If PAR levels have not been increased for these items at the beginning of the season, manual orders may be required until the automatic system is updated.

> **Tech alert!** Don't forget to decrease PAR levels of seasonal medications at the end of the season to avoid overstock!

When compiling a manual order in the computer system, technicians can use an online ordering system. This allows them to search for the desired medication in the database by scanning the barcode with a portable order entry device or entering the national drug code (NDC) or order number of the desired product in the computer system. They can then select the product to add it to the order and decide how many packages to order. Manual ordering can be used alone or in combination with automatic ordering systems to replenish the pharmacy's stock.

Automatic orders can be generated by the computer system based on reorder points, or PAR values, set up by the pharmacy. When the stock level goes below a set minimum desired level, the computer calculates how many items need to be added to raise the stock level to the maximum desired level and adds this quantity to the order.

Although the computer creates automatic orders, it is good practice to verify what the computer is trying to order before the order is sent out to ensure it is not ordering too little or too much stock. The pharmacy technician can view the list of pre-ordered medications and edit quantities on automatic orders if the medication quantity ordered is not appropriate for the pharmacy. This is commonly used for routine warehouse orders that are often delivered once or twice a week.

Orders for Schedule II controlled substances are regulated and require special ordering procedures. The Drug Enforcement Administration (DEA) is responsible for the regulation of controlled substances and the enforcement of the Controlled Substance Act. It governs the ordering and return of controlled substances and requires the use of DEA form 222 to order Schedule II controlled substances. The pharmacist must fill out this triplicate form carefully to order Schedule II drugs.

Many wholesalers also require the pharmacy to enter the drugs ordered on the 222 form into the computerized ordering system as well. The 222 form must be sent out with the wholesaler's delivery person, and the order will generally arrive the next business day. Therefore, it generally takes an extra day to order in Schedule II products, and this should be taken into account when giving estimated pickup times to patients.

After the order has been compiled, each order must be issued a purchase order number to keep track of what was ordered and when. The order can then can be sent to the wholesaler over the phone or across an Internet connection. A confirmation code should be sent to the pharmacy once the wholesaler has received the order. After confirmation of receipt, the wholesaler verifies the medications ordered to ensure there is enough stock to complete the order. The order is then picked off the warehouse shelves by machines or workers and collected together for delivery to the pharmacy. Many wholesalers deliver medications to pharmacies on the next business day, depending on the contract the wholesaler has with the pharmacy.

If a medication is not available from a wholesaler, the wholesaler may substitute an equivalent alternative medication. The substitution must be bioequivalent and comparable to the product ordered. For example, if the pharmacy technician orders a 100-count bottle of levothyroxine from the generic company Mylan and the wholesaler is out of the Mylan brand, it may substitute a 100-count bottle from Teva instead.

> **Tech alert!** Some patients require the use of specific manufacturers of their medications, so be sure to keep this in mind if the wholesaler automatically substitutes medications!

If the wholesaler cannot fill an order for a particular medication or provide a substitution, it will generally notify the pharmacy by making a notation on the invoice. When a wholesaler cannot supply a medication, the pharmacy technician may need to reorder the medication or notify the patient for whom the medication was ordered. Sometimes medications ordered cannot be supplied because they are backordered, discontinued, or temporarily out-of-stock products.

Orders for products that are not normally carried by the wholesaler or those that require special storage conditions or ordering procedures may need to be ordered directly from the manufacturer. Each manufacturer has specific ordering procedures for its products, such as specific order forms that must be faxed or mailed in, or requirements that orders must be placed over the phone. The manufacturer of the desired drug product should be contacted to find out what special ordering requirements they use.

When ordering from a drug manufacturer, orders generally take longer to arrive than they do if ordered from a wholesaler, so this must be taken into account when obtaining specific products for patients. The shipment of a medication from a manufacturer to a pharmacy is called a drop shipment. This type of shipment is often used for products that have specific storage conditions, such as frozen vaccines, or those with specific dispensing regulations, such as the antiarrhythmic medication Tikosyn.

Receiving

When products are shipped to the pharmacy from an external wholesaler or manufacturer, the pharmacy team must take several steps to properly receive the shipment. The technician receiving the order from the delivery driver should first verify that the quantity of boxes or totes delivered matches the expected quantity of packages. The packaging should then be inspected before opening to see whether it has been tampered with. Then the package may be opened, and inspected for damaged or outdated products.

If any products are damaged, outdated, or otherwise unfit for use, it should be brought to the attention of the wholesaler as soon as possible. These products should be separated from the pharmacy's stock to prevent accidental use.

The packaging should contain an invoice, which should be used to check in the order. The invoice lists the name, strength, and dosage form of medications shipped, as well as the cost of each product, the quantity shipped, and notations if items are unavailable or a lesser quantity was shipped. It also includes the total cost of the order and information on the location of the wholesaler and requesting pharmacy.

Each product shipped should be matched up with the invoice to verify that the quantity, strength, package size, and number of units match what was ordered. The prices printed on the invoice from the wholesaler should match up with the prices listed on the purchase order. Any discrepancies should be discussed with the wholesaler and entered into the pharmacy's computer system to allow for accurate accounting. After verifying that the products received match the products listed on the invoice, the invoice should be signed and dated, and set aside for accounting.

Receiving medications with special storage conditions

Any shipped products that require special storage conditions, such as freezing or refrigeration, should be checked in first and stored in their proper place. These products should be addressed first to avoid damage or decreased potency of the product.

Chemotherapy medications are considered hazardous substances, and should be shipped separately. Policies and procedures of the facility should be followed carefully when handling these products to prevent accidental exposure to these potentially dangerous medications. Special precautions for hazardous substances can be found on

the Material Safety Data Sheets (MSDS) that are provided to the pharmacy from the manufacturer for any hazardous agent.

Some of these medications may require special shipping procedures because the U.S. Postal Service and other shipping companies have special precautions for hazardous materials.

After medications with special conditions are put away, the remainder of the order can be put away as well. When putting an order away, it is important to put the newest stock behind older stock to ensure that products with shorter expiration dates are used before those that will last longer.

Receiving controlled substances

Controlled substances should be shipped separately from other medications. When checking in controlled substances, it is especially important to verify that the packaging has not been tampered with before opening it. A pharmacist must check in controlled substances

upon arrival at the pharmacy; the pharmacy technician should ensure controlled substances are given immediately to the pharmacist when they arrive.

Receiving investigational drugs

Investigational medications may be received in a similar manner to regular medications, though the invoices must be kept in a separate area for this type of medication. Policies and procedures of the facility

should be followed for receiving and storing these medications. A logbook of receiving, dispensing, and returning investigational drugs may be required, depending on the facility's rules and state laws.

Receiving damaged, outdated, excessive, or incorrect orders

If any products are received damaged or outdated, or if the pharmacy accidentally ordered a product it does not need, it may be eligible for return to the wholesaler. The wholesaler generally has policies and procedures dictating what medications may be returned for credit, and these rules must be followed to properly receive credit for returns.

Wholesalers often require credit to be requested before the product is sent back, and will send documentation to the pharmacy if the credit request is approved. This documentation should include the original purchase order number, the item number of the item to be returned, the quantity being returned, and the reason the item is being returned. This

documentation must be sent with the product when it is shipped to the wholesaler, and a copy must be retained at the pharmacy as well.

If a pharmacy technician discovers that the order has been filled incorrectly upon receipt, the technician should contact the wholesaler to figure out a resolution. Wholesalers will often send the correct product in the next shipment and accept return of any products received that were not ordered as well. The wholesaler may need to send return paperwork for the products that were not ordered before they can be sent back.

Paying invoices

After the order is received and put away, invoices must be paid according to the accounting procedures of the facility. They often need to be entered into the computer system on the same day they

are received or as soon as possible after receipt. Keeping up with accounting ensures that all invoices are paid as they are received, and prevents a backlog of invoices that can be time consuming to fix.

Receiving new products

New medications and newly introduced generic products are constantly going onto the market. Many pharmacies wait to order new medications until a patient brings a prescription for them, but some, especially large chain pharmacies, are set up to receive new generic products based on their usage of the brand name version.

These products are often shipped from the wholesaler or company warehouse, and should include an invoice that should be checked upon arrival and paid according to the accounting procedures of the pharmacy.

Returns

There are several different types of returns that need to be completed regularly to maintain the pharmacy's inventory. Return paperwork and

other records must be kept for at least two years or longer, depending on state-specific laws.

Outdated medications

Each pharmacy has its own policies and procedures for processing outdated products. In general, outdates should be pulled off of the shelves at regular intervals to minimize the possibility of expired medications getting to a patient. The pharmacy technician is often responsible for checking outdates on all products in the pharmacy once a month. Marking products that will expire in the next year with their expiration date on a sticker can help technicians spot soon-to-

expire medications to help use up stock before it expires. Because prescription labels are required to have the actual expiration date of a product if it expires in less than a year, this process helps maintain compliance with Board of Pharmacy regulations as well.

Medications should be pulled off the shelf two to three months or more before their expiration date, depending on the policies of the

specific pharmacy. All medication the patient receives must be used up before the expiration date occurs, and because many patients get 90-day supplies of their medications, the expiration date must be at least three months away for these patients. The pharmacy technician should ensure this task is done regularly to maintain the safety and effectiveness of products in the pharmacy's inventory.

Wholesalers and warehouses generally only accept outdated products for credit if they are returned within a specific window of time, generally two to three months before and after the manufacturer's expiration date. The pharmacy technician is responsible for completing this task once monthly to prevent profit loss.

Items that have expired should be separated from the rest of the pharmacy stock until the technician is ready to prepare and package these items for return to avoid dispensing expired products to patients. After outdated products have been pulled off of the pharmacy's shelves, the technician must take several steps to prepare them to be sent back to the wholesaler.

A list of all expired products, including the name, strength, and dosage form of the medication as well as the quantity, must be compiled. The list is then transmitted to the wholesaler to seek approval for the return. Once approval has been given, the outdated products may be packaged and prepared for shipment to the wholesaler.

The specific procedures for processing outdated medications depend on the policies and procedures of the pharmacy, and must be followed carefully to ensure credit is received for outdated products. Pharmacy technicians are generally responsible for the important inventory management task of checking for outdates at least monthly and sending them back to the wholesaler or drug manufacturer.

If medications are outdated and are ineligible for return to the wholesaler, they may be eligible to be sent to a reverse distributor for credit. Reverse distributors are companies that focus on the processing of expired, recalled, or damaged medications. They take these products back from pharmacies and complete the necessary paperwork required by each manufacturer to receive credit for returned items. Then they package and ship the unusable medication to the manufacturer and track the medication until credit is received.

These companies also accept expired, damaged, or unusable Schedule II-V controlled substances for return to the manufacturers. There is a fee to use the service of a reverse distributor, which is generally a percentage of the refund that is automatically deducted from the final refund amount.

Some outdated products are not eligible for return to a wholesaler, reverse distributor, or manufacturer. Compounded or reconstituted drug products are generally not eligible for return, and some companies will not accept bottles of medication that have been partially used. These medications must be either disposed of by the pharmacy or sent to an outside company for destruction.

If the pharmacy is destroying the medications, care must be used to ensure the medications are not endangering the environment or anyone who may come in contact with the product in the garbage. Many medications may be discarded with the pharmacy garbage; they should not be poured down the sink or flushed in the toilet to avoid contamination of the water supply.

However, there are some exceptions. Medications that are cytotoxic, such as chemotherapy agents, must be discarded in a hazardous waste container. Any medications that have needles in their packaging should be thrown away in a sharps container.

If the drug product that cannot be returned is a controlled substance, the DEA must be notified before the product may be destroyed by the pharmacy. DEA form 41 should be used to request permission to destroy controlled substances, and must be completed at least two weeks before the destruction of controlled substances. Once permission is granted, the pharmacy may destroy the drug products for which permission has been given. Destruction of medications must also comply with local, state, and federal environmental regulations, so care must be exercised when throwing away medications. The completed DEA form 41 must be maintained at the pharmacy for at least two years or longer, depending on state recordkeeping laws, and copies must be submitted to the DEA as well.

Overstock returns

Pharmacies can often return stock to the wholesaler that has been ordered in excess or is moving slowly off of the shelves. Pharmacy technicians should monitor the pharmacy's shelves for products that are not being used or were previously special ordered for a patient who discontinued treatment with the specific product. In general, if a package has not been opened or damaged and does not expire for at least 12 months, a wholesaler can accept the product for return.

Wholesalers should be contacted to request a return approval before sending the medication back. Once approval has been granted, the technician should package the medication and send it to the wholesaler using the method outlined on the approval notice. Specific policies and procedures will depend on the wholesaler's return policy.

> **Tech alert!** Check for overstock of seasonal products and return them for credit after the end of the season to prevent profit loss from outdates!

Damaged products

Occasionally, a product sent from the wholesaler may arrive at the pharmacy in a damaged condition. If it is noticed before dispensing to the patient, the pharmacy should contact the wholesaler to seek replacement of any damaged products. The wholesaler generally must send an approval code or return form before they will accept return of a damaged product. Once an approval code or return form has been issued, the pharmacy may send the product back to the wholesaler for credit or replacement, as determined by the wholesaler.

If a patient receives a product and discovers that it is damaged after its attempted use, the patient may generally bring it back to the pharmacy for replacement. The pharmacy can give the patient a replacement item from its stock, then contact the drug manufacturer to seek replacement of the damaged product. After completing the necessary paperwork, the manufacturer will send a replacement item to the pharmacy to replace the item the pharmacy gave out to the patient. The manufacturer may or may not request the pharmacy to ship back the damaged item.

Recalls

Recalls are issued to ensure the public is protected from adverse events from the use of a product that has been manufactured inappropriately. Manufacturers are required by the Food and Drug Administration (FDA) to recall products that are affected by the following issues:

- Incorrect labeling.
- Production or packaging errors.
- Contamination of a particular batch of medication.
- FDA mandated removal from the market due to safety reasons.

- Any error that occurs that prevents the medication from meeting the guidelines of the FDA or manufacturer.

Manufacturers can also voluntarily recall products if they are concerned about minor issues, such as potential tampering with products, or if their quality control teams find an inconsistency in the drug manufacturing process. This is known as market withdrawal.

Recalls are classified into three classes:
- Class I recall: Medications are recalled because they may cause serious harm to a patient's health, potentially including death.
- Class II recall: Medications are recalled because they can cause temporary or reversible health effects, and are at a low risk of causing serious harm.
- Class III recall: Medications are recalled for reasons that are unlikely to have adverse health consequences, such as labeling errors, defects in the containers, or abnormal color or odor.

When a recall has been issued, the manufacturer or wholesaler informs the pharmacy by mail, fax, or electronic message. The recall notice contains information on the drug products being recalled, including the drug name, expiration date, and lot number. It also contains information on why the recall is being issued and how to return recalled medication to the manufacturer.

Once a recall notice is received, the pharmacy should then check its shelves for the affected lot numbers and expiration dates of the product. If the pharmacy has any recalled products on its shelves, they should be removed immediately and segregated from the regular stock. Recalled products can be returned to the manufacturer or reverse distributor, and the pharmacy should receive credit for returned products. Any stock that has been lost to a recall should be reordered if necessary to maintain the pharmacy's inventory.

Depending on the severity of the reason for recall, the recall can extend to the stock that a patient has received as well. If this is the case, patients who may have received recalled medication should be contacted, and the pharmacy should attempt to recover the affected medication to send back to the manufacturer. Patients whose medication has been recalled should have their medication replaced with unaffected medication, free of charge.

Even if the pharmacy does not have any products that are listed on a recall notice, its completion should still be confirmed in the computer system. Documentation of the completion of recalls is important to maintain the safety of the pharmacy's medication inventory and therefore patient safety as well.

> **Tech alert!** Recalls should be completed the same day they are received to prevent patients from receiving recalled medications!

Unclaimed prescriptions

In community pharmacies, prescriptions that have not been picked up in a timely fashion by the patient must be returned to the pharmacy shelves to use for other patients. Most pharmacies have policies that require prescriptions to be restocked 7-14 days after they are initially filled. Many pharmacies have automatic reports that print daily to notify the technician of which prescriptions have been waiting for pick up for too long.

Many insurance companies are billed for products that have been sitting on the shelves for more than 14 days, so it is important to not only restock these products for accurate inventory management, but also to prevent insurance fraud as well. When an insurance company is billed for a prescription that a patient has not received, it can be

considered insurance fraud, and if the insurance company is a federally funded program, such as Medicare or Medicaid, it can be considered a greater violation of the law. Violations can be associated with hefty fines that can affect the profitability of the pharmacy.

Restocking these prescriptions on a daily basis will ensure the pharmacy is compliant with insurance company standards and the law as well as allowing these medications to be added back to the inventory to be used for other purposes.

> **Tech alert!** Calling patients a few days before returning their prescriptions to stock will help to minimize the number of unclaimed prescriptions that need to be returned to the shelf!

What medications should the pharmacy keep in stock?

The medications that each pharmacy should keep in stock will vary greatly depending on the type of pharmacy and the customer base of each pharmacy location. A hospital pharmacy will carry a very different inventory than an outpatient pharmacy because different medications

and dosage forms are commonly used in each setting. Insurance carriers and hospital formularies will also play a role in governing which medications are commonly used in a particular pharmacy.

Formulary

A formulary is a list of medications that have been approved for prescription within a hospital, health care system, or by an insurance company. There are three different types of formularies:
- Open formulary: Any medication may be purchased by the hospital or covered by the insurance company.
- Closed formulary: Medications prescribed may not be purchased or covered unless they are on a restricted list of medications selected by a committee. In general, only certain drugs in a drug class may be covered. This is to ensure cost savings by including less expensive generic medications on formulary instead of higher cost brand-name medications in the same drug class.
- Restricted formulary: A type of formulary that includes aspects of both an open and closed formulary.

Formularies at both hospitals and insurance companies are developed by a group of doctors, pharmacists, nurses, accountants, and drug buyers, known as the pharmacy and therapeutics (P&T) committee. The committee reviews the formulary annually and attempts to choose effective, reasonably priced medications for the institution to use.

Closed and restricted formularies are common, and many of these formularies prefer the patient use a particular medication over others in the same drug class. This method of creating cost savings often results in a less expensive charge to patients if they use the preferred medication, and a higher charge if they choose to use a non-preferred medication.

Using the drug class of proton pump inhibitors as an example, an insurance company may cover omeprazole, a generic product, for a lower co-pay than Aciphex, a brand-name product. Because many patients end up using the medication that results in a less expensive charge, if this particular insurance is commonly used at the pharmacy, it can result in more prescriptions for the cheaper product and fewer prescriptions for the more expensive product. Therefore, the pharmacy technician would need to ensure there is always enough omeprazole to fill prescriptions until the next delivery day, and that Aciphex is not overstocked.

Pharmacy technicians in both the hospital and community setting should be aware of the restrictions of common insurance companies or formularies at their pharmacy to ensure they maintain stock of

commonly covered medications and prevent overstock of non-covered medications.

Counting medications in the pharmacy inventory

Managing a pharmacy's inventory often involves counting medications in stock to verify or update their quantities in the computer system. Medication counts can be off because of many different reasons, including miscounting a patient's prescription, theft, or improperly inputting an invoice for an order received.

Knowing how much medication is on the shelves and ensuring that the quantity on hand in the computer system is an accurate reflection of what is actually on hand are essential to managing a pharmacy's inventory properly. There are two commonly used means of counting items in the inventory, annual inventory counts and cycle counts.

Annual inventory counts

Annual inventory counts are conducted once a year to verify the quantity and dollar value of products on the pharmacy's shelves. This event is generally done at a time when the pharmacy is closed or usually not busy to ensure all medications are counted at the same time for an accurate reflection of the inventory. It allows the pharmacy to see its total profitability for the previous year, as well as showing the pharmacy how well its inventory is being managed.

Pharmacies with a poorly managed inventory may have more loss through medications expiring, inaccurate accounting, and improperly recorded returns than a pharmacy that has a well-managed inventory.

Annual inventories may also uncover any issues with employee theft or missing inventory.

> **Tech alert!** Organizing medications on the shelves before an annual inventory count will help ensure everything is counted correctly!

The Controlled Substance Act requires biennial inventory counts for controlled substances. Many pharmacies complete this count annually to ensure there are no issues with compliance to this law. A pharmacist must physically count all controlled substances in this inventory, and records must be kept for at least two years or longer, depending on state law.

Cycle counts

Cycle counts are a method of auditing a particular product in a pharmacy's inventory at any given time. They are performed regularly to ensure the quantity of medication on the pharmacy's shelf matches up with the quantity of drug the pharmacy should have on the shelf.

Cycle counts can be done on random medications, medications pre-selected by the pharmacist or management because of the high cost or risk of theft, or generated by the computer system for medications whose quantities are suspected to be incorrect.

When a shortage or overage of a particular medication is suspected, they are often performed by pulling the drug in question off the shelf and physically counting the quantity on hand. The quantity is then updated in the computer system and analyzed by the pharmacist or pharmacy manager if needed.

Cycle counts allow the pharmacy to continually monitor the inventory level without interrupting the operation of the pharmacy. When completed correctly, they allow the pharmacy to maintain an accurate inventory and ensure the automatic replenishment system can work appropriately.

However, there is also a risk of error when completing cycle counts. When products are counted incorrectly or quantities are updated in the computer system incorrectly, errors can be introduced. Errors can also occur if products are counted at one time and not updated in the computer system right away. Pharmacy technicians should ensure that cycle counts are done regularly, in a timely fashion, and with as little interruption as possible to minimize error potential.

STORAGE OF MEDICATIONS

Bulk packaging

The majority of medications in outpatient pharmacies are received in bulk stock bottles. These bottles include labeling that is required by the FDA: brand and generic drug names, dosage form, quantity, national

drug code (NDC) number, lot number, expiration date, name of the manufacturer, and storage requirements.

Unit dose packaging

In hospitals or inpatient pharmacies, medications are often packaged individually for ease of use by the nursing staff and to decrease contamination of unused medication by sick patients. Individually packaged medications, or unit dose packaging, can be used for many dosage forms, using packaging such as vials, ampules, individual blister-packed medications, or dosage cups for liquid medications.

Unit dose packaging must be labeled properly and must include the generic name and strength of the medication, dosage form, the name of the manufacturer, expiration date, and lot number. Medications sent from the wholesaler in unit dose packaging generally have the required information on the packaging already, but the pharmacy technician should be aware of these requirements.

Repackaging medications

Medications that are not available in unit dose packaging can be repackaged by the pharmacy for use in the inpatient setting. To repackage medications, a machine is used to fill small plastic packets or plastic blister packs with individual doses of medication. The machines can range from simple manual machines that separate

the medication into each blister package, all the way to automatic machines that can fill each package as well as create labels with all required information for each unit dose.

There are five reasons for repackaging bulk medications into unit dose packaging. These are:

- Some medications are not available in unit dose packaging and must be repackaged into unit doses for use in the hospital setting.
- Some unit dose medications are much more expensive than the bulk version, so the hospital pharmacy may repackage the bulk version to save money.
- Repackaging medication increases the speed at which the medication is ready to use because the pharmacy does not have to order in unit doses and wait for them to be delivered.
- Unit dosing allows all of the drug information to be printed on each package, decreasing the risk of errors.
- If the unit dose is not used for a particular patient, it can be added back to the pharmacy's stock and reused at another time.

When repackaging medications, personal protective equipment should be used and good manufacturing practice (GMP) guidelines and state law must be followed. There are many GMP guidelines that can be applied to any step of the drug manufacturing process. Several of these guidelines apply when repackaging medications, including:
- Ensuring the equipment is clean and in good working condition.
- Prepackaging medications that originated from a bulk bottle that had not been previously opened.
- Only one medication should be prepackaged at a time.
- A registered pharmacist must verify all medications for accuracy and completeness.
- The packaging must be appropriate for the medications being repackaged.

Repackaged medications must include either a six-month expiration date from the time of repackaging or 25 percent of the remaining time of the manufacturer's original expiration date, whichever is shorter. 5 Repackaged medication labels must also include the generic name and strength of the medication, dosage form, and the name of the manufacturer and lot number. The packaging used for repackaging medications should comply with the manufacturer's recommendations for drug storage, including UV light-resistant packaging if needed.

A log must be maintained to keep track of all repackaged medications so that repackaged medications may be traced back to the original manufacturer, expiration date, and lot number in case of a recall. The log must contain these items as well as the date of repackaging, the name of the medication, the pharmacy-assigned lot number, the quantity of medication that was repackaged, and the initials of the technician and pharmacist involved in repackaging. The pharmacist must verify all repackaged medications for quality assurance.

Repackaging of medications to create unit dose packaging can be done for both liquid and solid dosage forms. The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) requires all medications to be patient-specific to decrease the risk of errors and contamination. This means all liquid medications must be in unit dose packaging; whole bottles may not be sent to a patient's room for continuous use. Oral syringes or dosing cups may be used.

General drug storage

The manufacturer's recommendations should be followed when storing prescription medications. Many medications are able to be stored at room temperature, between 59-86 degrees F. Drugs should not be stored above or below this temperature range unless authorized by the manufacturer.

The storage area should be clean and free of clutter, moisture, and dust, and be properly ventilated to allow for adequate airflow around the products.

Some medications are sensitive to UV light and can decompensate under these conditions. It is recommended to store medications in the manufacturer's original container or an amber-colored vial to decrease the transmission of UV light through the bottle.

Stock organization

The medications stocked in the pharmacy can be organized in many different ways. Some pharmacies organize medications alphabetically by the medication name on the bottle, so similar brand and generic products may not be located next to each other. For example, lisinopril may be next to lithium, instead of next to its brand name, Zestril.

Other pharmacies organize medications alphabetically by brand name, with the generic next to the brand name product. In this situation, Prilosec and omeprazole would be placed next to each other, because omeprazole is the generic form of Prilosec.

Organization can also be done alpha-generically, where all products are organized in alphabetical order by their generic name; in this case, Crestor would be found under R, because its generic name is rosuvastatin.

Some pharmacies have separate sections for certain types of medications that are not mixed in with the stock bottles of pills. Depending on the needs of the pharmacy, separate areas may be used for birth control pills, liquids, topical treatments, injectable medications, and inhalers. Some pharmacies even have sections for the fastest moving medications, to keep them close to the dispensing counter for easier use.

Hospital pharmacies should also have a separate area for IV bags and medications that have been compounded in anticipation of receiving an order from a prescriber. These products should be compounded in small quantities to avoid manufacturing, because pharmacies may compound small quantities of medications but not manufacture large quantities of them without an additional license.

A logbook should be maintained, including the date and quantity of medication produced, the lot number and expiration date of any products used in compounding, and the initials of the pharmacist performing quality assurance verification. These medications should be labeled, stored in a designated area, and checked for outdated products regularly.

Regardless of the type of stock organization used, error prevention strategies should be incorporated as well. Separating similar looking bottles or products that are different dosages of the same medication with dividers will help prevent technicians and pharmacists from pulling the wrong medication off the shelf to fill an order. Stickers or signs can also be used for high-alert medications or those that are prone to more dangerous errors.

An example of this is warfarin, a blood thinner, which is available in several dosages. Placing dividers between the dosages and using signage to alert the technician to the higher potential risk of error will help prevent potentially dangerous errors from occurring.

Schedule II controlled substances

Schedule II medications should be stored separately from other medications and are generally kept in a locked cabinet that only the pharmacist can access to prevent theft or diversion. Refrigerated Schedule II controlled substances must be stored in a locked refrigerator, separate from any non-Schedule II refrigerated medications.

Schedule II medications may be organized alphabetically by brand, generic, or the name listed on the bottle, whichever is preferred by

the pharmacy and pharmacist. The stock of Schedule II controlled substances must be continuously monitored and recorded in a perpetual inventory log by the pharmacist as prescriptions are filled.

Ordered Schedule II controlled substances must also be recorded in the perpetual inventory log upon receipt, and any recalls, damaged products, or outdated products must be recorded as they occur as well.

Medical supplies

Disposable medical supplies may also be stored in the pharmacy, and are often in a separate section from the rest of the stock for simplified organization. Some pharmacies maintain a stock of durable medical equipment as well, such as wheelchairs, crutches, walkers, and

assistive devices for activities of daily living, such as shower stools or bedpans. Because many of these products are large and consume a significant amount of space in the pharmacy, they may be stored in a separate storage area or ordered in from the wholesaler as requested.

Rotation of stock

Regardless of the type of organization a pharmacy uses, there are several procedures that should be followed when stocking shelves to ensure stock is circulated properly and minimize risk of error. When restocking shelves, the technician should make sure to place newer bottles behind older bottles, and organize stock with the shortest

expiration date in front of similar products with longer expiration dates. This is to ensure older stock is used up before newer stock, to minimize the number of expiring products. Shelves should also be organized with an adequate amount of space between similar products to prevent staff from picking the wrong product to fill a prescription.

Refrigeration [6]

Some drugs require refrigeration to maintain the stability of the medication. In general, refrigerated medications need to be stored between 36-46 degrees F. Thermometers should be placed in the refrigerator to maintain adequate temperatures; ideally a thermometer with a probe that remains in the fridge and connected to an external reader outside of the refrigerator should be used to minimize the number of times the door is opened.

A temperature log should be used to document the temperature of the refrigerator twice a day to ensure the products are stored adequately. Medications stored in the refrigerator should be given space between each item to allow adequate airflow between products. Medications should not be stored on the refrigerator door or in bins; they should be placed on shelves in the middle of the refrigerator to ensure the most stable temperatures.

If a product that requires refrigeration is kept out of the fridge for longer than the recommended amount of time described by the manufacturer, it may need to be discarded or given a shorter expiration date. The manufacturer can decide whether a medication should be

given a shorter expiration date, and may be contacted for guidance if a medication was left out of the refrigerator for longer than the recommended amount of time.

If possible, refrigerators should be plugged into an outlet that is set up to receive power from an emergency generator in case of a power outage. To maintain adequate temperatures for drug storage, they should never be unplugged, and should be marked with a tag to ensure there is no confusion.

Multiple refrigerators often are used for drug storage in a pharmacy. Outpatient pharmacies may have one or more refrigerators used for its main refrigerated stock, as well as a separate refrigerator for medications that are awaiting pick-up by the patient. All refrigerators should have their temperatures monitored and recorded twice daily to ensure proper drug storage.

> **Tech alert!** Pharmacy staff should not ever store food or drinks in the refrigerator that is used to store medications. State pharmacy laws exist in many states prohibiting this practice.

Freezing [6]

Because frozen medications are particularly vulnerable to damage, care must be used when handling these products. Frozen medications should be stored below 5 degrees F. There are very few medications that require storage in the freezer; those that do include the chickenpox and shingles vaccines as well as some premixed IV medications in the hospital setting that may be thawed out prior to use.

If the pharmacy stores frozen medication, a stand-alone freezer should be used. The temperatures in a stand-alone freezer are more stable than

temperatures in a freezer located on top of a refrigerator. If possible, freezers should be plugged into an outlet that is set up to receive power from an emergency generator in case of a power outage. Freezers should never be unplugged, and plugs should be marked to ensure there is no confusion. Thermometers should be placed in the freezer to maintain adequate temperatures, and freezer temperatures should be checked twice daily and recorded on a temperature log.

Chemotherapy and hazardous materials

Chemotherapy medications are considered hazardous substances. The Occupational Safety and Health Act mandates that all employees who could potentially come in contact with these products be aware of the hazards to which they could be exposed. All facilities that are involved in the handling of these products must maintain a written hazard communication program to inform employees of these risks. Facilities

must also receive and maintain MSDS forms for each hazardous material it handles.

Policies and procedures of the facility should be followed carefully when handling these products to prevent accidental exposure to these potentially dangerous medications. Special precautions for hazardous substances can be found on the material safety data sheets (MSDS) that the pharmacy must maintain.

Investigational drugs

Hospital pharmacies are often involved in the distribution of investigational drugs for clinical studies. The pharmacy is often responsible for obtaining, storing, packaging, labeling, distributing, and disposing of investigational drugs. They may also be involved in providing patient education and monitoring and reporting adverse reactions to investigational drugs. These medications often have documentation that needs to be completed and sent to the manufacturer each time they are dispensed. Maintaining the inventory of investigational medications depends on the needs of the clinical study and drug manufacturer, so institution policies and procedures should be followed for managing the inventory of these products.

Storage of medications at points of use

Automatic dispensing systems

Medications stored on nursing units or various departments in the hospital setting have different needs based on the area where they are located. For example, the medication storage machine located in an intensive care unit will have different medication needs than that in the pediatric ward.

The pharmacy technician should be aware of the medication needs of each machine based on its location, which can help to decrease errors. Knowing what medications should be in a machine located on a pediatric floor as compared to an intensive care unit will help pharmacy technicians do their part in preventing potentially fatal medication errors.

Code or crash carts

In the hospital setting, crash carts are trays of medication that are used when a patient's medical condition is rapidly decompensating, such as when the patient's heart stops or they stop breathing, also known as a code. These lifesaving medications are used to rapidly restore the patient to a stable condition, and must be readily available in patient care areas.

Crash carts generally contain injectable medications to achieve rapid effects in emergency settings, and are covered with an easy to remove plastic sheet and numbered lock, so it is easy to identify when a tray needs to be replaced. There are generally three types of trays – adult, pediatric, and neonatal – that ideally should be three different colors to avoid confusion, and they should be stored in separate areas in nursing units to avoid confusion during a code.

It is the responsibility of the pharmacy to refill and replace crash cart trays as they are used, and to know the location of each tray in the hospital. When refilling a crash cart tray, it is important to ensure that all medications in the tray are located in exactly the same place every time in every tray. This is because when a code occurs, doctors and nurses must work rapidly to restore the patient's medical condition, and having the medications in the same location every time decreases the risk of errors when quickly grabbing medications from the tray.

It is also important to check the expiration dates of the products in crash carts and replace soon-to-expire products regularly. The earliest expiration date of any product in the tray should be noted on the top of the tray to facilitate replacement of expiring medications as that date approaches.

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INVENTORY MANAGEMENT FOR THE PHARMACY TECHNICIAN

Final Examination Questions
Choose the best answer for questions 1 through 5 and mark your answers
online at **PharmacyTech.EliteCME.com**.

1. Which of the following is NOT a purpose of inventory management?
   a. Minimizing the occurrence of unexpected out-of-stocks to decrease the impact on patient care.
   b. Preventing costs associated with damage and expiration of inventory.
   c. Decreasing total costs to the pharmacy and overall health care organization by focusing on purchasing products with the lowest cost.
   d. Increasing costs and thus boosting income by ordering medications from wholesalers.

2. Which of the following forms does the DEA require pharmacies to use to order Schedule II controlled substances?
   a. Form 222.
   b. Form 41.
   c. Form 72.
   d. Form 333.

3. Which of the following is the first step a technician should take when receiving a medication delivery?
   a. Verify that the quantity of boxes or totes delivered matches the expected quantity of packages.
   b. Each product shipped should be matched up with the invoice to verify that the quantity, strength, package size, and number of units match what was ordered.
   c. The invoice should be signed and dated.
   d. Invoices must be paid according to the accounting procedures of the facility.

4. Which of the following recall levels occurs when medications are recalled because they may cause serious harm to a patient's health, potentially including death?
   a. Class I recall.
   b. Class II recall.
   c. Class III recall.
   d. Class IV recall.

5. Which of the following are trays of medication that are used when a patient's medical condition is rapidly decompensating, such as when the patient's heart stops or they stop breathing?
   a. Code or crash carts.
   b. Automated dispensing systems.
   c. Baker Cells®.
   d. Kirby Lester®

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