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MANAGING MEDICINES
AND HEALTH PRODUCTS

by Malcolm Clark and Andy Barraclough

CHAPTER 8 OF *HEALTH SYSTEMS IN ACTION*

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AUTHORS:
Malcolm Clark
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Management Sciences for Health
200 Rivers Edge Drive
Medford, MA 02155-5741 USA

Fax: +1.617.250.9090
Email: bookstore@msh.org
Website: www.msh.org

Tel.: +1.617.250.9500

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CHAPTER 8

Managing Medicines and Health Products

Malcolm Clark
Andy Barraclough

Effective supply management has the potential to make a powerful contribution to the reliable availability of essential medicines, which are a crucial part of the delivery of high-quality health care services. Because medicines are costly and poor management so often results in waste, good supply management is also crucial to the cost-effectiveness of providing medicines.

Officials with national-level responsibilities manage the full, integrated system described by the pharmaceutical management cycle (Figure 2). Theirs is a complex task that demands the highest level of leadership, management, and technical skills.

But even where good national policies and systems exist, unless those managing the "last mile" of the supply chain—from the district or organization to the health facility to the patient—fully appreciate the impact of their work and are trained to carry out their responsibilities, essential medicines and supplies will fail to reach medical staff and patients.

As a manager of a health program or health services at the district or health facility level, you can successfully accomplish this by using the practices described in this chapter, which focuses on supply management and use of medicines.

Supply management does not operate in isolation. At the center of the pharmaceutical management cycle is a set of core management practices and systems interlinking with the overall management of health services. Other chapters of this handbook cover these topics, as follows:

- planning and organizing (Chapter 5)
- human resource management (Chapter 6)
- financial management (Chapter 7)
- information management (Chapter 9)
- delivering health services (Chapter 10)

The entire pharmaceutical management cycle rests on a policy and legal framework that establishes and supports the public commitment to supplying essential medicines. The eight major sections of this chapter provide guidance on the following aspects of the management of the cycle:

- storage management
- inventory management and stock control
- distribution of stock from the health facility storeroom
- good dispensing practices
- rational prescription and use of medicines
- disposal of expired, damaged, or obsolete items
- training and performance improvement of supply staff
- supervision of supply management

This chapter outlines the essential elements of managing supplies at the district and subdistrict levels and in nongovernmental organizations (NGOs), provides practical guidance in assessing and improving the supply system at that level, and offers a range of other technical and managerial resources and references that will enable you to improve your management skills and study the areas that interest you further. Each section also provides overviews, guidelines, and checklists that will help you and your team identify and resolve major problems.

Introduction

Most leading causes of death and disability in developing countries can be prevented, treated, or alleviated with cost-effective essential medicines. Despite this fact, hundreds of millions of people do not have access to essential medicines, and for those who do have access, incorrect use of medicines limits their effectiveness.

Even when we invest large amounts of money in medicines, we often do not make the best use of that resource. Poor leadership and management can result in wastage in all its forms—from expired medicines to damaged stock to medicines that are never used—and underlie the failure to make the best use of medicines.

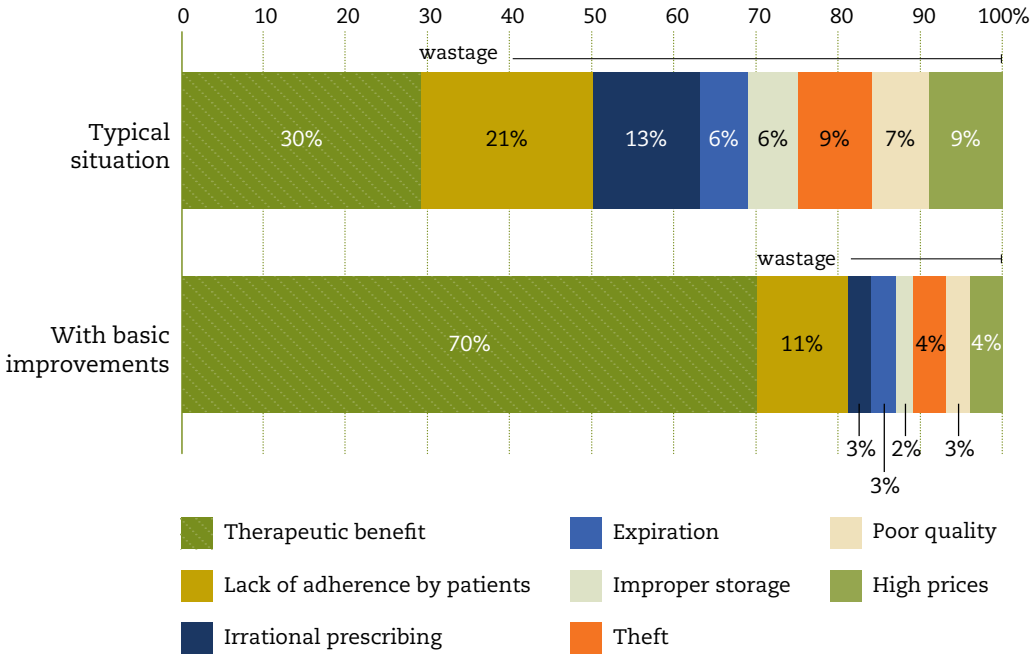
This chapter recommends practical ways in which the diverse players involved in a supply management system can improve the performance of their facility or organization.

Although written primarily for district managers and health facility staff, this chapter also provides information and insights for government policymakers, managers of essential medicine programs, NGOs, and donors interested in improving the functioning of public health supply systems.

Because medicines are costly—they frequently account for 30 to 50 percent of health budgets—and their management is quite different from that of other consumer products, handling by specialists is needed to ensure maintenance of their potency and effectiveness. In addition to their direct value to individuals, medicines also serve to generate trust and participation in health services. A health center without medicines to dispense, no matter how well staffed and maintained, soon loses its credibility in the community.

Improved supply management can bring dramatic improvements in the availability of medicines and the effectiveness of their provision. In a typical supply system, up to 70 percent of the funding invested in essential medicines can be lost or wasted. With only basic management improvements, it is possible to make a significant change, as Figure 1 illustrates. Note that all the categories except "therapeutic benefit" represent various types of wastage.

FIGURE 1. How Reducing Common Types of Wastage Can Increase Therapeutic Benefit



Note: Percentages add to more than 100% because of rounding.

In 1975 the World Health Organization (WHO) defined essential medicines as those medicines that meet the needs of the majority of the population. Since that time, much experience has been acquired in managing medicines, and some broad lessons have emerged from that experience, including the following:

- A national policy provides the necessary sound foundation for managing medicine supply.
- Prudent selection of medicines and the use of an essential drugs list (EDL) underlie all other improvements.
- Effective supply chain management saves time and money and improves performance: you cannot afford *not* to invest in effective supply management.
- Rational use of medicines requires far more than pharmaceutical information.
- Systematic assessment and monitoring are essential to the supply management system.

The recommendations and information in this chapter fall within this broad supply management framework. Logistics can be complex, with many interlinking components and factors, but it is possible, using the resources already available in most developing countries, to ensure an uninterrupted supply of medicines at the point of service, even in the most challenging environments. The use of computer technology has added greatly to the ease and practicality of data processing and the provision of the information needed for management decisions.

THE PHARMACEUTICAL MANAGEMENT CYCLE

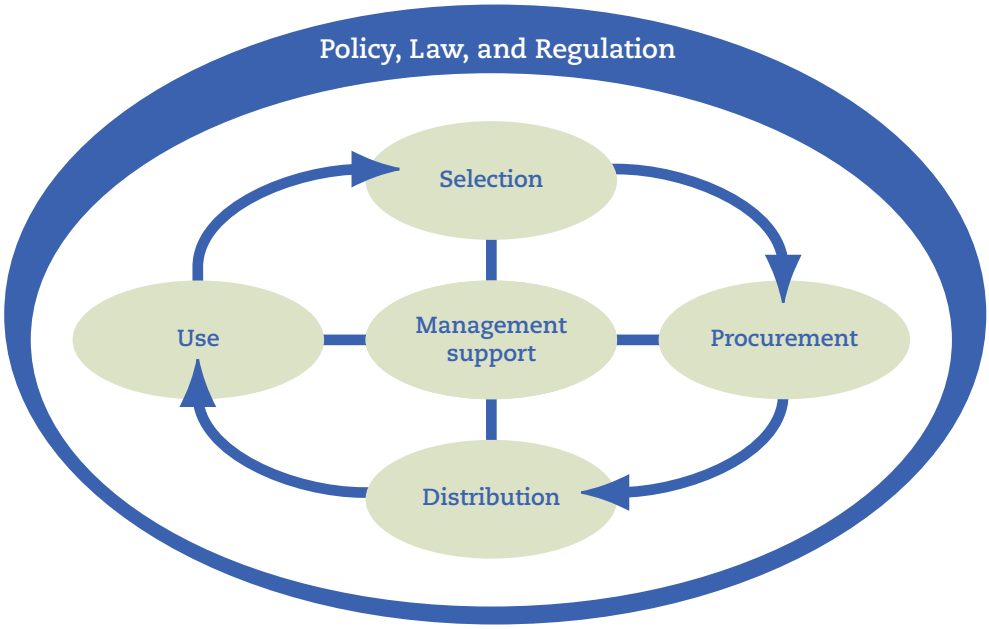
Pharmaceutical management comprises four basic functions: selection, procurement, distribution, and use.

- **Selection** involves reviewing the prevalent health problems, identifying treatments of choice, choosing individual medicines and dosage forms, and deciding which medicines will be available at each level of the health system.
- **Procurement** includes quantifying medicine requirements, selecting procurement methods, managing tenders, establishing contract terms, and ensuring pharmaceutical quality adherence to contract terms.
- **Distribution** includes clearing customs, stock control, store management, and delivery to depots, pharmacies, and health facilities.
- **Use** includes diagnosing, prescribing, dispensing, and proper consumption by the patient.

In the pharmaceutical management cycle (see Figure 2), each major function builds on the previous function and leads logically to the next. Selection should be based on actual experience with health needs and medicine use; procurement requirements follow from selection decisions, and so forth.

At the center of the pharmaceutical management cycle is the core of related management support systems, including the planning and organization of services, financing and financial management, information management, and human resource management. These management support systems hold the pharmaceutical management cycle together.

FIGURE 2. Pharmaceutical Management Cycle



Although individual parts of the cycle may function independently for a short time, the cycle as a whole will soon cease to operate and patient care will suffer without effective leadership, a functional organizational structure, adequate and sustainable financing, reliable management information, and motivated staff.

Finally, the entire cycle rests on a policy and legal framework that establishes and supports the public commitment to essential medicine supply.

In NGOs and at the district level, the focus of management activities in this chapter, the most relevant elements of the pharmaceutical management cycle are distribution, including storage and stock management, and use. This chapter concentrates on those areas. For those interested in reading more widely about the pharmaceutical management cycle, please refer to Chapter 46 of *MDS-3: Managing Access to Medicines and Health Technologies* (MSH 2012).

Managing and leading practices are important for effective supply management. Why is it so difficult to make supply management work effectively? Supply management is not difficult, but it does require:

- recognition of the value of supply management to the public health system;
- the commitment of funding and resources (which will be amply repaid in greatly reduced wastage);
- willingness to systematically apply the simple supply management techniques described in this chapter
- effective leadership and management practices, as discussed in Chapter 2:
  - **scanning** the system for problems and opportunities to ensure proper management of supplies;
  - **focusing** resources based on a well-defined plan to properly procure, store, and distribute supplies;

- **aligning** stakeholders, including staff at all levels, around a shared vision of proper supply management and mobilizing resources to reach that goal;
- **inspiring** teams to maintain the diligence necessary to ensure effective supply management;
- **planning** the quantities and use of supplies at all levels;
- **organizing** the structures, systems, and processes necessary for efficient supply management;
- **implementing** plans successfully to achieve appropriate storage, inventory levels, and use of supplies;
- **monitoring and evaluating** the supply chain continuously to ensure the system works well.

Global Fund Procurement

Procurement regulations for the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) seek to promote good procurement practice. In general, they follow regulations similar to the rules of other institutions and donor agencies. There are, however, demanding requirements related to product and supplier selection, which are designed to ensure product quality and maintain an audit trail that will promote the integrity and quality of the procurement process.

The practical impact of these requirements is that procurement with GFATM funds can by and large be satisfactorily carried out only by principal recipients at the national level, where procurement requirements can be pooled and a procurement team experienced in international purchasing can manage the process and ensure compliance with GFATM policies and requirements.

For district officers and others involved in GFATM programs, however, it may be interesting to know something about GFATM policies and procedures in relation to procurement. The GFATM publication "Guide to the Global Fund's Policies on Procurement and Supply Management" provides this information.

The Global Fund's voluntary pooled procurement (VPP) mechanism, initiated in May 2009, will be of special interest to those receiving small grants and those with little experience with international procurement mechanisms. Principal recipients wishing to use this mechanism will be able to procure first- and second-line antiretrovirals (ARVs), medicines for artemisinin-based combination therapy (ACT), and the long-lasting insecticide-treated nets (LLINs) recommended by the WHO Pesticide Evaluation Scheme (WHOPES). In addition, a broader range of health products is available to meet the individual needs of principal recipients.

More information on the VPP mechanism can be found on the GFATM web page titled, Procurement Support Services.

Further information from the Global Fund and WHO on LLINs covers the following topics:

- procuring long-lasting insecticidal nets
- recommended long-lasting insecticidal nets
- WHO's *World Malaria Reports*
- specifications for public health pesticides

Managing the storage of medicines and health products

This section of the chapter provides detailed information that health workers who handle medicines and medical supplies need to know. The content is organized into eight subsections, which are numbered for ease of reference. The links below will allow you to navigate easily to find the section in which you are interested.

I. HOW TO SET UP, MAINTAIN, AND ORGANIZE A PHARMACY STORE

All health facilities, from health posts to comprehensive health clinics and large hospitals, use medicines and related supplies. It takes a team effort to manage these supplies, involving all types and levels of staff: doctors, nurses, health workers, and storekeepers. This is especially true in small facilities with only one or two health workers. Each staff member has an important role and should know how to manage all supplies at the health facility correctly.

Medicines and related supplies are expensive and valuable. They need care so they will not deteriorate. If they deteriorate, they may lose their potency, have the wrong effects on patients, or, in the case of test kits, may produce incorrect results.

This section provides an overview on preparing a store at your health care facility. For a quick reference on procedures related to physical conditions, see the Physical Conditions Checklist in Appendix A in this chapter.

Choosing a secured room to serve as a store. A store is a simple way to keep supplies safe. Having all stock in one place also makes it easier for you to know what you have.

Your health facility should have a room that can be locked, is in good condition, and is well organized. That room will be your pharmacy store. It should be separate from where you dispense medicines. You should keep all supplies in the store and take (or issue) what you need daily from the store to a dispensing area. If your health facility does not have a room to use as a pharmacy store, you should have a lockable cupboard or cabinet with shelves to serve as your store.

The store should be large enough to fit all the supplies. Inside the store, there should be an additional secured area where narcotics and expensive items such as ARV medicines are kept.

Secure all openings (such as windows) with grills or bars to deter theft. Lock your store and limit the number of keys that are made, especially for areas where narcotics and expensive items are kept. Limit access to the store. Only the most senior storekeeper or pharmacist, and perhaps one other staff member, should have access to the store.

Your country's laws and regulations about the storage of pharmaceuticals and medical supplies must be adhered to. The national regulatory authority in each country will be able to give advice on this and provide relevant guidelines.

Keeping your store in good condition. Extreme temperatures, light, or humidity may cause medicines to deteriorate. Heat affects all medicines, especially liquids, ointments, and suppositories. Some medicines that are light sensitive, such as injectables, spoil very quickly when exposed to light. Humidity can spoil tablets and capsules because they easily absorb water from the air, making them sticky and causing them to deteriorate.

All products need to be kept in their original packaging, containers, or boxes. Follow the storage instructions given on the labels.

Keep your store clean and organized. This will make it easy to find supplies and help keep supplies in good condition and ready to be used.

Maintaining and using refrigerators and freezers. If there is a refrigerator or freezer, keep it in good working condition. Opening and closing the door frequently will increase the temperature and cause medicines or test kits to deteriorate. Do not keep staff food in the refrigerator.

Follow the instructions you received from your supervisor or district coordinator on how to pack a refrigerator or freezer. Check that there is enough space around the refrigerator so that air can move freely. Record the temperature inside the refrigerator or freezer daily.

Organizing medicines and health products in your store. The following principles will help you organize supplies in your main storage area, refrigerated area, and secure area. The more detailed guidance in Section III also generally holds true for a pharmacy store.

Store similar items together. "Similar" refers to the route of administration (external, internal, or injectable) and form of preparation (dry or liquid medicines). Store medicines in the following groups: externals, internals, and injectables. Shelve tablets and capsules together. Shelve liquids and ointments together. Shelve other health products and supplies together. Organizing each group of items in alphabetical order often improves store organization and simplifies stock management.

See the information in Section II about controlling access to medicines requiring special attention or control, such as ARVs and controlled substances.

Box 1 provides three examples of storing similar medicines together.

BOX 1. Examples of Storing Similar Medicines Together

- Ketoconazole 2% cream and ketoconazole 200 mg tablets are available. The cream is put on the skin (external) and the tablets are taken orally (internal). The health worker stores the cream with the externals and the tablets with the internals.
- Amoxicillin 250 mg tablets and amoxicillin 125 mg/5 ml oral suspension are also available. Both items are internals. The health worker stores the tablets with the other tablets and capsules. The oral suspension is placed with other liquids.
- A new supply of nevirapine tablets has arrived. The health worker stores the tablets in a locked cabinet with the other ARV tablets.

If there are three or more shelves in your store, organize your supplies as follows:

- **Top shelves:** Store dry medicines (tablets, capsules, oral rehydration packets) on the top shelves. Use airtight containers. If the top shelf is near the ceiling or out of your reach, use that shelf to store items that are not sensitive to heat and not used regularly.
- **Middle shelves:** Store liquids, including injectables and ointments, on the middle shelves. Do not put dry medicines below them. If liquids leak, the dry medicines may spoil.
- **Bottom shelves.** Store other supplies, such as surgical items, laboratory supplies, condoms, and labels on the lowest shelves.

Identify the products' generic names. Find the generic name of each medicine in your store. The generic name is the chemical name of a medicine and should be listed on its label. The generic name is different from the brand name, which is the name given by the manufacturer.

There may be many brand names for the same generic medicine. For example, some of the brand names for cotrimoxazole (sulfamethoxazole plus trimethoprim) are Cotrex, Cotrim, Bactrim, and Septrin.

Arrange and label the supplies. Arrange and label the supplies on the shelves as follows:

- Within each group, arrange the supplies in alphabetical order by generic name. Allow enough space for each item.
- Group identical items in amounts that are easy to count, such as in pairs or groups of 5 or 10.
- Print the generic name of each item on labels. Attach a label to the front of each item on the shelf.

When you organize your supplies in this way, it will be easy for you to see what and how much you have. You will be less likely to confuse items that are similar in appearance or name.

Group products by expiry date. The expiry date is very useful in storing and managing the stocks of pharmaceuticals.

The **first expiry, first out (FEFO)** method of inventory management involves issuing products with the earliest expiry date first, regardless of the order in which they are received. This method helps prevent expiration of valuable pharmaceuticals.

All pharmaceuticals have labels that include an expiry date established by the manufacturer. This is a very important piece of information for the dispenser and patient, because if the medicine is used after this date, its quality and efficacy are not guaranteed and the patient cannot be sure it will have the desired treatment effect. If pharmaceutical labels do not include an expiry date, this can be an indication of poor-quality manufacturing. You should bring this omission to the attention of the appropriate supervisor.

Pharmaceutical stock must therefore be stored and controlled so that the stock that will expire first is issued first. Newly arrived stock sometimes has an earlier expiry date than stock already in the store—especially when there are multiple sources of supply for an item, or stock is returned or transferred from another store. In a FEFO system, first-expiring stock is "promoted" to make sure it is issued first. Such promotion is usually a combination of physical placement—the earliest-expiring stock is placed at the front of the shelf so that will be picked first—and good record control, which tracks the expiry dates of all items in stock.

For example, if you have received two shipments of amoxicillin, and the first shipment received has an expiry date of November 2012, while the second shipment has an expiry date of August 2011, you would issue the stock that expires in August 2011 first, even though you received it after the stock that expires in 2012.

You should store medical supplies and other commodities without expiry dates using **first in, first out (FIFO)** procedures. For items that arrive without expiry or manufacture dates, record the date of arrival on the stock and the records, and use a FIFO system. It follows the same principles as the FEFO system—the stock that expires soonest goes at the front of the shelf—but you track the receipt dates rather than the expiry dates.

Follow these steps to remove expired and poor-quality items from the store:

- Identify all expired and other poor-quality medicines and related supplies.
- Identify overstocked items and any items that are no longer used at your health facility.
- If items are still within their expiry date, arrange for them to be returned to central stores or sent to other facilities where they are needed. Follow your health facility's policy to remove these items. In case of doubt, contact your supervisor or district coordinator.
- Keep a record of the removal of medicines and related supplies.
- Indicators of poor-quality or damaged supplies appear in Section VII of this chapter. Use it to help you determine unacceptable items in your store.

II. ORGANIZING SUPPLIES IN THE STORAGE AREA

Storage areas must be clean, properly arranged, and secured. The temperature must also be controlled (if needed, an air conditioner or ceiling fan should be installed) and the area well-ventilated but not exposed to dust. One rule of thumb is that if you feel too hot in the storeroom, the products are also being exposed to high temperatures.

Even though most medicines are packaged in sealed containers, moisture can still be more damaging to medicines than high temperatures. So there must be proper drainage, and no boxes or goods should ever be in direct contact with the floor. They must be placed on pallets or racks. Many products, particularly injectable forms, are sensitive to direct sunlight. Keep the vials in their boxes and if necessary hang curtains on the windows.

Regardless of the type of storage (warehouse, storeroom, shelves, or a cupboard), the products must be systematically arranged. There are several ways of classifying medicines and health products. Whichever system is used, it is important that all employees know the system being used and can work with it effectively.

> Module 3 of *Managing TB Medicines at the Primary Level* (Rational Pharmaceutical Management Plus 2007) contains useful guidance on storage of tuberculosis (TB) medicines, much of which is generally applicable to all medicines.

You can also use Appendix B in this chapter, the Storage Procedures Checklist, with your team to determine how well storage is being managed and plan improvements.

Principles of good storage. For all types of storage:

- Follow the manufacturer or shipper's directions when stacking, and follow labels for storage conditions.
- Place liquid products on the lower shelves or on the bottom of stacks.
- Store products that require cold storage in appropriate temperature-controlled zones.
- Store high-security and high-value products in appropriate security zones.
- Separate damaged or expired products from usable stock without delay, and dispose of them using established disposal procedures. See the sections on waste management and disposal.
- Store all commodities in a manner that facilitates FEFO policy for stock management.
- Arrange cartons so arrows point up and identification labels, expiry dates, and manufacturing dates are visible. If this is not possible, write the product name and expiry date clearly on the visible side.

Common classification systems for smaller stores and dispensaries. There are three common classification systems for smaller stores and dispensaries: by generic name in alphabetical order, by dosage form, or by therapeutic category.

- **In alphabetical order by generic name.** This classification is found in both large and small facilities.
- **By dosage form.** Similar dosage forms (for example, tablets, injectables, oral liquids, ointments, etc.) can be stored together. Products are sorted

alphabetically within each category. This method is simple to apply and maintain. It does not require much medical knowledge, and it allows the optimal use of the storage space because packages of similar size and requiring similar storage conditions are kept together.

- **By therapeutic category.** You can store products with the same therapeutic properties together, using the classification from the list of essential medicines. For example, all antibiotics can be stored together, all antihypertensive medicines can be stored together, and so on. Products are then sorted alphabetically within each category. This method is more complex to maintain and is best suited to stores or dispensaries where the staff responsible for the storeroom are knowledgeable about the therapeutic class of each product.

Classification systems for larger stores. In large stores, where the range and quantity of stock being held are greater, different systems are needed. In these settings, the following systems are most common.

- **Health system level.** In this system, items for different levels of the health care system are kept together. This works well in central or regional stores when, for example, essential medicines kits (compilations of common medicines in kit form) for primary health care are in use.
- **Frequency of use.** Fast-moving products are placed in the front of the working area in this system, to minimize the amount of movement required to pick and pack the items that are ready for dispatch to the customer.
- **Random location.** A specific storage space, such as a pallet or shelf, is assigned a unique location code that corresponds to its aisle, shelf, and position on the shelf. This system works best with a computerized warehouse management system.

Arranging stock by expiry date. Once a classification method is chosen, items with an expiry date have to be stored using the FEFO method. Items with a shorter expiry date should be stored in front of those with a longer expiry date.

If the products do not have any expiry date, the FIFO method should be used. Items newly received should be stored behind the ones already on the shelves.

Controlled access. Some products need storage in an environment with controlled access. It is important to identify products that are at risk of theft or abuse, have the potential for addiction, or have legal or regulatory requirements; be sure to provide increased security for those items.

Controlled products should include those that are in high demand or have the potential for resale on the black market. Medicines such as ARVs and ACT may need to be kept in secure storage because they are scarce, expensive, and in high demand and short supply.

Examples of controlled products requiring special attention also include narcotics (such as pethidine and morphine), opioids and strong analgesics (such as codeine), and psychotropic medicines (such as diazepam).

Some of these medicines are **controlled substances,** which are medicines handled under international control. These medicines need greater attention. There are specific procedures in place for the procurement, reception, storage, dispensing, and administration of controlled substances.

Secure, access-controlled storage. If you have products that need increased security, such as ARVs, new antibiotics, or any items with value in the local market, you must establish access-controlled storage.

It is essential to be fully aware of the regulatory requirements for the storage of controlled substances in your country. In addition to the security measures detailed below, it may be necessary to register the premises, use two-key or double-padlock systems so that two staff members must always be present when the medicines are being accessed, and have a staff member with specific qualifications (typically a senior pharmacist) be in control of access and all stock transactions.

Security measures will probably include storing the products in a separate locked room, cabinet, or safe, or a locked wire cage within the storage facility. These areas should be set up so that an alarm is activated if the products are accessed improperly. Entry to such areas must be limited to the most senior staff. Limit the number of keys made for the controlled location and keep a list of people who have keys.

Donated products. Managing the storage of donated medicines can be complicated by donors' requirements to store and account for them in ways different from those for other medicines. Some donor organizations require that medicines from different funding rounds be stored and reported separately. Supply management, and effective use of available storage space, is easier if such a requirement is not imposed. Wherever possible, it is best if the donating organization can be persuaded not to require separate storage and to accept the storage and inventory reporting systems in common use. When this is not possible, the donated medicines will have to be stored apart from general stocks, and you will have to use separate stock records and reports.

III. RECEIVING AND ARRANGEMENT OF STOCK

Seven things to do when receiving supplies. Following some basic steps will help you and your staff check the completeness and quality of deliveries of medicines and protect your facility or organization in case of fraud or theft.

1. Receive the supplies in person. All supplies should be received by at least one staff member at the time of delivery. Sometimes there will be an additional designated person to receive specific items, for controlled substances, for example. If this is the case at your health facility, both you and the designated person must be available to receive and check the supplies.

Check the delivery documentation against the original order. Make sure the number of boxes delivered matches what the medical store informs you was sent. This is often written on the delivery document.

2. Check the outside of the boxes for any signs of damage or opening that could indicate theft. Check for opened boxes. The bottom of a box may have been opened and carefully resealed after removing items. For example, someone may empty the contents from a tin and place the empty tin back into the carton.

Simply checking the number and quality of boxes can act as a deterrent to someone considering stealing supplies from your order.

3. Keep a record of deliveries. Delivery trucks often carry orders for several health care facilities on a delivery route. Supplies intended for your store or health facility may be delivered to another health facility by mistake. Keeping records of deliveries helps you to find and correct problems that may occur.

Record the delivery information each time you receive supplies and have the driver/person delivering countersign the document. Use a pen for this record so it cannot be easily changed.

At a minimum, the following information should be recorded at the time of delivery:

- date of delivery
- requisition/order number or, if that is not used, any information that would identify the order you placed
- issue voucher or delivery note number
- delivery person's name and signature
- delivery vehicle registration or license number
- number of boxes delivered
- signature of staff member(s) who received the supplies

Give a copy of the signed document to the driver for the supplier's records when the driver returns to the medical store. Keep delivery information in a secure and easily retrievable file.

If your health facility does not have a delivery form, you can make a form that includes all the essential information.

4. Check the supplies received against the items ordered and items identified as delivered on the delivery note. Remove the supplies from the boxes and read the original order and delivery forms. Review the items delivered against the quantities you ordered and received. Check that what you ordered is the same as what you received. Where the supplier has informed you that not everything you ordered was available, check that what you received is what the supplier says was sent.

If items are missing, order them again. If fewer supplies were received than were ordered, keep and use them, but plan on reordering these items soon. Notify your supervisor or local supply coordinator.

If you receive items that were not ordered or that are not listed on the requisition form, follow your policy for returning them. You may be able to keep and use some of the extra items, but be careful to check their expiry dates before accepting them. Check with your supervisor or local supply coordinator. If keeping the extra items means that your store will be overstocked or that items with shorter expiry dates will expire before you use them, return the extra items to the supplier.

5. Check the expiry dates of all items. Never accept expired items. Expired items may harm a patient or have no therapeutic effect. Check the expiry date against your receiving policy—which could be six months remaining until expiry, at a minimum. Follow your policy to return or dispose of them, and notify your supervisor or local coordinator.

6. Check the basic quality of all items in the delivery. Check for visual signs of damage or deterioration. Do not accept medicines that are poor quality or appear to have been tampered with.

Check and store all refrigerated items first. If refrigerated items, such as vaccines, are not packed in cold packs, they may have spoiled. *Do not accept them.* Look for temperature indicators—usually cards with a colored spot, which are increasingly being used to make certain that cold-chain temperatures are maintained throughout transit.

> The section "Maintaining the Quality of Products in Storage" provides more detailed information about maintaining product quality.

Put any damaged or poor-quality items in a box to return to the supplier or medical store. Dispose of or return expired and poor-quality supplies as soon as possible, following the appropriate policy on removing poor-quality items from your store.

7. Document all discrepancies. Documenting discrepancies protects you. If any medicines or health products are missing or were overissued, expired, damaged or of poor quality, tell your supervisor and record the problem in writing.

- If you notice the discrepancy at the time of delivery, ask the driver or delivery person about it and note it on the delivery form.
- If you find the discrepancy after the delivery, contact the supplier and follow your policy on reporting a discrepancy.

A discrepancy report form provides an easy way to record discrepancies. Record all missing or overissued supplies and expired, damaged, and poor-quality items. Sign the record and keep it on file.

If you do not have a form, write a letter about the discrepancy, including all the information described in this section. Agree with your supervisor about who should receive the letter. Usually you should send a copy to the appropriate authority and the supplier or medical store, and keep one on file. Health facilities and lower-level medical stores usually receive medicines and health products from a central or regional medical store or from other sources, such as donors. Module 1 of Managing TB Medicines at the Primary Level contains guidance on receiving TB medicines, much of which is generally applicable to all medicines.

In some settings, supplies are delivered to the health facility, while in others supplies are collected from the medical store. Either way, when supplies are received, the responsible person who receives them should:

- make sure there is sufficient storage space;
- prepare and clean the areas used for receiving and storing the products.

It is important that what is delivered is the same as what was ordered. The person receiving stock must have a copy of the order and should check against both the order and delivery paperwork to make sure that no supplies have been lost, stolen, or damaged and that the delivered items are of the expected quality and not expired or near their expiry date.

If the products are not the same as you ordered, either in specification or quantity:

- If there is time, check with the relevant authority—pharmacy, laboratory, or other clinical section—to see if you can accept them or not.
- If there is not time to obtain clarification on acceptance while the truck is there, accept the goods provisionally or conditionally, marking the delivery note to that effect. Quarantine the supplies until clarification is obtained, and then either accept them into stock or arrange to return them.

If products appear damaged or expired:

- Separate the damaged or expired stock from the usable stock.
- If damage or expiry is discovered while the delivery truck is still at your site, refuse to accept the products and note the problem(s) on the delivery note.
- If damage or expiry is discovered after the delivery truck has departed, follow your facility's procedures for handling damaged or expired stock.

If products do not appear damaged or expired:

- Count the number of units of each product received and compare your count to the issue voucher.
- Record the date and the quantity received on the stock card and bin card, if applicable. (A bin card is a stock card kept on the shelf with the product that records the amount in that location only.)
- Make sure the expiry date is visibly marked on every package or unit.
- Arrange products in the storage area to facilitate the FEFO procedure.

Discrepancies in orders are common. They may include missing items or smaller quantities than ordered. They may also include items that are or are nearly expired, damaged, or of poor quality. Discrepancies are very costly and should not be ignored. For a quick reference on receiving supplies, see the Receiving Supplies Checklist in Appendix C.

IV. STOCK ROTATION AND EXPIRY MONITORING

When you issue products that have an expiry date, follow the FEFO guidelines to minimize wastage from product expiry:

- Always issue products that will expire first, double-checking to make sure that they are not too close to or past their expiration date. The shelf life remaining must be sufficient for the product to be used before the expiry date. Take special care with TB treatment kits: these contain medicines for a six-month treatment period, and so must have a minimum of a six-month expiry time remaining when they are issued to health facilities or dispensing centers.

- ARVs and other products that have come from the United States may have the date in the month-day-year format instead of the customary international standard of day, month, and year.
- To facilitate FEFO, place products that will expire first in front of products with a later expiry date.
- Write expiry dates on stock cards, so stocks can be sent to facilities at least six months before they expire.

V. PRODUCTS THAT REQUIRE SPECIAL STORAGE CONDITIONS

The storage of flammables, corrosives, and products that require temperature-controlled conditions is discussed in this section.

Flammables. Some flammable liquids commonly used by the health care facilities include acetone, anesthetic ether, alcohols (before dilution), and kerosene. Large quantities of flammables can be stored on the premises if necessary, but they should be kept in a separate location away from the main storeroom. Large quantities of flammables should never be stored in the same areas as medicines.

A small stock of flammables may be kept in a steel cabinet in a well-ventilated area, away from open flames and electrical appliances in the main store. Whether you are storing large or small quantities of flammables, always store them in their original containers. The shelves of the cabinet should be designed to contain and isolate spillage. Mark the cabinets to indicate that they contain highly flammable liquids, and display an international hazard symbol like this one.

It is very important to store flammable materials in the coolest location possible and never in direct sunlight. It is also important to control the evaporation rate and avoid the buildup of pressure. This can be done, initially, through good design: providing temperature control and good open (nonmechanical) ventilation. The design for a small store of flammables may be as simple as locating it in a shaded area with double-layer roofing and open-block-style walls (in other words, if the structure is made of small bricks, every other brick in the wall is missing) or ventilation or "air" bricks that have holes in them. During hot weather, it may be necessary to spray water over the structure and to place especially volatile items, such as ether, in dishes of water.

The flammables store should be at least 20 meters away from other buildings. Fire-fighting equipment should be readily available.

Corrosives. Corrosive substances commonly found in hospitals or other high-level health facilities include acetic acid, concentrated ammonia solutions, silver nitrate, and sodium nitrate.

Never store corrosive substances close to flammables. Ideally, corrosive materials should be stored in a separate steel cabinet to prevent leakage. Use appropriate industrial protective gloves and eyeglasses when handling these items. Protect workers by making the necessary safety equipment available for the quantities of corrosive stored, which for large quantities may include eyewash and flood showers.

Temperature-controlled products. Cold-chain defects are a frequent cause of problems in immunization programs. The potency of vaccines, blood products, test kits, and many other items depends on cold storage. Vaccines, in particular, must be kept at precisely controlled temperatures from the point of manufacture to the point of administration.

National and regional vaccine stores should be equipped with standby generators; ideally, district vaccine stores should have them as well. Having backups ensures that vaccines and other products are protected in the event of a power failure.

A collaboration between WHO and PATH, known as Optimize: Immunization Systems and Technologies for Tomorrow, has published comprehensive materials on assessing, designing, and implementing a cold chain. Please refer to this material for detailed technical advice. Box 2 lists some relevant publications.

VI. CONDUCTING A PHYSICAL INVENTORY

A physical inventory is the process of counting by hand the number of each type of product in your store at any given time. A physical inventory allows you to check that the stock on hand matches stockkeeping records. When you conduct a physical inventory, count each product individually by generic name, dosage form, and strength.

There are two common kinds of physical inventory: a complete physical inventory and a cyclic or perpetual physical inventory.

Complete physical inventory. In a complete inventory, all products are counted at the same time. A complete inventory should be done at least once a year in all stores, but more frequent inventories (quarterly or monthly) are recommended. A complete physical inventory is easier to conduct regularly at facilities that manage small quantities of products. If you manage a large warehouse, you may need to close the storage facility for a day or longer.

Cyclic or perpetual physical inventory. In a cyclic or perpetual inventory, selected products are counted and checked against the stockkeeping records on a rotating or regular basis throughout the year. Cyclic or perpetual physical inventories are usually appropriate at facilities that manage large quantities of products. If a cyclic physical inventory is used, count each product at least once during the year. Count fast-moving and sensitive products more frequently.

BOX 2. Publications about the Cold Chain

- PATH and WHO. "2009–2012 Optimize Strategy."
- PATH and WHO. "Landscape Analysis: Analysis of EVSM." [effective vaccine stores management] February 2008.
- PATH and WHO. "Landscape Analysis: Analysis of VMAT." [vaccine management assessment tool] October 2008.
- PATH and WHO. "Landscape Analysis: Cool Chain Technologies." June 2008.
- PATH and WHO. "Developing a Vision for Immunization Supply Systems in 2020: Landscape Analysis Summaries." 2011.

Organizing a cyclic physical inventory. There are a number of ways to organize a cyclic physical inventory. The most common are by:

- **Dosage form:** Count tablets in January, capsules in February, liquids in March, etc.
- **Location in the storeroom:** Count shelves 1–4 in January, 5–8 in February, etc.
- **Time availability:** Count a few items each day whenever staff have time. In large stores, a full-time staff is needed for conducting cyclic physical inventory checks.
- **Stock on hand:** Periodically count each item for which stock on hand is at or below the minimum inventory level.

VII. MAINTAINING THE QUALITY OF PRODUCTS IN STORAGE

This section covers five topics: indicators of quality problems, preventing damage in general, protecting against fire, preventing pests, and preventing theft. The specific checklists for each topic are in Appendix D in this chapter and will help you train your staff and manage these potential problems.

Products of different types show damage in different ways. Some indicators you can use to detect damage appear in Table 1.

Damaged products should never be issued to facilities or dispensed to patients. If you are not sure if a product is damaged, check with someone who knows. Do not issue or dispense products that you suspect are damaged.

When your supervisor or local coordinator or an inspector visits your facility, report any problems to him or her. The following list describes areas where you, as manager of a health program or health services, can prevent damage or loss.

Physical damage. Avoid crushing products stored in bulk. As a general rule, do not stack them higher than 2.5 meters (8 feet). Heavy or fragile items (such as those packaged in glass) should be placed in small stacks. Bind sharp edges or corners in the store with tape. Most important, arrange products so that nothing in the store can fall and injure members of the staff.

Cleaning. Sweep and mop or scrub the floors of the storeroom regularly. Wipe down the shelves and products to remove dust and dirt. Dispose of garbage and other waste often and in a manner that avoids attracting pests. Store garbage in covered bins.

Heat and humidity. Try to maintain the store at a constant temperature. Use a wall thermometer to monitor and record the temperature at least daily.

Simple ventilation systems such as extract fans can reduce both the temperature and humidity.

In cold countries, protect the store from frost damage using insulation. If necessary, a low-powered covered light bulb (“hot box”) heater or oil immersion heater can be used

TABLE 1. Indicators of Damage to Pharmaceutical Products

Type of Product	Signs of Damage
All products	■ broken or ripped packaging (vials, bottles, boxes, etc.) ■ missing, incomplete, or unreadable label(s) ■ blackening of the packing, which may indicate fungal growth in the packing material from extreme humidity, water damage, leakage of liquids, or low-quality glue used in the packing material
Liquids	■ discoloration ■ cloudiness ■ sediment ■ broken seal on bottle ■ cracks in ampoule, bottle, or vial ■ dampness or moisture in the packaging
Light-sensitive products (such as X-ray film)	■ torn or ripped packaging
Latex products	■ dryness ■ brittleness ■ cracks
Lubricated latex products	■ sticky packaging ■ discolored product or lubricant ■ stained packaging ■ leakage of the lubricant (moist or damp packaging)
Tablets	■ discoloration ■ crumbled pills ■ missing pills (from blister pack) ■ stickiness (especially coated tablets) ■ unusual smell
Injectables	■ liquid that does not return to suspension after being shaken ■ foreign particles
Sterile products (incuding IUDs)	■ torn or ripped packaging ■ missing parts ■ broken or bent parts ■ moisture inside the packaging ■ stained packaging
Capsules	■ discoloration ■ stickiness ■ crushed capsules
Tubes	■ sticky tube(s) ■ leaking contents ■ perforations or holes in the tube
Foil packs	■ perforated packaging
Chemical reagents	■ discoloration

to provide protection from freezing during the colder months. In countries with severely cold winters, vaccines must also be protected against freezing and frost damage.

Make certain that boxes are at least 10 cms above floors and at least 30 cms away from walls and ceilings to enable adequate air circulation.

Water damage. In flood-prone areas, stack boxes well off the ground, at least 1 m. Keep roof gutters and external drainage such as monsoon ditches clear and inspect them regularly. If the roof might be subject to storm damage, consider covering the tops of all shelving with waterproof plastic sheets.

Protecting against fire. Use the following guidelines to prevent damage to products from fire.

- Remove waste and packing materials from the store. If you wish to sell or recycle the packing materials, store them away from the medicines until they are collected.
- Make standard fire extinguishers available in every storage facility according to national regulations.
- Visually inspect fire extinguishers every two to three months to check that their pressures have been maintained and the extinguishers are ready for use.
- Service fire extinguishers at least once a year.
- Place smoke detectors throughout the storage facility and check them every two to three months to make sure that they are working properly.
- Strictly prohibit smoking in the store.
- Conduct fire drills for personnel every six months.
- Clearly mark emergency exits and check regularly to be sure they are not blocked or inaccessible.
- Display fire precaution signs in appropriate places in the storage facility (especially in locations where flammables are stored).
- Use sand to extinguish fires where there are no fire extinguishers. Place buckets of sand near the door.

Be sure medical store staff are trained to use fire extinguishers correctly. Appendix D in this chapter provides more information about the types and uses of fire extinguishers.

Preventing pests. The section on cleaning above provides guidance on basic ways to prevent infestations by pests. Appendix D provides detailed checklists for preventing pest infestation inside and outside the storage facility. Click here for additional information on this topic.

Protecting against theft. Typically, between 10 and 20 percent of the medicines you stock will account for more than 70 percent of the total cost of all medicines used. These are the medicines that should be monitored most frequently.

To carry out additional monitoring of products likely to be stolen or misused:

- Check inventory records for stock on hand. Then conduct a physical inventory and compare the results.
- Check the inventory records to determine the consumption during a specified period. Then check medical charts or prescription ledgers, and count the number of treatment courses during the same period. Convert treatment courses into dose units, and compare this figure with the stock issued from the storage area.

If you find a significant discrepancy, report it to your supervisor and investigate further.

Signs of corrupt activity can include:

- overcharging of patients
- substitution of medicines or other essential supplies
- bribery or acceptance of unauthorized payments from patients or staff
- abuse of authority
- travel-related fraud, including falsely claiming per diems

Reporting suspicions of theft or other corrupt actions is most safe and effective when there is an explicit whistle-blower policy that encourages such reporting and provides a reporting mechanism that protects the person reporting the suspicion. In the absence of such a policy and mechanism, reports should be made only to someone in authority in whom you have complete confidence. Your report should contain the following information:

- what alleged wrongdoing you are reporting
- where and when (dates and times if available) the incident took place
- who the perpetrator(s) is
- how the individual or firm committed the alleged wrongdoing

Box 3 contains links to useful guidelines and information on the issue of corruption.

BOX 3. Links to Information about Corruption

- From the World Bank, a list of anticorruption links;
- From WHO, "Good Governance for Medicines";
- From WHO, "Curbing Corruption in Medicines Regulation and Supply";
- From WHO, "Good Governance for Medicines Program Progress";
- Checklists for preventing theft during transport, in storage, and at health facilities are provided in Appendix D.

VIII. WASTE MANAGEMENT

It is important to dispose of pharmaceuticals properly because there can be serious negative consequences from improper disposal. Improper disposal can result in:

- environmental impacts, which may include contaminated water supplies, damage to flora (plants) and fauna (wildlife), and increases in antimicrobial resistance to medicines that have been inappropriately released into the environment;
- the diversion and resale of expired or inactive medicines;
- air pollution from improperly incinerated products.

Always follow your facility's procedures for handling damaged or expired medicines. In most cases, this will mean that you should send the products back to the warehouse that provides you with your supplies. Safe disposal of modern medicines is a specialized task that can often only be undertaken economically in bulk disposal facilities. Bearing this in mind, you might have to refer any need for medicine disposal to your regional or national health authority.

Storage facility grounds, including the area around health centers, must remain free of health care waste and other garbage. Maintaining a clean environment where pharmaceuticals and other health supplies are stored will reduce the number of pests, such as insects and rodents, and reduce the number of people, including children, who may be injured by used medical equipment or discarded medicines.

Check with local officials about laws that pertain to health care waste management and environmental protection before instituting a disposal technique.

Plan storage, transportation, and disposal techniques that are practical and simple. Monitor disposal practices on a regular, frequent basis.

Appendix E in this chapter provides guidelines for managing different kinds of waste. More detailed information can be found on the WHO website.

Inventory management and stock control

A well-functioning supply management system is essential for the effectiveness of the health system as a whole and, therefore, to the well-being of patients.

INVENTORY MANAGEMENT

Benefits of a successful inventory control system at the facility level. Maintaining a sufficient stock of items at a health facility has many benefits. Patients receive medicines promptly, and stock-outs can be prevented even when deliveries to the store are delayed. Supplies can be replenished at scheduled intervals, saving on administrative costs and transport time. Patients have confidence in the facility and seek help when they are ill. In addition, an effective inventory control system keeps track of and guarantees accountability for supplies.

Stock cards are the inventory management tool used to monitor stock level and consumption of medicines and health supplies. By monitoring the rate of consumption, the staff responsible for managing stocks can forecast future requirements with accuracy.

Problems arising from poor stock control. When inventory control fails, problems occur. A patient's condition may worsen because of a delay in treatment, or antimicrobial resistance may develop because a course of treatment was not completed. A patient may even die if a lifesaving medicine is out of stock. If medicines are not available in rural facilities, patients may have to make long and expensive journeys to obtain treatment. If the availability of medicines at the secondary level is better than at the primary level, the community will lose confidence in primary health care and seek hospital treatment instead.

Frequent stock-outs may establish or reinforce poor prescribing habits. For example, when a medicine is out of stock, a less suitable alternative may be prescribed. Emergency orders, which are expensive for the purchaser and inconvenient for the supplier, may be required.

Cost of maintaining stock. Stocking a new health facility can account for a significant amount of the facility's total annual budget. If stock is managed well, however, future expenses will be consistent with use. An efficient inventory control system saves money. Poor inventory control leads to wastage or increased costs for holding stock. For example:

- Overstocking of certain items may tie up a substantial portion of the pharmaceutical budget, leaving insufficient funds for other important, perhaps lifesaving, medicines.
- Overstocked medicines often expire.
- Poor storage conditions may result in spoiled stock (for example, dressings may be soaked by a leak in the roof, or injectable medicines may lose potency if the storeroom is too hot).
- Poor stock records and poor security make theft easier.
- A change in prescribing policy or practice may make a medicine obsolete. Without good inventory control, such changes may result in excessive wastage.

The role of leaders and managers in improving inventory management. Whether you are a supply officer, facility manager or clinic director, district manager or local supply coordinator, or provincial or national manager of medicines, you play a critical role in helping staff and stakeholders understand the costs and benefits of good management of medicines and health products. You apply good leadership and management practices in your work, for example, by inspiring staff and organizing them to implement improvements to inventory management systems.

Staff sometimes resist the implementation of inventory control systems. The reasons should not be ignored but rather brought out into the open for discussion. Common reasons for resistance are a perceived lack of time for record-keeping or the feeling that "this is not my job." Lack of appropriate training may also play a major role in resistance to new systems.

An advocate on staff can demonstrate that the time used for inventory management activities is time well spent. Patients also need to understand that the time health workers spend to maintain records helps ensure that their medicines will be available during their next visit.

Using stock records for ordering stock. Successful supply management means that the required items are available for the patients who need them. Supplies are more likely to be available if you order them regularly and in the correct quantities. In general, the amount of supplies to be ordered should be based on the amount that is used or their past consumption. Well-maintained stock records contain all the data required for deciding what to order, when to order, and the quantities to order.

For a quick reference on supply ordering, see the Ordering Supplies Checklist in Appendix F.

STOCK CONTROL

Standard list of stock items. Each medical store should maintain a standard list of stock items that includes all the products it handles, with their specifications, including form, strength, and quantity per package. The list should be regularly updated and distributed to substores and units.

Do not order products that are not on the standard list unless you have specific permission. You should not accept deliveries of products not on the list unless special circumstances have been identified.

Stock records should be maintained for all products on the list.

Stock records. It is important to keep good records of all the medicines and related supplies you have in stock. This helps you understand the flow of supplies into and out of your health care facility. It will also help you know:

- what items are available in stock
- how much is available of each item in stock
- how much stock is used on a regular basis

In addition, keeping records serves as the basis for the information needed when ordering new stocks of medicines and other supplies.

Keeping records saves you time and protects all the supply staff. If there are accusations of theft or misuse of supplies, you will be able to refer to your records and provide a clear audit trail and evidence. Your records will document the movement of supplies. They can show that you are not responsible for the problem.

There are different ways of keeping records. The procedures recommended in this section are based on the use of a typical stock card format. Your store, health care facility, or organization may have its own stock card format. Stock cards can be made or modified to fit most types of record-keeping systems.

> For a quick reference on record-keeping procedures, see the Stock Card Checklist in Appendix F. Modules 2 and 4 of *Managing TB Medicines at the Primary Level* also contains useful guidance on keeping records and calculating orders for TB medicines, much of which is generally applicable to all medicines.

THE STOCK CARD AND STOCK CARD SYSTEM

Stock cards are essential to manage supplies correctly. You will refer to the information recorded on the cards as you manage medicines and related supplies. A good reference for explaining the value of stock cards and training staff in their use is Andy Gray's "Using Stock Cards to Improve Drug Management."

There should be a stock card for each item in your store. In small stores, keep the stock card with the item on the shelf. Use the stock card to track the movement of the item. Record when and how the item is used. This includes all movements, such as when a new shipment of an item arrives at the store, when an item is moved out of the storeroom to the dispensary, or when an item is dispensed directly to a patient.

If your store receives supplies from donors, there may be special requirements. Follow the instructions you have received from your supervisor or local coordinator.

A typical stock card, such as the one illustrated in Figure 3, would record the following information at the top:

- **item:** generic name of product, including its form and strength;
- **code number:** number that identifies the item, if there is one;
- **unit and size:** type of container (tin, bottle, tube, blister package, etc.) and the amount of item in the container;
- **price or per unit cost:** if this information is collected at your store.

There may be an item in your store that has different forms, strengths or unit sizes. Examples of differences include:

- **forms:** medicine can be in tablet, liquid, or ointment form;
- **strengths:** for example, amoxicillin can be in 250 mg tablets or 500 mg tablets;
- **unit sizes:** a tin of tablets can contain 50, 100, 500, or more tablets.

If you have an item in your store with more than one form, strength, or unit size, use a separate stock card for each one. Treat each different form, strength, or unit size as a separate stock item.

A typical stock card also has columns for recording information about the movement of the item:

- **date:** when the item is received into the store or issued out of the store;
- **received from:** name of supplier or medical store;
- **quantity received:** number of units received at the store;
- **issued to:** name of health facility and/or dispensing area where the item will be used or dispensed to patients;
- **quantity issued:** number of units issued from the store;
- **stock balance:** number of units remaining in the store;
- **remarks:** important information about the movement of the item, such as batch numbers and expiry dates;
- **signature:** person who records the movement of the item.

FIGURE 3. Typical Stock Card

COMMUNITY HEALTH NGO PROVIDED SERVICES — Medicines Stock Control Card							
Item Name: Depo Provera							
Strength: 150mg/ml				**Dosage Form:** Vial			
Unit: 100 vials				**Price/Unit:** $1.09			
Date	**Received From**	**Quantity Received**	**Issued To**	**Quantity Issued**	**Stock Balance**	**Remarks**	**Signature**
1/6/08	B/F				125	Balance brought forward	
4/6/08			Family Planning Center I	30	95		
5/6/08			Family Planning Center II	20	75		
9/6/08			Health Post	8	67		
14/6/08			Health Center	61	6		
18/6/08	UNFPA	200			161	100 vials broken when box dropped	

How to record information on stock cards. When you record information on a stock card:

- Use a *pen* to record the item, code number, unit, and size and all information about the movement of the item. This information does not change.
- Use a *pencil* for the price. This information may change.
- Use a *pen* to make all stock entries and record issues and balance information.
- If you make a mistake on an entry, do *not* use correcting fluid. Cross out the incorrect entry, and make a correct entry on the line below. Enter the reason for the correction in the Remarks column.
- Use a different color, such as red, only for recording physical stock counts or making any other adjustments, for example, if you find an arithmetical error in the balance. Write the correction in red ink with an explanation in the Remarks column.

The information that you write in the Stock Balance column helps you determine when it is time to order more and how much to order. In the Remarks column, record information about the stock, such as the following:

- In the first line of a new stock card, write "balance brought forward" if this is a replacement stock card or "new stock" if this is the first time you are keeping this item in your store.
- For new or reordered stock, record the order requisition number, expiry date, and price, if necessary.
- For expired, poor-quality, or overstocked items, record information about the removal of the items.
- Record any other information that is important to the management of medicines and health products at your facility, such as the consignment arrived with a number of broken bottles, the color of the packaging has changed, storage instructions have been revised, etc.

Make an entry every time you receive or issue an item. Record only one movement (that is, one receipt or one issue) per line. It is very important that you write the record at the time of movement. See Figure 3 for an example of a stock card.

How to manage stock cards. One of the key aspects of good stock management is keeping accurate records. It means that at any time the physical stock of a product should match the quantity recorded on the stock card.

This can be easily achieved only if the stock card is updated at the time the transaction occurs, that is, when items are received or issued. *Quantities received or issued should* not *be entered on a separate ledger or a piece of paper and the stock card updated at a later date.*

In small stores, it is helpful to keep the stock card with the products to facilitate and speed the maintenance of the record.

Entering data on the stock card. Any time information is entered, the date of the transaction is entered first and whoever enters the transaction on the card must initial the entry. Guidance on entering information on stock cards is provided in "How to Record Information on Stock Cards."

At the health facility, the stock may be divided into two categories: the **bulk stock** and the **dispensing stock**.

- The **bulk stock** is stored in the main storeroom, if there is one, or on the shelves or in the cupboard of the facility.
- The **dispensing stock** is kept in the dispensing area. The dispenser fills prescriptions from the dispensing stock only.

Staff should use the bin card kept with a product in bulk stock to record only the issues made from the bulk stock to the dispensing stock, not every pharmaceutical dispensed to a patient.

When a container from the dispensing stock is empty, the supply officer replenishes its stock with another one from the bulk stock.

How to enter receipts. When the goods that have been ordered arrive, the quantities received should be checked against the accompanying delivery documentation. If there are any discrepancies, the following should be checked:

- Were all the boxes received?
- Was anything broken?
- Were any goods delivered that were not ordered?

If these issues cannot be resolved, the supplying organization must be contacted.

To accurately reflect the stock balance, all receipts must be recorded following the guidelines previously listed in "How to Record Information on Stock Cards." To keep an accurate balance, other types of receivables (exchanges between districts or facilities, goods returned, etc.) should be entered in the same way.

After recording the receipts, the supply officer places the new stock alongside the regular stock on the shelves using the FEFO or FIFO method.

Inventory adjustment when a product is expired, broken, or damaged. At regular intervals (for example, every three months), check the expiration date of the various batches, and discard expired, damaged, or obsolete items. The stock card should be updated as follows:

- **date:** the date the expired medicines were removed from the shelf;
- **to/from:** the name of the institution to which the item is being returned for disposal. Otherwise write the word "destroyed";
- **quantity issued:** the quantity removed from the shelves. The quantity is circled, preferably with a colored pen, to indicate that it was not issued for use by a health facility or patient;
- **stock balance:** the stock balance, which equals the previous stock balance minus the quantity issued;
- **remarks:** an indication that the item was "expired," "broken," or "damaged." Record the expiry date of the batch that has been removed.

STOCK CONTROL AND BUDGET MANAGEMENT

Budget management is an integral part of supply management in many countries. It is essential that managers at the district- and health-facilty levels, as well as NGOs working in the system, use budget management to optimize the use of resources, which are becoming more limited from year to year. Please see Chapter 7 of this handbook, which is about financial management, for more information on creating and monitoring budgets and the efficient use of resources.

Analyzing the costs of products and total expenditures on medicines. The stock card can assist the budget management process by providing essential information on product consumption. Once the consumption of the most frequently used items is

BOX 4. Formula for Calculating the Total Cost of a Product Used during a Specific Period

estimated cost of item "A" for a specific period =
total consumption for that period × last cost paid per item

BOX 5. Formula for Calculating a Facility's Total Expenditures on Medicines in a Specific Period

total facility expenditures for a specific period = sum of receipts for that period

compiled for a particular period (a year, for example), it is easy to multiply the consumption figures (obtained from the stock cards) by the latest cost (which was recorded on the stock card after the last receipt) and get a clear idea of the cost of this particular item. Box 4 shows this simple formula.

All receipts can be costed and totals for the year calculated. This will give you a clear picture of the total expenditures for the facility. See Box 5.

The next step is to identify what percentage of the overall expenditures is spent on the most prescribed or most used products. See Box 6 for an example.

When a computerized system is available, it is quite easy to perform this exercise for all items. However, when you do the exercise manually, focus on the most popular items and the most expensive ones.

BOX 6. Calculating the Percentage of Overall Expenditures on the Most Popular Items

Formula

percentage of total expenditures spent on item "A" for a specific period "x" =
estimated item A cost for that period/total facility expenditures for that period × 100

Example

The total quantity of paracetamol issued during the last financial year equals 1,000 units. The price charged during the last delivery was $1.50 per issue unit. The product cost for the last financial year therefore equals $1,500, as follows:

1,000 × $1.50 = $1,500

During this period, the total value of the medicines received amounted to $30,000. Therefore, this product represents 5 percent of the overall expenditures for this particular financial year. Using the above formula, that is:

(1,500 ÷ 30,000) × 100 = 5%

Using ABC analysis. As a rule of thumb, when you do this analysis, called **Pareto** or **ABC analysis**, if you classify the items by descending order according to their value (the most expensive on the top), you will find that about:

- 15 to 20 percent of the top number of items are responsible for about 70 to 80 percent of the expenses (Class A);
- 10 to 15 percent of the next number of items are responsible for about 10 to 15 percent of the expenses (Class B);
- 60 to 80 percent of the last number of items are responsible for only 5 to 15 percent of the expenses (Class C).

There are two main reasons for an item to belong to Class A:

- It is an inexpensive item (such as paracetamol tablets) but is widely used.
- It is an expensive item (such as third-generation cephalosporins) whose use should be restricted to some specific conditions, but it is misused or over-prescribed.

It is, therefore, important to identify the items that belong to Class A. Any changes in the consumption or prices of one of these items will have a significant impact on overall expenditures.

Using VEN classification. As a manager responsible for the supply of medicines, you can use ABC analysis to find out "where the money goes," but it will not indicate whether the money is being spent on the right products. To complement this exercise, therefore, you also need to classify each item into one of three categories—vital (V), essential (E), or nonessential (N)—as follows:

- **V = vital** items (such as ACT or IV fluids) which are potentially lifesaving and have a significant negative impact if they are not available;
- **E = essential** items, which are effective against less severe, but nevertheless significant forms of illness (such as antibiotics and medicines for chronic conditions);
- **N = nonessential** items, which are used for minor or self-limited illnesses or are of questionable efficacy, and high-cost items with a marginal therapeutic advantage (such as cough mixtures, vitamins, or antacids).

There are no standard VEN classifications, since priorities change according to the level of care that a particular facility is expected to deliver or the geographical location of the facility. For example, malaria medicines are essential or vital in malaria-infected areas but are nonessential in malaria-free zones.

Once the Class A items are identified and tagged according to the VEN classification, you would expect to have only V or E items in Class A. Any N items that belong to A should be investigated, and you should aim to substantially reduce stock levels and orders of those items. Prescribers and patients should be informed about these measures, and you should provide ongoing education to staff as part of supervision.

ORDERING NEW STOCK

This section focuses on estimating needs for medicines and health products, based on historical data on consumption, and determining the quantities to order.

How to estimate future needs. There are two methods commonly used to estimate product needs for a procurement system: the **consumption method**, which uses historical consumption data, and the **morbidity method**, which is based on the number of cases of each major prevalent disease or health condition. The two methods are not exclusive, and each has strengths and weaknesses.

Consumption method. This section focuses on the consumption method through the use of the data recorded on the stock cards. The consumption method is the simplest, and often most accurate, way for you to calculate medicine requirements, because you (or the supply officer) has the information on medicines dispensed readily available on stock cards.

Nevertheless, it is important to realize that other factors, such as stock-outs, seasonal variations, short shelf life, and storage space, can affect the accuracy of consumption data. Formulary changes can also affect the accuracy of consumption data, for example, if new medicines are added or older ones removed. You will need to consider these factors when planning orders.

Morbidity method. The morbidity method takes into consideration the prevalence of various diseases in the community and the number and ages of patients to be treated. Pharmaceutical requirements are then estimated using standard treatment guidelines. The morbidity method can be useful, especially when you are planning new programs or scaling up programs, but it requires data that are generally not readily available to district and health facility staff.

Furthermore, data analysis can be difficult, since a larger data set is required to accurately assess disease patterns in a particular country. Its accuracy also depends on prescribers following standard treatment guidelines, which is often not the case and is beyond the control of supply managers.

Morbidity analysis is useful, however, when no consumption records are available, as a check on the accuracy of the consumption data, or when you are assessing whether prescription of medicines is being done in accordance with standard treatment guidelines.

Comparison of the consumption and morbidity methods. Table 2 compares the consumption and morbidity methods of quantifying pharmaceutical needs.

CALCULATING MONTHLY CONSUMPTION

Monthly consumption is one of the most critical pieces of information for forecasting your needs. At the start of each month, and for each stock item, you should calculate the quantity used during the previous month. The result is either entered onto the stock card, if it provides an appropriate space for that data, or recorded on a separate form or ledger.

TABLE 2. Comparison of the Consumption and Morbidity Quantification Methods

	Consumption	Morbidity
Uses	■ First choice for procurement forecasts if reliable data are available ■ Most reliable predictor when consumption pattern remains unchanged	■ Estimating needs in new and scaling-up programs or for disaster assistance ■ Comparing use with theoretical needs ■ Developing and justifying budgets
Essential data	■ Reliable inventory records ■ Records of supplier lead time ■ Projected medicine costs	■ Data on population and patient attendance ■ Actual or projected incidence of health problems ■ Standard treatments (ideal, actual) ■ Records of supplier lead times ■ Projected medicine costs
Limitations	■ Must have accurate consumption data ■ Can perpetuate irrational use	■ Morbidity data not available for all diseases ■ Accurate attendance data not available ■ Standard treatments may not really be used

There are two ways to calculate monthly consumption:

- Add all quantities of a specific pharmaceutical or contraceptive issued during this period.
- Add the quantity of medicines received during the month to the balance at the beginning of the month, and subtract the month-end stock balance from this subtotal.

See Box 7 for the formula for the second method and an example.

There are three kinds of figures in the monthly consumption:

- **A positive number:** If a product was issued during the previous month to at least one health facility or patient, the monthly consumption should be positive.
- **Zero:** If a product was not issued during the previous month, the monthly consumption is zero.
- **O/S (out of stock):** If the medicine was out of stock during the whole month, "O/S" should be entered in the corresponding box.

It is not possible for the monthly consumption of a given pharmaceutical to be a negative number, since this would mean that the pharmaceutical was distributed although the

BOX 7. Calculating Monthly Consumption

Formula

monthly consumption = (beginning of month stock + monthly receipts) – month-end stock balance

Example

A stock card for paracetamol 500 mg tablets shows the following:

- Beginning of April stock balance = 200 packs of 10
- Total receipts during April = 100 packs of 10
- Stock balance at the end of April = 50 packs of 10

Therefore, the monthly consumption during the month of April = (200 + 100) – 50 = 250 (250 packs of 10)

Note: The quantities added for the month must reflect only the quantities issued to your own health facility or patients. Quantities "issued" for the following reasons should not be included:

- expired or damaged
- stock adjustment or stock loaned to another facility

If the quantities issued under these circumstances are circled on the stock cards, it is easier to identify them.

facility was out of stock. If the monthly consumption appears to be a negative number, check the calculations for an error, or check the inventory card to verify that the data recorded are accurate.

Calculating average monthly consumption. The next step is to determine the average monthly consumption. The average monthly consumption is calculated for a particular period, which usually does not exceed 12 months. The method to calculate the average monthly consumption for a particular period is simple and involves the following parameters:

- **forecasting period:** the number of months included in the period, for example, 12 months;
- **total consumption:** the sum of the monthly issues obtained from the record containing each of the monthly issues, as described in the previous section on monthly consumption;
- **number of months out of stock:** the number of months included in that period during which the product was out of stock.

The average monthly consumption can be calculated using the formula in Box 8.

In the example in Box 8, the total usage for the fiscal year (606 units) is divided by 10, not by 12, because the item was out of stock for two months (January and May) during that period. Therefore, the average monthly consumption equals 606 ÷ (12 – 2) = 60.6, which can be rounded up to 61 units.

Once the average monthly consumption is known, you can use this information as a guideline to anticipate future pharmaceutical needs.

BOX 8. Calculating Average Monthly Consumption

Formula

average monthly consumption = total consumption for a given period ÷
(number of months covered by consumption period – number of months out of stock)

Example

Fiscal Year	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Usage	Expired
FY 2008/09	80	67	0	45	90	80	O/S	60	50	45	O/S	89	606	10

Calculating annual consumption. In the example in Box 8, the first month of the consumption table is not the first month of the calendar year but the first month of the fiscal year. Because budget monitoring is an essential concern, having the months in this order will facilitate the analysis of information for the fiscal year.

At the beginning of each fiscal year, total the monthly consumption of each pharmaceutical over the past year. Enter the result in the "Usage" column. Next to it in the "Expired" box, record the total expired quantities that were removed from stock.

In the example in Box 8, the consumption for the fiscal year is 606 units, that is, the sum of all the monthly consumption.

Assessing your stock status. To estimate how long the current stock will adequately meet the needs of your facility, district, or area (your **stock status**), divide the stock on hand by the average monthly consumption, as shown in Box 9.

Once you know the average monthly consumption of a product, it is a very useful and easy exercise to check the stock status of essential items routinely, especially for Category A items (which account for most of the spending on medicines).

BOX 9. Determining Your Stock Status

Formula

stock status (in months) = stock on hand ÷ average monthly consumption

Example

If the average monthly consumption of amoxicillin 250 mg capsules is 40 packs of 50 capsules per month, and the current stock is 160 packs of 50 capsules, the stock status equals 4 (160 ÷ 40 = 4). It means that the quantity in stock should last for another four months. This is true, of course, only if there are no major changes in the consumption pattern.

If the current stock of amoxicillin 250 mg capsules were 400 packs of 50 capsules, the stock status would equal 10 (400 ÷ 40 = 10). The next step is to determine if the product is overstocked.

When items are overstocked, they should be returned to either the depot (or hospital) or redistributed to other health facilities. District or regional meetings are excellent opportunities for you to explore with other supply managers the possibility of redistributing overstocked items.

Factors that influence order quantity. When calculating the quantity to order, you need to consider many factors. These factors can be divided into two broad categories:

- **Constant factors:** These factors do not vary too much from month to month. Their values are reasonably predictable and can be easily calculated from historical data.
- **Variable factors:** These vary regularly or cannot be anticipated.

Constant factors include:

- **Average monthly consumption:** the average quantity used per month;
- **Supplier lead time:** the length of time that elapses between the time the order is placed and the time the order is received at your store or facility;
- **Stock balance:** the balance in stock at the time of the order;
- **Procurement period/order frequency:** the length of time between two orders or how often an order is placed;
- **Storage capacity:** the smaller the facility storage, the less it can store.

Variable factors include:

- **Health campaigns:** If a campaign is launched to promote a particular product (such as contraceptives or vaccines), you can expect its consumption to increase during the campaign;
- **Disease outbreaks:** If there is an outbreak of a disease, the consumption of the products that are needed to treat this outbreak can be expected to increase;
- **Seasonal factors:** Some diseases are more frequent during a particular period of the year. Therefore, the consumption of the recommended medicines for these diseases increases. Examples include influenza in winter and diarrhea during the rainy season;
- **New prescribers:** If a new prescriber is appointed at the facility, you can expect some changes in the use of certain products;
- **Budget allocations:** When products are purchased within a limited facility budget, health workers have to make choices, and sometimes they decrease the use and order quantity of some nonessential items.

Ideally, you should have a clear idea of how all these factors influence the quantity to order. However, although some of them can be clearly defined, others are unpredictable.

The easiest option would be to order enough not to have to worry about potential stockouts, but financial resources are always limited. Remember that the greater the stock, the more funds are invested, and the greater the likelihood that stocks will expire.

BOX 10. Benefits and Costs of Keeping Inventory

Benefits	Costs
Minimize life-threatening shortages	Capital cost
Facilitate bulk purchasing	Expiration
Increase transportation efficiency	Spoilage
Protect against fluctuations	Obsolescence Storage Pilferage

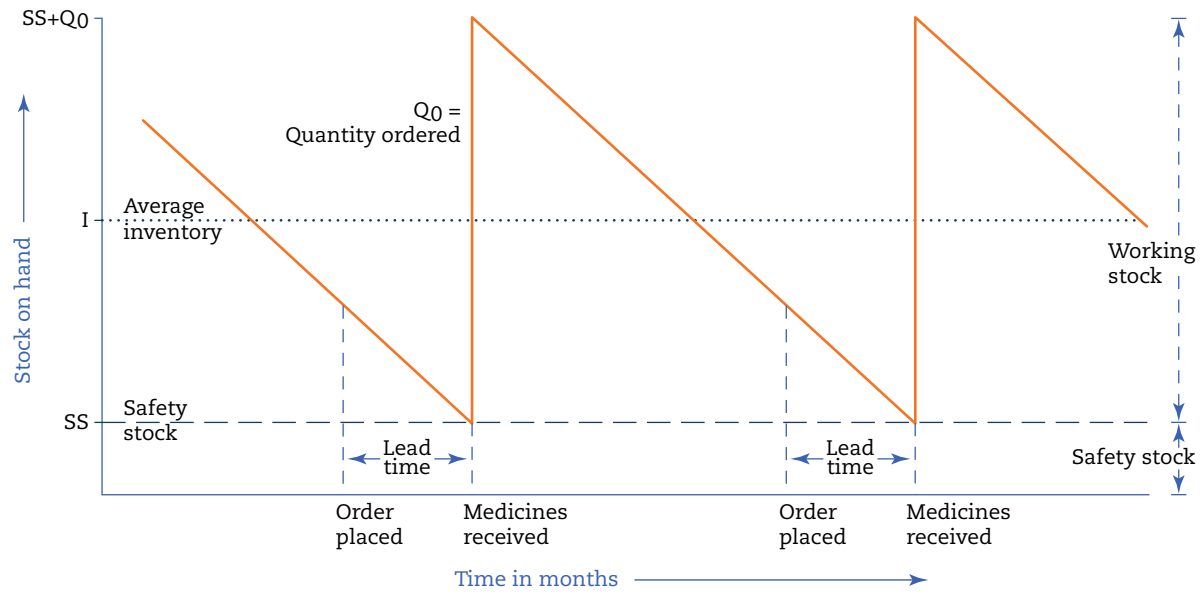
The art of good inventory management is to keep a balance between the benefits of keeping inventory and the costs associated with it. Box 10 lists some of these benefits and costs.

How to calculate the maximum stock. Besides monitoring stock status, the main objective of keeping good stock records is so you can order the right quantity at the right time, that is, have enough stock to supply health facilities or to dispense to patients until the next order arrives. This section presents two calculations you need to make to manage stock reordering:

- calculating the maximum stock
- calculating the quantity to order

In a typical inventory management graph, such as Figure 4, the stock level goes down with time, during which period an order is placed, ideally before the safety stock level is reached. When the order arrives, the stock level rises to its maximum. The quantity starts to be used again, and the stock level goes down over time, etc.

FIGURE 4. Ideal Inventory Control Model



The art of inventory management is to replenish the stock before the stock level falls below the safety stock level while not going over the maximum stock level.

In this model, orders are placed at regular intervals. When an order is placed, the quantity ordered should be just enough to bring the stock balance to the maximum stock level. However, because of unexpected changes in consumption patterns that can occur during the lead-time period, average monthly consumption could change. When the goods are received, therefore, the stock level would not match the maximum stock level. It could be lower or higher than the maximum stock level. You can correct the situation when the next order is placed.

This section describes the **maximum stock approach,** which means replenishing the stock to an optimal maximum stock level every time an order comes. This is a simple and reliable method, suitable for health facility and district stores. There are variations on this approach, such as those described in *The Logistics Handbook: A Practical Guide for Supply Chain Managers in Family Planning and Health Programs* (USAID | DELIVER Project, 2011), available at John Snow, Inc.

The maximum stock level is usually defined as having enough stock to cover both known times for processing reorders and any unforeseen delays. In general, this is the lead time plus order frequency period, with an additional amount for safety stock.

In most cases, the **safety stock** should be enough to last one lead-time period, in order to cover for any delays in delivery or unforeseen increases in consumption while you are awaiting the delivery. In essence, the formula doubles the lead-time period to allow for exceptional delays and unforeseen increases in usage.

Using maximum stock factors. To simplify calculation, you can use a predefined **maximum stock factor.** The system used by the Department of Health of the Eastern Cape Province in South Africa is shown as an example in Table 3. The maximum stock factor varies with the frequency of orders and the lead time.

In this example, with a lead time of four weeks (one month) and an order frequency of one month, the maximum stock factor in the table is 3, which is:

the lead time (1) + order frequency period (1) +
safety stock sufficient to cover the lead time (1)

TABLE 3. Maximum Stock Factor

	Lead Time (Weeks)			
Order Frequency	1	2	4	6
Weekly	1	1	2	3
Every 2 weeks	1	2	3	4
Monthly	2	2	**3**	4
Every 6 weeks	2	3	4	5
Every 2 months	3	3	4	5
Every 3 months	4	4	5	6

BOX 11. Calculating the Maximum Stock

Formula

maximum stock (in issue units) =
average monthly consumption × maximum stock factor

Three examples

1. If supplies are ordered once a month and the lead time is four weeks (one month), then the maximum stock factor is three. The average monthly consumption equals 50 units, and the current stock balance is 80 units. Therefore, the maximum stock is:

   50 units (average monthly consumption) × 3 (maximum stock factor) = 150 units

   In this example, the current stock balance of 80 is below the recommended maximum stock level of 150, so you would need to place an order for this item.

2. If supplies are ordered once a week and the lead time from the source is two weeks, then the maximum stock factor is one. The average monthly consumption equals 40 units, and the current stock balance is 58 units. Then the maximum stock is:

   40 units (average monthly consumption) × 1 (maximum stock factor) = 40 units

   In this case, because the stock balance (58) is greater than the recommended maximum stock, you do not need to place an order.

3. If supplies are ordered every two weeks and the lead time from the provider is four weeks, then the maximum stock factor equals three. The average monthly consumption equals 30 units, and the current stock balance is 85 units. Then the maximum stock is:

   30 units (average monthly consumption) × 3 (maximum stock factor) = 90 units

   Since the stock balance is just under the maximum stock, you could order a small quantity. A larger quantity can be ordered with the next scheduled order.

With a lead time of four weeks and an order frequency of six weeks (1.5 months), the maximum stock factor would be:

lead time (1) + order frequency (1.5) + safety stock (1) = 3.5

In this example, the sum would be rounded up to a maximum stock factor of 4.

Calculating the maximum stock. Once you have identified the maximum stock factor, the next step is to calculate the maximum stock using the formula in Box 11.

Then compare this maximum stock with the current stock balance of usable stock (without any expired or damaged items) to make a decision about whether to order stock:

- If the current stock balance is greater or equal to the maximum stock, there is no need to place an order.
- If the current stock balance is smaller than the maximum stock then you should place an order, unless the product is discontinued or its use is influenced by external factors such as the end of the rainy season, end of a campaign, or modification of the essential medicines list or standard treatment guidelines.

HOW TO CALCULATE THE QUANTITY TO ORDER

This section describes how to calculate the quantity to order so you can avoid stock-outs or overstocks.

Without knowing the exact average monthly consumption, it is impossible to determine with accuracy how much to order. This highlights the importance of maintaining up-to-date and accurate stock records.

One very common mistake is to order the quantity that equals the maximum stock minus the current stock. This does not work, because during the lead-time period issues are made from the stock. There is always a delay between ordering and receiving goods, which must be taken into account in the order quantity.

In effect, when the order is received, the stock balance is less than at the time of the order, and the sum of the stock plus the quantity received is not sufficient to reach the maximum stock. The solution is to add to the order a quantity equivalent to the amount likely to be issued during the lead-time period.

The concept behind calculating the quantity to order is simple: when the order is received, the quantity ordered should replenish the stock so that it returns to the maximum level. As explained in Box 11, if the maximum stock is greater than the stock balance, there is no need to place an order. So you must know the maximum stock before making any decision.

When you are ready to place an order, you need information about:

- the average monthly consumption
- the stock balance when the order is placed

Average monthly consumption has already been discussed in detail. The stock balance is available from the stock card or from a physical count if necessary.

In addition, you also need to know two relatively constant parameters:

- the lead time
- the order frequency

You should know the lead time and order frequency from experience, or you can consult the order schedule.

Determining reorder factors. To simplify decision-making, you can develop a **reorder factor table.** See Table 4, in which the lead time is added to the maximum stock factor for several combinations of lead time and order frequency. For example, in the maximum stock factor table (Table 3), the maximum stock factor for a four-week lead time and a monthly order frequency is 3. To determine the reorder factor, you add the lead time (one month) to this value, which gives you a reorder factor of 4.

TABLE 4. Reorder Factor Table

Order Frequency	Lead Time (Weeks) 1	2	4	6
Weekly	1.25	1.50	3.00	4.50
Every 2 weeks	1.25	2.50	4.00	5.50
Monthly	2.25	2.50	**4.00**	5.50
Every 6 weeks	2.25	3.50	5.00	6.50
Every 2 months	3.25	3.50	5.00	6.50
Every 3 months	4.25	4.50	6.00	7.50

Once you have identified the reorder factor, the next step is to calculate the quantity to order, using the formula in Box 12.

If the suggested order quantity is very small, you might decide to postpone ordering until the next scheduled date. Or, if the demand for a product is related to a particular season and the season is over, you would decrease the quantity to order or order nothing.

Combining the maximum stock and reorder factors. Once you have mastered using the maximum stock factor and the reorder factor, you can use both factors together to calculate the quantity of an item to order.

Appendix F in this chapter contains examples using these tables.

A caveat. These formulas should be used only as guidelines in estimating the precise quantities to order. A modification in any component of the procurement cycle (time of delivery, expiration date, disease outbreak, etc.) will influence the entire system. Your experience and the nature of each medicine or product are essential considerations in arriving at a final decision about the quantities to order.

Emergency orders. If there is an epidemic, emergency, or seasonal disease, do not follow the procedures for ordering supplies based on past consumption. Plan for the new situation after seeking the guidance of your supervisor or local supply coordinator.

For an epidemic or emergency, determine your emergency needs based on anticipated monthly consumption. Estimate what emergency supplies you will need and place an urgent order. Make sure that you know where and how to get these supplies as quickly as possible.

For a seasonal disease, order enough of the appropriate supplies well in advance of when you think the disease season will begin. Determine the amount you order based on how much you used during the previous season, such as last year or last rainy season or drought.

BOX 12. Formula for Calculating the Quantity to Order

quantity to order (in issue units) =
(average monthly consumption × reorder factor) – stock on hand

TABLE 5. Combined Maximum Stock and Reorder Factor Table

Order Frequency	Lead Time (Weeks)							
	1		2		4		6	
	Maximum Stock Factor	Reorder Factor	Maximum Stock Factor	Reorder Factor	Maximum Stock Factor	Reorder Factor	Maximum Stock Factor	Reorder Factor
Weekly	1	1.25	1	1.50	2	3	3	4.50
Every 2 weeks	1	1.25	2	2.50	3	4	4	5.50
Monthly	2	2.25	2	2.50	3	4	4	5.50
Every 6 weeks	2	2.25	3	3.50	4	5	5	6.50
Every 2 months	3	3.25	3	3.50	4	5	5	6.50
Every 3 months	4	4.25	4	4.50	5	6	6	7.50

In case of poor weather, which can cause delays in supplies reaching the facility, avoid delivery delays by planning ahead. If the rainy season is approaching and roads will be flooded, the supplies will need to reach the health care facility before the rains begin. Order extra supplies, increase buffer stocks, or place an order earlier than planned. Determine the quantity to be ordered based on the estimated number of months to be covered.

MONTH-END PROCEDURES FOR STOCK CONTROL

It is a good practice to check your stock regularly, and the end of the month is a good time to do so. You might want to do this on a rotating basis, which means checking the tablets and ointments, for example, one month and checking the injectables and large-volume parenteral preparations the next month, and so on.

Another good practice is to draw a line on your stock card to indicate the end of the month using a red or green pen. This allows you to identify the month quickly and make consumption calculations for it.

EVALUATION OF INVENTORY MANAGEMENT SYSTEMS

When you evaluate an inventory management system, you are not looking for complicated mathematics. Instead, you should be looking to see if:

- there are reasonable rules for determining order quantities (such as the system described in "Ordering New Stock;"
- the rules are widely understood and accepted, and applied consistently;
- basic stock records are maintained, are accurate, and are up-to-date;
- important parameters are kept up-to-date (minimum and maximum levels are reviewed, for example);
- senior staff show leadership by taking inventory management seriously.

The problem is that many organizations think that they do these things, but few actually do in practice. You can use the Inventory Management Assessment Tool (IMAT) to examine the effectiveness of inventory monitoring and record-keeping practices in warehouses

and helps users identify suggestions for improvement. This tool provides simple indicators of problems with inventory management; you can easily collect the information and rapidly make the calculations you need.

While IMAT does not offer a complete analysis of the reasons for any problems you identify with the supply officer or supply management team, it provides useful tips about where problems lie and suggests further work to fully understand those problems and develop possible solutions.

Distributing stock from the health facility storeroom

Medicines and supplies need to be moved from the facility store to the places where they are used, such as treatment areas, wards, or outpatient facilities. The procedures are similar, whatever the size of the facility. For details, see Chapter 46, "Pharmaceutical Management for Health Systems," in *MDS-3: Managing Access to Medicines and Health Technologies* (MSH 2012).

DISTRIBUTION IN SMALL HEALTH FACILITIES

Small facilities may not have a separate pharmacy, but they should have a storeroom or cupboard for medicines and a separate dispensing and treatment area. A working stock (often a single container) of common medications should be kept in the treatment area. You can store oral medications in a lockable trolley cart, cupboard, or dispensing box. A small stock of common injectable medicines should be kept on a covered tray in the treatment room. There is usually a separate area for cleaning and dressing wounds, where an appropriate range of items should be kept on trolley carts and in lockable cupboards.

Replenish these working stocks from the storeroom daily. Working-stock containers must be kept closed, except when they are actually being used, to avoid deterioration and loss of therapeutic value. Details appear in the section of this chapter headed "Good Dispensing Practices."

DISTRIBUTION IN HOSPITAL PHARMACY DEPARTMENTS

The movement and control of stock is more complex in larger facilities where medical, surgical, and maternity care are provided. Each type of ward should have its own stock list to facilitate control and reduce the potential for misuse, and separate storerooms may be needed. The hospital pharmacy should be responsible for restocking all medicine storage areas and may also dispense to individual inpatients and outpatients. The volume of outpatient prescriptions may justify an outpatient dispensary separate from the main pharmacy. An option for hospitals serving patients with chronic conditions is to refer established patients to local health facilities for their medications, which reduces the time and cost of travel for patients.

The hospital pharmacy may have working stock from which it dispenses medications to inpatients and upon their discharge, to outpatients, and to wards, departments, and emergency trays. A "want list" should be compiled throughout the day, for daily replenishment from the storeroom. This responsibility will normally rest with a limited number of individuals; this work is done on a rotating basis in many hospital wards.

Prepacking for outpatient dispensing. To save time for both staff and patients in busy facilities that dispense a high volume of prescriptions, prepacking commonly dispensed oral medications in appropriate quantities for standard treatment courses is useful. This packing can be done at quiet times of the day or week. Prepacking is also necessary when quantities smaller than the original pack are needed for ward stocks.

In some countries, purchasing commonly used medicines commercially prepacked in unit-of-use (course-of-therapy) containers may be cost-effective. This is especially appropriate for long-term therapies, such as those for TB, where use of the TB kits provided by the Global Drug Facility has been especially beneficial. Prepacked medicines are also appropriate for high-volume items such as malaria treatments.

Important considerations when repacking medicines are:

- use containers suited for maintaining pharmaceutical quality;
- avoid contaminating or mixing different batches of medicines;
- label containers appropriately and assign a new "use by" date.

Supplying inpatients. There are three basic techniques for hospital pharmaceutical distribution to inpatients:

- bulk ward stock
- individual medicine orders
- unit dose distribution

The bulk ward stock system is still used in many countries. The imprest, exchange, or topping-up system is a common method for supplying wards with bulk stock. Empty containers are returned for refilling, with the empty container being exchanged for a full one (the "full-for-empty" method) at weekly or twice-weekly intervals. Each ward should have a box that can be locked by both pharmacy and ward staff for transferring supplies between the two units. Stricter security procedures should be applied for antibiotics, items with a high value in the local market, and narcotics.

In a ward stock system, the pharmacy should provide a schedule indicating on which day each ward or department is to be supplied and specifying the category of supplies. Pharmacy, stores, and ward staff must decide together about the types and quantities of medicines required based on usage data, and pharmacy staff members must monitor ward stock storage and record-keeping.

Emergency trays. A selection of medicines and equipment for emergencies should be placed in wards and outpatient departments. The contents should be recorded on a list and checked regularly. Whenever an item is used, it should be restocked immediately. The emergency tray should not be used for routine supplies.

Table 6 indicates the contents of an emergency tray at a rural health center. This example is from Zimbabwe and is indicative of what could be used in similar settings.

TABLE 6. Medicines for an Emergency Tray at a Health Post

- Ampicillin powder for injection, 1 g (as sodium salt) in vial
- Atropine injection, 1 mg (sulfate) in 1 mL ampoule
- Calcium gluconate injection, 100 mg/mL in 10 ml. ampoule
- Charcoal, activated powder for oral suspension, bottle, 50 g
- Chloramphenicol powder for injection, 1 g (sodium succinate) in vial
- Diazepam injection, 5 mg/mL ampoule (intravenous or rectal)
- Epinephrine/adrenaline injection, 1 mg (as hydrocloride or hydrogen tartrate) in 1 mL ampoule
- Ergomerine injection, 200 µg (hydrogen maleate) in 1 mL ampoule
- Gentamicin injection, 40 mg (as sulfate)/mL in 2 mL vial
- Glucose injectible solution, 5% in 1 L bag
- Glucose injectible solution, 50% hypertonic
- Hydrocortisone powder for injection, 100 mg (as sodium succinate) in vial
- Phytomenadione (vitamin K1) injection, 10 mg/mL in 1 mL ampoule (adult)
- Promethazine injection, 25 mg (as hydrochloride)/mL in 2 mL ampoule
- Magnesium sulfate injection, 500 mg/mL in 10 mL ampoule for use in eclampsia and severe preeclamsia and not for other convulsant disorders; available for trained midwives
- Magnesium sulfate powder
- Nifedipine scored tablet, 10 mg
- Quinine injection, 300 mg (as dihydrochloride)/mL in 2 mL ampoule
- Salbutamol injection, 50 µg (as sulfate)/mL in 5 mL ampoule
- Sodium lactate, compound solution injectible solution, 1 L bag

Source: Timor-Leste Ministry of Health 2004.

SUPPLYING COMMUNITY-BASED HEALTH WORKERS

Community health workers (CHWs) usually have a limited selection of the most commonly used items. A topping-up system, whereby stock levels are checked and then resupplied to a predefined level, can be used to replenish stocks as long as requirements are small and the health center is reliably stocked. A monthly supply interval is usually adequate.

HOME-BASED CARE KITS

The family is usually the source of long-term care for chronic conditions such as AIDS and TB. Home-based care kits can be supplied to CHWs to distribute to caregivers. Kits should be designed according to the individual condition, but at a minimum they should contain appropriate essential medicines, such as painkillers and antidiarrheals, as well as supplies such as gloves, soap, and disinfectant.

Basic care information written in local languages and using diagrams and drawings should be included. CHWs should restock the kits regularly from the supplies at dispensaries and health centers.

Good dispensing practices

The aim of all pharmaceutical management systems is to deliver the correct medicine to the patient. The steps in the pharmaceutical management cycle of selection, procurement, and distribution are essential steps in the rational use of medicines.

A critical component of rational use is correct dispensing of medication, including providing patients with appropriate information about their medication. Correct dispensing is, therefore, a vital part of the daily work of primary health care facilities and district hospitals.

Good dispensing practices ensure that an effective form of the correct medicine is delivered to the right patient, in the prescribed dosage and quantity, with clear instructions, and in a package that maintains the medicine's potency. Dispensing includes all the activities that occur between the time the prescription is presented and the medicines are issued to the patient.

A safe, clean, and organized working environment provides a basis for good practice. Dispensing must be performed accurately and should be done in an orderly manner, with disciplined use of effective procedures. Appendix G in this chapter provides a detailed guide to dispensing principles and procedures.

Rational prescription and use of medicines

The goal of good pharmaceutical management practices is having the correct medicines prescribed for and used by the patient. According to WHO, "the rational use of drugs requires that patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time, and at the lowest cost to them and their community" (WHO 1987).

Many factors influence rational use, and it is essential to formulate an overall policy for rational use of medicines and detailed procedures to address each of the component areas. However, the following criteria are central to any policy on rational prescribing and use:

- correct medicine;
- appropriate indication: the reason for prescribing is based on sound medical considerations;
- appropriate medicine, considering efficacy, safety, suitability for the patient, and cost;
- appropriate dosage, administration, and duration of treatment;
- appropriate patient: no contraindications exist, and the likelihood of adverse reactions to the medicine is minimal;
- correct dispensing, including appropriate information for the patients about the prescribed medicines;
- patient adherence to treatment.

More information about rational prescribing and use can be found in the Human Resources section of *MDS-3: Managing Access to Medicines and Health Supplies* (MSH 2012).

Dealing with expired, damaged, or obsolete items

Expired goods should not be accepted from the supplier; they must be sent back immediately. The resources of the health facility should not be used to pay for these items.

Sometimes having expired items becomes unavoidable, however. For example, items may be held in reserve for emergencies, they might be vital items that are not used regularly, or they were overstocked and were not redistributed to another health facility. Remove any expired, damaged, or obsolete items immediately from the storage area and secure them in a clearly labeled container or box with a label warning others not to use the contents. Indicate that the items are going to be destroyed. This box should be stored in a different room, away from any regular stock.

If feasible, this box should be returned to the supplier (pharmaceutical depot or hospital). If it is not feasible, the items have to be destroyed at the facility.

Disposal methods are discussed in the next section. Regardless of the method, the destruction of pharmaceutical waste should be undertaken by a team under supervision and not by an individual. The team must witness the actual destruction of the product, that is, its entry into an incinerator or transport to and discharge at a dump site.

The procedure should be documented in a dedicated ledger. The following information should be recorded:

- date, time, and place of disposal
- disposal method
- list of the items disposed of and reason(s) for
- estimated value of the items disposed of
- composition of the team
- name and signature of the team leader and one witness

METHODS OF DISPOSAL

The following guidelines are derived from a WHO document, "Guidelines for Safe Disposal of Unwanted Pharmaceuticals in and after Emergencies."

In general, expired pharmaceuticals do not represent a serious threat to public health or the environment. Improper disposal may be hazardous if it leads to contamination of water supplies or local resources used by nearby communities or wildlife. *Expired medicines may fall into the hands of scavengers and children if a landfill is insecure.* Most expired pharmaceuticals become less efficacious, and a few may develop a different adverse reaction profile.

Many methods exist to dispose of pharmaceuticals. In this section, we look at the methods that should (or should not) be used at the facility level. The methods used depend on the nature of the medicines and their pharmaceutical forms. These methods are summarized in the table in Appendix E in this chapter.

Open, uncontrolled, nonengineered dump. A nonengineered dump is probably the most common method of land disposal of wastes. Untreated waste disposal into an open, uncontrolled, nonengineered dump does not protect the local environment and should not be used unless the products are immobilized, for example by being encased in concrete.

If it is not possible to immobilize the waste pharmaceuticals, using a nonengineered dump should be the last resort. The untreated waste must be covered rapidly with large quantities of municipal waste to prevent scavenging. Discarding in open, uncontrolled dumps with insufficient isolation from the aquifer or other watercourses can lead to pollution, and, in the worst cases, contaminate of drinking water.

Engineered landfill. Such a landfill has some features to protect against loss of chemicals into the aquifer. Direct deposit of pharmaceuticals into an engineered landfill is the second-best option.

Waste immobilization by encapsulation. The best option is disposal of encapsulated pharmaceuticals into an engineered dump. Encapsulation involves immobilizing the pharmaceuticals in a solid block within a plastic or steel drum. Drums should be cleaned prior to use and should not have contained any hazardous materials previously. They are filled to 75 percent capacity with solid and semisolid pharmaceuticals, and the remaining space is filled by pouring in cement, a cement-lime mixture, or a bituminous mixture, such as road tar. The sealed drums should be placed at the base of the landfill and covered with fresh municipal solid waste.

Sewer. Some liquid pharmaceuticals, such as syrups and intravenous fluids, can be diluted with water and flushed into sewers in small quantities over a period of time without serious public health or environmental effects. Fast-flowing watercourses may likewise be used to flush small quantities of well-diluted liquid pharmaceuticals or antiseptics. If in doubt, check with your environmental health authority.

Burning in open containers. You should not destroy pharmaceuticals by burning them at low temperatures in open containers, because toxic pollutants may be released into the air. Paper and cardboard packaging may be burnt. Polyvinyl chloride (PVC) plastic, however, must not be burnt. While burning pharmaceutical waste is not advocated as a method of disposal, we recognize that it is sometimes used. We strongly recommend that only a very small quantity (less than 5 kg) of waste pharmaceuticals be disposed of in this way.

Incineration. Waste pharmaceuticals can be destroyed in high-temperature incinerators. A minimum temperature of 850°C is required. Hospital incinerators may be used for this purpose if they meet the necessary temperature requirements.

Disposal by specialists. Increasingly, environmental concerns and stricter regulations are leading to the need to use specialized disposal operators—especially when there are significant quantities of medicines to be destroyed. These operators typically use recycling techniques for packaging materials, and fully oxidant, high-temperature incineration with controlled and monitored gaseous discharge, followed by ash encapsulation and land site dumping. Costs are naturally high, but it is a component of the management of medicines to make adequate cost provisions for the destruction of expired and damaged medicines.

Appendix E in this chapter identifies appropriate disposal methods for various categories of pharmaceuticals. Detailed information can be found in WHO's, Guidelines for Safe Disposal of Unwanted Pharmaceuticals in and after Emergencies (1999).

Training and performance improvement of supply staff

Effective pharmaceutical management depends on the people who carry out the work, as well as those who lead and manage it. Staff members who handle medicines and health products in district medical stores and public and NGO health facilities need training so that they have a minimum set of skills, competencies, and knowledge in the following subjects:

- setting up a storeroom and good storage practices
- inventory management and use of stock control forms, including requisitions, stock records, and prescriptions
- receiving and issuing stock
- good dispensing practice
- handling expired and damaged stock
- cold-chain procedures, including the use and maintenance of refrigerators
- security and theft control
- pest control

There are no standard training courses that are perfectly suited for all countries and settings, since different countries manage the delivery and distribution of medicines and health products in various ways. Some of the procedures described in this chapter may differ from the practices in your country. Some of the tasks described may not be relevant for some settings. Consult national or local authorities for help in developing a training program customized for your situation.

To develop a training program that meets local requirements, carry out a rapid assessment of training needs by:

- reviewing previous assessment findings and/or conducting a new assessment;
- observing staff performing their normal duties;
- interviewing staff and others;
- reviewing activities in relation to standard operating procedures;
- studying routine reports and performance reviews, along with job descriptions.

Then you can design a training program to improve the performance of a particular task or set of tasks, taking into account the demands of standard procedures, the educational level of the personnel, and the time and resources available for training. For health facility and district-level training, options would normally range from on-the-job training to short courses. Long-term placements in academic institutions might be considered for some staff, such as pharmacists, depending on local circumstances and the particular needs of the individuals concerned. In general, however, such placements would not be warranted for health facility and district staff.

BOX 13. Training Programs and Resources

Supply Management Training for Primary Health Care Facilities. The WHO drug supply management training program describes all major medicine and supply management tasks at first-level health care facilities and is a useful resource for training program development.

Training in Pharmaceutical Management. *MDS-3* Chapter 52 discusses the design and management of training programs for supply system staff in more detail. A related training series is available from Management Sciences for Health for use in training programs.

Training in Logistics. The *Logistics Workbook—A Companion to the Logistics Handbook* from the USAID | DELIVER Project contains a series of distance-learning exercises that can be undertaken at your own pace and used as a method of self-development.

The workbook should be used in conjunction with *The Logistics Handbook: A Practical Guide for Supply Chain Managers in Family Planning and Health Programs*.

One challenge when training lower-level staff is that they may not be sufficiently fluent in the official national language to benefit from a course conducted entirely in that language. To overcome this problem in Senegal, where many storekeepers at the health facility level spoke only their local languages, the DELIVER Project designed a series of culturally sensitive visual aids for supply training. Key logistics concepts, such as average monthly consumption and months of stock on hand, were depicted using calabashes to represent quantities and crescent moons to represent time. The materials not only communicated advanced logistics concepts to storekeepers with low French literacy but also enhanced supervision because storekeepers' tasks became clearer.

In any case, apply the leadership practices of **scanning** and **focusing:** weigh your options against the immediate operational needs of the drug supply system. Then **plan, organize, implement,** and **evaluate** the training, making sure the running of health facilities and medical stores is not compromised when staff are in training courses. Box 13 summarizes some training programs and resources for your consideration.

Performance improvement goes beyond pre-service training to include on-the-job training, team problem solving, and supportive supervision. As a manager, you should introduce the standard management procedures for medicines to your staff and provide opportunities, for example during regular meetings, for continuing education on specific topics. Whenever possible, all the facility's staff should rotate through the pharmacy store and dispensary to learn these procedures so that supplies will be managed correctly.

The Physical Conditions Checklist in Appendix A in this chapter provides a starting point for training and for taking a team approach to making improvements.

Follow up with health workers who have been trained, using structured supervisory visits to make sure that the techniques of good pharmaceutical management are being implemented correctly. These visits are opportunities for health workers to receive support to continuously improve supply management.

Supervising supply management

This section is intended for the person who supervises the staff responsible for managing essential medicines and health products. In addition, logistics staff can use this section to informally evaluate their logistics system.

A useful source is *The Pocket Guide to Managing Contraceptive Supplies.* Module 6 of *Managing TB Medicines at the Primary Level* also contains useful guidance on supervision and self-monitoring at the primary health care level. While the indicators suggested are geared toward managing TB medications, most of them can be easily adapted for general management of medicines.

PRINCIPLES OF SUPERVISION

Good supervision is essential to a well-run supply system. A supervisor's primary job is to guide and support staff so they can perform their tasks well. The supervisor must make sure that staff have the knowledge, skills, motivation, and support to carry out their supply management activities. This may mean providing on-the-job training and constructive feedback if an employee's skills need improvement. It is just as important for a supervisor to notice and comment on things that are being properly managed as it is to help solve problems.

A supervisor's tasks are to:

- praise and reinforce good work;
- support employees by helping them get what they need to do their jobs well;
- work with staff to resolve problems;
- identify staff training needs;
- train staff in the necessary skills or arrange for training;
- follow up on problems and requests;
- motivate staff and remind them of the principles and goals of the health supply system;
- make sure that established supply guidelines and procedures are known and followed.

Supervision provides opportunities to use the leadership practices described in Chapter 2 of this handbook. For example, **scan** for strengths and areas to improve; **focus** on the highest-priority problems; **align and mobilize** staff to address the problems; and **inspire** staff so that the system functions effectively and clients get the medicines they need. See Chapter 6 of this handbook for more details on managing performance.

CONDUCTING A SUPERVISORY VISIT

When a supervisor visits a medical store or health facility at the district level, the core supply functions of inventory management and storage should be examined. The supervisor can use all or some of the questions from the checklists on inventory management and storage management that follow to check whether the supply system is operating properly. Any No answer indicates a problem that should be addressed.

CHECKLIST FOR INVENTORY MANAGEMENT

Review a sample of records and carry out informal interviews and observations to answer the following questions.

Record-keeping

- Are the inventory records up-to-date? Check the stock cards to see how recently they have been used.
- Are the inventory records accurate? Do they agree with what is on the shelves?
- Is the arithmetic correct?
- Are complete records kept of the quantities of medicines and supplies dispensed to patients?
- Do the calculated quantities on the stock cards generally agree with the physical inventory quantities?

Stock levels

- Are minimum and/or maximum stock levels calculated for each item?
- Has the average monthly consumption been calculated recently and accurately?
- Has the store successfully avoided stock-outs?

Quality assurance

- Is there a system for performing quality checks to make certain that all medicines are usable by patients (that is, not expired or damaged)?
- Are medicines and supplies checked for quality immediately upon arrival and before they are dispensed to patients?
- Are all reported problems documented?
- Are all documented problems reported?

Physical inventory

- Is a physical inventory conducted at least once a year? (In a small facility it should be done more frequently, for example, every one to two months.)

Ordering

- If the facility orders its supplies, are orders placed on time in order to maintain inventories at agreed stock levels?
- Are the quantities to order calculated correctly?
- Has an ABC and/or VEN analysis been performed?

Reporting

- Are reports submitted on time?
- Are any reports missing in the last six months?
- Are reports filled out correctly?
- Is the information in the reports accurate?

Disposal

- Is there an annual survey of expired or damaged medicines and supplies, or physical inventories of unusable stock that is set aside?
- Are damaged or expired products removed and disposed of according to government guidelines?

Materials

- Is there an up-to-date supply manual available to the staff?
- Is there an adequate supply of the correct forms for recording stock movements, reporting, and ordering?

If the answer to any of the questions is No, the situation needs to be corrected.

CHECKLIST FOR STORAGE CONDITIONS

Properly stacked supplies

- Are cartons stacked no more than 2.5 m high?
- Are stacks off the floor (on pallets or shelves)?
- Are stacks away from the wall?
- Is there adequate space (at least 30 cms/1 foot) between stacks?

Organization

- Are the most frequently used commodities stored in an easily accessible place?
- Are the unusable products stored away from the usable ones?

Preventing expiration

- Are the boxes clearly marked with expiry dates?
- Are the boxes arranged according to FEFO? (Are the commodities that will expire first kept in front or in a more readily accessible location?)

Temperature

- Is the temperature of the storage area below 35°C?

Ventilation

- Are there fans or a ventilation system to circulate air throughout the storage area during hot weather?

Dryness

- Are the floors and walls dry?
- Are roofs, windows, and doorways without leaks?

Workspace

- Is there sufficient storage space for all the needed commodities?
- Is the storage area large enough to allow for distributing, receiving, and checking supplies?

Lighting

- Is there sufficient light to read product identification marks and labels easily?
- Are medicines protected from direct sunlight and fluorescent light?

Cleanliness

- Is the storage area clean, tidy, and free of dust?

Orderliness

- Are only medicines and other medical supplies kept in the medical storage area?
- Are flammable and corrosive products stored appropriately (separate from other products, away from each other, and in secure storage)?

Pests

- Are storage areas free from signs of pests and rodents (live or dead insects, insect eggs, cartons that show signs of chewing or boring)?

Security and safety

- Is there a security system that limits access to the storage area?
- If the storage area has doors and windows, are they secured?
- Are fire extinguishers readily accessible and in working condition?

Access

- Is an authorized person with a key available during all service hours so that clinic staff can get supplies when they need them?

If the answer to any of the questions is No, the situation needs to be corrected.

Your job as a supply manager and supervisor is to:

- search out the necessary information for identifying the causes of a problem;
- analyze it;
- decide in consultation with staff what actions need to be taken;
- work with facility/warehouse staff to provide feedback on the strengths and weaknesses of the storage practices and conditions and develop solutions together for areas needing improvement.

If you find a problem on one visit and work with the staff to identify a solution, you should check that situation again on the next visit to see if things are going well or more assistance is needed. In addition to asking the questions above, a supervisor must consider the following situations:

- Has there been a change in demand lately? Look at the trend in average monthly consumption.
- Have there been any shortages or stock-outs? If so, identify the cause.
- Have there been any problems in getting supplies, such as delays and insufficient quantities sent?

- What is the rate of loss of commodities in the system (due to expiration, damage, disappearance, etc.)? Is this rate so high that it constitutes a problem?
- What are all the supply management activities that have been well managed lately?

Proven practices

- Successful supply management at the district and subdistrict levels requires a national framework because it typically represents up to 30 percent of the health care budget. Senior, national-level health care leaders and managers should demonstrate that they recognize the importance of effective supply management.

- Recognition of the value of effective supply management must be paired with an allocation of resources for supply management that is commensurate with its importance to the functioning of health services.

- Successful inventory management systems exhibit the following characteristics:
  - There are written rules for determining order quantities that are widely understood and accepted.
  - These rules are applied consistently.
  - Basic stock records that record all essential stock movements at the time transactions take place are maintained and are accurate and up-to-date.

- Regular physical stock checks are a routine part of supply management activities. In smaller stores, these checks take place monthly. All discrepancies are investigated and reconciled.

- The store is secure, in good condition, clean, and well organized. At a hospital or health facility, the store is separate from the dispensary.

- Good storage practice is followed at all times to maintain product quality and facilitate good management. This includes:
  - Products are stored in their original packaging.
  - Label directions for storage conditions are followed.
  - Liquids are placed on the lower shelves or on the bottom of stacks.
  - Products that require cold storage are stored in appropriate temperature-controlled zones.
  - High-security and high-value products are stored in appropriate security zones.
  - Damaged or expired products are immediately separated from usable stock and disposed of using formal disposal procedures.
  - All commodities are stored in a manner that facilitates a FEFO policy for stock management.
  - Cartons are arranged so arrows point up and identification labels, expiry dates, and manufacturing dates are visible.

- Good dispensing practices will make certain that an effective form of the correct medicine is delivered to the right patients, in the prescribed dosage and quantity, with clear instructions, and in a package that preserves the potency of the medicine. And not only is the patient correctly treated, good dispensing practices lessen the likelihood of developing a resistance to the medicine.

Glossary of supply management terms

ABC analysis: Method by which pharmaceuticals are divided, according to their annual usage, into Class A, B, and C items. Class A products usually account for 10 percent to 20 percent of items, but 75 percent to 80 percent of the value of pharmaceuticals supplied. Class B represents intermediate usage rates, while Class C contains the vast majority of products but accounts for only 5 percent to 10 percent of the value. ABC analysis is used to identify products in Class A, which should be given priority in terms of inventory management. *Also called* **Pareto analysis.**

antineoplastics: Pharmaceuticals used in chemotherapy to control or kill cancer cells. They all have unpleasant side effects that may include nausea, vomiting, hair loss, and suppression of bone marrow function.

average monthly consumption: The average amount issued to clients or patients each month over a period of time, normally not more than 12 months. It is calculated by dividing the total consumption for a given period by the number of months covered by the consumption period taking into account time out of stock. This information is vital to accurately determining how much to order.

bin card: A stockkeeping record that records receipts, issues, and balances of a single product in a single store location or shelf. It is kept on the shelf or pallet with the item.

central stores: A national location for receiving, storing, and distributing medical materials. *Also known as* **central medical stores.**

cold chain: A fully integrated system of maintaining products at a controlled temperature, requiring freezers, refrigerators, cold boxes, and other devices. It is used especially for vaccines and other products requiring temperature control, from the point of manufacture to the point of administration.

consumption: The rate at which items are issued to clients or patients. *Also known as* **demand**.

corrosive: Characteristic of a substance that will destroy or irreversibly damage another substance with which it comes in contact. The main hazards to people include damage to the eyes, skin, and tissue under the skin, but inhalation or ingestion of a corrosive substance can damage the respiratory and gastrointestinal tracts. Exposure results in chemical burns.

cost of holding stock: The cost of keeping inventory/stock in storage. *Also known as* **holding costs.**

dispense: To prepare and distribute to a patient a course of therapy on the basis of a prescription.

essential medicines: Essential medicines are those that satisfy the priority health care needs of the population. They are selected with regard to public health relevance, evidence on efficacy and safety, and comparative cost-effectiveness. Essential medicines are intended to be available within the context of functioning health systems at all times in adequate amounts, in the appropriate dosage forms, with ensured quality and adequate information, and at a price the individual and the community can afford. The implementation of the concept of essential medicines is intended to be flexible and adaptable to many different situations. The determination of which medicines are regarded as essential is a national responsibility.

expiry date: The date appearing on a pharmaceutical product and established by the manufacturer, beyond which the manufacturer will not guarantee the quality and efficacy of the product.

first expiry, first out (FEFO): A method of inventory management in which products with the earliest expiry date are the first products to be issued, regardless of the order in which they are received.

first in, first out (FIFO): A method of inventory management in which the first products received are the first products issued.

flammable: Characteristic of a substance that will easily burn or ignite, causing fire or combustion.

forecasting: Management function that estimates the quantities of products a program will dispense to users for a specific period of time in the future.

formulary: A list of pharmaceuticals approved for use in a specific health care setting.

generic pharmaceuticals: Products marketed by any producer under nonproprietary or approved names.

immobilized pharmaceuticals: Pharmaceutical materials that have been encased in an inert material, such as concrete, for disposal purposes.

imprest system: A form of periodic inventory control in which stocks are replenished up to a pre-established level. No running stock records are kept. The only stock control document is a preprinted sheet showing each item, its description, the unit of issue, and the imprest level. An imprest system is normally used only in small systems, such as hospital wards.

inventory: The sum of all items held in stock.

lead time: The time between when new stock is ordered and when it is received and available for use.

losses: The quantity of stock removed from inventory for any reason other than consumption by clients (for example, expiry or damage).

maximum stock: The level of stock above which inventory levels should not rise under normal conditions.

nonimmobilized pharmaceuticals: Pharmaceutical materials that have not been encased in an inert material, such as concrete, for disposal purposes.

order quantity: The amount of stock to be ordered via a requisition or purchase order from a supplier or other supply agency.

out of stock: Having no stock available to provide to the requesting party.

pharmaceutical use: The process of diagnosis, prescribing, labeling, packaging, and dispensing and of adherence to pharmaceutical treatment.

physical inventory: The process of counting by hand the total number of units of each commodity in a store or health facility.

quantification: System for calculating order quantities and budget requirements.

safety stock: The buffer, cushion, or reserve stock kept on hand to protect against stockouts caused by delayed deliveries or markedly increased demand.

stock: The items stored in the warehouse or facility for future use.

stock card: An individual stockkeeping card that contains information about the full quantity of stock of a product.

stock records: A generic term for all types of records, including bin cards, stock cards, stock ledgers, and computer files, that provide basic essential information for inventory management. Used to record all transactions for an item, including receipts, issues, stock balances, and stock losses.

stock status: The number of weeks or months that existing stocks will last at current or anticipated rates of consumption. It is normally calculated by dividing the stock on hand by the average monthly consumption.

VEN classification: A system of prioritizing pharmaceuticals and the amount to have in stock according to their therapeutic importance. An analysis of the products in use divides the pharmaceutical products into **V**ital, **E**ssential, and **N**onessential categories.

wastage: The quantity of stock removed from inventory for any reason other than consumption by clients (for example, losses, expiry, and damage). *See also* **losses.**

waste encapsulation: Handling of hazardous waste by placing it into a container that is then closed with a cover.

waste inertization: Method for treating hazardous waste material contaminated with heavy metals so as to neutralize it and make it inert.

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Appendices

APPENDIX A. Physical Conditions Checklist

How does your store match up to a well-run store? Answer YES or NO to the following questions. Answering No indicates an area requiring improvement.

1. The store is separate from the dispensary; medicines are not dispensed to patients from the store.
2. The store is large enough to hold all of the supplies.
3. The door to the store has two locks; each lock has a separate key.
4. The store is kept locked at all times it is not in use.
5. The store structure is in good condition; there are no cracks, holes, or signs of water damage.
6. There is a ceiling in the store, and the ceiling is in good condition.
7. Air moves freely in the store; fans and screens are in good condition.
8. The windows are painted white or have curtains; windows are secured and have grilles.
9. The store is free of pests; there are no signs of pest infestations.
10. The store is tidy; the shelves are dusted, floor is swept, and walls are clean.
11. Supplies are stored neatly on shelves or in boxes.
12. Shelves and boxes are raised off the floor on pallets or on boards and bricks.
13. The refrigerator is in good condition; there is no staff food in the refrigerator.

APPENDIX B. Storage Procedures Checklist

How well organized is your store? Answer YES or NO to the following questions. Answering No indicates an area requiring improvement.

1. Supplies are shelved in groups: externals, internals, and injectables.
2. Tablets, capsules, and other dry medicines (such as packets of oral rehydration salts) are stored in airtight containers on the upper shelves.
3. Liquids, ointments, and injectables are stored on the middle shelves.
4. Supplies, such as surgical items, condoms, and labels, are stored on the bottom shelves.
5. Cold-chain items are stored in the refrigerator.
6. Controlled substances are kept separate in a double-locked storage space.
7. Supplies are arranged on the shelves in alphabetical order by generic name.
8. Items are grouped in amounts that are easy to count.
9. There are no expired items in the store.
10. Items with shorter expiry dates are placed in front of those with later expiry dates.
11. For items with the same expiry date, newly received items are placed behind those already on the shelves.
12. Supplies with no expiry or manufacture date are stored in the order received (FIFO).
13. Supplies with no expiry date but with a manufacture date are placed so that those with later dates are behind those with earlier dates.
14. There are no poor-quality items on the shelves, such as expired medicines or broken bottles.
15. On the shelves, there are no overstocked items or items that are no longer used.
16. There is a record of the removal of items; the record includes date, time, witness, and manner of removal.

APPENDIX C. Receiving Supplies Checklist

How are supplies received at your store? Answer YES or NO to the following questions. Answering No indicates an area requiring improvement.

1. A health worker receives deliveries in person.
2. The health worker checks the outside of the boxes for damage at the time of delivery.
3. The health worker keeps a written record of deliveries.
4. The delivery person signs the form before he or she leaves the health care facility.
5. The health worker checks the supplies received against the items listed on the delivery's requisition form.
6. The health worker checks the expiry dates of all items.
7. The health worker checks for poor-quality items, such as:
   - poorly packaged refrigerated items;
   - discolored medicines and vaccines;
   - broken containers and supplies spoiled by leakage;
   - unsealed and unlabeled items.
8. If deterioration is suspected, the health worker checks for:
   - unusual odors of tablets and capsules;
   - damaged tablets or capsules;
   - injectables with small particles that reflect light.
9. The health worker does not accept expired or poor-quality items.
10. The health worker documents all discrepancies.
11. The health worker stores the supplies; the movement of each item is recorded on its stock card.

APPENDIX D. Checklists for Maintaining Good Storage Conditions

To maintain good storage conditions, you should take the following steps.

- Inspect the physical structure of the store regularly.
- Repair any damage to the roof, walls, door, windows, and floor.
- Control the temperature in the store to the extent possible. Install a ceiling fan if possible.
- Provide good ventilation that allows warm air to escape. Put air vents in the walls or ceiling.
- Be aware that refrigerators standing in the same room generate additional heat and raise the temperature in the room. If you have a fan, use it. Keep it in good working condition. If your store is small and refrigerators raise the temperature, move them to another place and put security locks on their doors.
- Control the light in the store. If light enters the store through windows, block the direct light. Either paint the windows white or hang curtains.
- Prevent water damage and control humidity. Check that there is good drainage. There should be drainage channels around your store. The roof should have gutters. Repair leaks as soon as they occur to reduce moisture and water damage.
- Containers of tablets and capsules may be packed with a sachet of desiccant (nonedible drying crystals). The desiccant keeps the inside of the container dry. Do not open the sachet. Keep the sachet in the container. Keep the container closed except when dispensing the medicines.
- Keep the store free of pests, such as rats, cockroaches, ants, and wasps. Spilled items may attract pests. Clean spills and remove broken containers immediately. Use screens on windows to keep out insects.
- Clean the store and keep it tidy. Clean up spills and leakages immediately. Keep dust to a minimum, since it can contaminate supplies and make labels difficult to read. Mop the floor, dust the shelves, and wipe down the walls regularly.
- Store supplies on shelves. If there are no shelves in your store, make temporary shelves. Use boxes, stacked bricks and boards, or pallets. Do not put boxes directly on the floor, which may be or become wet. Moisture can rot cardboard or wood.
- Boxes and boards should be regarded as a temporary measure while you wait for adequate shelves to be made. Air should circulate around the boxes, which should be stored with sufficient space from the wall and from the floor.

CHECKLIST FOR PREVENTING PESTS

Inside the Storage Facility

- Provide adequate toilet facilities for staff.
- Establish a dedicated eating area, preferably outside the main store but if necessary within the store but with rigorous cleanliness.
- Do not permit eating outside the designated area.
- Do not store or leave food in the storage facility.
- Design or modify the storeroom to facilitate cleaning and prevent moisture.

- Maintain a clean environment to prevent conditions that favor pests. For example, store garbage in covered garbage bins. Regularly clean floors and shelves.
- Keep the interior of the building as dry as possible.
- Paint or varnish wood, as needed.
- Use pallets and shelving.
- Prevent pests from entering the facility.
- Inspect the storage facility regularly for evidence of pests, and if detected conduct a vigorous eradication exercise.
- Shrink-wrapping cartons can also assist in preventing pest damage.

Outside the Storage Facility

- Regularly inspect and clean the outside premises of the storage facility, especially areas where garbage is stored. Check for any rodent burrows, and be sure that garbage and other waste are stored in covered containers.
- Check for still or stagnant pools of water in and around the premises, and be sure that there are no buckets, old tires, or other items holding water.
- Treat wood-frame facilities with water sealant, as needed.
- Use mercury vapor lighting where possible, and locate lighting away from the building to minimize the attraction of pests.

CHECKLIST FOR PREVENTING THEFT

During Transport

- Verify documents.
- Make certain that packing seals are used.
- Use strong boxes or other containers.
- Provide reliable, well-maintained vehicles.
- Make sure drivers are reliable.
- Expedite clearance at airports and seaports and through on-land borders.

At Storage Facilities

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

In Health Centers

- Lock the storeroom or cupboards.
- Have inventory control cards for each product.
- Set maximum dispensing quantities.
- Have dispensers record individual prescriptions and maintain prescription or dispensing registers.
- Limit dispensing to authorized staff members.

Monitor Selected Products

As additional protection against theft, monitor items that are fast moving, chronically in short supply, in high demand by customers, expensive, lifesaving, and easy to hide or disguise.

CHECKLIST FOR ROUTINE STORAGE MANAGEMENT TASKS

Daily/Weekly

- Monitor storage conditions.
- Clean receiving, storage, packing, and shipping areas.
- Sweep or scrub floors.
- Remove garbage.
- Clean bins, shelves, and cupboards, as needed.
- Check that aisles are clear.
- Make sure there is adequate ventilation and cooling.
- Protect products from direct sunlight.
- Monitor store security and safety.
- Check the store roof for leaks, especially during the rainy season and during or after a storm.
- Monitor product quality (visually inspect commodities and check expiration dates).
- Ensure that products are stacked correctly. (Are the lower cartons being crushed?)
- Update stock records and maintain files.
- If cycle counting is being done, conduct a physical inventory and update stockkeeping records.
- Monitor stock levels, stock quantities, and safety stocks.
- Submit emergency orders as needed, using local guidelines.
- Update backup files for computerized inventory control records.
- Update bin cards.
- Separate expired stocks and move them to a secure area.

Monthly

- Conduct a physical inventory or cycle count and update stockkeeping records.
- Run the generator to check that the system is working correctly; check the level of fuel and add fuel, if needed.
- Check for signs of rodents, insects, or roof leaks.
- Inspect the storage structure for damage, including the walls, floors, roof, windows, and doors.

Every Three Months

- Use established procedures to dispose of expired or damaged products.
- Visually inspect fire extinguishers to make sure their pressures have been maintained and the extinguishers are ready for use.

Every Six Months

- Conduct fire drills and review fire safety procedures.
- Inspect trees near the medical store, and cut down or trim any trees with weak branches.

Annually

- Service fire extinguishers and smoke detectors.
- Conduct a complete physical inventory and update stockkeeping records.

FIRE EXTINGUISHERS

There are four main types of fire extinguishers. The following table provides a summary of each of them.

Type of Fire Extinguisher	Description and Use
Dry chemical	Contains an extinguishing agent such as potassium bicarbonate (similar to baking soda) and uses a compressed gas as a propellant. They are effective for multiple types of fires, including combustible solids like wood or paper, combustible liquids like gasoline or grease, and electrical fires.
Water	Contains water and compressed gas and should be used only on ordinary combustibles, such as paper and wood. Never use water on fires caused by liquids (such as gasoline or kerosene) or on electrical fires.
Carbon dioxide (CO_2)	Most effective on fires caused by liquids (such as gasoline or kerosene) and electrical fires, but not on fires caused by combustibles like paper, cardboard, or lumber. The gas disperses quickly and does not leave any harmful residue.
Halon	Often used in areas with computer equipment or other machinery because it leaves no residue. Halon can be used on common combustibles, flammable liquids, and electrical fires. However, it is dangerous to inhale and harmful to the environment. Halon is most effective in confined spaces, but the area will need to be ventilated before it can be reoccupied.

Source of Appendix D: John Snow, Inc./DELIVER and the World Health Organization (WHO). *Guidelines for the Storage of Essential Medicines and Other Health Commodities.* 2003.

APPENDIX E. Managing Different Types of Waste

The following table provides an overview of the major types of waste that must be destroyed safely and effectively.

Nonmedical Waste	Methods of Disposal
Garden rubbish	Compost leaves, sticks, weeds, and trimmings from shrubs and trees, if feasible. Designate a separate area for composting.
Cardboard cartons	If possible, recycle cardboard; otherwise, treat it like ordinary rubbish.
Ordinary rubbish	Where municipal solid waste facilities exist, dispose of ordinary rubbish in the municipal dump. Otherwise, burn or bury it.
Human waste	Use pit latrines or other toileting facilities to dispose of all human waste.

Health Care Waste	Definitions
Sharps	Single-use disposable needles, needles from auto-disable syringes, scalpel blades, disposable trocars, sharp instruments requiring disposal, and sharps waste from laboratory procedures.
Other hazardous medical waste	Waste contaminated with blood, body fluids, human tissue; compounds such as mercury; pressurized containers; and wastes with high heavy metal content.
Pharmaceuticals	Expired, damaged, or otherwise unusable medicines and items contaminated by or containing medicinal substances.

The disposal methods for various categories of pharmaceuticals are identified in the following table.

SHARPS CONTAINERS

Sharps containers or safety boxes are puncture- and water-resistant, impermeable containers. When used correctly, they reduce the risk of skin-puncture injuries that may spread disease. Once filled, the sharps boxes are disposed of either by incinerating them or by filling them with bleach to remove biological hazards and then putting them in a landfill.

Category	Disposal Methods	Comments
Solids Semisolids Powders	■ Landfill ■ Waste encapsulation ■ Waste inertization ■ Medium- and high-temperature incineration (cement kiln incinerator)	■ No more than 1% of daily municipal waste should be disposed of in an untreated form (nonimmobilized) in a landfill.
Liquids	■ Sewer ■ High-temperature incineration (cement kiln incinerator)	■ Antineoplastics should not be disposed of in the sewer due to the high risk they present to anyone coming into contact with them.
Ampoules	■ Crush ampoules and flush diluted fluid into sewer	■ Antineoplastics should not be disposed of in the sewer due to the high risk they present to anyone coming into contact with them.
Anti-infective medicines	■ Waste encapsulation ■ Waste inertization ■ Medium- and high-temperature incineration (cement kiln incinerator)	■ Liquid antibiotics may be diluted with water, left to stand for several weeks, and discharged to a sewer.
Antineoplastics	■ Return to donor or manufacturer ■ Waste encapsulation ■ Waste inertization ■ High-temperature incineration (cement kiln incinerator) ■ Chemical decomposition	■ Not to landfill unless encapsulated ■ Not to sewer ■ No medium-temperature incineration
Controlled medicines	■ Waste encapsulation ■ Waste inertization ■ Medium- and high-temperature incineration (cement kiln incinerator)	■ Not to landfill unless encapsulated
Aerosol canisters	■ Landfill ■ Waste encapsulation	■ Not to be burnt: may explode
Disinfectants	■ To sewer or fast–flowing watercourse: small quantities of diluted disinfectants (max. 50 liters per day under supervision)	■ No undiluted disinfectants to sewers or watercourses ■ Maximum 50 liters per day diluted to sewer or fast-flowing watercourse. ■ No disinfectants at all to slow-moving or stagnant watercourses
PVC plastic, glass	■ Landfill	■ Not for burning in open containers
Paper, cardboard	■ Recycle, burn, landfill	

Source: World Health Organization, *Guidelines for Safe Disposal of Unwanted Pharmaceuticals in and after Emergencies 1999.*

APPENDIX F. Checklists for Inventory Management and Stock Control

EXAMPLES OF CALCULATING ORDER QUANTITY USING MAXIMUM STOCK AND REORDER FACTOR TABLES

The following examples demonstrate how to use the tables and methods described in the section of this chapter titled "How to calculate the quantity to order."

Example 1

The average monthly consumption (AMC) of Product A equals 45 units. This product is ordered every two weeks, and the lead time is four weeks. The current stock is 60 units. If an order has to be placed, how much has to be ordered?

1. First, identify the maximum stock factor. In this case it is 3. Therefore, the maximum stock equals 135, using the following formula: 45 (AMC) × 3 (maximum stock factor) = 135 (maximum stock, in issue units). Since the current stock balance is 60, an order has to be placed.
2. Second, identify the reorder factor. The information above, when used in conjunction with the reorder factor table, shows that, the reorder factor equals 4.
3. Third, calculate the quantity to order using the recommended formula: quantity to order = [45 (AMC) × 4 (reorder factor)] − 60 (stock) = 120

Example 2

Product B's average monthly consumption is 30 units. This product is ordered once a month, and the lead time equals six weeks. The stock balance is 90 units. How much should be ordered?

1. First, identify the maximum stock factor. In this case it equals 4. Therefore, the maximum stock is equal to 120, using the formula: 30 (AMC) × 4 (maximum stock factor) = 120 (maximum stock, in issue units). The current stock balance is 90, so an order has to be placed.
2. Second, identify the reorder factor using the reorder factor table. The reorder factor is 5.5.
3. Third, calculate the quantity to order using the recommended formula: quantity to order = [30 (AMC) × 5.5 (reorder factor)] − 90 (stock) = 75.

STOCK CARD CHECKLIST

How are the stock cards used in your store or facility? (A sample stock card appears in Figure 3 in this chapter.) Perform this self-assessment, and share the results with your health team and/or your supervisor.

There is a stock card for each item in the store.

- All information on the stock card is up-to-date and accurate.
- The stock card is kept on the same shelf as the item.
- Information is recorded on the stock card at the time of movement.

- There is an accurate running tally kept in the Balance column.
- A physical count is made at regular intervals, such as once a month.

Once your assessment is completed, identify what can be done immediately to solve the highest-priority issues, and implement the changes that are required.

ORDERING SUPPLIES CHECKLIST

Answer the following questions. If delivery schedules change, erase and record the new delivery information. Keep the answers current.

- When are supplies delivered?
- How often are supplies delivered?
- What is your facility's order frequency?
- What is your lead time?

SELF-ASSESSMENT

Perform this self-assessment by answering YES or NO to the following statements. Share the results with your health team and/or your supervisor.

- You know how to calculate the average monthly consumption (AMC).
- You take stock-out periods into consideration when calculating the AMC.
- You calculate the maximum stock by multiplying the AMC by the maximum stock factor.
- The maximum stock has been calculated for each item in the store.
- The maximum stock is recorded on each item's stock card.
- You place your order when the stock balance *is less* than the maximum stock.
- When you order, you use the formula for quantity to order.
- All orders are placed in writing using the prescribed forms.
- All information on the requisition is complete, accurate, and written clearly.

Once your assessment is completed, identify what can be done immediately to solve the most pressing issues and implement the changes that are required.

APPENDIX G. Checklist for Good Dispensing Practices

PREPARE YOUR DAILY SUPPLIES

Before dispensing medicines to patients, you should do the following:

- Check the quantities that are available in the dispensing area.
- Estimate the number of units of each item that will be needed for the day or the clinic session. Base the amount on past use and the clinics that are operating that day. If necessary, ask someone with experience in issuing supplies to help you.
- Go into the store and request the stock you need from the storekeeper. Once the storekeeper issues the fresh supplies to you, place the items on a tray or trolley and take them to the dispensing area.
- If, later in the day, items are running short, the same procedure should be followed to replenish those stocks.
- Make sure that the stock records in the store are updated immediately by recording the movement of each item that you issue out of the store on its stock card.
- Once items are issued to a dispensing area, do not return them to the store. Keep them in the dispensing area.
- Keep supplies in the dispensing area safe and organized.
- Make sure that the security in the dispensary is the same as in the pharmacy store. Staff should always be present in the dispensing area when it is not locked. Do not leave the area unattended and unlocked.
- Organize supplies in the same way as they are organized in the store. Organize by route of administration and by form of preparation. Arrange each group of items in alphabetical order by generic name.

Medicines and other supplies should be collected from the dispensary shelves according to FEFO or FIFO rules.

Some facilities use stock cards in the dispensary as well as in the store. Stock cards used in this way become dispensing records. However, health workers, administrators, and accountants often need to collect information about medicines and related supplies given to patients to treat certain illnesses. It is therefore usually better to use a notebook or dispensing ledger to keep dispensing records of medicines on a daily or weekly basis. This approach can be especially useful when you are scaling up services; it will allow you to monitor rapidly changing consumption patterns.

PRINCIPLES OF DISPENSING TO THE PATIENT

In all health care facilities, the person dispensing medicines to the patient must understand and follow five principles.

1. When a medicine is given to a patient, it is important that the patient receives:
   - the correct medicine;
   - the correct amount of the medicine;
   - the correct information on how to take the medicine.

2. Dispensing to a patient consists of:
   - checking the prescription;
   - collecting, counting, and packaging the medicine;
   - transferring ownership to the patient;
   - providing information to the patient (or caregiver of children).
3. Carefully and clearly explain to patients how to take their medicine. This is very important. Medicines are effective only if taken correctly. Then check that patients understand how to take their medicines. Patients should be able to repeat to you how they will take their medicines.
4. To dispense properly, you need to know:
   - how to prepare medicines and related supplies;
   - how to give them to patients;
   - how to interact effectively with patients to ensure they understand.
5. Prescribing and dispensing medicines are two separate activities in a health care facility. Prescribe medicines in the clinical area. Dispense medicines from a dispensing area (or dispensary). Keep the areas separate, if possible. Do not dispense to patients directly from the store! The dispensary may be a room, part of a room, a cabinet, or a dispensing trolley.

DISPENSING PROCEDURES CHECKLIST

To dispense a medicine (or other item) to a patient, follow these steps:

1. **Check that the prescription is appropriate for the patient.**
   - Review the prescription.
   - Find the generic name of the medicine. If you cannot read it or if you have any questions about a prescription, ask the person who wrote it to explain it to you.
   - Check that the prescription is appropriate for the age, weight, and sex of the patient.
   - Where feasible, also check that the medicine prescribed is appropriate in form, strength, and dosage and in line with the standard treatment guidelines for this medicine. If you have any doubt about this, ask the person who wrote the prescription to confirm it for you.

2. **Prepare one prescribed item at a time.** If more than one item has been prescribed, do not combine them.
   - Collect a bottle, strip, tube, or container of the item, and check its expiry date.
   - Read the generic name on the label of the container.
   - Check that it is the correct medicine.
     ▶ **Remember that some medicines look the same** and can easily be confused.
   - Check that it is the correct form, strength, and unit size.
   - Check that the item has not expired.
   - Collect a medicine envelope or container to package the item for the patient.

3. **Label the package** to be given to the patient.
   - Some packages will have preprinted labels on them. Some will not have labels, or the labels will not be in the operating language of your country/region, and you will need to prepare a label.
   - Print clearly on the label. Include the following information:
     - patient's name
     - patient's age
     - the day's date
     - generic name of the item
     - strength
     - form
     - quantity dispensed
     - expiry date
     - dosage: instructions that tell the patient when, how much, for how long, and how the medicine should be taken, for example, "Take two tablets with food every morning for five days."
     - any advisory or warning instructions, such as "May cause drowsiness," "Do not drive while taking this medicine," etc.
   - Use pictures or numbers to record the dose. Include written instructions also. Patients who cannot read may need pictures for instructions and should have someone at home who can read the instructions to them.
   - After you record the information on the label, attach it to the empty package.
     - ▶ **A clearly written label is important.** When a patient returns to a health care facility with a previous prescription, any health worker should be able to read it.

4. **Open the bulk medicine container and check the quality of its contents.**
   - If medicines have an odd smell, they may have deteriorated. If tablets or capsules are cracked, broken, powdery, or sticky, they are damaged. If capsules are swollen, softened, or stuck together, they are damaged.
     - ▶ **Never give patients poor-quality medicines.** Dispose of those medicines properly.

5. **Count the quantity needed in a clean, safe manner.**
   - Count tablets or capsules using a counting tray.
   - If you do not have a tray, you can make one from a sheet of paper or used X-ray film, or you can use a clean surface covered with paper.
   - Count the tablets or capsules with a clean spatula. Do not use your hands. You may contaminate both the medicine and your hands.
   - Do not use the same tray to count new medicines without cleaning the tray. If you use a sheet of paper to count, use a new sheet each time. If you reuse the same tray or paper, you may contaminate both the medicines and yourself.

6. **Put the correct amount of the medicine into the package** for the patient to take home.
   - Put the medicine into its own labeled package using the tray and spatula (or measuring device for liquids).
   - Do not mix prescriptions or medicines.

7. **Immediately put any extra tablets or capsules back into the appropriate container.**
   - If more than one medicine has been prescribed, close one container before you open another container.
   - Prepare all of the prescribed items before you dispense them to the patient.
   - Before closing the container, check the container's details against the prescription. This is simply to confirm to yourself that you have dispensed the correct medicine.

8. **Give the package to the patient.**
   - If the patient is a child, go through the following steps with the mother (or caretaker).
   - Explain to the patient how to take the medicines (see Step 10).
   - If the patient has more than one prescription, dispense one item at a time.

9. **Advise and counsel the patient on how to take the medicine.**
   - **Tell the patient the name of the medicine**, its **form** (tablet, syrup, etc.), **what it is for**, and the **dosage**. The dosage includes:
     - when to take the medicine (for example, in the morning)
     - how much of the medicine to take (for example, one tablet)
     - how long to take the medicine (for example, two days)
     - how to take the medicine (for example, with food)

You may decide to display the dosage instructions about how to take the most common medicines in the dispensary. Then your staff will be more likely to give the same (and correct!) instructions to patients. In addition, you may consider displaying some instructional materials for frequently used medicines on a wall where patients can see them. This makes your message more meaningful.

- **Show the patient how to prepare the dose.** Allow the patient to practice before he or she leaves the dispensary.
  - If a dose is less than a whole tablet, show the patient how to divide the tablet.
  - If the medicine should be mixed with food, show how to crush the tablet and mix it with food.
  - If you are dispensing syrup, show how to measure the correct amount. Use the cap of the syrup bottle or show the patient common spoons to use.
  - Ask the patient to practice measuring the dose. Use the medicine that you have already packaged for the patient to take home.
  - When you are confident that the patient understands how to prepare the dose, ask him/her to take the first dose.

- **Tell the patient to take *all* of the prescribed medicines.**
  - Sometimes patients will feel better before they finish all of the prescribed medicines. Tell patients that, even if they feel better, it is important to take all of the medicines to stay well. This is especially true of antibiotics or antimalarials because bacteria or parasites may still be present. Also tell patients with chronic conditions, such as those with hypertension or those taking ARVs, that they need to return for follow-up treatment.
- **Ask patients to tell you how they will take the medicine.**
  - Each time you dispense a medicine, check the patient's understanding.
  - If patients answer correctly, compliment them! If not, explain the dosage to them again. Explain until they can answer you correctly.
  - If you are giving patients more than one prescription, give them one item at a time. Give the next item only after you are sure that patients know how to take the medicines you have just given them.
  - Medicines are effective only if patients take them correctly. Sometimes even intelligent patients who are sick do not understand how to take their medicines. Medicines taken incorrectly may be ineffective or even poisonous. *Always check the patient's understanding.*

10. **Tell the patient to keep all medicines and related medical supplies in a safe place** at home and out of the reach of children.
    - Tell the patient that medicines are expensive and dangerous and need to be stored in a special place at home.
    - The place must be cool, dark, and dry, safe from pests, and out of the reach of children.
    - Recommend places typically found in homes in your area where patients could store their medicines.

11. **Keep accurate dispensing records.**
    - Complete dispensing records in accordance with the instructions given by your supervisor or local supply coordinator.
    - Be sure to follow any special requirements for controlled substances and medicines from donor programs to which separate recording requirements may apply.

