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CHAPTER 44

Medical stores management

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SUMMARY

This chapter discusses medical stores management at central-level stores and at regional or district-level stores that are independent from health facilities. This supply model represents the traditional top-down system that is operated by a governmental or parastatal entity or a nongovernmental organization; however, a number of countries have now decentralized many of their pharmaceutical sector operations, including stores management. Chapter 8 discusses supply chain options, including the trend toward decentralization. In addition, many supply systems contract out certain operations to private-sector companies. Managing contracts requires skills such as defining and monitoring performance indicators and negotiating payment and service terms. See Chapter 39 for more information on contracting. The tenets of this chapter, therefore, apply to stores operating in either the public (often called central medical stores) or nonpublic sectors.

Medical stores management should assist both the flow and reliability of supplies from source to user as economically and reliably as possible, and without significant wastage, loss of quality, or theft. The primary purpose of a store is to receive, hold, and dispatch stock. This materials management process is implemented through inventory control and warehouse management systems, which may be manual or computer based. The primary purpose of inventory control is to manage stock and ensure the smooth flow of goods by determining what, how much, and when to order stock. Consequently, it provides essential information for procurement management. Warehouse management comprises the physical movement of stock into, through, and out of a medical store warehouse. The systems should also be designed to provide information for performance monitoring.

The following are characteristics of a well-managed stores operation—

- The store should be divided into zones that provide a range of environmental conditions and degrees of security.
- There should be an appropriate zone to suit every item to be stored.
- Stock should be arranged within each zone according to some orderly system.
- Stock should be stored off the floor on pallets, on pallet racks, or on shelves. Each of these systems requires specific types of handling equipment.
- Good housekeeping—cleaning and inspection, the disposal of expired and damaged stock, recording of stock movements, and the management of security—should be maintained.
- The management structure should be clearly defined.
- Staff should be appropriately qualified, trained, disciplined, and rewarded.
- Clearly written procedures and handbooks should be available.
- To promote efficiency, staff should have good working conditions and facilities.
- Stock should be verified regularly and periodic audits should be conducted.

Although the essential characteristics of materials management are the same for all systems, the level of sophistication of medical stores varies widely, and each store approaches its system and documentation differently. Therefore, the basic features presented in this chapter are adaptable, depending on the complexity of the medical stores management operation.

44.1 Information for materials management

The goals of medical stores management are to protect stored items from loss, damage, theft, or wastage and to manage the reliable movement of supplies from source to user in the most economical and expeditious way. Effective management of information is the key to achieving these goals. The integrated process is known as materials management. A fully developed system has three key components—

1. An *inventory control system* ensures that the right goods are acquired, in the correct quantities, monitors their quality, and minimizes the total variable cost of operations (see Chapter 23).

2. A *warehouse management system* monitors the physical flow of goods within the system, such as receipts, storage, and issues.
3. A *performance monitoring system* checks that the systems are operating effectively.

Information is essential to management (see Chapter 49). Collecting, processing, and disseminating information may seem costly, but the cost of developing and maintaining an information system should be balanced against the costs of ineffective inventory control (see Chapter 23). The design of the information system is important, but its success depends primarily on well-trained, organized, and supervised staff. Country Study 44-1 describes some of the

inventory control system challenges to the central medical stores in Namibia.

Manual versus computerized systems

The information system must include data on products entering and leaving the warehouse, products in stock, products on order, and ways to monitor the progress of orders in the supply pipeline. Key elements of the system are well-designed forms, computerized information systems, and clearly defined procedures.

Two decades ago, most public supply systems relied completely on manual stock records, but now, many programs have changed to computerized systems. Even with computerization, however, many countries still maintain a manual system, such as bin cards, as a backup, especially during the transition to computerization. There is a widely held belief that computerization solves the problem of inventory control. This belief is misguided. A computer is not a substitute for trained staff; it is simply an additional tool for staff to use (see Chapter 50). Both manual and computerized systems perform the same fundamental information-processing tasks: data input, data storage, data processing, data retrieval, and data dissemination. The difference is that a computerized system enables some tasks

to be accomplished more rapidly, accurately, economically, and flexibly. Even with a computerized system, data must be entered, manipulated, and interpreted by skilled and knowledgeable staff.

Procurement information

The procurement process (Chapters 18–21) involves medical stores input at all levels of the distribution system. These inputs are described below.

Procurement can be handled from a department within the medical stores or from an external unit. The medical stores unit provides the (internal or external) procurement unit with a list of the types and quantities of medicines needed for its operation. After a supplier is selected and a purchase order is placed, the procurement unit informs the medical stores unit about suppliers, unit prices, the quantities on order, the expected arrival dates of shipments, and other vital information.

The procurement unit tracks information on inventory status, new shipments received and taken into stock, issues made to health facilities, expired medicines, damaged medicines, and audit data from physical stock checks.

The medical stores unit also tracks issues to individual health facilities, noting methods of transport, delivery

Country Study 44-1

Central medical stores inventory control system operations in Namibia

Namibia operates a classic central medical stores (CMS) distribution system with a CMS and two regional medical stores. Administratively, the regional stores do not have any links with the CMS—the relationship between them is one of customer and client. The CMS distributes medicines and supplies to the two regional medical stores, all district hospitals, and local hospitals and clinics in the surrounding regions, while the regional stores and district hospitals are responsible for distributing to other facilities within their geographic jurisdictions.

Facilities are expected to order products from CMS every six weeks, and it usually takes CMS about four weeks to process and deliver the order. An assessment of the CMS distribution showed, however, that stock records were not adequately maintained and physical inventory counts did not correspond with either stock records or computerized records. Because the regional stores and health facilities had no effective systems for deciding when, what, or how much to order, most facilities ended up placing many emergency orders within the six-week order period, which stretched the capabilities of the already overburdened CMS.

A computerized inventory control system had been installed at the CMS several years earlier, but most of the staff members who were initially trained to use it had left the public service; remaining staff members, therefore, were not using the system to its full advantage. Many functions that could have been handled by the system were done manually or with spreadsheets. Moreover, management personnel reported that they did not have enough time to acquire the additional skills that would help them use the system.

As a result of the CMS assessment, a number of recommendations to improve the inventory control system were made: conduct complete physical inventory counts at all levels and use the results to update or introduce stock records; develop standard operating procedures for store management; and train staff on how to maintain stock records and use the computerized inventory control system to their best advantage.

Source: Management Sciences for Health/Rational Pharmaceutical Management Plus Program.

times, and confirmation of receipts from user units. This tracking should generate information on the monthly and annual value of total issues, issue quantities, details of specific products, and how budget allocations are used.

After an order has been placed, its progress should be monitored until it is received at the central medical stores (CMS). A good monitoring system makes it possible to estimate realistic delivery times and to decide whether any supplementary or emergency orders are needed, well before a stockout occurs.

Both manual and computerized systems should identify milestones during the lead-time period to facilitate communication with suppliers and to prompt corrective action if required. Important milestones of the procurement lead time are—

- Order initiating date
- Date of award to supplier (for tenders)
- Letter of credit information
- Shipment information and date
- Arrival at port
- Port-clearing date
- Date of issuing a receiving report

An effective supplier information system should include general information on suppliers and products, lead times, merit ratings, value of purchases, product quality, payment methods, and prequalification based on good manufacturing practices. Information about supplier performance should be compiled throughout the procurement cycle to assist in choosing future suppliers. Chapter 21 discusses the features of a procurement information system in more detail.

Stock records

Stock records contain information about suppliers, customers, prices, stock receipts, stock issues, stock losses, and stock balances. These data are essential for planning distribution.

A stock record (manual or computerized) must be maintained for each item in the inventory. The stock record documents all transactions relating to an item. It may contain information about reorder level, reorder interval, reorder quantity, lead time, stock on order, and estimated consumption rate. Many stores also maintain bin cards for each product in each storage area to record information on issues, receipts, and stock balances. In some stores, this bin card is the most current and accurate record of inventory movement.

The design of stock cards and bin cards depends on the choice of inventory control system. For details regarding the design, selection, and use of different types of inventory control systems, see Chapter 23; examples of a stock record card and a bin card are provided in Annexes 44-1 and 44-2.

When a shipment of medicines is received at the CMS, it is inspected to ensure that it meets the specifications in the supply contract. If the shipment is satisfactory, the receiving section of the warehouse produces a receiving report (see Annex 44-3). This report brings the procurement lead-time period to an end.

Individual health facilities are the end users of medical supplies. Maintaining information from health facilities is essential in order to monitor consumption, forecast pharmaceutical requirements, and make other management decisions. Many medical stores information systems also keep general information on facility location, facility status, population served, method of distribution, delivery schedule, value of issues, and extent of current budget utilization.

Performance monitoring and reporting

A store should monitor and evaluate its operations to identify problems in the system that need to be addressed. Record-keeping and reporting systems should be designed to make the collection of data for routine monitoring as simple as possible (see Chapter 48). Stock records are a vital source of information on how effectively the distribution system is being managed; therefore, maintaining these records accurately and keeping them up-to-date is vital. They provide detailed evidence of how products flow through the system and can be used to identify where problems are occurring so that corrective action can be taken. Operational indicators can track progress at two critical levels: from the supplier to the store, or “upstream,” and from the store to clients, or “downstream.” Upstream information includes lead-time from supplier to the store, number of medicines procured, and monthly stock status reports. At the downstream level, the store should collect routine lead-time information; distribution information by facility, district, and product; client satisfaction and consumption data; and order-fill rate. Box 44-1 shows a list of sample indicators. The medical stores should prepare regular reports on stock and order status, such as those described in Chapter 23, and send them to relevant parties such as the ministry of health, public health programs, donors, lower-level warehouses, and health facilities.

Communications

The medical stores must maintain effective communications with suppliers, with procurement and inventory control units, with lower-level warehouses and health facilities, and with managers from the ministry of health. Periodic meetings with the staff members of client facilities can help ensure good communications and a more effective supply system.

Box 44-1 Examples of monitoring and evaluation targets and indicators

- Number of sites to which medicines are distributed
- Quarterly report delivered on time
- Payment voucher processing time
- Number of patients receiving treatment
- Percentage of medicines that are wasted (as a result of breakages, expiries, pilferage) as a proportion of overall stocks
- Time elapsed from order receipt by store until shipment receipt by client
- Order processing time within the store
- Lead time between the supplier and the store
- Lead time between the store and the client
- Forecast for store commodities completed
- Percentage of commodities out of stock in service delivery sites
- Percentage of products tested for which a quality problem was detected
- Percentage of shipments to service delivery sites that are consolidated
- Percentage of cost savings as a result of price negotiations

44.2 Flow of stock and information

Stock, and the information that accompanies it, should flow through the warehouse in an orderly manner. This process has six stages—

1. *Receiving*: Goods that arrive in the receiving room are quarantined, inspected, and if found to be acceptable, entered into the stock-recording system. Receiving reports are prepared.
2. *Storage*: Accepted goods are moved to their allocated storage positions in the warehouse, where they are stored in first-in/first-out (FIFO) or first-expiry/first-out (FEFO) order. Records for stocks on hand and on order are adjusted.
3. *Allocation of stock*: In most medical stores, the manager determines whether to allocate the complete quantities requested when a requisition is received. The decision can be made in collaboration with the requesting facility but generally depends on stock status, a review of facility consumption patterns, and, in some cases, budget status.
4. *Order picking*: An order-picking list is prepared (this may be the original requisition form rather than a separate list). Workers use this list to identify and col-

lect the allocated items from the warehouse.

5. *Order assembly*: Individual orders are assembled and checked in the packing area. They are then packed for delivery. Delivery documentation is prepared.
6. *Dispatch and delivery*: The packed goods are held in designated secure areas pending shipment, then loaded onto the transport and dispatched, accompanied by the necessary documentation, including a packing list recording all items and quantities. Ideally, an invoice showing unit costs of medicines and total value should accompany the shipment. Signed delivery notes are checked when the vehicle returns. If errors or damage have been reported, appropriate action is taken.

Formal and informal physical stock counts should be taken regularly to ensure that stock is being correctly handled and that losses and inaccuracies are properly accounted for.

Stock receipt

Importation and port clearing are described in Chapter 24. The procedure outlined here assumes that those tasks are carried out by an import unit attached to the CMS. Port clearing may, however, be contracted to a clearing agent or made the responsibility of the supplier. In such cases, the goods are delivered directly to the CMS or are collected from the agent's warehouse. Final responsibility for inspection remains with the CMS.

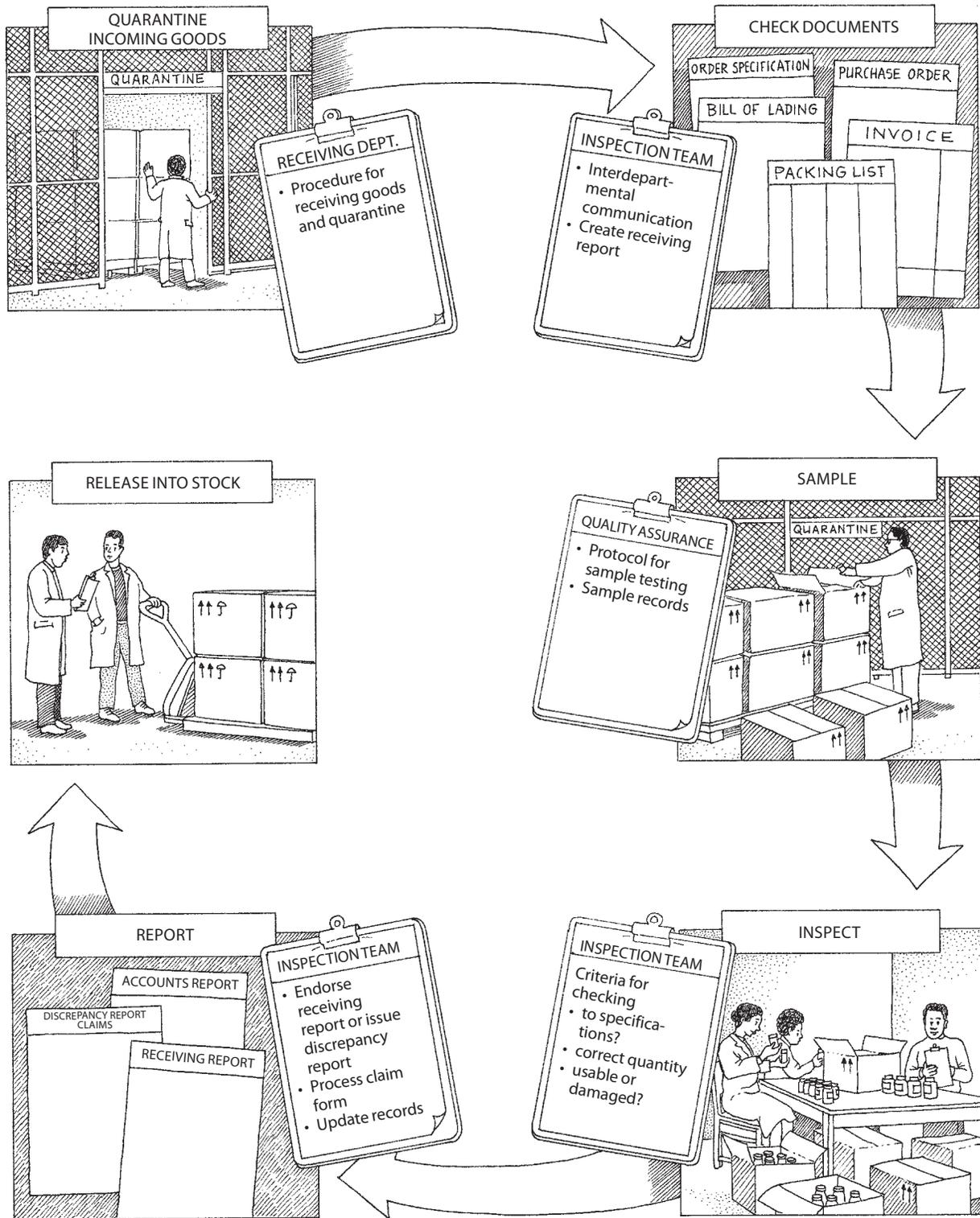
With the exception of locally purchased items, multiple copies of the supplier's shipping documents and supplier's invoice should be received by the CMS before supplies arrive at the port of entry. This information is recorded on a manual or computerized form to track each purchase order. In addition, the import unit should record the arrival information. This advisory is clipped to the purchase order in the supplier's file to await the arrival of the shipment.

When notice is received of a shipment's arrival at the port, the necessary customs forms are completed. It is always necessary to visit the port to arrange for the release of the shipment.

Containers are inspected against the supplier's shipping document. The first part of the receiving report is completed (Annex 44-3). Any apparent damage and missing shipping cases are noted and reported to the port authorities, insurance agents, and customs officials.

When the shipment arrives at the warehouse receiving area, contents should be quarantined until they have been checked (Figure 44-1). The receiving clerks systematically check the cases and their contents against the supplier's invoice. Discrepancies, variations, and damage are noted on the invoice. A prompt and thorough inspection based on predefined criteria is essential to quality assurance and as a

Figure 44-1 Checking received goods



precursor to any insurance claim. Table 44-1 is a checklist with sample inspection criteria.

The annotated invoice is signed and dated by a senior staff member. Observations are summarized on the second part of the receiving report.

One copy of the receiving report is filed according to the purchase order number to which it corresponds. The other copy and the annotated supplier's invoice are passed to the stock control section. In some warehouses, a separate copy goes to the accounting department.

The items are then entered on their respective stock record cards (Annex 44-1). The new stock on hand and on order totals are calculated, as well as the average cost per unit for each item. If a computerized system is used, receipts are entered into the system as prescribed in the software manual.

Planning for space requirements

As mentioned in other chapters, the massive increase in funding for pharmaceuticals from global health initiatives such as the Global Fund and the U.S. President's Emergency

Plan for AIDS Relief has increased the storage and distribution volume needed in some countries by two- or threefold. In addition, managing these "strategic" stocks can be challenging; for example, in the case of what to do with "dead" stock that never gets issued. Stores, therefore, need to work carefully with their clients to communicate about scale-up of initiatives such as antiretroviral therapy and distribution of bed nets to prevent malaria that will affect space and distribution planning and to develop policies on managing strategic stock.

Stock storage

After incoming stock has been checked and approved, it is formally released from the receiving area and moved to the warehouse to be stored in the appropriate zone. New stock may be stored on floor pallets, pallet racks, or shelves. If a fluid or semifluid location system is used (see Section 44.4), the exact location of each item must be recorded. If a bin card system is in use, receipts should be entered on the bin card when the items are transferred to the storage area.

Table 44-1 Inspection checklist for medicine receipts

| Product | Notes | Checklist |
|---------------|--|---|
| All shipments | Compare the goods with the supplier's invoice and original purchase order or contract. Note discrepancies on the receiving report. Take a sample for testing (if preacceptance sampling is a standard procedure). | <input type="checkbox"/> Number of containers delivered is correct <input type="checkbox"/> Number of packages in each container is correct <input type="checkbox"/> Quantity in each package is correct <input type="checkbox"/> Drug is correct (do not confuse generic name and brand name) <input type="checkbox"/> Dosage form is correct (tablet, liquid, other) <input type="checkbox"/> Strength is correct (milligrams, percentage concentration, other measurement) <input type="checkbox"/> Unique identifiers are present, if required (article code, ministry of health stamp, other code) <input type="checkbox"/> No visible evidence of damage (describe if present) |
| Tablets | For each shipment, tablets of the same drug and dose should be consistent. | <input type="checkbox"/> Tablets are identical in size <input type="checkbox"/> Tablets are identical in shape <input type="checkbox"/> Tablets are identical in color (shade of color may vary from batch to batch) <input type="checkbox"/> Tablet markings are identical (scoring, lettering, numbering) <input type="checkbox"/> There are no defects (check for spots, pits, chips, breaks, uneven edges, cracks, embedded or adherent foreign matter, stickiness) <input type="checkbox"/> There is no odor when a sealed bottle is opened (except for flavored tablets and those with active ingredients normally having a characteristic odor) <input type="checkbox"/> There is no odor after tablets have been exposed to room air for 20 to 30 minutes |
| Capsules | For each shipment, capsules of the same drug and dose should be consistent. | <input type="checkbox"/> Capsules are identical in size <input type="checkbox"/> Capsules are identical in shape <input type="checkbox"/> Capsules are identical in color (shade of color may vary from batch to batch) <input type="checkbox"/> Capsule markings are identical <input type="checkbox"/> There are no defects (check for holes, pits, chips, breaks, uneven edges, cracks, embedded or adherent foreign matter, stickiness) <input type="checkbox"/> There are no empty capsules <input type="checkbox"/> There are no open or broken capsules |
| Parenterals | Parenterals are all products for injection (IV liquids, ampoules, dry solids for reconstitution, suspensions for injection). | <input type="checkbox"/> Solutions are clear (solutions should be free from undissolved particles, within permitted limits) <input type="checkbox"/> Dry solids for use in injections are entirely free from visible foreign particles <input type="checkbox"/> There are no leaking containers (bottles, ampoules) |

Stock control using FIFO and FEFO

In order to avoid accumulation of expired and obsolete stock, items should be stored and issued on a FIFO or FEFO basis, according to the following guidelines.

The stock control system must record the expiry date and the date of receipt. Stock must be stored so that earliest-expiring or first-delivered batches can be picked and issued first. When small quantities are involved, this goal can be achieved by placing the newly received stock at the back of the shelf behind the existing stock. When larger quantities are involved—for example, several pallet loads—the newly received items can be placed on the upper levels of the pallet racking. They remain there until the older stock has been issued. The picking stock is kept in an accessible position, assuming that orders are picked by hand in relatively small quantities. In warehouses where whole pallet loads are picked for distribution to lower-level stores, accessibility is less of a concern because mechanical transporters are used.

Newly arrived stock sometimes has an earlier expiry date than a previously received batch of the same item. If a FEFO system is used, this stock should be “promoted” so that it is issued before later-expiring stock. Making this adjustment is particularly important with products that have short shelf lives, such as vaccines.

Note that the system for stock rotation may be determined by the scheme for price increases, if medicines are sold to clients. If pricing is done on a FIFO basis, this system should also be used for stock management, except when newer stock will expire before it can be used under a FIFO rotation.

Order allocation

Under a pull distribution system, lower-level stores and health facilities submit requests, or requisitions, for supplies. At most medical stores, a designated official is responsible for reviewing requisitions and allocating stock based on inventory levels at the requesting facility and in the issuing warehouse as well as on past consumption at the facility. In many countries, facilities use a set formula for quantification based on their inventory control system to prevent over- or underordering. Usually, the order quantity is rationed at the warehouse level only if there are insufficient funds or stock. The requesting facilities may have budgets that must be considered in making allocations. After the allocation has been made, the order can be picked.

Order picking

The allocated quantities form the order-picking list. This list is passed to the storekeeper. In a large store—especially one that uses a fluid location system (see Section 44.4)—the picking list often needs to specify the exact position of the items to be selected. In a small store, the storekeeper prob-

ably knows where everything is. The listed items are taken from stock in strict FIFO or FEFO order and transported to the packing area, where order assembly takes place.

In large stores, it is common to use separate zones or rooms for storing specific types of products, such as anti-retrovirals, which must be locked up. A specific storekeeper is also assigned the responsibility of managing these products. In such instances, it may be necessary to divide the picking list for a given customer into several smaller picking lists, according to the number of separate storerooms or areas in use. A similar approach would be needed when generating goods received notes and transferring fresh supplies to individual storage areas.

If bin cards are used, the stock issued should be recorded on the bin card as it is pulled from the storage area.

Order assembly

At a secured shipping location, the supplies are arranged in the order in which they appear on the picking list or requisition voucher. The order is double checked by the storekeeper or shipping clerk before the items are packed, sealed, and labeled for delivery. Some items, such as vaccines and controlled substances, require special packing and handling.

Order dispatch and delivery

In the most commonly used in-house delivery system, supplies are generally distributed according to a fixed delivery schedule. In some instances, a collection system may be used, whereby representatives from health facilities collect supplies from the store. The shipping clerk completes a delivery voucher (Annex 44-5). The voucher lists the number and type of shipped packages. Their specific content is not identified unless the items require special handling, such as vaccines, loose items (such as bulk germicides), and medical gas tanks. The voucher is signed by the driver, who takes two copies with him, together with two copies of the invoice or completed requisition form. The third copy of the delivery voucher remains bound in the delivery vouchers book, which is maintained by the shipping clerk.

When the delivery arrives at the receiving facility, the driver and the facility’s receiving officer count and inspect the containers. Any apparent loss or damage is noted on the delivery voucher. The receiving officer and the driver sign both copies; each keeps one copy. Ideally, the received parcels should be opened and verified against the requisition form in the presence of the driver. Because of time constraints, however, immediate inspection is not always possible.

The signed delivery voucher certifies that the driver has safely delivered the supplies. The receiving store retains the two copies of the completed requisition form. One is signed

and dated and returned to the delivering store. Any differences between the contents of the delivery and the requisition form are reported on the requisition form, and an investigation takes place if there are discrepancies.

The driver returns the signed copy of the delivery voucher to the inventory clerk, who signs and dates it and also signs and dates the permanent copy in the delivery vouchers book. That copy (now bearing the signatures of the driver, the receiving officer, and the inventory clerk, with the respective dates) is placed with the file copy of the completed requisition form.

Some supply systems require that the receiving facility send a written notification of receipt. In such cases, the receiving facility should return a signed copy of the completed requisition form to the CMS before the facility's next requisition date. The date of its return is entered in the register of requisitions (stores issues ledger; see Annex 44-6). If the receiving facility does not submit this "certified received" copy, the supplying store may refuse to fill the next requisition. The copy is filed in the individual requisitioner's file by date. If any discrepancies have been noted and subsequently verified, all relevant records, including the inventory card, must be adjusted. Again, all these records can be computerized, with file copies maintained.

Inventory taking

The bin card (Annex 44-2) and the stock record card (Annex 44-1), the computer file, or both provide a continuous record of each supply item in stock. The filed copies of the purchase orders and the verified copies of suppliers' invoices are used to document additions to the inventory.

The medical stores unit must regularly take physical counts of stock on hand to check that the stock balance on perpetual inventory records is correct. The government or stores audit office should also periodically certify that the recorded transactions and net totals are accurate. The audit is carried out by examining procurements and requisitions and is verified by a physical stock count. As discussed in Chapter 23, the cyclic stock count is now preferred to the traditional annual count. The cyclic count is easier to manage and is more likely to allow reconciliation of discrepancies between records and physical stock.

Both active and safety stock in all locations should be counted as scheduled and compared with the numbers on the respective cards (or computerized records). Inventory verification, at every location where supplies are stocked, should be planned to—

- Enforce procedures and regulations designed to prevent loss and wastage
- Ensure that security measures are adequate
- Provide an additional form of evaluation that may reveal defects in the warehousing system

- Provide regular evaluation of storage conditions and the adequacy of storage facilities, layout, and stock arrangement
- Identify surplus, expired, and obsolete stock

44.3 Zoning stock within the store

Medicines and essential medical supplies must be located in a part of the store with the correct combination of temperature and security. This initial zoning process is the most basic way in which supplies are arranged.

A zone can be a separate building or room, a locked cupboard, a refrigerator, a freezer, or a cold room. Table 44-2 indicates several possible combinations of temperature and security and illustrates how to classify items according to their storage requirements. Thus, an item classified "2B" in this scheme would be stored at +15 to +25–30°C in a secure store.

The product manufacturer's storage instructions should be followed to the extent possible. If these instructions cannot be followed, the product must be kept in the most suitable conditions available and used as quickly as possible. The product manufacturer should be consulted before violating recommended storage conditions, to determine how long the product will remain safe and effective under the actual storage conditions.

If no specific storage instructions are given, "normal storage conditions" apply. Normal storage conditions for medicines have been defined as "storage in dry, well-ventilated premises at temperatures of +15°C to +25°C, or, depending upon climatic conditions, up to +30°C" (WHO 2003). Each storage zone should have at least one thermometer, and temperatures should be recorded daily at the hottest time of day.

Table 44-2 Temperature and security zones

| Category | A Normal security | B High security | C Flammable | D Corrosive |
|--|-------------------------|-----------------------|----------------|----------------|
| 1: Uncontrolled temperature | X | X | X | X |
| 2: +15 to +25–30°C (controlled humidity) | X | X | | |
| 3: 0 to +8°C | X | | | |
| 4: –20°C | X | | | |

Notes: The +15 to +25–30°C zone is assumed to be air-conditioned and therefore humidity controlled. In temperate climates, this temperature range can be achieved without air-conditioning, but humidity control may still be necessary. Cells marked X are commonly required temperature and security zones. Other combinations may be required for specific products. For example, zones "3B" and "4B" may be needed for vaccines if the vaccines have a black-market value—for instance, hepatitis B—or there is a particular problem with security for refrigeration equipment.

Storage at uncontrolled room temperature

Many products can be safely stored at uncontrolled room temperature. However, the temperature in the upper part of a store can exceed +40°C even in temperate climates. In cold climates, temperatures will drop below freezing in unheated stores. Such temperature extremes may damage some items. Chapter 19 discusses items known to be sensitive to extreme storage conditions.

Storage at controlled temperature and humidity

In hot climates, it is necessary to store many items in air-conditioned rooms. In humid climates, dehumidifiers are useful for preventing moisture damage. In cold climates, stores may need to be heated in winter to protect products that are damaged by freezing.

Cold storage

The potency of vaccines, sera, test kits, and many other items depends on cold storage. Vaccines, in particular, are temperature-sensitive and must be kept at precisely controlled temperatures from the point of manufacture to the point of administration.

Cold-chain defects are a frequent cause of problems in immunization programs. The World Health Organization's (WHO) Department of Immunization, Vaccines and Biologicals publishes comprehensive advisory material on designing and implementing a cold chain (see the WHO Immunization, Vaccines and Biologicals website). This material should be referred to for detailed technical advice. Table 44-3 summarizes the requirements for an effective cold chain.

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.

Secure storage

Narcotics and other controlled substances should be kept in a secure room or in a safe. Ideally, a red warning light or warning bell that will activate when the door is unlocked should be fixed close to the store. The keys to the secure store should be kept in a safe.

Entry to the store must be controlled. No more than two assigned officers should have access. Typically, one should be the director of the store, the most senior pharmacist, or the most senior storekeeper (see also Chapter 43). Such precautions may also be needed for non-narcotic medicines that are frequently stolen. For example, many stores keep expensive products, such as antiretrovirals, in a secured space.

Flammables

Flammables, such as alcohol and ether, must be stored in special buildings or rooms. A separate building is best because it greatly reduces the risk of a fire's spreading to the main store. The flammables store must be well ventilated and fireproof. It must be fitted with an "explosion hatch," which may be part of the roof or part of a wall.

Fuel must never be stored in or near a medical store. Fuel tanks should be placed inside a locked compound to prevent theft. There should be a continuous earth bank or low wall around the tanks. The area enclosed should be sufficient to hold the total potential volume of fuel stored to ensure that fuel is contained if a major spill occurs. With these precautions, if a fire occurs, the risk of its spreading will be reduced.

44.4 Stock location within a zone

Within each zone, stock may be located in fixed, fluid, or semifluid locations. Fixed location systems are the simplest to manage, because each stock item is always stored in the same place, but they waste space. Fluid location systems make better use of available space, but require sophisticated stock management, because the location of each stock item varies over time. Semifluid systems combine features of both systems.

Fixed location

In a fixed location system, each stock item is allocated to specific shelves, pallet racking, or an area of floor. A fixed location system is like a house in which each family member has his or her own room. A room is left empty if a person is not at home.

For a fixed location system to work well, the store has to be large enough to accommodate the maximum possible level of stock for every item, including safety stock. As stock is used up, the storage location is emptied and left vacant until a new shipment of the item is received.

With a fixed location system, stock administration is relatively easy. Goods can always be found in the same place. However, this system has certain disadvantages—

- Fixed location systems are inflexible. If there is a change in the quantity ordered or a change in packaging, the assigned location may become too large or too small.
- If a new item is ordered, there may be no place to store it.
- Theft may increase because all store staff are familiar with the locations of valuable items.
- Storage space may be wasted, because at times it is largely empty.

Table 44-3 Typical requirements for an effective cold chain

| Level and staff functions | Management activities | Supplies and equipment needed |
|---|---|---|
| National | | |
| Management <ul style="list-style-type: none"> • National program coordination • Epidemiology • Logistics • Transport management • Training • Procurement • Budget and finance • Data analysis Central store <ul style="list-style-type: none"> • Storekeeping • Delivery Maintenance <ul style="list-style-type: none"> • Equipment care and maintenance | Program planning <ul style="list-style-type: none"> • Demographic/epidemiological data • Administrative structures • Logistic systems Program monitoring <ul style="list-style-type: none"> • Disease surveillance • Immunization coverage • Cold-chain and transport operations • Supplies usage • Program costs Supplies management <ul style="list-style-type: none"> • Procurement, storage, delivery • Refrigeration monitoring • Transport management Also— <ul style="list-style-type: none"> • Independent evaluations • Staff recruitment and training • Supervision of operations | Cold-chain equipment <ul style="list-style-type: none"> • +4°C cold room: twin refrigeration units, recording thermometer, alarm • –20°C freezer room equipped as above • Ice packs and cold boxes unless refrigerated vehicles are used • Standby power supply Working and safety stocks <ul style="list-style-type: none"> • Vaccines and injection equipment • Stationery and forms • Cold-chain monitoring cards • Cold-chain equipment and spare parts Also— <ul style="list-style-type: none"> • Transport and fuel • Special facilities • Vaccine control laboratory (where feasible) |
| Regional/provincial | | |
| Management <ul style="list-style-type: none"> • Regional program • Epidemiology • Logistics and transport • Training • Data analysis and reports Regional store <ul style="list-style-type: none"> • Storekeeping • Delivery Maintenance <ul style="list-style-type: none"> • Equipment care and maintenance | Program monitoring <ul style="list-style-type: none"> • Disease surveillance • Immunization coverage • Cold-chain and transport operations • Supplies usage Supplies management <ul style="list-style-type: none"> • Requisitioning, storage, delivery • Refrigeration monitoring • Transport management Also— <ul style="list-style-type: none"> • Staff recruitment and training • Supervision of district operations | Cold-chain equipment <ul style="list-style-type: none"> • +4°C cold room or vaccine refrigerators, thermometers, alarm • Vaccine freezers, thermometers, alarm • Ice packs and cold boxes unless refrigerated transport is used • Standby power supply Working and safety stocks <ul style="list-style-type: none"> • Vaccines and injection equipment • Stationery and forms • Spare parts Also— <ul style="list-style-type: none"> • Transport and fuel |
| District | | |
| Management <ul style="list-style-type: none"> • District program • Data analysis and reports District store <ul style="list-style-type: none"> • Storekeeping • Delivery Maintenance <ul style="list-style-type: none"> • Equipment care and maintenance | Program monitoring <ul style="list-style-type: none"> • Disease reporting • Immunization reporting • Cold-chain and transport operations • Supplies usage Supplies management <ul style="list-style-type: none"> • Requisitioning, storage, delivery • Refrigeration monitoring • Transport management Also— <ul style="list-style-type: none"> • Supervision of health facilities | Cold-chain equipment <ul style="list-style-type: none"> • Vaccine refrigerators, thermometers, alarm • Vaccine freezers, thermometers, alarm • Ice packs and cold boxes • Standby power supply Working and safety stocks <ul style="list-style-type: none"> • Vaccines and injection equipment • Stationery and forms • Spare parts Also— <ul style="list-style-type: none"> • Transport and fuel |
| Health facility | | |
| <ul style="list-style-type: none"> • Giving immunizations • Storekeeping • Reporting • Equipment care and maintenance | Supplies management <ul style="list-style-type: none"> • Requisitioning and storage • Refrigerator monitoring • Transport management Reporting of— <ul style="list-style-type: none"> • Disease incidence • Immunizations given • Refrigerator defects • Transport mileage and defects • Stock on hand | Cold-chain equipment <ul style="list-style-type: none"> • Vaccine refrigerator with ice-making compartment and thermometer • Cold boxes for outreach sessions • Vaccine carriers Working and safety stocks <ul style="list-style-type: none"> • Vaccines and injection equipment • Stationery and forms Also— <ul style="list-style-type: none"> • Transport and fuel |

Fluid location

In a fluid location system, the store is divided into many designated locations. Each location is assigned a code. Individual items are stored wherever space is available at the time of delivery. A fluid location system is like a hotel. Rooms are assigned only when guests arrive.

A fluid location system uses available space efficiently, but it requires sophisticated stock administration. Experience suggests that a store using a fluid location system can be 20 to 25 percent smaller than one using a fixed location system.

The administration of a fluid location system works as follows—

- The procurement unit provides information on the type, volume, and weight of goods arriving.
- The storekeeper assesses which locations will be empty when the new stock arrives and assigns an appropriate location. These data are recorded in the stock control system.
- If insufficient space is available, other goods may be moved to create more space.
- The stock control location records are updated.

Fluid location systems require a classification system that allocates a unique identifier code to each stock item and to each location. Also, the stock record for each batch of each item must always indicate the physical location of the item in the store. In a fluid location system, different batches of a particular item may be stored in several different places. For example, if item number 150-050-48 is 500 mg amoxicillin, 150-050-48: B1-B could be a batch of this product stored in aisle B, bay 1, cell B, and 150-050-48: C2-B could be another batch of the same product stored in aisle C, bay 2, cell B.

Fluid location systems benefit immensely from the use of a computerized bin location and storage system, which improves productivity and optimizes storage capacity. Such systems identify not only locations of items, but also the best location for storing an incoming consignment within storage areas.

Semifluid location

A semifluid location system is a combination of the fixed and fluid systems. It is like a hotel that has regular guests. Regular guests are always given the same room. Casual guests are given any room that is available.

In a semifluid location system, each item is assigned a fixed space for picking stock. When an order is prepared, the order-picking staff members know where to find each item. The remainder of the store is filled on the fluid location principle. When the picking stock runs low, the fixed locations are restocked using items from the fluid locations.

A semifluid location system is not as space-efficient as a fluid location system. However, picking stock is stored at a convenient height, eliminating the need for mechanical handling during order picking in stores that issue in relatively small quantities.

Another feature is that picking stock is always kept in the same place. Unlike in a fixed location system, however, less risk exists that changing requirements will disrupt the system. If demand increases for a particular item, the picking stock can be replenished more frequently. As new products are introduced, picking bays may be subdivided to provide sufficient space.

44.5 Stock classification

Items should be clearly organized within each zone of the store. Such organization makes it much easier for store personnel to control stock, take periodic stock inventory, and pick orders.

In stores that use the fixed location principle, items can be physically organized in one of several ways—

- Therapeutic or pharmacological category
- Alphabetical order
- Dosage form
- Random bin
- Commodity code

In a fluid location system, clear organization and unique product identification are absolutely essential to the success of the system. Otherwise, items get lost. Coding by any one of the first four methods is inappropriate for a fluid location system, because the position of a particular stock item will vary over time. For example, if antipyretics are randomly distributed about the store in a fluid location system, organizing the store on the basis of therapeutic class is not feasible.

However, therapeutic or pharmacological class, alphabetical order, and classifications may be used as ways of organizing the stock records, whatever stock location system is used. One of the advantages of a computerized stock control system is that records can be sorted in a variety of ways for different management purposes; for instance, according to therapeutic classes or in alphabetical order.

Therapeutic or pharmacological category

Therapeutic or pharmacological classification may be an effective way of organizing medicines in smaller stores and in the dispensaries of small clinical facilities where the storekeeper is also the dispenser. It is not an advantage in larger stores.

Alphabetical order

Alphabetical order (by generic name) is also attractive in peripheral stores that keep a small number of items. However, each change in the national (essential) medicines list or in the level-of-use list requires reorganization of the stores themselves and of the stock administration system. This method may not result in optimal use of available space.

Dosage form

A system based on dosage form is commonly used in smaller warehouses. Tablets and capsules are stored together, with separate areas for oral liquids, injections, creams and ointments, and topical liquids. Within each dosage-form area, products may be stored in a fixed, fluid, or semifluid manner and further organized by any of the other systems described in this section. The main advantages are that the forms are easy to recognize when receiving goods and this system allows optimal use of space.

Random bin

The random bin is a unique storage space identified by a code. For example, a shelving unit can be divided vertically and horizontally into cells, each with a unique location code. A unit of shelving might be labeled “B,” its bays “B1” and “B2,” and its shelves “A,” “B,” and “C.” A unique cell would be identified, for example, as B1-B (see Figure 44-2). This cell is called a bin.

The random bin storage method can combine the methods previously described. For example, items are placed alphabetically within therapeutic classifications. Generic names are used throughout. If there is more than one brand of the same generic drug preparation, all are stored in the bin for that type.

Commodity code

Commodity coding is an abstract organizational system. It offers maximum flexibility and can be used equally well in small and large stores.

This system is based on a unique article code combined with a unique location code. Examples of article codes include WHO technical specifications or UNICEF stock codes. Article codes can be designed to specify therapeutic class, clinical indication, level of use, or any other relevant data. In systems that use article coding and location coding, storekeeping staff do not need to have specific knowledge of pharmaceutical names and therapeutic uses.

Changes in the national medicines list can easily be introduced by assigning unique article codes to new products. Article coding works well in a computerized system. Tender contracts may require that only the article code be marked

on the bulk packaging as well as on the smaller units of supply. This method increases security but still allows the goods to be identified by those staff members who have access to the coding key.

The location code is totally independent of the article code and is similar to the random bin principle. Codes can be designed to incorporate any number of characteristics, including—

- Correct storage temperature for the product
- Correct security level for the product
- Whether the product is flammable
- The building where the product is located
- Pack size
- Pharmaceutical form

44.6 Stock storage and handling

Within each temperature and security zone, products must be stored so that they are easily accessible and protected against damage. There are four basic systems of storage: shelves, floor pallets, block-stacked pallets, and pallet racks. Direct storage of cartons on the warehouse floor should be avoided because their contents may be damaged by moisture. The choice of system depends on the following factors—

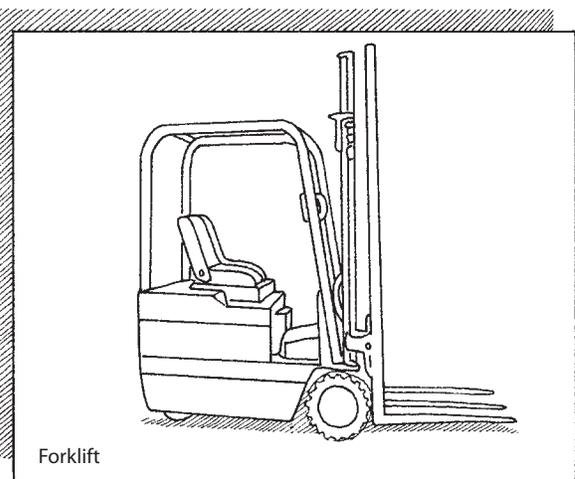
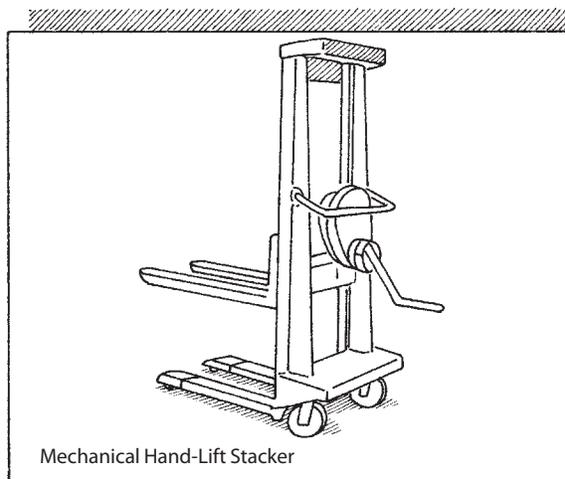
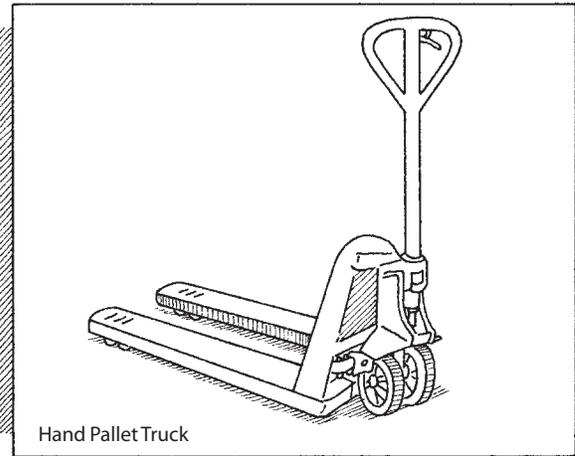
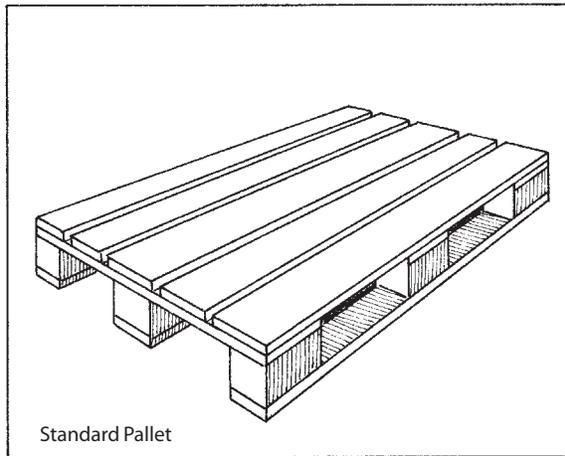
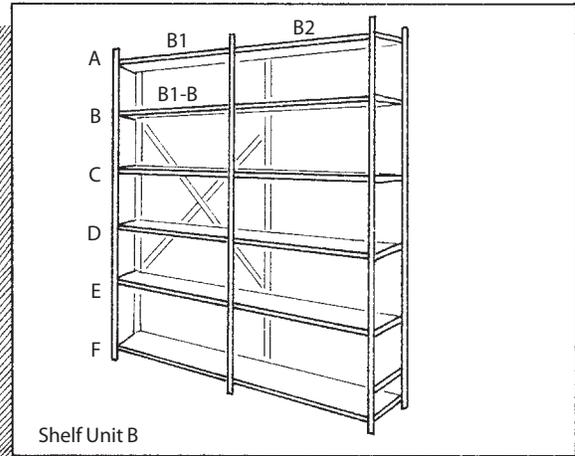
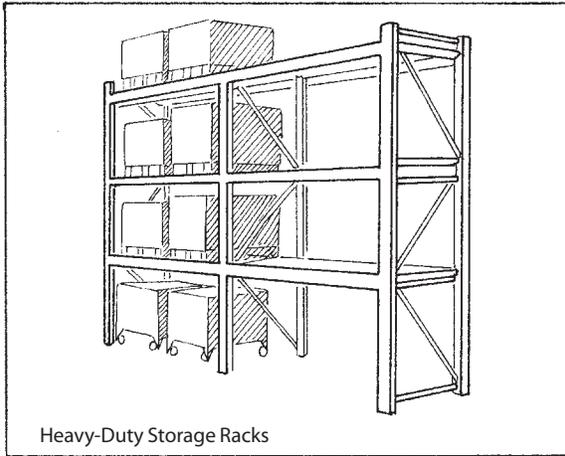
- Total quantity of products to be stored
- Average volume of each product
- Internal height of the storage building
- Local availability of mechanical handling equipment and the skills to use and maintain it

Pallets are generally used at the national and regional levels, where products are stored in bulk. At the district level and below, storage on shelves is most common. The fundamental rule for pallet storage is that each pallet should be used for only one product line. Pallets have the following advantages—

- They keep goods together and impose a disciplined method of storage.
- Large loads can be moved easily using mechanical handling equipment.
- Pallets are easy to transship because they do not require any unpacking and repacking.
- Pallets isolate goods from floors, which may be damp.
- If goods are supplied by the manufacturer on shrink-wrapped pallets, it is easy to see when tampering has occurred.
- Inspection for damage and for short shipments is easy to perform.
- When stock rearrangement is necessary, it is much easier to move pallets with mechanical handling

44.14 ORGANIZATION AND MANAGEMENT

Figure 44-2 Storage and load-handling equipment



equipment than it is to move a large volume of loose stock that has been placed on shelves.

Packaging specifications

Appropriate packaging specifications reduce the risk of damage during handling. Floor pallets and pallet racks must be laid out to suit a selected pallet module. Pallets come in a range of sizes, and the size and weight of pallets affect the layout of the store and the choice of mechanical handling equipment. Although it may be difficult in practice due to the range of pallets that may be available, whenever feasible, a standard pallet size should be adopted throughout the distribution system, and all contracts with suppliers should include this specification.

Shelving

Storage on shelves does not require mechanical handling equipment and is a good choice when—

- The volume and weight of individual items are too small to justify pallets.
- The internal height of a building is not large enough for multitier pallet racking, and shelving can be used on its own or in combination with floor pallets or two-tier racking.
- Manual goods handling is locally more reliable or economical than mechanical handling.

If shelving is used in a warehouse more than 4.5 meters high, it may be possible to install an independent mezzanine flooring system supporting a second tier of shelving. This system can increase the available shelving volume by up to 100 percent, at the expense of some inconvenience in materials handling. Obviously, if a mezzanine is added, high-quality construction is critical to avoid injury to staff and damage to stored goods.

Floor pallets

Floor pallets are a good solution in warehouses with ceiling heights of less than 3 meters and in stores where the cost of pallet racking and forklift trucks cannot be justified. Many heavy or bulky items, such as rolls of cotton, medicine kits, or large hospital equipment, require floor locations. Floors should be marked to indicate pallet and aisle positions.

Block-stacked pallets

Pallets containing light goods may be stacked on top of one another in blocks. Block-stacked pallets should be used only for items without expiry dates or with very high turnover, because the first-in items are at the bottom of the stack.

Block stacking is a cheap and space-efficient method of storage, and no racking is required.

Pallet racking

Simple pallet racks generally have two or three tiers. Two tiers of racking require a clear height of about 3 meters, and three tiers require a clear height of about 4.5 meters. It is possible to have several more tiers, but sophisticated mechanical handling equipment is then required.

The benefits of shelving and pallet racking can be combined. The bottom tier of racking may be used to store the working stock. This tier is at a convenient height for manual order picking. Alternatively, a special picking shelf can be placed immediately above the bottom tier of pallets. In both cases, the upper tiers can be used to store safety stock.

Load handling

Each of the four storage systems described above requires suitable handling equipment and appropriate organization of stored goods. Appropriate handling equipment reduces the risk of injury to workers and damage to goods. Careful stock organization on shelves and pallets reduces unnecessary lifting and ensures easy access to goods during order picking.

Shelving. In order to reduce manual handling, goods should be transported to and from the shelves on trolley carts. Heavy items should be stored on the lower shelves. Whenever possible, other items should be organized so that frequently picked items are at waist height. Safety stock may be stored at a higher level.

Pallets. Loaded pallets can be moved only by using mechanical equipment. Hand-operated hydraulic pallet trucks and pallet lifts are suitable for floor pallets and for pallet racking up to three tiers high. Operations that have pallets stored at higher levels or turn over large volumes of stock must use powered forklift trucks. Figure 44-2 illustrates some typical storage and handling equipment.

44.7 Housekeeping

Housekeeping tasks for a store include cleaning and pest control, a regular inspection system for issues such as temperature and roof leaks, disposal of stock, precautions against fire, and strict security measures.

Cleaning and pest control

The store should be kept tidy and should be cleaned at minimum two or three times a week; a busy store should be cleaned once a day. Most warehouses have adequate personnel available for scheduled cleanups, and adequate cleaning

Figure 44-3 Good stores management

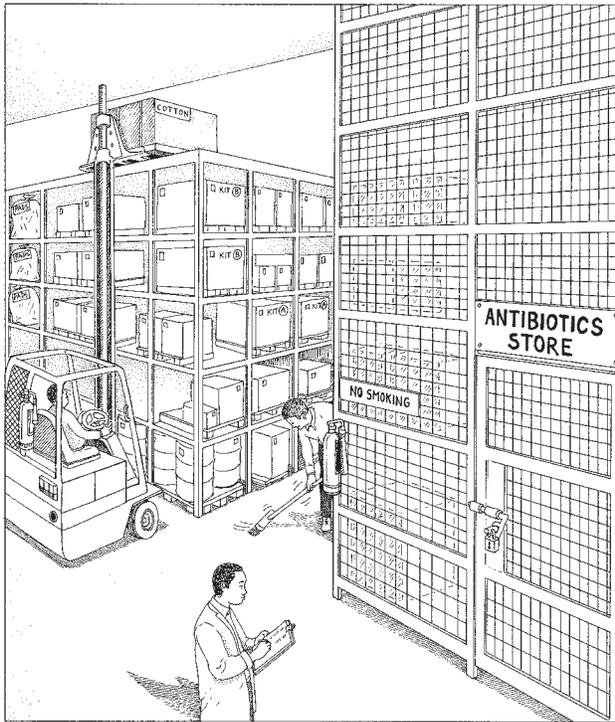
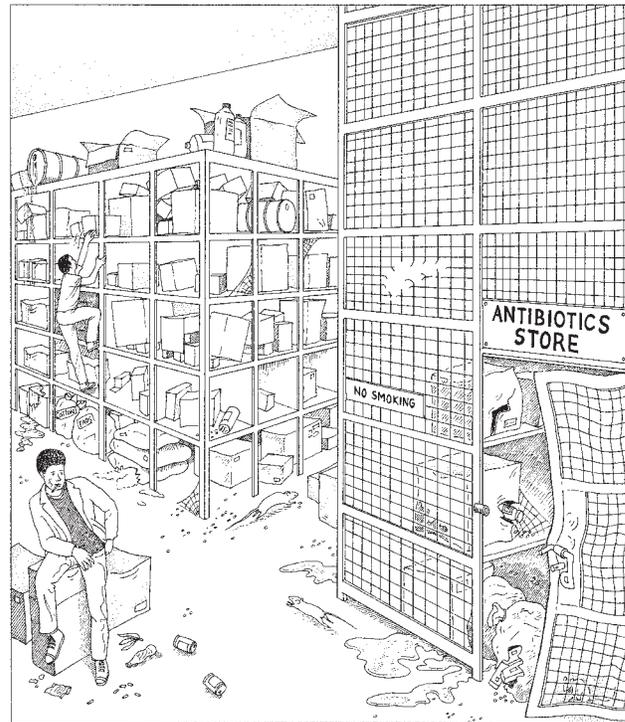


Figure 44-4 Poor stores management



equipment should be made available. Figures 44-3 and 44-4 illustrate good and bad stores management.

Pest control can be difficult, but to avoid possible contamination and physical damage to stock, insects, mice, and other pests must be kept out of the storage area. If needed, pest control measures such as poison should be implemented, with proper precautions. One of the chief reasons pests become a problem is the consumption of food in storage areas; therefore, this practice should be strictly avoided.

Inspection

Senior staff should inspect the store regularly. The chief storekeeper must make sure that storeroom employees check the shelves and pallets daily for signs of theft, pests, or water damage and for deterioration caused by climatic conditions. Storekeepers should open suspect containers and report problems to managers.

Buildings and equipment need both emergency and routine maintenance, but a regular building and equipment inspection and maintenance program prevents major failures and saves costs overall (see Chapter 42).

Disposal of expired or damaged stock

Damaged or expired stock should be placed in a designated salvage area to await authority for disposal. A written record of all stock consigned to this area should be maintained. It

is recommended that each item be valued at its acquisition cost. The responsible authority should be informed in writing that stock is to be written off. Disposal may be delayed if a committee decision is required, and substantial storage space may be needed for junk stock. When destruction is authorized, the inventory control clerk must adjust the stock records. All medicines and other potentially toxic products should be disposed of in accordance with local regulations in a manner that does not pose a risk to public health.

Fire precautions

Flammable trash, such as cartons and boxes, must not be allowed to accumulate in the stores. Smoking must be strictly forbidden, with "No Smoking" signs posted throughout the store. Senior staff must obey the rule as strictly as junior staff, and penalties should be imposed on those who ignore the rules. A smoking area outside the warehouse should be designated. Management must ensure that fire-detection and firefighting equipment are regularly inspected and that staff members receive adequate training in firefighting techniques and emergency action. Regular fire drills should be held to reinforce that training.

Staff should check frequently for fire, but management is ultimately responsible. Night watchmen can serve the dual purpose of responding to fire alarms and protecting against theft.

Security

Ideally, the chief storekeeper's office should have windows that overlook the loading bay, the compound entrance, and the store itself. A storekeeper who sits behind a closed door with the curtains drawn cannot observe what is happening at the site.

No vehicles should be allowed into the store compound unless they are authorized by the chief storekeeper or another senior staff member. A list of authorized vehicles should be prepared for the compound's gatekeeper.

Pedestrian access to the storage buildings should be strictly controlled. Visitors should report to the storekeeper's office and should not be allowed into the store area except on business. Visits by friends and family of staff should be discouraged. Business visitors should always be accompanied by a senior staff member. (See Chapter 43 for further discussion of security measures.)

44.8 Human resources management in medical stores

The organization of a typical central medical store is illustrated in Figure 44-5. The organizational structure at an intermediate store is generally a compressed version of this structure.

Medical stores managers are encouraged to review Chapters 51 and 52, which discuss human resources management in more detail.

Staff training and the medical stores procedures manual

Every worker should receive appropriate job training and refresher training, as appropriate. Most warehouse jobs are nontechnical, and in-service training and supervision of staff are likely to be the most effective approach. A written manual of standard operating procedures should cover the following—

- General management policy
- Management structure
- Job descriptions
- Reporting procedures
- Stock control and other record-keeping procedures
- Operational procedures
- Health and safety procedures
- Security

The manual should include visual aids that clarify operations. These documents are normally used by the director and section chiefs to train new staff and to settle procedural questions. Table 44-4 gives a sample contents list.

Each work area should have a copy of the manual. The contents of the document should be reviewed and explained in group presentations. The manual should be available to every employee, and staff members should be encouraged to use it in performing their duties. The manual should also be regularly reviewed and updated to reflect changes in operations or the introduction of new systems or procedures.

Staff supervision and discipline

The supervisory hierarchy should be clearly described to all workers. Personnel problems should be solved at the appropriate level. Section heads who do not supervise their workers regularly and effectively should be replaced.

Positive feedback and encouragement are essential. Minor lapses in performance should be kept in perspective. Major problems, such as proven cases of theft or reckless driving, should be handled through established ministry or organizational regulations. Regular staff meetings can help maintain a sense of shared purpose and ensure that all staff members understand their responsibilities.

Career development

Workers in the logistics system often have low status. They are frequently badly paid, work under poor conditions, and are not motivated. These problems result in low levels of performance.

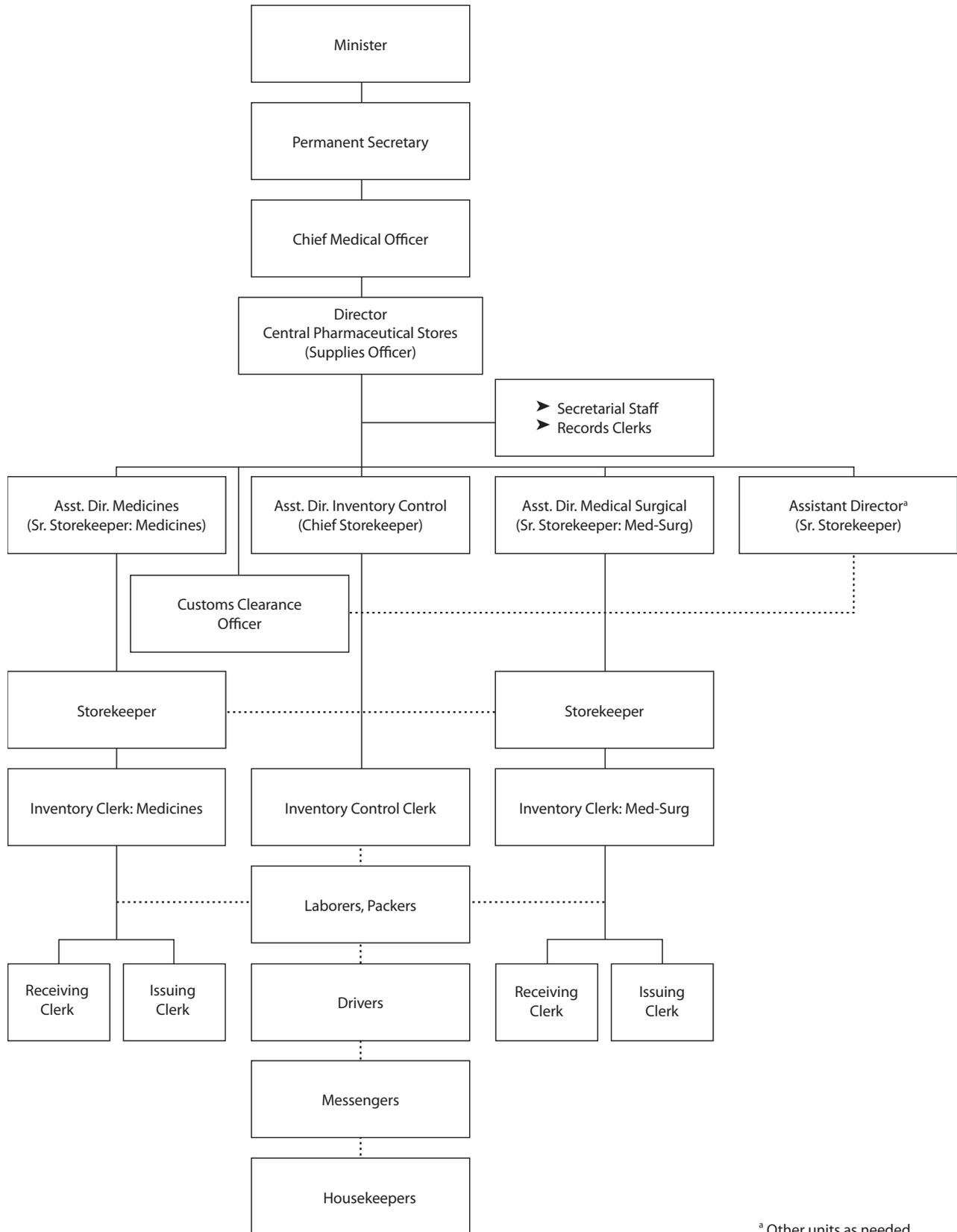
An effective store relies on staff members who want to perform their jobs correctly. When staff members perform well, they should be rewarded and praised. Although it is difficult to do in many government supply systems, improving salary grades and promoting staff who show ability and commitment will help the organization retain good staff. Staff members are also motivated by participating in training programs and other opportunities for personal development. Frequent transfers of personnel from one site to another should be avoided, if possible. Chapter 51 discusses employee satisfaction and motivation.

If stores staff are treated badly by management, they will look for other jobs, and their experience will be lost. A stores operation that relies on casual labor is more likely to suffer from theft, breakages, and distribution errors.

44.9 Staff facilities

Good staff facilities encourage cleanliness, protect workers against occupational injuries, and contribute to good staff morale. Just as medicines are susceptible to damage from excessive heat or cold, staff performance and motivation suffer in these conditions.

Figure 44-5 Medical stores organizational chart



^a Other units as needed

Table 44-4 Contents of a procedures manual for a central pharmaceutical supply system

| Content unit | Typical structure |
|---|---|
| Statement of operational policy | <ul style="list-style-type: none"> • Central level |
| Organizational staffing pattern | <ul style="list-style-type: none"> • Regional level • District level • Community level • Lines of authority |
| Overview of sequence of tasks and activities in supply management process (with discussion of objectives) | <ul style="list-style-type: none"> • Job descriptions (all personnel by level, each level treated separately) • Logistics information system • Flow chart of central, regional, and district information • Supply operations forms (purchase order, receiving report, inventory card, requisition/issue form, issues ledger by item and facility, delivery voucher) • Accounting system and procedures • Inventory control system and procedures • Security system and regulations • Computerized information systems • Supply system administration • Operating budget (utilities, salaries, maintenance, supplies, miscellaneous) • Maintenance procedures (for buildings and equipment) • Special operating instructions • Cold-chain storage procedures • Quality-control procedures • Shipping and packaging procedures |

Sanitary facilities

Personal cleanliness is essential among workers who handle medical supplies. The store needs well-maintained sanitary facilities for staff and visitors. Sanitary accommodations should be located on the perimeter of the building to allow natural ventilation and keep the drains outside the building.

Staff rest areas

A separate rest area, with a kitchen, toilet, and pantry for preparing and storing food, improves staff morale and reduces fire hazards and the risk of vermin infestation in the warehouse. It also improves efficiency by segregating resting staff from working staff.

First aid

Adequately trained personnel with first-aid equipment and dressings should be available to treat workers who suffer injuries on the job. Emergency washing facilities should be provided in case a staff member comes into contact with a corrosive or toxic agent. Installing emergency showers may be necessary. Eye-washing sprays should also be provided. Local health and safety regulations should always be followed. ■

References and further readings

★ = Key readings.

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ASSESSMENT GUIDE

General description

- How are goods received, stored, and supplied?
- What facilities are served? How often is each supplied? What methods of transport are used? Is a delivery, collection, or mixed system in use?

Stores management and staffing

- Does an operations manual adequately describe current procedures and responsibilities?
- Are staff positions described by category, listing the positions approved to be filled and those that have been filled?

Receiving

- Are procedures for receiving and checking medicines observed? Are standard checklists used?
- What medicines were returned during the past year, and why?
- How are complaints concerning product quality handled?

Communications and reporting

- What reports are regularly issued from medical stores, for whom, and how often?

Stock control

- What stock control system is used?
- Are random and periodic stock checks carried out? Is a stock auditing system in place?
- What percentage of stock records (and bin cards) corresponds with physical counts?

Stock management

- Is stock location fixed, fluid, or semifluid?
- Are medicines issued by FIFO or FEFO?

- What was the average stockout duration over the last year?
- How many expired medicines are in stock? What is their value?
- What was the value of inventory at the beginning and end of the last fiscal year?

Storage conditions

- Are medicines zoned in correct combinations of temperature, humidity, safety, and security?
- How are medicines organized within each zone?
- Are vaccines stored and monitored in accordance with the recommendations of the WHO Expanded Programme on Immunization?
- Is the store neat, and are effective pest control procedures in place?

Buildings and equipment

- Is storage space too small, adequate, or excessive?
- Are the loading bay, receiving area, packing area, administrative area, staff rest area, and sanitary facilities adequate?
- What is the condition of roofs, walls, floors, ceilings, firefighting equipment, windows, doors, locks, burglar bars, and water supply and drainage equipment and infrastructure?
- What storage systems are used (shelving, floor pallets, pallet racking)?
- What are the conditions of mechanical handling equipment, electricity supply, and telephones?
- What computer hardware and software systems are employed and are they adequate to support inventory control needs?
- Is there direct access to international communications?

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44.22 ORGANIZATION AND MANAGEMENT

Annex 44-2 Sample bin/stock card

**Ministry of Health
Department of Medical Supply
BIN/STOCK CARD**

Description: Paracetamol tabs 500 mgUnit of issue: 1,000 tabsStock No.: 02-4600

| Date 2007 | Document/ Number | Received From/ Issued To | Units Received | Units Issued | Balance | Initials |
|--------------|-------------------------|-----------------------------|-------------------|-----------------|---------|----------|
| Mar 5 | BALANCE BROUGHT FORWARD | | | | 1,665 | PF |
| 5 | IV 98534 | PHC 42 | | 10 | 1,655 | RS |
| 5 | IV 98541 | PHC 44 | | 10 | 1,645 | RS |
| 6 | IV 98543 | HOSP 6 | | 200 | 1,445 | BJ |
| 6 | IV 98546 | PHC 55 | | 16 | 1,429 | BJ |
| 6 | IV 98561 | PHC 53 | | 10 | 1,419 | PF |
| 6 | IV 98562 | PHC 52 | | 12 | 1,407 | BJ |
| 6 | IV 98565 | PHC 54 | | 10 | 1,397 | PF |
| 6 | IV 98567 | HOSP 7 | | 150 | 1,247 | PF |
| 6 | IV 98570 | PHC 63 | | 5 | 1,242 | PF |
| 6 | IV 98572 | PHC 64 | | 5 | 1,237 | BJ |
| 7 | IV 98573 | PHC 66 | | 5 | 1,232 | RS |
| 7 | IV 98575 | PHC 62 | | 5 | 1,227 | RS |
| 7 | IV 98574 | PHC 68 | | 5 | 1,222 | RS |
| 7 | IV 98579 | PHC 61 | | 5 | 1,217 | PF |
| 7 | IV 98601 | PHC 65 | | 5 | 1,212 | PF |
| 7 | IV 98600 | PHC 69 | | 5 | 1,207 | RS |
| 7 | IV 98603 | PHC 67 | | 5 | 1,202 | PF |
| 8 | RN 98166 | NOVAPHARM | 10,000 | | 11,202 | BJ |
| 8 | IV 98605 | HOSP 9 | | 200 | 11,002 | BJ |
| 8 | IV 98604 | HOSP 8 | | 200 | 10,802 | BJ |
| 8 | IV 98609 | PHC 71 | | 10 | 10,792 | BJ |
| 8 | IV 98611 | PHC 75 | | 12 | 10,780 | RS |
| 8 | IV 98613 | PHC 78 | | 10 | 10,770 | RS |
| 8 | IV 98614 | PHC 72 | | 15 | 10,755 | RS |
| | | | | | | |
| | | | | | | |
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| | | | | | | |

Annex 44-3 Sample receiving report

**Ministry of Health
Department of Medical Supply
Central Pharmaceutical Stores
RECEIVING REPORT**

Supplier: Apotex Inc.
 P.O. No.: DMS-116/07 Invoice No.: 686033
 Port of entry: Port St. Philip Carrier: Fast Forwarders
 Date received at port of entry: 5/12/08 Date Cleared: 05/17/08
 Number of shipping cartons/containers: 3

Certified that from external inspections, all containers appear to be suitable and without damage except as follows:
Nil

Gavaza H. 05/18/08
 Clearing officer Date

Certified that all items on the invoice and the purchase order (specified above) were received and, after inspection, released for removal to shelving except as follows (or as marked on the invoice):

Check Muvuro 05/22/08 Usopero M. 05/22/08
 Receiving clerk Date Chief storekeeper Date

Annex 44-4 Sample requisition/issue voucher

**Ministry of Health
Department of Medical Supply
REQUISITION/ISSUE VOUCHER**

Requisition no.: PHC63-98-3-23
 Health facility: Utano H.C.
 Authorized by: Mukuru, DNO.
 Date: March 4, 2008 Supply period: April to May 2008

Status of requisition:
 regular
 interim
 emergency

| Item No. | Stock Number | Description | Unit of Issue | Stock on Hand | Quantity Requested | Quantity Approved | Quantity Issued | Amount (\$) | Notes |
|----------|--------------|---------------------------|---------------|---------------|--------------------|-------------------|-----------------|-------------|-------|
| 1 | 02-0500 | Aspirin tabs 300 mg | 1000T | 12 | 18 | 18 | 18 | 165.60 | |
| 2 | 02-2200 | Metronidazole 150 mg | 1000T | 3 | 5 | 5 | 5 | 61.00 | |
| 18 | 02-4600 | Paracetamol tabs 500 mg | 1000T | 6 | 8 | 8 | 8 | 209.60 | |
| 19 | 02-4800 | Phenoxymethyl tabs 250 mg | 1000T | 3 | 4 | 4 | 2 | 81.40 | short |
| 20 | 02-4850 | Piperazine tabs 500 mg | 1000T | 1 | 1 | 1 | 1 | 11.20 | |

15:00 March 4, 2008 11:00 March 26, 2008
 Hour and date requisition received Hour and date shipment received

CLEARANCES:

| | | | |
|--|--|---|---|
| <u>Mutamba, SO</u> 1. Shipping and receiving review | <u>Kaeke, Dir.</u> 2. Director of medical stores | <u>Mhanda, PT</u> 3. Inventory control unit | <u>Mundandishe, PT</u> 4. Medical stores |
| <u>Mufawatamba, SO</u> 5. Shipping and receiving | <u>Mugari</u> 6. Driver or custodian accepts shipment | <u>Tinoda, SRN</u> 7. Recipient, acknowledgment of receipt of shipment | |

44.24 ORGANIZATION AND MANAGEMENT

Annex 44-5 Sample delivery voucher

| Ministry of Health Department of Medical Supply DELIVERY VOUCHER | | | |
|---|------------------------------|---------------------------------|---------------------------|
| Deliver to: <u>Utano HC</u> | | | |
| Requisition no.: <u>PHC 63-98-3-2R</u> | | Issue voucher no.: <u>98570</u> | |
| Received from Central Pharmaceutical Stores <u>3</u> sealed cartons and <u>2</u> containers described below: | | | |
| <u>3 x cartons</u> | | | |
| <u>1 x 5L disinfectant</u> | | | |
| <u>1 x bale of sanitary pads</u> | | | |
| | | | |
| for delivery to the above-named requisitioner/facility. | | | |
| <u>Mufawatamba</u> | <u>Mugari</u> | <u>09:00 Mar 26, 2008</u> | |
| Stores issuing officer | Driver/custodian of shipment | Date and time | |
| Received by requisitioner from the above-named custodian of shipment, the containers and/or items stated above in good order, except as follows: | | | |
| <u>1 carton damaged by leakage</u> | | | <u>Mugari</u> |
| <u>1 container missing</u> | | | <u>Mugari</u> |
| | | | |
| <u>Tinoda (TINODA, SRN)</u> | | | <u>11:00 Mar 26, 2008</u> |
| Receiving officer of requisitioning facility | | | Date and time |
| IF ANY DISCREPANCY IS RECORDED BY THE RECEIVING OFFICER, THIS DELIVERY VOUCHER IS TO BE INITIALED BY THE CUSTODIAN OF THE SHIPMENT AS WELL. | | | |

Annex 44-6 Sample register of requisitions

| Ministry of Health Department of Medical Supply REGISTER OF REQUISITIONS (STORES ISSUES LEDGER) | | | | | | | | |
|--|-------|-----------------|-------------------|----------------------|-----------|--------|----------|-----------|
| Stores Issue No. | Date | Requisition No. | Issue Voucher No. | Value of Issues (\$) | | | | Certified |
| | | | | Drugs | Med-Surg. | Other | Total | |
| 001 | Mar 5 | 98-3-2R | PHC42 98534 | 2412.60 | 836.50 | — | 3249.10 | Mariyacho |
| 002 | Mar 5 | 98-3-2R | PHC44 98541 | 2933.50 | 1078.50 | — | 4012.00 | Mariyacho |
| 003 | Mar 5 | 98-3-4R | HOSP6 98543-45 | 28364.20 | 6517.60 | 937.50 | 35819.30 | Mariyacho |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| 023 | Mar 8 | 98-3-2R | PHC75 98611 | 3545.30 | 948.60 | — | 4493.90 | Zvinodura |
| 024 | Mar 8 | 98-3-2R | PHC78 98613 | 2266.40 | 592.30 | — | 2858.70 | Zvinodura |
| 025 | Mar 8 | 98-3-2R | PHC72 98614 | 2947.70 | 876.10 | — | 3823.80 | Zvinodura |