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CHAPTER 30

Ensuring good dispensing practices

SUMMARY

Good dispensing practices ensure that an effective form of the correct medicine is delivered to the right patient, in the correct dosage and quantity, with clear instructions, and in a package that maintains the potency of the medicine. Dispensing includes all the activities that occur between the time the prescription is presented and the time the medicine or other prescribed items 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. Care should be taken to read labels accurately. The dispenser must count and measure carefully and guard against contamination of medicines by using clean equipment and never allowing skin contact with the medicines.

Staff members who dispense must be trained in the knowledge, skills, and practices necessary to dispense the range of medicines prescribed at the facility. Their performance should be regularly monitored.

Prepackaging medicines can improve efficiency in dispensing. Dispensing can also be improved by routine procedures for safety checking before issuing medicines to patients.

Cost factors inevitably lead to the use of packaging that is less than ideal. The packaging used must be the best compromise between cost and the risk of waste, with regard to maintaining standards of cleanliness.

Labeling is also affected by cost. Labels should contain information about the medicine and its correct use. The style and language of labeling should be appropriate to the needs of the patient.

Ensuring patients' understanding of how to take their medicines is a primary responsibility of dispensers. Dispensers should check understanding by asking each patient to repeat instructions.

Good records, though sometimes neglected, are an essential part of dispensing; they facilitate good management and monitoring of services provided.

30.1 Introduction

Dispensing refers to the process of preparing and giving medicine to a named person on the basis of a prescription. It involves the correct interpretation of the wishes of the prescriber and the accurate preparation and labeling of medicine for use by the patient. This process may take place in a public or private clinic, health center, hospital, or in a shop or community pharmacy setting. It is carried out by many different kinds of people with a variety of training and backgrounds. No matter where dispensing is done or who does it, any error or failure in the dispensing process can seriously affect the care of the patient.

Dispensing is one of the vital elements of the rational use of medicines. Programs to improve rational use have often been concentrated on ensuring rational prescribing habits, overlooking dispensing and the patient's use of medicines.

Dispensing is commonly assumed to be a simple, routine process that cannot go wrong. Yet all the resources involved in patient care prior to dispensing may be wasted if dispensing does not result in the named patient receiving an effective form of the correct drug, in appropriate packaging, and with the correct dose and advice.

This chapter considers the factors that influence the process of dispensing and therefore are important in ensuring "correctly dispensed" medicine.

30.2 Dispensing environment

Dispensing environments must be clean, because most medicinal products are for internal use, making it important that they be hygienic and uncontaminated. The environment must also be organized so that dispensing can be performed accurately and efficiently. The dispensing environment includes—

- Staff
- Physical surroundings
- Shelving and storage areas
- Surfaces used during work
- Equipment and packaging materials

Staff members involved in dispensing must maintain good personal hygiene and should wear a uniform or other clean clothing.

The physical surroundings must be kept as free of dust and dirt as possible. Although the dispensary must be accessible to patients, care should be taken to locate it in a protected place and not beside, or open to, a road or other area where dust, dirt, and pollution are commonly present. Ideally, the dispensary should be designed so that access to the dispensing area itself is restricted to authorized personnel only.

Figure 30-1   Illustration of a stock container label

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                    Tablets

                 PARACETAMOL
                   500 mg


              Batch no. 9312101
         Date of Manufacture: 12/06
              Expiry Date: 11/09
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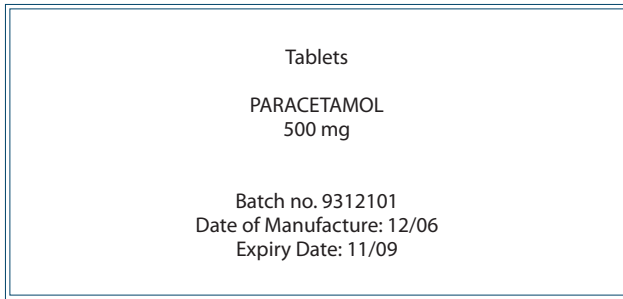
Maintaining a clean environment requires a regular routine of cleaning shelves, daily cleaning of floors and working surfaces, and daily removal of waste (garbage). A regular schedule should be in place for checking, cleaning, and defrosting the refrigerator. Spills should be wiped up immediately, especially if the liquid spilled is sticky, sweet, or attractive to insects and flies. Food and drink must be kept out of the dispensing area, and the refrigerator used strictly for medicines. Regular monitoring of the refrigerator temperature should be an established procedure, together with detailed actions to be taken to promptly repair the refrigerator if temperatures fall outside of acceptable limits (usually +2–8°C).

Dispensing equipment is used for measuring liquids, weighing solids, or counting tablets or capsules. Uncoated tablets normally leave a layer of powder on any surface they touch, which can easily be transferred to other tablets or capsules counted on the same surface. This process is called *cross-contamination* and can be dangerous if the contaminating substance (for example, aspirin or penicillin) is one to which a patient is sensitive. Cleaning any equipment used for handling different products, both between uses and at the end of the day, is essential.

The dispensing environment must be organized to create a safe and efficient working area. Space should be sufficient to allow for movement by staff members during the dispensing process. However, the distance that a dispenser must cover during the dispensing process should be minimized to maintain efficiency.

Stock containers and prepacked medicines must be stored in an organized way on shelves, preferably according to dosage forms (for example, tablets and capsules, syrups and mixtures) and in alphabetical order. All stock containers in use must be clearly and accurately labeled to ensure the safe selection of the correct preparation and to minimize the risk of error (see Figure 30-1).

In addition, a system of stock rotation should determine which items are to be used first, on either a first-in/first-out (FIFO) or first-expiry/first-out (FEFO) basis. Regular checking of expiry dates and removal of expired stock facilitates stock rotation, as does placing stock to be used first at the front of the shelf. Recommended storage conditions in terms of temperature, light, and moisture should be followed as closely as possible to maintain product quality. Stock bottles must be kept closed except when in use.

A limited range of preparations will be used with the greatest frequency, and these "fast movers" may be placed in the most accessible areas for the convenience of dispensers.

30.3   Dispensing person

A superficial look at dispensing suggests that it is a process of supplying goods to a patient on the basis of a written order, and that it can be done successfully by anyone who can read the prescription, count, and pour. As a result, dispensing is often delegated to any staff member who has nothing else to do, who then performs this function without any training or supervision. This situation is irrational and dangerous.

One major difference between supplying medicines or medical supplies and supplying other goods is that, with medicines or medical supplies, the recipient/patient usually does not know the correct use and is unable to judge the quality of the product he or she receives. Therefore, responsibility for the correctness and quality of medicines or products supplied lies entirely with the person dispensing them, and the patient must rely on the dispenser's ability. Consequently, in most countries, laws mandate that the distribution of medicines and important medical supplies to the general public be carried out by professional pharmacists. In many countries, however, where a shortage of qualified pharmacists or trained dispensers makes it difficult to achieve this level of service, medicines and related products are supplied by individuals who have no training in medicines and no knowledge about their safe use.

In addition to reading, writing, counting, and pouring, the dispenser or dispensing team needs specific additional knowledge, skills, and attitudes to complete the dispensing process. These include—

- Knowledge about the medicines being dispensed (common use, correct dose, precautions about the method of use, common side effects, common interactions with other medicines or food, storage needs)
- Good calculation and arithmetic skills
- Skills in assessing the quality of preparations
- Attributes of cleanliness, accuracy, and honesty
- Attitudes and skills required to communicate effectively with patients

The level of training needed for any particular dispensing task is determined by the range of medicines dispensed and the extent to which calculation and preparation are required.

Dispensing personnel must receive an appropriate level of training, which will enable them to correctly dispense the

range of medicines prescribed in their facilities. This is true in both the private and the public sectors. At a basic health facility, where a limited range of medicines is used and the number of patients is small, dispenser training may be basic, highly structured, and built on the trainee's previous health care training. Dispensing assistants with this level of training may be employed at higher levels (for example, a district hospital) but should work under the guidance and supervision of trained pharmacy staff, such as a pharmacy technician or technologist. Dispensers in community pharmacy shops should also be trained in the basics of good dispensing practices and the handling of medicines. Dispenser training in medication counseling and adherence is especially important to the success of programs providing antiretroviral therapy for HIV/AIDS patients, which are rapidly increasing in resource-limited settings (see Country Study 30-1).

In areas where graduate pharmacists are scarce, they are more effectively employed as trainers and supervisors rather than as technicians performing the routine tasks of dispensing.

Country Study 30-1
Improving dispensing and counseling practices for antiretroviral therapy in Kenya

Starting in 2003, the government of Kenya initiated antiretroviral therapy (ART) for HIV/AIDS patients at four health facilities serving the Coast Province, including the Port Reitz District Hospital in Mombasa. Management Sciences for Health's Rational Pharmaceutical Management (RPM) Plus Program performed a facility assessment and identified several factors related to dispensing that needed to be addressed before the ART program was initiated—

- Prescriptions were written on unofficial pieces of paper, difficult to read, and often incomplete.
- Tablet counters were available, but staff used their hands to count.
- Labeling of medicines was inadequate.
- The facility was extremely hot and no fans were available.
- Only one dispensing window was available—access to the second window was restricted.
- Patients crowded at the windows, which was distracting to the dispensing staff and made confidential counseling impossible.
- Average length of a medication counseling session was twenty-two seconds.
- No reference books or guidelines of any type were available.
- The dispensary was used to store nonpharmacy items (for example, staff members had to maneuver around a wheelbarrow).
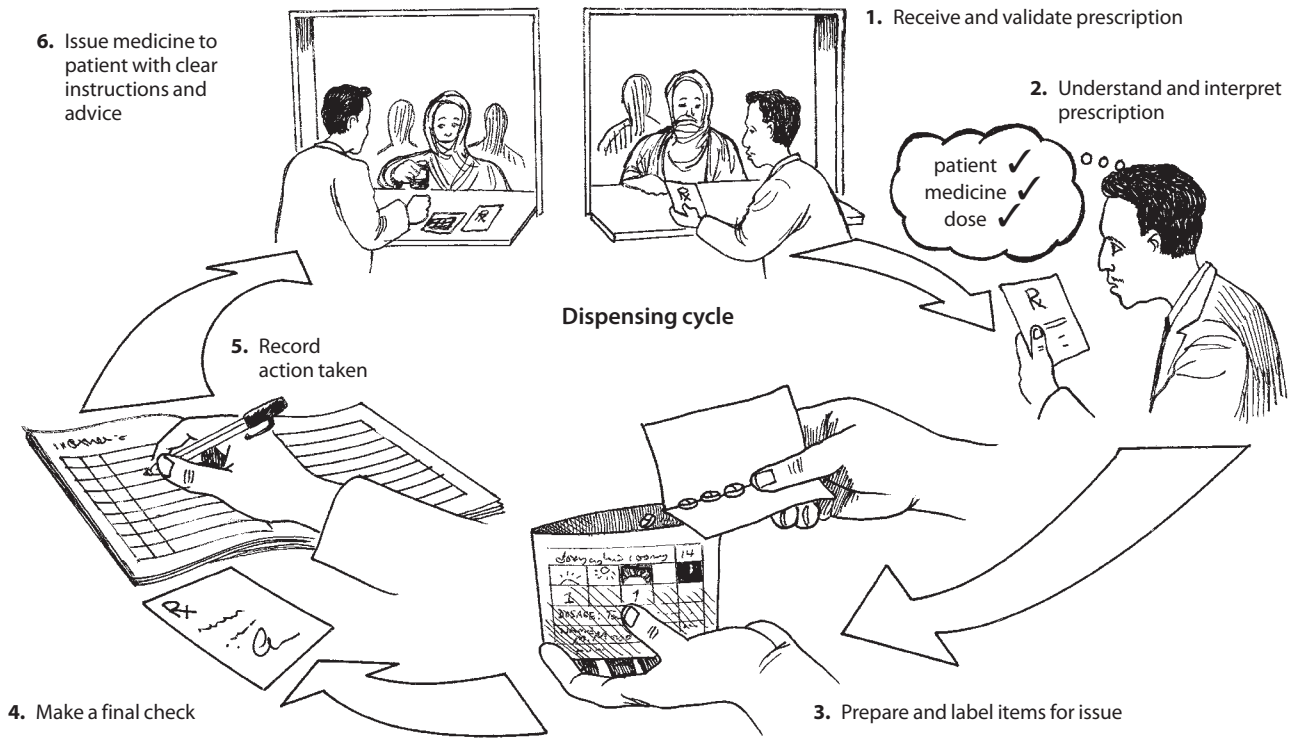
Before the ART program began, the newly appointed head pharmacist attended an RPM Plus Promoting Rational Drug Use course. Upon returning to the hospital, the pharmacist shared the results of the RPM Plus assessment with the dispensary staff, and the team worked to identify the underlying causes of problems and develop strategies to address each issue. The staff team—

- Prepared a code of good dispensing practice and hung it on the dispensary wall
- Collaborated with the medical staff to design an official prescription form that specified patient information
- Committed to using tablet counters—supportive supervision by the pharmacist in charge encouraged the behavior change
- Designed a preprinted stamp to clearly label medication envelopes
- Installed fans in the pharmacy
- Improved dispensing conditions and confidentiality by arranging for the installation of private counseling booths and freeing access to the second dispensing window
- Worked to apply their training in good dispensing practice and medication counseling for ART to improve the quality of dispensing and patient care for all medicines dispensed
- Made use of a set of key resource materials and national guidelines that were made available to them
- Cleared nonpharmacy items from the dispensary

In a review conducted one year later, staff members commented that reorganizing patient flow was key in facilitating the improvements in dispensing and that one of their greatest achievements was improving medication counseling for all patients. The new private booths at pharmacy windows provided a welcoming and secure atmosphere. The staff members saw the confidential nature of the booths as a valuable addition: "Before when I was dispensing pessaries to a patient there would be four heads listening." In addition, several of the dispensing staff members reported that they were applying their training on ART medication counseling to those patients taking medicines for the treatment of diabetes or hypertension.

Source: Pharmacist, Port Reitz District Hospital, personal communication.

Figure 30-2   The dispensing cycle

6. Issue medicine to patient with clear instructions and advice

1. Receive and validate prescription

2. Understand and interpret prescription

patient ✓
medicine ✓
dose ✓

Dispensing cycle

5. Record action taken

4. Make a final check

3. Prepare and label items for issue

30.4 Dispensing process

The consistent, repeated use of good dispensing procedures is vital in ensuring that errors are detected and corrected at all stages of the dispensing process. The term *dispensing process* covers all activities involved, from receiving the prescription to issuing the prescribed medicine to the patient.

The development and use of written standard operating procedures (SOPs) for the dispensing process will improve consistency and quality of work and can be used for training and reference. The framework for such SOPs may be based on the six major areas of activity (see Figure 30-2)—

1. Receive and validate the prescription
2. Understand and interpret the prescription
3. Prepare and label items for issue
4. Make a final check
5. Record the action taken
6. Issue medicine to the patient with clear instructions and advice

Step 1. Receive and validate the prescription

Upon receiving a prescription, the staff member responsible should confirm the name of the patient. This action is particularly important when the clinic is dealing with a large crowd of people and when there is any risk that staff

or patients may mix up prescriptions. Cross-checking the name and identity of the patient must also be done when issuing the medicines. (The use of matching numbers or symbols—one attached to the prescription and one given to the patient—can also contribute to making sure the right patient gets the right medicines and is especially helpful in situations where many people share the same surname.)

Step 2. Understand and interpret the prescription

Interpreting a prescription must be done by a staff member who can—

- Read the prescription
- Correctly interpret any abbreviations used by the prescriber
- Confirm that the doses prescribed are in the normal range for the patient (noting sex and age)
- Correctly perform any calculations of dose and issue quantity
- Identify any common drug-drug interactions

It is assumed that the prescription will be in written form. Verbal orders for medications should be given only in exceptional and emergency situations. In such cases, the order should be repeated back to the prescriber to ensure accuracy, and written confirmation should be supplied within

an agreed-upon period. Computerized prescribing and dispensing systems are becoming more widespread, especially in large hospitals (see Chapter 45). If the person dispensing the medicine has any doubt about what is required by the prescriber, he or she must check with the prescriber. Illegible writing by prescribers has serious implications when many product names are confusingly similar. Checking a prescription may save a life (see Box 30-1).

All calculations should be double checked by the dispenser or counter-checked by another staff member. An arithmetical error could be fatal.

Step 3. Prepare and label items for issue

Preparation of items for issue is the central part of the dispensing process, and it must include procedures for self-checking or counter-checking to ensure accuracy. This part of the process begins after the prescription is clearly understood and the quantity has been calculated. It is good practice to write the label at this point as a form of self-check (see Figure 30-3).

Select stock container or prepack. A good dispenser selects the item by reading the label and cross-matching the product name and strength against the prescription. The dispenser should check the stock to make sure that it has not expired and choose the oldest stock (first-in/first-out) or first expiry, depending on the stock rotation method used. Most well-trained staff members deliberately read the container label at least twice during the dispensing process (see Figure 30-4). Selecting according to the color or location of

Box 30-1
Dispensing errors cost lives

A patient had been given a prescription for an antacid—something beginning with "D" and ending in "l." The prescription was poorly written, but the dosage of two tablets taken four times a day was clear. The dispenser at the shop was not sure about the drug name but knew of a product on the market with a trade name that began with "D" and ended with "l," and so dispensed it. That was how glibenclamide tablets (brand name Daonil) were dispensed at a level eight times the recommended daily dose, and the patient died of hypoglycemia. The prescriber who wrote out the prescription had the antacid Diovol in mind, but the handwriting was unclear. Although it is easy to see how this tragedy occurred, the fact remains that it should not have happened.

the container, without consciously reading the label, is poor dispensing practice and may have fatal consequences.

Another dangerous practice that should be discouraged is having many stock containers open at the same time. In this situation, product selection is frequently made only according to appearance, which could lead to errors. In addition, medicines continuously exposed to the air eventually deteriorate in quality. It is important to open and close containers one at a time.
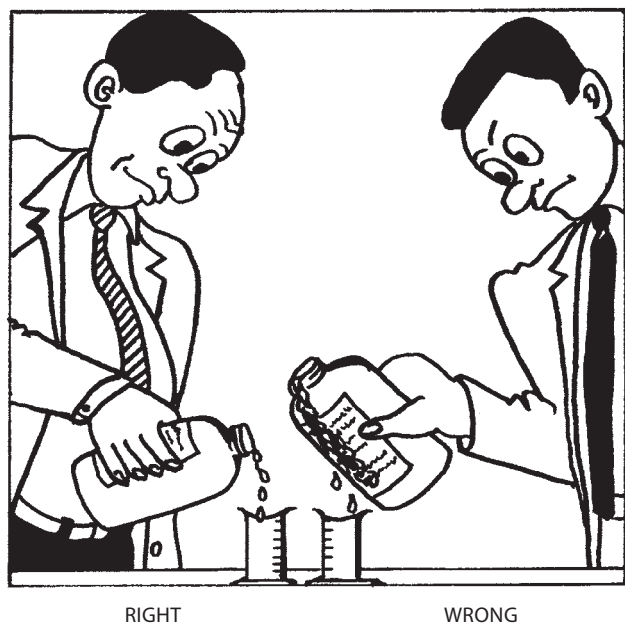
Figure 30-3   Writing medicine labels

Figure 30-4   Selection from a shelf: Read the label every time

Figure 30-5   Position label upward when pouring liquids

RIGHT   WRONG

Figure 30-6   Counting methods

Measure or count quantity from stock containers. Liquids must be measured in a clean vessel and should be poured from the stock bottle with the label kept upward. Using this technique avoids damage to the label from any spilled or dripping liquid (see Figure 30-5).

Tablets and capsules can be counted with or without the assistance of a counting device (see Figure 30-6). The most important rule to follow is that the dispenser's hands must not be in direct contact with the medicine. Using the hands is bad practice for both hygienic and product quality reasons. Counting should be done using one of the following—

- Clean piece of paper and clean knife or spatula
- Clean tablet-counting device
- Lid of the stock container in use
- Any other clean, dust-free surface

Immediately after measuring or counting, the stock container lid should be replaced and the stock container label should be rechecked for drug name and strength.

Pack and label medicine. Tablets or capsules should be packed into a clean, dry container, such as a bottle, plastic envelope, cardboard box, or paper envelope. Any of these containers are satisfactory in a dry climate. During the rainy season or in a humid climate, however, cardboard or paper will not protect tablets and capsules from moisture in the air, which can quickly ruin medicines and make them unfit for use. Capsules and sugar-coated tablets are the most vulnerable to moisture. Section 30.6 and Table 30-1 cover packing and labeling in more detail.

Step 4. Make a final check

At this point, the dispensed preparation should be checked against the prescription and against the stock containers used. Although this step can be done as a self-check, it is valuable to have the final check done by another staff member. The final check should include reading and interpreting the prescription before looking at the dispensed medicines; checking the appropriateness of doses prescribed and checking for drug interactions; checking the identity of the medicine dispensed; checking the labels; and finally countersigning the prescription.

Step 5. Record action taken

Records of issues to patients are essential in an efficiently run dispensary. Such records can be used to verify the stocks used in dispensing, and they will be required if a need arises to trace any problems with medicines issued to patients.

Three different methods can be used to keep a record of medicines dispensed. When the prescription is retained, the dispenser should initial and annotate the prescription with strength and quantities dispensed and either file it or enter the details into a record book as soon as time is available. When the prescription is returned to the patient, details of the medicines dispensed must be entered into a record book before the items are issued to the patient. The date, the patient's name and age, the medicine name and strength, the amount issued, and the dispenser's name should be entered into the register. When dispensers use computers to record the dispensing details, the computer program should retain

Table 30-1   Packaging materials for medicine dispensing

Category of packaging*	Package characteristics	Examples
Tablets/capsules		
Desirable	Clean, dry, plastic or glass container with tight-fitting cap or seal	Blister packages, plastic sachets, tightly sealing plastic or glass containers with screw or snap cap
Acceptable	Clean, dry container that provides protection from dirt and moisture	Zipper-lock plastic bags, glycine paper, tin with tight-fitting lid
Undesirable	Unclean absorbent paper, cotton, cardboard containers with no provision for closure	Unsealed plastic bags, paper bags, newspaper or other printed paper
Liquids (oral and topical)		
Desirable	Clean, dry, light-resistant glass container with tight-fitting cap	Amber or opaque bottle with screw cap
Acceptable	Clean, dry plastic or glass container with tight-fitting cap	Glass or plastic bottle with tight-fitting cap
Undesirable	Unclean paper, cardboard, metal, or plastic (not formed) container with no provision for closure	Previously used liquid-containing cartons, plastic-lined paper bags, plastic bags
Liquids (otic and ophthalmic)		
Desirable	Clean (preferably sterile), light-resistant glass or plastic container with a dropper incorporated into a tight-fitting cap or a top fitted with a dropper with a protective sleeve	Amber dropper bottle, opaque plastic dropper bottle
Acceptable	Clean, dry plastic or glass container with tight-fitting cap and a clean plastic/glass dropper (separate)	Glass or plastic bottle with tight-fitting cap, glass or plastic dropper with protective container (cardboard, zipper-lock, plastic, or paper)
Undesirable	Anything other than above	Anything else
Creams/ointments		
Desirable	Clean glass or porcelain wide-mouth jar with tight-fitting lid or collapsible plastic or metal tube	Wide-mouth jar with tight-fitting lid, cream or ointment tube with cap
Acceptable	Clean glass or porcelain jar with lid	Glass or porcelain jar
Undesirable	Anything other than above	Anything else

*   *Desirable:* Packaging should meet listed requirements for a period greater than 30 days.
    Acceptable: Packaging should meet listed requirements for up to 30 days.
    Undesirable: Packaging provides no protection from dirt, moisture, or other contaminants, thus permitting rapid deterioration or contamination.

the information, which can then be recalled to generate summary reports.

Step 6. Issue medicine to the patient with clear instructions and advice

The medicine must be given to the named patient, or the patient's representative, with clear instructions and any appropriate advice about the medicine. The appopriate level of informational detail about possible side effects varies from patient to patient. Verbal advice is important, because illiteracy and poor labeling may both be problems. Country Study 30-2 shows data collected on how well dispensers instructed patients on medication use in six different countries.

Apart from information on the dose, frequency, length of treatment, and route of administration, priority should be given to providing information that will maximize the effect of the treatment. Advice should therefore concentrate on—

- When to take the medicine (particularly in relation to food and other medicines)
- How to take the medicine (chewed, swallowed whole, taken with plenty of water, etc.)
- How to store the medicine

Warnings about possible side effects should be given cautiously. Common but harmless side effects (nausea, mild diarrhea, urine changing color) should be mentioned to prevent a frightened patient from stopping the treatment. More serious side effects should be mentioned only with the agreement of the prescriber, who needs to take those risks into account when prescribing the medicine.

Every effort must be made to confirm that the patient understands the instructions and advice. This can be difficult to do if someone other than the patient is collecting items for the patient or for several patients, particularly when the same medicines are prescribed in different dosages. Whenever possible, the staff member dispensing

Country Study 30-2
The quality of medication counseling in three pharmaceutical service sectors

As part of an overall assessment of pharmaceutical management in six resource-limited countries, Management Sciences for Health's Strategies for Enhancing Access to Medicines (SEAM) Program used standard indicators to measure the quality of pharmaceutical services, including dispensing. The data on patients' knowledge of how to take their medicine came from interviews with patients exiting public and nongovernmental organization (NGO) facilities and from simulated patients at privately owned retail outlets. The exit survey did not aim to determine whether the patient's information about how to take the medicine was correct, but to determine if the patient was able to relate any information about the medicine's intended use, based on what they had been told by the dispenser. Simulated patients entered

retail medicine outlets asking for help for their sick child. Results of the surveys are reflected in the tables below.

In general, attendants at all facilities and in all countries were lax about giving customers information on possible problems and side effects, but this finding was especially pronounced in private, for-profit outlets. The percentage of people receiving instructions on the purpose of their medication and how to take it varied, but was greatest in Cambodia and El Salvador. Of note are Cambodia's figures, where, in all three types of facilities, almost all those surveyed knew basic information on why and how to take their medications.

Sources: SEAM Program 2003a, 2003b, 2003c, 2003d, 2003e, 2003f.

Patients' knowledge of prescribed medicines at public facilities based on exit interviews

Indicator	Ghana n = 813	Tanzania n = 209	Cambodia n = varied	El Salvador n = 712	Brazil n = 178	India n = 1,391
% Patients who knew name of medicine	65	61	75	NA	60	9
% Patients who knew purpose of medicine	54	81	97	98*	80	63
% Patients who knew how long to take the medicine	40	76	100	98*	NA	81
% Patients who received other information about the medicine (including possible adverse effects)	35	20	48	NA	NA	8

* Patients were asked if they knew "how and why" the drugs are used. NA = not applicable.

Patients' knowledge of prescribed medicines at NGO facilities based on exit interviews

Indicator	Ghana n = 621	Tanzania n = 216	Cambodia n = varied	El Salvador n = 447	Brazil	India n = 373
% Patients who knew name of medicine	61	10	86	NA	NA	9
% Patients who knew purpose of medicine	46	70	98	98*	NA	61
% Patients who knew how long to take the medicine	35	80	100	98*	NA	78
% Patients who received other information about the medicine (including possible adverse effects)	35	80	45	NA	NA	3

* Patients were asked if they knew "how and why" the drugs are used. NA= not applicable.

Quality of dispenser services in simulated patient encounters in private, for-profit facilities

Indicator	Ghana n = 18	Tanzania n = 45	Cambodia n = 36	El Salvador n = 26	Brazil n = 21	India n = 48
% Encounters where attendant provided instruction on taking medication	14	87	100	89	42	60
% Encounters where attendant gave information on possible problems with medication	21	9	42	12	5	2
% Encounters where attendant provided information on care and how to treat fever	14	24	69	19	16	10

Figure 30-7   Ensuring understanding

Figure 30-8   Check routines, prevent mistakes

the medications should have the recipient repeat back the instructions (see Figure 30-7).

Every patient must be treated with respect. The need for confidentiality and privacy when explaining the use of some types of medicine must be recognized, and efforts should be made to structure medicine collection so that advice to patients can be as individual as possible. The person receiving the instructions may be feeling ill, and the success of treatment depends on the accuracy and effectiveness of the dispenser's communication with the patient.

30.5   Promoting efficient management in dispensing

Good dispensing practices are most threatened when dispensing staff face a crowd of patients demanding immediate attention. The need for speed must be balanced with the need for accuracy and care in the dispensing process. At this point, the patient's care, or even life, is in the hands of the dispenser. In dispensing, *accuracy is more important than speed.*

Prior agreement with the prescribers to prescribe only items that are available at the pharmacy or listed on the hospital or clinic formulary prevents unnecessary delay and confusion for the patient and improves efficiency in the dispensing process.

Organizing patient flow, such as establishing systems to receive payment and prescriptions and issue medicines, can reduce the potential for dispensing errors by removing the dispenser from the intense scrutiny of ten or more patients

anxiously waiting at the dispensary window. Strategies such as giving information on the current waiting time and issuing numbers linked to the order in which prescriptions will be dispensed can encourage patients to use the waiting time to access other hospital or clinic services, helps to prevent long queues and crowding at the dispensary window, and can improve patient satisfaction.

One good way to reduce dispensing time and improve safety is to prepackage and label commonly used medicines. This process also distributes some of the dispensing workload to less busy periods of the day. See Section 30.7 for a more detailed discussion of prepackaging.

Another way to prevent staff from making errors when under pressure is to organize the work so that more than one individual is involved in the dispensing process for each prescription. This method introduces a system of using counterchecks, which is a wise precaution in most situations (see Figure 30-8). One example of such a system assigns one person to receiving and checking prescriptions, another to preparing the medicines, and a third person to handing them to the patient with advice; the team members then rotate responsibility for these activities at regular intervals.

Techniques to ensure quality in dispensing include—

- Requiring that all staff work in accordance with written SOPs
- Maintaining records on what medicines and products have been issued
- Scheduling worker shifts to make best use of staff: providing more staff at peak hours, maintaining enough coverage to keep the dispensary open during breaks,

and coordinating shift starting/ending times with patient flow

- Involving the pharmacy staff in hospital/facility committees to identify and resolve problems involving patient flow, communication, and other areas

Regular inspection or auditing using a checklist, together with supportive supervision, may improve dispensing in a health facility (see Box 30-2).

A number of studies have investigated determinants, other than the management of the dispensing process, that influence dispenser behavior. Box 30-3 lists factors that have been cited as influential and may need to be addressed to improve the quality of the dispensing process.

30.6 Packaging and labeling of dispensed medicines

When products for dispensing have been collected from the shelf, they must be packaged so that they can be stored by the patient, and labeled to ensure patient understanding.

Containers for dispensed medicine

The purpose of a medicine container or packaging is to preserve the quality of the medicine up to the time of use, as well as to provide a surface for attaching or writing a label with identifying details and instructions for use. The container should not affect the quality of the medicine in any way or allow other contaminants to do so.

Ideally, such a container would match standard criteria per textbooks and international standards. These describe the nature and color of the container and its closure (cap or top), as well as the requirements for good labeling. Because many health systems cannot meet this ideal for financial or logistical reasons, it is important to seek the best possible solution, keeping in mind basic principles. Table 30-1 compares various options.

Liquids require clean bottles and effective caps or closures. Under no circumstances should two liquid medicines be mixed together for dispensing. They may interact chemically and become ineffective or dangerous. In many situations, suitable containers for dispensing liquids are difficult to obtain, and a policy of prescribing solid-dose preparations whenever possible is recommended. If patients bring their own bottles for liquid medicine, it is important to rinse and thoroughly drain the bottles before use.

The use of medicine reminder devices or medicine compliance aids as dispensing containers is becoming more popular as a tool for helping patients with complex medication regimens—especially elderly patients—take their medicines correctly at home. These devices typically hold seven days' supply of a patient's medicines in twenty-eight

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Box 30-2
Sample inspection checklist

Environment

- ☐ Does the area appear clean and tidy?
- ☐ Is the refrigerator clean and tidy?
- ☐ What nonmedical items were found in the refrigerator?
- ☐ Is the temperature of the refrigerator checked regularly and maintained within an acceptable range?
- ☐ Are any spillages left unattended?
- ☐ Are stock containers in their proper place (or in use)?
- ☐ Are stock containers open but not in immediate use?
- ☐ Do any stock containers have incorrect or inadequate labeling?
- ☐ Are prepackaged medicines clearly labeled?
- ☐ Are sufficient counting aids or surfaces available?

General procedures

- ☐ Are all dispensed medicines checked by a second staff member before issue?
- ☐ What proportion of prescriptions are cross-checked for the patient's name at the point of receipt?
- ☐ Are dispensing containers cleaned before use?
- ☐ Are the required materials in the most efficient places?

Individual practices

- ☐ Are medicines counted into or out of dispensers' hands?
- ☐ Are there obvious self-checking routines for accuracy in calculation, selection, and labeling?
- ☐ Is equipment for measuring and counting cleaned between use for different medicines?
- ☐ What quality of advice is given to patients, and in what manner?
- ☐ Are patients able to repeat and remember vital instructions?

Box 30-3
Factors that influence dispenser behavior

Pharmacies can often be a patient's first source of advice, and therefore, dispensers can greatly influence rational medicine use in the community. Many factors influence dispenser behavior—

- Training and knowledge
- Professional compensation (salary, prestige)
- Economic incentives (markup and volume of sales)
- Supply (cannot dispense what is not in stock)
- Available product information
- Availability of dispensing equipment (counting trays, vials, bottles, syringes, labels, and so on)
- Public- versus private-sector promotional and marketing techniques

- Social status of a dispenser and his or her role in the health care system
- Dispenser-prescriber relationship
- Lack of communication skills

A review of the literature on determinants that affect antibiotic dispensing showed that dispensers most frequently cited the desire to meet customer demand, followed by economic incentives, such as dispensing according to what the customer could afford to pay. Other factors named included a lack of regulation and enforcement, marketing influences, and a lack of knowledge (Radyowijati and Haak 2003).

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total compartments, four for each day. The use of reminder devices, however, has both advantages and risks (Nunney and Raynor 2001). The obvious advantage is that the patient is able to manage his or her medication schedule better, with fewer missed doses and less confusion. Risks include patients' difficulty with opening the compartments, little space available for appropriate labeling, the possibility of product deterioration in imperfect storage conditions, and the difficulty of cleaning the compartments. Moreover, the device cannot accommodate certain dose forms, such as liquids or drops. In addition, when tablets and capsules are separated from their original containers, patients may lose track of what medications they are taking and why. A card that provides the details of physical appearance of the contents of the device can help patients with identification.

Labeling of dispensed medicine

When there is a shortage of suitable containers, the labeling of medicines is frequently inadequate or even nonexistent. As a result, dispensed medicines are often used incorrectly and therefore do not provide the patient with the intended treatment. Studies have shown that, even in countries with the most sophisticated labeling practices, only about 50 percent of medicines are taken as intended by the prescriber.

Despite these discouraging statistics, however, labeling is important, and every effort should be made to provide information about the nature and contents of the preparation, the dosage regimen to be followed, and the identity of the intended patient (see Figure 30-9). This information is important to include even if the patient is illiterate; another family member may be able to read the instructions. In addition, if a patient is admitted to the hospital for acute care

and is unconscious or unable to communicate fully, labels can provide vital information on the medication and dose for the treating clinician.

In some countries, small auxiliary labels are available with preprinted instructions, such as "Shake well before using," or cautions, such as "May cause drowsiness." Where such labels are available, they should be routinely used, as appropriate.

Prepackaged medicines should always be labeled with the name, strength, and quantity of the preparation and, where established courses of therapy exist, the dosage regimen. Such a label should leave a space for the patient's name to be added. It is important to avoid abbreviations, and unfamiliar expressions should not be used. If possible, the inclusion of the product batch number and expiry date is recommended.

Self-adhesive labels are unlikely to be available in many settings, but labels can be inserted into containers or stapled onto bags for tablets and capsules. Instruction labels may be preprinted, or the process can be simplified by having rubber stamps made for the common regimens (for example, "one to be taken three times a day"). If labels are handwritten, block capital letters should be used. Labels should be composed in the local language. If paper envelopes are used as containers, the instructions can be stamped onto them directly.

Where levels of illiteracy are high or where research has proved that written labels are not effective, consideration should be given to the additional use of pictorial or graphic labels, as illustrated in Figure 30-10. Graphic symbols should always be combined with written instructions. Before any large investment is made in printing such labels, however, they should be pretested to make sure that they communicate effectively. Pictorial language can be very culture specific.

The use of computers and printers to produce labels for dispensed medicine is now common in many countries. The

Figure 30-9   Dispensed medicine label

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JOHN TETTEH
AMOXICILLINE CAP
500 MG
TAKE 1 CAPSULE THREE TIMES A DAY

                                Daniel Piri  3/3/07
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Figure 30-10   Pictorial labeling

required software is designed for use on desktop personal computers, and this system may be considered where computers are available and affordable. Using computers can be very attractive and efficient, but the need for a continual supply of computer paper or labels and ink cartridges, as well as for a consistent electricity supply, must be considered.

30.7 Course-of-therapy prepackaging of medicines

The prepacking done at the local level differs from that done by the manufacturer, which includes preparing fixed-dose combinations of medicines and unit-dose blister packs. This chapter focuses on prepacking as a pharmacy-specific operation. However, blister cards and other unit-of-use packages created at the manufacturing level are useful to the dispenser because of the time saved and errors prevented by eliminating the need to count out tablets removed from a bulk package (Lipowski et al. 2002).

Local prepackaging of medicines for dispensing is valuable if the following conditions apply—

- Large numbers of patients come for medicines at the same time.
- A few medicines are prescribed frequently, and in the same quantities.
- The type of packaging used will provide protection from the environment until the patient uses the medicine.
- The package can be labeled with the drug name and strength.
- Prescribers are involved in the selection of packaging quantities and agree to prescribe the chosen quantities.

Benefits of course-of-therapy prepackaging

Course-of-therapy prepackaging has many advantages—

- Safer, easier, and faster distribution of medicines, with less room for error, which frees the dispenser from routine counting chores and allows more time for communication with patients

- Improved credibility among users, because of the attractiveness and cleanliness of the package, which can be comparable to that of commercially purchased medicines
- More accurate and efficient prescribing by all health workers because of the standard treatments chosen for prepackaging
- Simplified dispensing for multidrug therapies (for example, copackaging isoniazid, rifampicin, ethambutol, and pyrazinamide for tuberculosis treatment), resulting in improved patient adherence with recommended regimens
- Possibility for routine prepackaging to be done by untrained staff following clear procedures and subject to appropriate quality checks and controls
- Easier and more accurate recording of inventory, with better control over supplies and more accurate consumption data

Importance of controls in prepackaging process

Prepackaging of medicines is technically a "manufacturing" process, which must be done under strict controls reflecting good manufacturing practices. In particular—

- Only one kind and strength of medicine is prepacked at a time in one work area or on one surface.

- The supervisor checks beforehand that the "prepacker" has the correct labels and that the number of labels and containers is the same and corresponds to the number of tablets or capsules to be prepacked. For example, to prepack in amounts of twenty from a bulk container of 1,000 tablets, the packer requires fifty containers and fifty labels.
- The supervisor checks the product at the end of the process.
- A written record is kept of the details (name, strength, batch number, expiry date) of the preparation to be packed, the number of packs produced, the date packed, the name and signature of the packer, the name and signature of the supervisor, and the internal batch number for the prepackaged product.

Precautions and quality checks

Prepackaging is repackaging, and the legal responsibility for the quality and labeling of the newly packed medicine is transferred from the original manufacturer to the repacker. Repackaging of medicines may compromise the original manufacturer's expiry date, and generally an expiry date of six months, or the original expiry date if less, is given to repackaged medicines. Therefore, the quality of the product must be checked (at least a 10 percent sample) before and after prepacking. Package seals must also be checked on a regular basis to ensure that they close tightly and will protect the prepackaged medicine adequately.

The amount to be prepackaged depends on rate of use and the climatic conditions. In humid climates or during the rainy season, it may be best to prepack only an amount sufficient for a few days' needs, especially if the new packaging cannot be tightly closed. Repackaging is a waste of time and resources if the product becomes unfit for use. Chapter 7 provides more information on procedures for repackaging.

30.8 Aids in counting tablets and capsules

Aids for counting tablets and capsules include triangular or rectangular tablet counters, pan weighing scales, and electronic tablet counters.

Tablet counter

A tablet counter is a flat rectangle or triangle made of wood, metal, or plastic with raised edges along two sides. Metal or plastic is preferred because the surface can be easily cleaned or washed between uses for different products. The tablets are counted by first counting the number of rows of tablets in the counter and then pouring them into the container or package using a raised edge as a guide (see Figure 30-11).

Figure 30-11   Tablet counter in use
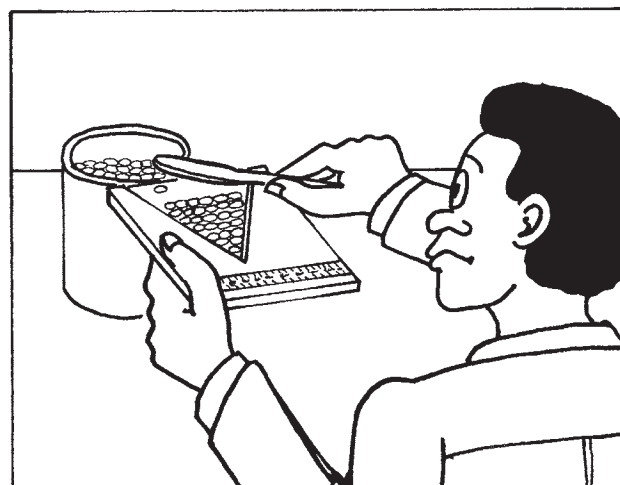
7 ROWS = 28 TABLETS

Key

Rows	4	5	6	7	8	9	10	11	12	13
Tablets	10	15	21	28	36	45	55	66	78	91

This simple device is good for counting small quantities of round compressed tablets, regardless of their size. The smaller the tablet, the more tablets can be counted at one time. With care, the counter can be used for sugar-coated round tablets. It is also useful as a surface on which to count any tablet or capsule, making the transfer to a container a simple process. The key for the number of rows and number of tablets is shown in Figure 30-11.

Pan weighing scales

Scales can be particularly useful when counting tablets or capsules during prepackaging. The balance must be free to move, and the pans must be clean. The required number of tablets or capsules is counted and placed on one of the scale pans. Equal quantities of the same tablet or capsule can then be counted by adding to the other scale pan until a balanced position is reached.

Electronic tablet counter

When prepackaging is done on a large scale, as in a teaching hospital for use in both the ward and outpatient department, the use of an electronic counter may be justified.

30.9 Pharmacy personnel

The availability of qualified pharmacy personnel varies widely throughout the world, and the status given to different levels of trained pharmacy staff is equally varied. These

facts reflect the indeterminate role of trained pharmacy personnel in health care services.

Pharmaceuticals play such a prominent role in the provision and cost of health care that it is surprising how often the management of this resource is left to untrained and non-specialized staff. It is important to appreciate the value of an appropriately trained pharmacy workforce.

There are three recognized cadres of pharmacy staff: pharmacists, pharmacy technicians (also called technologists), and auxiliary or assistant staff. The first two normally receive their training in the formal educational sector.

Chapters 51 and 52 discuss in detail aspects of human resources and training related to pharmaceutical management.

Pharmacists

In most countries, a pharmacist is a professional who is registered with the appropriate national board or society after having obtained a university degree in pharmacy, frequently followed by a year of supervised work or apprenticeship.

Pharmacists are employed to practice in four main areas: regulation and control of medicines, hospital pharmacy, the manufacturing industry, and community (retail) pharmacy. The first two areas of practice are usually part of the public sector, and the latter two are usually part of the private sector, although manufacturers may be owned and operated by the public sector. Along with their practices, many pharmacists are also involved in teaching, training, and research.

The role of pharmacists in the supply of medicines has been altered significantly over the last twenty years. This change can be summarized as a move away from the care of pharmaceuticals (being product centered), and toward pharmaceutical care (being patient centered). A decrease in the need to compound medicines and an increase in the complexity and potency of available finished manufactured products have resulted in a change from concern about the preparation of medicinal products to involvement in the use of medicines by patients.

The training of pharmacists in industrialized countries reflects this change by providing more clinical and patient-oriented teaching, which prepares pharmacists to be participating members of the clinical team in hospitals and primary health care settings. Pharmacists are increasingly involved in deciding on and designing treatments, and are recognized by health professionals and the public as experts in medicine management and use. Their expertise and potential contribution to public and private health care have yet to be appreciated by many countries, which try to provide an effective supply of medicines and treatment without a trained pharmacist workforce of sufficient numbers.

Pharmacy technicians

Pharmacy technician training is usually a government-recognized vocational course provided on a full- or part-time basis through technical colleges or health training institutes. The length of training may vary according to the national education system. In most developing countries, courses are two to three years, whereas a course can be one year or less in industrialized countries. All courses emphasize practical skills and experience in dispensing medicines, and work experience is commonly a significant portion of the course. Basic teaching is given in pharmacology, pharmaceutics, microbiology, and related subjects. Course content always needs to be updated to meet evolving job requirements.

Pharmacy technicians are important members of the pharmaceutical care team, and they constitute the largest group of trained pharmacy personnel in many countries. Their training qualifies them to work effectively in dispensing and pharmaceutical supply activities. They have sufficient training to be involved in decision making and supervision of other staff members, and individuals with experience can be given significant responsibility. In countries where professional pharmacists are scarce, by default pharmacy technicians are often put in charge of managing pharmacies without pharmacist supervision.

Insufficient planning has been directed to developing attractive and rewarding career structures for pharmacy technicians so that those with experience and ambition can fulfill their potential.

Auxiliary or assistant pharmacy staff

Auxiliary staff complete a relatively short on-the-job training program to assist pharmacists and technicians in the routine work of dispensing and medicine supply. Such training should be oriented to the tasks of the work environment. Assistant staff should follow written protocols and need to be supervised in their work, especially if the products of that work are given directly to patients. These staff should not be expected to interpret prescriptions on their own. Their supervisors should recognize that, with experience, these assistants can develop higher skills in particular areas.

Untrained medicine sellers

Many people rely on private medicine shops and other retail outlets as their primary source of medicines and health care, and although regulations may prohibit access to certain medicines at these outlets, often a lack of enforcement means that restricted, prescription-only medications are sold without a prescription. Countries may not have any legal requirements for the training or education of these sellers; however, sellers are increasingly recognized as

influential sources of information on illness and treatment in many areas. A number of interventions focused specifically on private-sector retail outlets have shown that training and incentive programs can improve dispensing habits among such sellers (see Chapter 32). ∎

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ASSESSMENT GUIDE

Dispensing indicators

- *Average dispensing communication time.* This indicator measures the time the dispenser actually spends explaining how the medicines should be taken.
- *Percentage of prescribed items actually dispensed.* This indicator is primarily a stock indicator.
- *Percentage of prescribed medications that are adequately labeled as per standard operating procedure.* At a minimum, package labeling should indicate patient names, drug name, and when the medicine should be taken (dose and frequency).
- *Patients' knowledge of correct dosage.*

Dispensing regulation

- Does a licensing system regulate the sale and dispensing of pharmaceuticals (wholesalers, pharmacists, retailers)?
- Are pharmacists legally allowed to substitute generic products for brand-name products?

- Is there an official checklist for carrying out inspections in different types of pharmaceutical establishments?

Dispensing training

- At each level in the health care system, who is responsible for the dispensing of medicines? What training do these individuals have in the principles and practices of medicine dispensing? Are standard operating procedures for dispensing and medication counseling available?
- How much supervision do these individuals receive? What type of pharmaceutical training is available in the country? Are there standardized education curricula for pharmacy personnel? Are experience requirements for dispensers clearly defined, and are these reasonable, given the numbers and geographical distribution of individuals meeting, or eligible for meeting, these requirements?

Note: See also the checklist in Box 30-2.