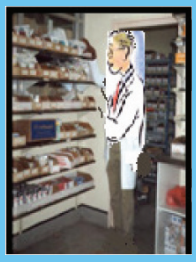
Manual for Medicines Good Dispensing Practice

Receive a prescription

Evaluation & Interpretation of a prescription



Selection & manipulation of medicine

Labeling & packaging of the medicine

Provision of information & instruction

Recording the transaction

DISPENSING PROCESS

Second Edition
May, 2012

Food, Medicine and Healthcare Administration and Control Authority (FMHACA) of Ethiopia

Food, Medicine and Healthcare Administration
and Control Authority of Ethiopia

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Table of contents Page

Acknowledgement....iii

Acronyms....iv

Preface....v

Operational Definitions....vi

Background....1

1. DISPENSING ENVIRONMENT AND STOCK MANAGEMENT....3

1.1. Dispensing Environment....3

1.2. Stock management....5

2. PRINCIPLES AND PROCESSES OF MEDICINES GOOD DISPENSING PRACTICE....13

2.1. Principles of Good Dispensing....13

2.2. Dispensing Process....15

2.3. The Dispenser....66

3. MEDICINE INFORMATION....69

3.1. Importance of Medicine Information....69

3.2. Sources of Medicine Information....70

3.3. Dissemination of Medicine Information....71

4. QUALITY ASSURANCE OF MEDICINES AND DISPENSING PRACTICE....74

4.1. Quality Assurance of Medicines....74

4.2. Techniques for Quality Medicines Dispensing....76

Annex-1: Dispensing aid and Materials....77

Annex-2: Standard Prescription Paper....78

Annex-3: Tips for Managing Adverse Drug Reactions (ADRs)....80

Annex-4: Adverse Drug Event Reporting Form....84

Annex- 5: Filled Prescription Paper Registration Book (PRB).....86
Annex-6: Daily Medicine Requisition Form from In- patient Pharmacy for Unit Dose System.....87
Annex-7: Medicines Dispensing Guide.....88
Annex-9: Counseling Points for Selected Dosage Forms.....90
Annex-10: Tips for Managing Drug Interactions.....97
Annex-11: Medicines with sound alike and look alike spellings which are potentially prone for medication error.....98
Annex-12: Equipments and Materials for Compounding in Health Facilities.....101
References for Further Reading.....102
List of Consultative Workshops Participants.....104

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Acronyms

ADR	Adverse Drug Reaction
ART	Anti Retroviral treatment
EML	Essential Medicine List
FEFO	First Expire First Out
FIFO	First in First Out
FMHACA	Food, Medicine and Healthcare Administration and Control Authority
FMOH	Federal Ministry of Health
LME	List of Medicines for Ethiopia
MSH/SPS	Management Sciences for Health/Strengthening Pharmaceutical Systems
NPS	Narcotics and Psychotropic Substances
OTC	Over-The- Counter
PRB	Prescription Registration Book
USP	United States Pharmacopoeia
WHO	World Health Organization

Preface

Good dispensing of medicines is an important component of rational medicine therapy in order to maximize the benefits and minimize the risks to end users. However, dispensing practices in Ethiopia are may not to the standard expectations. It is therefore, of utmost importance to prepare this manual that would aid individuals involved in dispensing and improve the quality of pharmaceutical service. Furthermore, the manual is useful for other health care professionals and training institutions.

This revised edition of the manual is intended to cope-up with new Food, Medicine and Health Care Proclamation no. 661/2010 and Regulation no. 189/2011. It is also thought to go with new national standards and directives updates. This edition has also accommodated new topics especially in good dispensing process and also contains useful annexes that will help in day to day activities of the medicines dispensers as quick references.

The manual contains four main Parts. The first one deals briefly about dispensing environment and medicines stock management. The second describes principles, processes of good dispensing practices and about the dispensers followed by medicines information. Finally the fourth part gives guidance to quality assurances of the dispensing practice and dispensed medicines. Readers are encouraged to read this manual and others references mentioned in the annex section of this manual for further reading. It is hoped that the manual would enhance the quality of pharmaceutical services so that improve treatment outcomes of clients.

YEHULU DENEKEW ALAMNEH

Director General,

Ethiopian Food, Medicine and Healthcare Administration and Control Authority (FMHACA)

Operational Definitions

Adverse drug reaction: A noxious and unintended effect of medicine that occurs in doses normally used in humans or animals for the diagnosis, prophylaxis or treatment of disease.

Dispenser: Any person who is licensed or authorized by the appropriate body to dispense medicines and/or medical supplies.

Dispensing: The act of preparing medicines and/or medical supplies and distributing to users with adequate information, counseling and appropriate follow up.

Label: Any material which is printed or affixed to a packing material which provides the necessary information about medicine, and includes an insert.

Medical Instrument: Any instrument or supply that may be used on the inner or outer part of the body for diagnosis or treatment of a disease in human, and includes various diagnostic, laboratory, surgery, dental medical instruments and suturing materials, syringes and needles.

Medicine: Any substance or mixture of substances used in the diagnosis, treatment, mitigation or prevention of a disease in human and includes narcotic drugs, psychotropic substances and precursor chemicals, traditional medicines, complementary or alternative medicine; poisons, blood and blood products, vaccine, radioactive pharmaceuticals, cosmetics and sanitary items and medical instruments.

Over-the-counter medicines: Medicines that can be dispensed without prescription

Packing material: means any article that may be used for filling, inserting or wrapping or packing medicine and includes immediate container and other

materials for wrapping the product.

Patient/client: A person presenting to an authorized health care provider to promote health, prevent or treat disease.

Prepacking: Repackaging of medicines into usable quantities before they are requested by of patients (users)

Prescriber: Any medical practitioner who is licensed or authorized by the appropriate body to write a prescription.

Prescription medicines: medicines dispensed only with prescription

Prescription: Any order for medicine written and signed by a duly licensed or authorized practitioner issued to a patient in order to collect medicine from dispensing outlet.

Regulatory body: Food, Medicine and Health Care Administration and Control Authority of Ethiopia or Regional Food, Medicine and Healthcare Administration and Control body as appropriate.

Repacking: Packing of any processed or semi-processed medicine by a different manufacturing company in any other way.

Shelf-life: The length of time a medicine product may remain on the shelf, in the original package and under usual environmental conditions and retain an acceptable level of its original potency and overall quality.

Stock: The amount of medicines and/or medical supplies available in legal medicine retail outlets.

Stock solution: A solution of higher strength of a medicine that requires dilution before use.

Background

Good medicine dispensing practice refers to the delivery of the correct medicine to the right patient, in the required dosage and quantities, in the package that maintains acceptable potency and quality for the specified period, clear medicine information counseling and appropriate follow up. This practice is a key step for effective treatment outcome. Though rational medicine therapy requires the concerted efforts of all health care professionals, the role of pharmacy professional is immense.

Traditionally, pharmacy professionals' primary responsibility has been stocking, distributing and maintaining quality of medicines dispensed. Nowadays, this role has emphasized more on advising the prescribers and other health professionals about medicine therapy, counseling patients about medicines and monitoring medicine use. Pharmacy professionals bridge the gap between the prescriber and the patient and serve as the gate-keepers of medicine supply system.

Irrational medicines dispensing practices is common in Ethiopia like any other developing country. The dispensing of prescription-only medicines at partial doses and without prescription, poor labeling of the dispensed items, lack of patient counseling, incomplete compiling and recording of prescriptions, and charging patients unreasonably high prices for the dispensed medicines are some of the practices that reflect an irrational dispensing. For Examples:
According to assessment of the pharmaceutical sector in Ethiopia in 2006

- It was observed that on average, only 19.95% of medicines dispensed to patients in health facilities were adequately labeled while the ideal

value is 100%.

- Only 12.18% of the respondents understood how to take their medicines as compared with an ideal value of 100%.
- The national average dispensing time was 78.69 seconds, excluding the time needed for payment, which is not adequate

In addition to this according antimicrobials use resistance and containment baseline survey report, 2009:

- Only 40% dispensers use written labels or adherence aids while dispensing antibacterials
- Only one third of drug dispensers have practiced feedback mechanisms to ensure patients' adherence and better outcome to dispensed antibacterials.

Therefore this second edition of good dispensing manual is issued as one means of promoting proper use of medicines. It is believed to support health professionals as source of information for good medicines dispensing practices and medicines management. The manual should be supported by other reference materials such as standard treatment guidelines, drug lists, and medicine formularies dispensing SOP, etc and by no means it substitutes the above documents.

Generally the purposes of the manual are to:

- Provide the general steps for good medicines dispensing practices.
- Describe the principles of good dispensing process that should be practiced in Ethiopia
- Describe the six steps for good dispensing processes to be used while dispensing of medicines
- Encourage professionals to promote ethical practices

1.DISPENSING ENVIRONMENT AND STOCK MANAGEMENT

1.1.Dispensing Environment

Premises and facilities

The premises on which a dispensing service is provided would reflect the quality of service and inspire confidence on patients in the nature of pharmaceutical service delivered. Therefore,working conditions are recommended to take into considerations the safety and health of the public and people working on the premises.

- The walls, floors, windows, ceiling, and all other parts of the premises should be as per the requirement set by the regulatory body.
- Rooms (with minimum area specified) are required for dispensing, storing and compounding medicines.
- Toilet with water supply and drainage system is also a requirement.
- All parts of the premises should be maintained in an orderly and tidy condition.
- Pharmaceutical products should be protected from the adverse effect of light, freezing or other temperature extremes and humidity.

The dispensing environment should possess:

- Appropriate temperature
- Sufficient lighting
- Optimum humidity control
- Cold storage facilities
- Adequate number and type of shelves
- Lockable cabinet for Narcotic medicines , Psychotropic substances and poisons

- Patient/care provider waiting area
- Dispensing aids, etc.

Careful consideration is to be given to the overall security of the dispensary and the stores. Special attention must be paid to controlled medicines and flammables, which must be kept separately from other medicines and be locked properly.

Hygiene and Sanitation

The physical surroundings must be maintained 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 common.

Maintaining a clean environment requires a regular routine of cleaning shelves and a daily cleaning of floors and working surfaces. There should be a regular schedule 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, with the refrigerator used strictly for medicines.

Dispensing equipment used for measuring liquids or counting tablets or capsules should be kept clean at all times. For example, 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 is called cross contamination and could be dangerous if the contaminating substance (e.g. aspirin or penicillin) is one to which a patient is sensitive.

All persons engaged in dispensing should observe high standards of personal cleanliness and wear protective cloths that should be laundered regularly.

Smoking should be prohibited in any area where medicines are dispensed, sold or supplied. Direct contact between the operator's hands and the dispensed products should be avoided.

Dispensing Equipment

The facility should make sure that the equipments on the premises are adequate and suitable for all the operations that have to be carried out. All equipment should be kept clean and should be checked for cleanliness prior to each use. With the exception of non -returnable containers, equipment must be of such material and be kept in such good repair and condition as to enable it to be thoroughly cleaned to prevent any risk of contamination. Use of stainless steel and glass is recommended.

Equipment should include:

- A dispensing bench of adequate size having a smooth, impervious working surface.
- Tablets and capsules counting devices.
- A refrigerator equipped with a maximum/minimum thermometer
- A suitable range of dispensing containers for pharmaceutical products with separate sets for internal and external use.
- Adequate shelves, lockable cabinet etc.

1.2. Stock management

Good stock management facilitates safe and effective dispensing service. To ensure proper stock management, the following elements are important:

- Acquisition of medicines
- Stock keeping
- Stock rotation

- Arrangement of medicines in the dispensary
- Storage conditions

Acquisition of medicines

Before medicines and medical supplies are issued from store to dispensing room, store requisition/delivery (issue) form should be filled by the dispenser and duly signed by authorized personnel. It is mandatory that all medicines found in medicine retail outlets are obtained or collected from legal sources.

When you receive medicines for dispensing:

- Ensure that there is sufficient storage place
- Prepare and clean the areas for receiving and storing
- Inspect packages for damaged and/or expired products
- Check that all original boxes, tins, or bottles are unopened and are in good condition.

If products are defective:

- Separate the damaged or expired stock from the usable stock
- Refuse to accept the products and note the problem(s) on the delivery note
- Follow your facility's procedure for handling damaged or expired stock.
- Report quality problem to the nearest regulatory body and fill prepaid adverse drug event report form and send to FMHACA.

If Products are not damaged:

- Fill issue voucher and requisition voucher
- Count the number of units for each product received and compares to issue voucher
- Record received item on receiving voucher, stock card, bin card and computer (if applicable)

- Ensure the expiry date is visibly marked on every package or unit
- Arrange products in the storage area in such a way to facilitate the dispensing of the first to expire by first expiry first out (FEFO) or first in first out (FIFO) procedure.

Stock keeping

Medicine should be kept within the dispensary/or store rooms as follows:

- Follow the manufacturer or shippers directions when stocking, and follow labels for storage conditions
- Ensure safe custody of poisons,
- Place liquid products on the lower shelves or on bottom of stacks
- Store products that require cold storage in appropriate temperature controlled zones.
- Keep high security/high value products such as narcotic drugs psychotropic substances in appropriate secured places
- Separate damaged, expired and returned products from the usable stock without delay and dispose using established disposal procedures.
- Always store all products in a manner that facilitates FIFO policy for stock managements.
- Report to appropriate body for redistribution of medicines with near expiry date

Stock rotation

When issuing products, it is important to follow the FEFO and FIFO procedures, which minimize wastage due to product expiry. Therefore:

- Periodic stock reconciliation should be performed by comparing the actual and recorded stocks.
- Always issue products that will expire first, ensuring they are not too close to or past their expiration date. The shelf life remaining should be

sufficient for the product to be used before the expiry date.

- To facilitate FIFO and FEFO, place products that may expire first in front of products with a latter expiry date.
- Write expiry dates on stock cards, so that stocks can be used before they expire.
- Supplies with no expiry or manufacture date (e.g. gauze, cotton, medical gases etc.) should be stored in the order received and dispensed accordingly.

Arrangement of medicines

Medicines should be arranged on shelves made of steel or treated wood and the shelves should be strong and robust.

Health institutions and medicine retail outlets can use one or a combination of the following commonly used methods of medicine arrangement:

1. Pharmacotherapeutic category
2. Alphabetical order by generic name
3. Dosage forms

In arranging medicines, the following points should be considered:

- Each dosage form of medicine is arranged in separate and distinct areas
- Sufficient empty space should demarcate one medicine or dosage form from another
- Put medicine in well ventilated ,dry and place protected from direct sun light and heat
- Store liquids in a pallet on the floor or on the lowest shelf
- Do not store anything directly on the floor
- Always store cold-chain items in the refrigerator.

Storage conditions

Storage conditions can be arranged in two classes:

1. Normal storage conditions
2. Special storage conditions
    a. Cold storage conditions
    b. Combustible /flammable
    c. Secured

Normal storage conditions

It's Storage in dry, well-ventilated premises at temperatures of 15–25°C or, depending on climatic conditions, up to 30 °C. Extraneous odours, other indications of contamination, and intense light must be excluded.

Medicine products that must be stored under defined conditions require appropriate storage instructions. Unless otherwise specifically stated (e.g. continuous maintenance of cold storage) deviation may be tolerated only during short-term interruptions, for example, during local transportation.

The use of the following labeling instructions is recommended:

On the label Means

"Do not store over 30 °C" from +2 °C to +30°C

"Do not store over 25 °C" from +2 °C to +25°C

"Do not store over 15 °C" from +2 °C to +15°C

"Do not store over 8 °C" from +2 °C to +8°C

"Do not store below 8 °C" from +8 °C to +25°C

"Protect from moisture" no more than 60% relative humidity in normal storage conditions; to be Provided to the patient in a moisture resistant container.

"Protect from light" to be provided to the patient in a light-resistant container

Unless special storage conditions are stated, it is vital that medicines be stored

in a dry, adequately ventilated shady and cool store room. Efforts should be made to maintain the specified storage conditions with regard to exposure to humidity, sun light, heat, etc. When a product label states "Protect from moisture", store the product in a space with no more than 60% relative humidity. Free air circulation by opening windows, using fans or air conditioners can be considered to reduce the effects of humidity.

Some products are photosensitive and will be damaged if exposed to light.

To protect products from sunlight:

- Shade the windows or use curtains, if they allow the passage of direct sunlight
- Keep products in intact cartoon
- Do not store or pack products in sunlight
- Maintain trees on the premises around the facility to help provide shade

Heat will also affect many products. It melts ointments and creams and affects other products. It is important to have thermometers, hygrometer and other equipment in order to regulate the temperature and humidity of storage areas.

Special storage conditions

Some categories of medicines and supplies require special storage conditions which can be further classified in two three as cold storage conditions, combustible or flammable storage conditions and secured storage.

a. Cold storage conditions

Cold storage conditions maintained by using refrigerators and freezers for products that may be degraded rapidly when kept at room temperature or even at cool places, e.g. vaccines ,insulin, etc the following points are recommended

when using refrigerators and freezers :

- Refrigerators that open on the top are more efficient than vertical ones ,because hot rises while cold air falls
- Store products that are sensitive to freezing or very low temperatures on the upper shelves.
- If there is enough space, place a few plastic bottles of water in the refrigerator. This will help maintain the temperature for a longer period of time if the power is cut off. The temperature ranges for different storage conditions are shown in the following table.
- Do not keep staff food in the refrigerator. Opening and closing the door may lower the temperature and cause medicines to deteriorate. Record the temperature daily. Check that there is enough space around the refrigerator so air can move freely.

Table 1.1. Terms that relate to storage temperature

Terms used		Applications
1.	Store frozen (-20 ^{0}C (^{0}4 F))	For products, such as certain vaccines, need to be transported within a cold chain.
2.	Store at 2 ^{0}C – 8 ^{0}C (36 - 46 ^{0}F)	For products which are very heat sensitive but must not be frozen. This temperature is appropriate of storing vaccines for a short period of time.
3.	Keep cool	For products labeled to be kept between 8 ^{0}-15 ^{0}C (45 ^{0}-59 ^{0}F)
4.	Store at room temperature	For products labeled to be kept between 15 ^{0}-25 ^{0}C (59 ^{0}-77 ^{0}F).
5.	Store at ambient temperature	Store at the surrounding temperature. It means "room temperature" or normal storage conditions, i.e. storage in a dry, clean, well-ventilated area room temperature between 15 ^{0}-25 ^{0}C (59 ^{0}-77 ^{0}F) or up to 30 ^{0}C , depending on climatic conditions

N.B. when storing medicines, we have to follow manufacturer's recommendations on storage conditions of specific products.

b. Combustible /Flammable

Combustibles such as alcohol, ether and other organic solvents must be stored in special or separate rooms. An advisable precautionary measure is to use a small, separate outbuilding as a special store for inflammable supplies, since it virtually guarantees that fire will not spread throughout the store. All stores should be equipped with fire extinguishers. A good alternative to fire extinguishers is represented by wooden or metal buckets filled with sand.

c. Secured storage conditions

Narcotic drugs, psychotropic substances, and their documents should be kept in securely locked rooms or cupboards. The keys should be kept in a secure place and it is preferable that only the chief of pharmacy should have access to them.

2. PRINCIPLES AND PROCESSES OF MEDICINES GOOD DISPENSING PRACTICE

2.1. Principles of Good Dispensing

The rational use of medicine requires that patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time, and at the lowest cost to them and their community. Rational use of medicines is a complex issue demanding mainly an integrated action of prescribers, dispensers and users and/or patients. It may even extend to the level of health administrators and policy makers, for instance, in matters related to the development of a list of essential medicines and improvement of the availability of medicine. Dispensing practice, the duty of dispensers, plays a central role in the provision of rational medicine use.

Dispensing refers to the process of preparing medicines and distributing to users with provision of an appropriate information, counseling and follow up. It may be based on a prescription or an oral request of users (patients or care providers) depending on the type of medicines to be dispensed. The dispensing process involves the correct interpretation of prescription or oral request, accurate preparation and labeling of medicines with provision of appropriate information and follow up. The medicine should be dispensed in a safe and hygienic manner, making sure that the patient or care provider understands and appreciates the value of taking specific medicines for specific indications.

Good dispensing practice ensures that the correct medicine is delivered to the right patient, in the required dosage and quantities, with clear instructions, and in package that maintains an acceptable potency and quality of the medicine. Dispensing includes all the activities that occur between the time

the prescription or oral request of the patient or care provider is presented and the medicine or other items are issued to them. This process may take place in health institutions and community medicines retail outlets. It is often carried out by pharmacy professionals. No matter where dispensing takes place or who does it, any error or failure in the dispensing process can seriously affect the care of the patient mainly with medical and economical consequences. Therefore, the dispenser plays a crucial role in the therapeutic process.

The quality of dispensing may be determined by the training and supervision the dispenser has received and the medicine information available to the dispenser. A shortage of dispensing materials and insufficient dispensing time due to heavy patients load may also have adverse impacts on dispensing.

One good way to reduce the dispensing time and potential errors is to prepack and label commonly used medicines. Another way to prevent staff from making errors when working under pressure is to organize the work so that more than one individual is involved in the dispensing process for each prescription.

Pharmacy professionals involved in dispensing of medicines have the need for medicines information in order to keep themselves up to date with developments related to medicines and to provide such information to patients, other health professionals and to the general public. Because of an increasing number and complexity of medicines, the need for up-to-date information is greater than ever. The provision of medicines information to prescribers and other professionals is mainly directed at improving prescribing and medicines administration. On the other hand, because counseling of patients on medications is an integral part of the medicines dispensing process. Medicine dispensers should be adequately equipped with up-to-date medicine information. Lack of knowledge and information by patients about the

medicines they take leads to incorrect use which in turn results in loss of efficacy or occurrence of adverse effects.

Communication skills are very important for dispensers dealing with patients or health care professionals to convey relevant medicine information effectively and clearly, which can be done verbally and/or in written form. Medicine dispensers must have the ability to explain information clearly by the language the patient or care provider can understand and check whether the information is being understood.

Finally, an application of the professional code of ethics by pharmacy professionals is an important issue that needs due consideration.

2.2. Dispensing Process

The dispensing of medicine involves interpretation of the prescription instruction, technical knowledge required to carry out the instructions & delivers with accuracy & safety to the patient by an authorized & qualified pharmacy professional. There are a considerable variety of factors that require close attention in dispensing, and proficiency requires the establishment of a routine system which can be followed safely even under stress. In fact, for OTCs, dispensers may be involved in selection of medicines for their users.

Pre -dispensing Activities

A. Getting prepared for dispensing

Check the following

- The room, shelves and dispensing counter are clean and organized
- Wear a clean and white gown
- Attach your identification tag on the gown in such a way that it is visible to clients
- Availability dispensing aid,(counting try, labeling materials, packaging

materials, sufficient no of spoons etc)

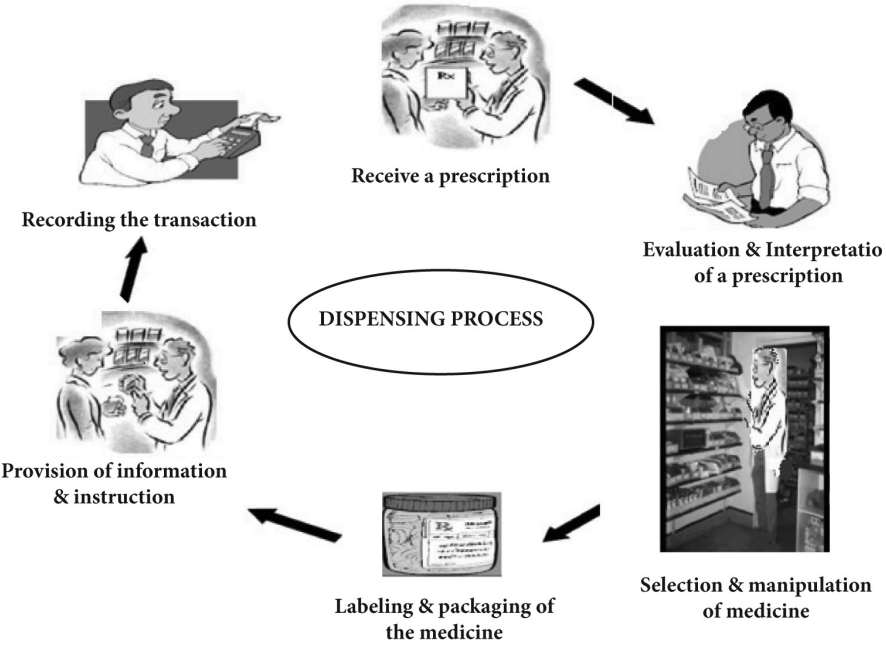
- ❖ Availability updated drug list, OTC list ,good dispensing manual, STG, formulary ,prescription registration book

B. Reception

As clients come into the pharmacy section, they must be made to feel attended to and comfortable by:

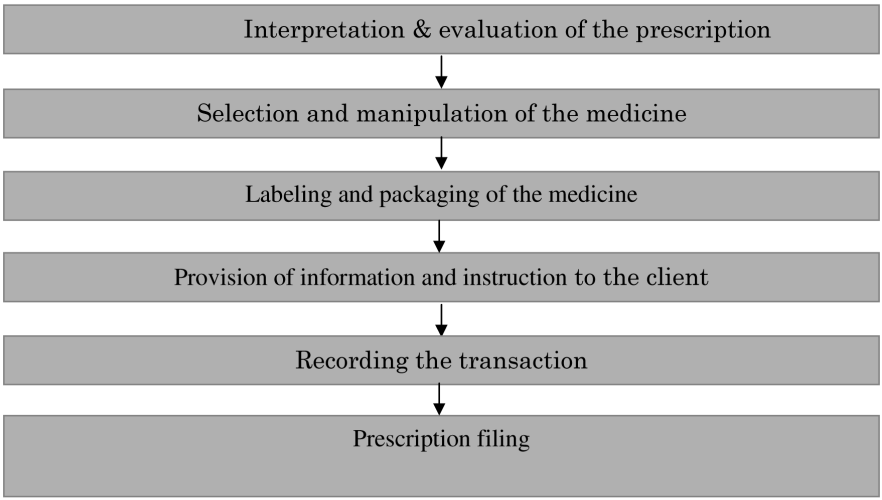
- ➢ Friendly gestures
- ➢ A smile
- ➢ Eye-to-eye contact
- ➢ A friendly welcome
- ➢ Politeness
- ➢ Feeling of caring

NB. Verbal request can be done only for OTCs with justification.



2.2.2. Dispensing procedures

The various activities involved in dispensing are:



Dispensing for ambulatory patients:

In general there are six major steps to be performed in the dispensing cycle during the dispensing process.

Step 1: Interpretation & evaluation of the prescription

I. Evaluation

The pharmacy professionals should confirm

1.Legality

A prescription is legal when:

- It is written (can also be typed) and signed by an authorized prescriber
- NPS prescription(Narcotic and psychotropic prescription) for Controlled drugs
- The medicines are written on the right prescription such as normal, NPS and ART
- Date of issue not exceeding 15 days for narcotic drugs and psychotropic substances and 30 days for other medicines
- Has all the information required to be contained with respect to parts of prescription (See Annex-2) For example

PRESCRIPTION PAPER Code_____

Name of health institution..... Institution Name: _____ Tel. No… ……

Name & address of patient..... Patient's full Name: _____

Sex: ___ Age:___ Weight: _____ Card No. _____

Region: _____Town _____ Woreda_____Kebele ____

House No. ____ Tel. No: _____ ☐ Inpatient ☐ Outpatient

Type of Diagnosis..... Diagnosis, if not ICD _____

	Drug Name, Strength, Dosage Form, Dose, Frequency, Duration, Quantity, How to use & other information	Price (dispensers use only)
Superscription.....	℞	
Inscription	Amoxicillin 500mg capsule	
	TID, PO for seven days,	
Subscription.....	#21 capsules	
	Total Price	

Prescriber/dispenser information....

	Prescriber's	Dispenser's
Full name	_____	_____
Qualification	_____	_____
Registration #	_____	_____
Signature	_____	_____
Date:	_____	_____

See overleaf

2. Legibility

A brief examination of each prescription should be made immediately upon receiving it from the patient to ascertain the legibility of various parts of the prescription.Pharmacy professional must examine the prescription only behind the dispensing counter, and must not allow themselves to be distracted while doing so. Any doubt regarding the reading of the prescription (i.e. name of the medicines or directions, or if it appears that an error has been made by the prescriber), should be examined closely and, if necessary discussed/ consulted with other pharmacists or the prescriber himself/herself without arousing doubts or fears in the patient.

a) Handwritten names of patients and medicines are often difficult to read. In case of illegibility of name, age, etc, ask the patient for the correct spelling tactfully. For example the pharmacy professional may ask "Excuse me. Is the first name Meseret or Mahelet?"

Always use 'please', 'excuse me' etc and be polite

Every prescription should be read and understood thoroughly before attempting to dispense it. Every word, abbreviation, has a meaning.To assume that an illegible or confusing word is unimportant inviting a costly mistake. In case of doubt, consult another pharmacy professional or the prescriber.

'NEVER DISPENSE GUESS WORK'

Legibility is a problem requiring alertness and critical judgment on the part of the pharmacy professional. Careless handwriting and similarity in spelling of names of different medicines add to the difficulty (See annex-9).

Example of a Reading error:
Medoprazole and Mebendazole - Due to illegible handwriting of prescribers, Medoprazole could be read as Mebendazole. Medoprazole is a brand containing omeprazole where as mebendazole is an antihelmentic two different medicines used for two different conditions. When handwriting is illegible, the best thing to do is to contact the prescriber over the phone and confirm.
Remember, you are dealing with medicines and thus, the lives of patients. So be sure of what you are dispensing. Imagine the disastrous consequences of dispensing the wrong medicine.

b) The dosage form, the dosage and the quantity to be dispensed have to be legible so that dispensing becomes easier for the pharmacy professional. The instructions written for administration should state clearly what the prescriber expects from the patient so that the pharmacy professionals can counsel the patients efficiently.
All terminology, including units of measures and Latin abbreviations should be properly interpreted and checked.

3.Identifying the patient's condition

4.Completeness of the prescription

The prescription serves as a vehicle for communication from the licensed medical practitioner to the pharmacy professionals about the pharmaceutical care of the patient.

Details to be checked for completeness of the prescription

A. Seal of the health institution or header
B. Prescriber's details (Name of prescriber's, Qualification, Signature and

Date)

C. Patient's details (Patient Name, Patient Address, Sex, Age, Weight and Diagnosis)
D. Medicine details

Checking the medicine details will include checking:

- Name of the medicine
- Dosage form
- Strength/ potency of the medicine
- Total amount to be dispensed and its availability
- Dosage and directions for use
- Frequency of administration and duration of the treatment

A) Name of the medicine

The name of medicine must be legible and correct without a doubt. Since many brands sound alike, brand confusion is quite common especially if the handwriting is illegible and the pharmacy professionals proceeds on the basis of guesswork.

The prescriber should ideally write the generic name in parentheses against the brand name or write the generic name alone. This makes it easier if the pharmacy professional is not familiar with the brand prescribed. It would also aid in avoiding brand confusion.

Example: The prescription could state – Diclofenac 50mg rather Voltaren 50

If the prescriber writes the generic name alone, the pharmacy professional can give a brand of his choice. It is, however, the pharmacy professional's responsibility to ensure that the brand is of a standard company and registered by EFMHACA, and is cost effective at the same time. The pharmacy professional has to proceed ethically and morally, and in the best interest of the patient.

Activity

Discuss amongst your colleagues the following situation:

A client comes to the pharmacy in the late evening for a prescription of

1) 'A' brand of Vibromycin for severe pain and inflammation. You do not have 'A' brand stock, there is no other pharmacy close by, and the prescriber is not contactable. **What do you do?**

2) 'X' brand from a reputed multinational has been prescribed for a severe chest infection. You do not have the brand prescribed, and are not in a position to procure it for the client within 24 hours. **What do you do?**

B) Dosage form

Some medicines are available in many different formulations. It is essential to check that the product on the prescription is available in the correct formulation, and to correctly choose the formulation.

Confusion and mistakes can be made if the name of the formulation is similar to another formulation. For example, tablet formulations of a medicine are available as tablets of 25mg and 50mg, dispersible/effervescent tablets, and 100mg sustained release tablets

The same medicine could be available as tablets, capsules, and even injections. It is important to check the prescriber's prescription for the dosage form. If the dosage form is not specified, it is advisable to call up the prescriber and find out, especially if the medicine is available as different formulations.

Examples –

diclofenac available 50mg tab., 100mg tab., 100mg suppository and 75m/3ml inj.

Dermatological preparations: Creams, ointments, gels and lotions are not necessarily interchangeable; in fact wrong use can cause problems. The same medicine could be available as cream, gel, lotion and ointment and the prescriber may decide the exact dosage form to be dispensed to a particular condition. However, in Ethiopia, prescribers may also write without specifying the dosage form;

Example – dermovate 25 gram # one tube, apply nocte

Retinoic acid (Tretinoin 0.5%) # one tube; apply once a day,it may be available as gel and lotion

Fucidin (fucidic acid) # one tube; apply bid, it may be available as cream and ointment forms.

In such cases, the pharmacy professional has to choose the dosage form: the decision to use an ointment, paste, cream, or lotion depends on

a) The degree of skin penetration of the medication

b) The characteristics of the skin to which the product is being applied.

For ointments (oleaginous bases) are generally used on dry scaly lesions as their emollient properties will aid in re-hydrating the skin and they stay on longer.

Pastes are generally applied to an area that is intended to be protected

C) Strength/potency of the medicine

The pharmacy professionals should check that the strength is mentioned. There may be cases for prescribers to prescribe the medicine without the strength. Forexample:

Amlodipine 5mg……..Correct way
Amlodipine……...Incorrect way

If no strength is mentioned, it cannot be assumed that the lowest or highest strength has to be dispensed. This is because many times the lower strength may not be sufficient to treat the condition or higher strength may lead to toxicity. E.g. combination of amoxycillin and clavulanate (Augmentin) is available as 1gm, 625mg, 412mg, 375mg, and so on. If a lower dose is given for an adult it may not be sufficient to kill the microbial load and cure the infection.

For example,

The prescriber prescribes a combination of amoxycillin and clavulanate and mentions the dose as take 5ml twice a day.

It is available as Amoxicillin 125mg+ Clavulanic acid 31.25mg and Amoxicillin 200mg+ Clavulanic acid 28.5mg.

Which one to dispense?

In this case the pharmacy professional has to be sure about which preparation to dispense. The best option would be to consult the prescriber.

What to do?

If the strength is not stated on the prescription, mostly it may be necessary to contact the prescriber for confirmation of the appropriate strength.

D) Quantity to be dispensed

The prescription should lead to arrive at the exact number of the total quantity to be supplied to the patient. The pharmacy professional should check this quantity to confirm that it is appropriate for the patient, and that the product can be supplied in such quantity.

For any product with a short expiry period, ensure that the quantity dispensed will not last longer than the expiry date.

For example, if the prescription reads 'Glibenclamide 5mg tablets p.o per day for 3 months' for a chronic patient who has been taking the medicine since 3 years ago, on may 15, 2011, and the stock available of Glibenclamide in the pharmacy has an expiry date of July 2011, and no fresh stock is available, what to do? Is there a way to dispense for him all stocks? Here the patient should be politely asked to show which stock he has been taking? Thereafter, he can be advised to take 30 or 60 tablets according to the stock he has, and then to collect the balance tablets later when the pharmacy can arrange for fresh stock.

Remember if the expiry date of a product is labeled as July 2011, then the product can be used until the end of July 31st 2011.
In case the duration of therapy or total quantity to be dispensed is not mentioned, it will be necessary to contact the prescriber.

E) Dosage and directions for use

A knowledgeable and an alert pharmacy professional can be a great asset and a lifesaver especially if the prescriber makes mistakes (at times major ones) while prescribing.

F) Contraindications: The age, sex, disease(s) conditions, or other characteristics of a patient may cause certain prescribed medicines to be contraindicated. The pharmacy professional should look out for such contraindications.

The dose should always be checked taking into account the patient's age, and weight (especially for a child or for the elderly and pregnant woman).
For pregnant woman all categories, A, B, C, D and X should be checked; i.e. Medicines under category 'A' adequate well controlled studies in pregnant woman do not show risk to the fetus example vitamins like B complex,

minerals like iron,

Medicines under category 'B 'either animal findings show risk and human findings do not, or ,if no adequate human studies have been done ,animal findings do not show risk. Example like ceftriaxone sodium injection, chlorpheniramine maleate

Medicines under category 'C' human studies are lacking, and animal studies either show risk or lacking as well. However, potential benefits may out way the potential risks. Example: albendazole, aspirin with codeine phosphate.

Medicines under category 'D investigational or post marketing data show risk to the fetus .nevertheless, the potential benefits may sometimes outweigh the risk.example: Atenolol, captopril, Phenobarbitals

Medicines under category 'X'= studies in animals or humans or investigational or post marketing surveillance reports show fetal risk that clearly outweighs any possible benefits gained from the drug to the patient. Example ethinyl estradiol and norethindrone, lovastatin, simvastatin, thalidomide, vitamin A, warfarin sodium.

More Examples–

Aspirin is not recommended for children below 12 years of age; so caution should be taken.

Atenolol is contraindicated in asthma.

Tretinoin contraindicated in pregnancy

The pharmacy professional should always check that the dose, dosage regimen and any directions for use are appropriate for the patient and the medicine. Any suspected medicine under dose/overdoses or inappropriate dosing should always be referred to the prescriber.

The dose should be carefully checked in case of children, and for all categories of potent medicines. Confirm the units written on the prescription, i.e. milligrams, micrograms, decimal points, etc. for medicines like digoxin.

Example –

You need to check carefully whether the prescription states:

0.25 mg or 0.025 mg.

0.5mg or 50mg

0.125mg or 125mcg (microgram)

The pharmacy professional should verify, whether the dosage prescribed is within the standard minimum and maximum dose range. Use standard textbooks or reference books for the standard dose.

Medicines that have a very wide dose range can be a little tricky. It may be difficult for pharmacy professionals to detect inappropriate doses, and extra vigilance is needed. For example, for Amoxicillin, the recommended dose is 20-50 mg per kg body weight per day. Thus making it difficult for the pharmacy professionals to gauge whether the prescribed dose is correct or not.

Develop a professional and good relationship with prescribers in the vicinity of the pharmacy or with those whose prescriptions come to you, so that you feel confident and not afraid to talk/discuss with the prescriber about a possible prescribing error.

G) Frequency of administration

Check if the frequency recommended by the prescriber is as per the standard dosing patterns. Doses more frequent than standard, proven doses may cause toxic manifestations. At the same time, doses lesser than standard, required doses may result in failure to treat the condition properly.

In addition to frequency of administration, adherence to the time schedule is

also important. For instance, patients taking medicines for hypertension have to take the medicine at the same time to maintain blood levels of the medicine.

5. Correctness of the prescription

A.Double medication: (same medicine or different medicine with same pharmaco-therapeutic effect) concurrently prescribed by the same or different prescribers to the same patient undergoing treatment.

Example –
If a patient has been prescribed diclofenac for fever, and if the dentist has prescribed other NSAIDs for the same patient, it could lead to overdosing of NSAIDs, and result in the risk of GI bleeding and may aggravate hypertension.

B. Interactions:

- Many medicines are known to interact with other prescribed or OTC medicines, food, diseases, herbal medicines, and laboratory results.
- Ideally, all multiple item prescriptions should be checked for medicine interactions. (Unfortunately, checking for medicine interactions is a major problem in Ethiopia because of the large number of medicines prescribed by prescribers.
- If a prescribed item is known to interact with many medicines or to interact with OTC medicines then it is imperative that the pharmacy professionals check with the patient which other medicines or traditional/complementary medicines the patient is taking, in order to eliminate possible medicines interactions (see annex-10).
- Any medicine interactions likely to render the therapy ineffective or cause undesirable effects to the patient, or affect the treatment in any way, should be brought to the notice of the prescribing prescriber (without unduly alarming the patient).

Example –

- Acetylsalicylic acid taken can increase the effect of an anticoagulant (warfarin) that a patient is taking, and may thus lead to bleeding.
- Patients taking ciprofloxacin should avoid taking antacid within 2-3 hours because the antacid can drastically reduce the absorption of ciprofloxacin

While interactions should be considered when dispensing all prescriptions, some groups of patients are particularly vulnerable, and extra vigilance is required. (Pregnant women, children, elderly, and those with kidney or liver malfunction)

Known allergies should be checked, particularly for an antibiotic prescription, where prescribers may fail to consider cross sensitivities within groups of medicines e.g. penicillins.

Also check if there is any therapeutic or other type of incompatibility. For example, a pharmacy professionals may know that the client regularly takes oral contraceptives, but the prescriber may not have asked or not known about it.

At times, a prescriber may have prescribed a medicine without considering certain aspects. For example, a prescriber may prescribe a medicine without confirming with a woman whether she is pregnant or not. A prescriber may miss asking this question. A pharmacy professional can question the patient politely about, whether she is pregnant, or the patient/client may pose the question herself while the prescription is being filled.

C. History of overuse, under use or misuse of medicines by the patient.

D. Check for overwriting: Overwriting can be done by the patient, to buy extra medicines (especially habit forming medicines or medicines of abuse).

E. Fake/false prescription:

Pharmacy professionals should be alert to detect misuse of prescription blanks by clients (obtained by stealing from private practitioners or from Government hospital OPDs, where blanks are often left lying around).

Pharmacy professionals should also be alert to fake prescriptions written/ printed by the patient or client coming to the pharmacy. If the handwriting is not the usual handwriting of the prescriber or you notice it to be unusual otherwise, confirm with a senior colleague or call the prescriber to confirm. Do not dispense such prescriptions, and be sure to alert the prescriber about the misuse.

F. For potent medicines, and medicines with a Narrow Therapeutic Index:

Special care has to be taken with such medicines, as slight changes in systemic concentration lead to marked changes in pharmacodynamic responses.

Examples of narrow therapeutic index medicines

1. Digoxin
2. Lithium
3. Phenytoin
4. Warfarin

G. Special care has to be taken in case of:

a) Medicines with similar names:

Certain medicines have names that may appear similar when carelessly written or when not read carefully. Others may lead to confusion for other reasons. Problems are particularly likely if the strengths and doses of the two preparations are similar. Doubts should always be resolved by checking with the prescriber. Sadly, in most cases where mistakes have occurred, it has been because the item was dispensed without a second thought.

Example of similar names that illustrate the pit falls are:

- Folic acid versus Folinic acid
- Dexamethasone versus Desoximetasone (also see annex 11)

b) Abbreviations

Although widely used in prescription writing, abbreviations can kill!! This is because in health care there are no recognized standards for abbreviations, and most of the time, prescribers invent their own. Secondly, different individuals/ pharmacy professionals may assume or interpret abbreviations differently.

Examples

'HCT' 25mg was intended to mean Hydrocortisone 25mg, but Hydrochlorthiazide was dispensed.

'CPZ' may refer to Chlorpromazine, an antipsychotic or to Carbamazepine, which is an anticonvulsant.

'CPM' can mean Chlorpromazine or Chlorpheniramine

NEVER HINT ON ABBREVIATIONS. BE SURE TO CONFIRM WITH THE PRESCRIBER.

H. Changes to the prescription

Before a pharmacy professional attempts to dispense a prescription, he/she must read and understand it thoroughly. If any portion of the prescription is not understood, or if he/she has detected an incompatibility, he/she should consult the prescriber who wrote the prescription.

Any changes made to the prescription over the telephone by the prescriber, should be recorded on the prescription, with the words "changes made over the telephone, in consultation with the prescriber at (time) on (date)" and should be signed and stamped by the pharmacy professional. This exercise facilitates a trust based professional relationship with the prescriber, besides

documenting the changes made to the legal document - the prescription, by the pharmacy professional.

Many pharmacy professionals hesitate to call the prescriber about these matters, but, if the calls are executed tactfully, there is no reason why they should not create a better understanding between the persons of both professions.

6. Therapeutic aspects

- the safety of the medicine,
- possible contra-indications,
- drug/drug interactions,
- drug/food interaction,
- drug/disease interactions, and
- Treatment duplications.

7.Appropriateness of the individual

Confirm that the dose and duration of prescribed medicine are in the normal range for the patient (noting sex and age or weight)

NB. Under no circumstances should an untrained person attempt to read or discuss the prescription with the client.

II. Interpret prescription or verbal request for OTC

- Correctly interpret any abbreviations used by the prescriber
- Correctly perform any calculations of dose and the quantity to be issued

Call the Prescriber

If any details are illegible, missing or incomplete, this prevents any mistakes/ errors while dispensing. The pharmacy professional can assure himself as well as the patient that the medicines dispensed by him/her are according to the prescription.

Step 2: Selection and manipulation of the medicine

This includes:

1. Select stock container of pre-pack reading the label and cross matching the medicine name and strength against the prescription.
2. Read the container label at least twice during the dispensing process.
3. Do not select the prescribed medicine according to the color or location of container.
4. Do not open many stock containers at the same time. This trend will lead to errors and/or expose the medicines to air and eventually leads to deterioration in quality.
5. Open and close containers once at a time.
6. While counting, pouring or measuring, the following points should be noted:
    - short and/or over counting should be avoided
    - Clean counting tray and/or spoon used
    - Graduated measuring cylinder and/or flask must be used for measuring liquid reduction. If small volume is to be measured, small measuring cylinder/flask has to be used (if compounding is performed in the pharmacy).
7. Appropriate balance should be used (if compounding is performed in the pharmacy)
8. In dispensing liquids (if compounding is performed in the pharmacy):
    - Must be measured in a clean vessel and should be poured from the stock bottle with the label kept up ward. This avoids damage to the label by any spilled or dripping liquid.
    - Pour the measured liquid preparation into the container/bottle and label it.

- Provide appropriate bottles with caps for repackaging liquid preparations
- Dispense liquid preparations in suitable containers
- Do not use patient's own bottle
- Dispense each medicine in a different bottle

9. In dispensing tablets and capsules:
    - Do not use fingers to count tablets as this can lead to contamination of medicines
    - Use a spoon to put tablets and capsules onto a counting tray
    - Count and put them in a labeled medicine container or pack
    - Close stock containers tightly after dispensing
    - Keep the spoon clean at all times
    - Do not keep the spoon inside the container

10. Labeling of dispensed medicines should be clear and legible.

Use separate plastic boxes for different patient's requirements of medicines. To avoid mix-ups of medicines of different patients, it is a good practice to assemble medicines of different patients in separate/different boxes, till they are billed and packed.

Step 3: Labeling and packaging of the medicine in an appropriate container

The containers used for dispensing must be appropriate for the product dispensed. All containers intended for medicinal products must be protected and kept free from contamination.

A. Packaging of medicines

Medicines must be suitably contained, protected and labeled from the time of manufacture until they are used by the patient. The container must maintain the quality, safety and stability of the medicine throughout this period.

The selection of packaging for medicines depends on:

- Nature of the medicine
- Type of patient
- Dosage form
- Method of administering the medicine
- Required shelf-life
- Use, such as for dispensing.

Original containers used by manufacturers are expected to protect medicines for their specified shelf-life. Because original containers may contain large amount of medicines, repackaging of medicines into another container may be necessary in order to dispense medicines for patients. Such repackaging procedure can be done at-the –spot or in advance.

Prepackaging is the process by which the pharmacy professional transfers a medication manually from a manufacturer's original commercial container to another type of container in advance (before clients come to medicine retail out lets).

The following guidelines are recommended in prepackaging of medicines:

- Prepackaging procedures must comply with laws and regulations.
- The prepackaging operations and area must be clean and separate from other pharmacy activities.
- Only one medicine product at a time should be prepackaged in a specific work area.
- Before beginning a prepackaging run, a physical evaluation (color, odor, appearance, and markings) of the medicine product being prepackaged should be made to assure product integrity. The bulk container should also be examined for evidence of damage, contamination, and other deleterious effects.
- All prepackaging equipment and systems should be operated and used

in accordance with the manufacturer's or other established instructions. There should be valid justification and authorization by the supervisor for any deviation from those instructions on the part of the operator.

- The pharmacy professional must use available data on the characteristics of all packaging material used to protect the integrity of the medicine product. This information should include data on the chemical composition, light transmission, moisture permeability, size, thickness (alone or in laminate), recommended sealing temperature, and storage requirements.

Upon completion of prepackaging, all unused medicine stock, unused labels and finished packages should be removed from the prepackaging area. The packaging equipment should then be completely emptied, cleaned, and inspected before commencing the next prepackaging operation.All prepackaged medicines should be stored in a temperature and humidity-controlled environment. Prepackaging materials should be stored and used in accordance with the manufacturer's instructions.

The main advantages of prepackaging medicines is that it allows enough time for patient counseling and minimizes dispensing errors resulting from hectic operation due to heavy patient load. Unfortunately, the materials commonly used for repackaging in many medicine retail outlets of Ethiopia are ordinary papers and the labeling is incomplete. In such cases, repackaging of medicines is likely to have many disadvantages than advantages.

B. Packaging aids and materials

The materials used for repackaging include: glass bottles, plastic bottles, collapsible tubes, paper envelops, plastic envelops, etc. The requirements of containers for packaging different dosage forms are indicated in table 2.1. Paper has the least value as the primary packaging material in terms of maintaining the quality, safety and stability of packaged medicine.

Table 2.1. Requirements for packing materials.

Requirements for packing material	Package characteristics	Examples
Tablets/capsules		
Desirable	Clean, dry, plastic or glass container with tightly sealing 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	zip-lock plastic bags, glycine paper, hinged-lid unsealed boxes, sifter-top boxes, tight-top tins
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 tightly sealing 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, metallic	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 tightly sealing cap or a top fitted with 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, zip lock, plastic, or paper)
Undesirable	Anything other than above	Anything else
Cream/ointment		
Desirable	Clean glass or porcelain wide-mouth jar with tightly fitting lid or collapsible plastic or metal tube	Wide-mouth jar with well-closed 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:__ Package should meet listed requirements for 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.

C. Labeling of medicines

The main functions of a label on a dispensed medicine are to uniquely identify the contents of the container and to ensure that patients have clear and concise information about the use of the medicine.

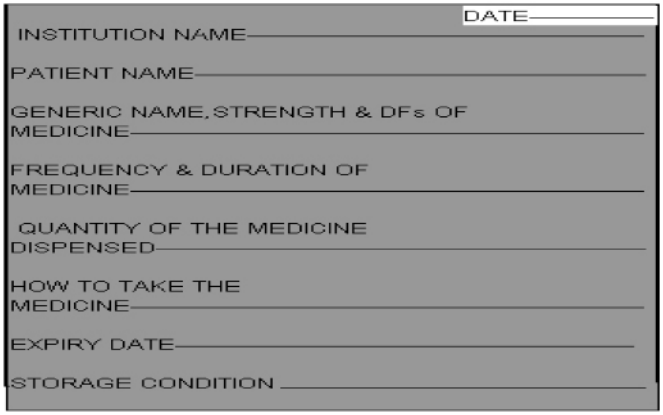
Each dispensed medicine must be appropriately labeled to comply with legal and professional requirements. All medicines to be dispensed should be labeled and the labels should be unambiguous, clear, legible and indelible. If possible lettering should be printed. The following information must be indicated on the label:

Minimum drug label information should include the following:

- Patient name
- Generic name, strength and dosage form of the medicine
- Dose, Frequency and Duration of use of the medicines
- Quantity of the medicine dispensed
- How to take or administer the medicine?
- Storage condition

If the medicine has been prepared extemporaneously, a batch number may be included.. All labels must be unambiguous, legible, accurate and comprehensible.

Figure 2.2: Example of labels



The labeling of medicines in drug retail outlets of Ethiopia is very disappointing. It is common to see the dispensed medicines without a label, incomplete label, or illegible label. The size of the commonly used paper envelops may not even allow to write the required information on it.

Case study 2.1.

Ato Kebede went to a pharmacy with a prescription for nitroglycerin sublingual tablets. The pharmacy worker repackaged the prescribed number of tablets in paper envelops and dispensed with appropriate instructions for use. Some other day, Ato Kebede consulted the pharmacy professional about decreasing efficacy of the medicine dispensed. Comment.

Discussion: Nitroglycerin is volatile medicine. It should be packaged in tightly closed containers (bottles). The use of paper envelops for repackaging leads to a reduced efficacy of nitroglycerin, a possible reason for the complaint of Ato Kebede.

Case study 2.2.

The pharmacy professional received a prescription with the following information:

Tabs Ibuprofen 400mg

Mitte 60

One t.i.d.

The pharmacy professional dispensed 60 tablets of ibuprofen 400mg.and wrote a label that the patient should take three tablets daily with or after food. Comment on dosage.

Discussion: The prescription was to take one tablet three times a day. The information on the label is not clear. Accordingly, the patient may take three tablets at a time, which may lead to an occurrence of adverse effects or loss of

efficacy. Understanding the meaning of Latin abbreviations that may appear on the prescription papers is important.

Step 4: The provision of information and instruction to client

General Steps of Counseling

All medicines should be dispensed with adequate and appropriate information and counseling. Information must be structured to meet the needs of individual patients and questions and answers should be used to check the patient understands. Written information should be provided to supplement verbal communication as appropriate. Counseling should ensure that the patient has an unequivocal understanding of the instructions for use, and any distinct characteristics or requirements of the medicine. Counseling should cover matters that will enhance or optimize medicine therapy.

Issue medicines to patient with clear information and advice

The prepared, packaged and labeled medicine is handed over to the right patient or care provider with appropriate medicine information. The information in the form of verbal and/or written instructions should include the following:

- How much and how often to take the medicine
- When to take the medicine (e.g., before or after meals)
- How long the treatment is to last (e.g., why the entire course of an antibiotic treatment must be taken)
- How to take the medicine (e.g., with water, chewing or swallowing)
- How to store the medicine (e.g., avoid heat, light and dampness)
- Not to share medicines with other persons
- Which types of foods and beverages should avoid while taking the medicine

- To keep medicines out of reach of children
- One has to demonstrate to the patient on how to administer the dispensed medications in case of inhaled administration and suppository application (see annex-9) Counseling Points for selected dosage form).
- Patients should also be informed not to stop treatment when side effects occur or in the absence of response without consulting the prescriber or dispenser.
- Finally, check whether patients have understood the information provided (see figure 2.3)

Figure2. 3. Communicating with a patient at the dispensary

Step 5: Recording the transaction

Prescriptions should be recorded and documented as proof of transaction between the patient and the dispenser. Prescriptions can therefore be traced back if any need arises. All dispensing units should have a standardized Prescription Registration Book (PRB) for recording every pharmaceutical issued to a patient (table 2.2). A computerized dispensing and registration system may also be used, but should always be supported by paper back up. The registration book should be completed at the time of dispensing or at the close of the working day.

The prescription registration book should be used both when prescriptions are retained in the pharmacy and when they are returned to the patient.

For a prescription which is returned to a patient because all the items in the original prescription could not be filled, the medicines that have been dispensed from the pharmacy should be copied on a blank prescription and the prescription should be filed appropriately. On the original prescription, which is retained by the patient, the word "dispensed" should be stamped adjacent to those items which have been dispensed. For prescriptions which are to be refilled on a later date, the dispensing information should be entered into the registration book before returning the prescription to the patient. The official seal of the pharmacy/Health institution, name and signature of the dispenser, the date of dispensing and the next refill date should be written on the back of the prescription.

Documentation and report

- The receipts for requisition, receiving as well as the prescription registration book (See annex-5) should be kept properly.
- Blank prescription should be kept carefully, only prescribers have access to them.

Page _____

Example: -.

Table 2.2. Prescription Registration Book (PRB)

Name of Health Facility _____, Region, _____, Town _____

S.N.	Prescription No.	Date	Patient Information					Diagnosis	Description of Medicine Dispensed					Prescriber Information		Dispenser Information		Remark		
			Name of Patient	Sex	Age	Weight	General Record No.		Medicine Name	Strength	Dosage Form	Qty in BU*	Total Qty (Page/ Day)in BU*	Prescriber name	Qualification	Dispenser name	Qualification	Credit	Free	prisoner
1	001	1/1/03	XXX	F	42	65	2222	Minor UTI Infection	Amoxicillin	500mg	Capsule	**30**	**81**							
									Paracetamol	500mg	Tablet	10	10							
2	543	1/1/03	YYY	M	40	55	111	Upper RTI	Amoxicillin	500mg	Capsule	**30**	_							
									Ibuprofen	200mg	Capsule	20	65							
3	875	1/1/03	AAA	F	23	56	342	Arthritis	Ibuprofen	200mg	Capsule	45	_							
4	678	1/1/03	TTT	F	45	87	765	Celulitis	Cloxacillin	250mg	Capsule	56	56							
									Diclophenac	50mg	Tablet	10	40							
5	789	1/1/03	YXT	M	60	88	654	UTI	Amoxicillin	500mg	Capsule	**21**								
									Diclophenac	50mg	Tablet	20								

BU* = basic unit (e.g. tablet, capsule, tube, sachet, vial etc)

Please note in this example that the total in BU per page on 06/06/12 for Amoxicillin is 30cap + 30cap + 21cap = 81 capsules (shown in bold). Similar total per day (per page) for paracetamol, ibuprofen, cloxacillin and diclophenac is 10, 65, 56 and 40 respectively.

- Filled prescription should be kept as a receipt. Prescriptions for narcotic and psychotropic Substances should be kept for 5 years and other prescriptions for 2 years. Thereafter, they should be disposed carefully in the presence of appropriate body.
- Regular reports on medicine consumption and prescribing pattern from patient prescription registration book should be prepared and report to the appropriate body timely.
- Information obtained from prescription registration book could be used for further planning and efficient utilization of resource.
- The report on physical inventory shall be documented

Step 6: Prescription filing

Each prescription should be signed and accountability accepted by the dispenser or other authorized person for the correctness of the dispensing of the medicine and confirming that the medicine was supplied.

1. At the close of each day all dispensed prescriptions should be organized
2. Prescriptions should be filed sequentially by day in a single container/ carton for each month. The container should be labeled with the month and year.
3. Containers should be arranged on a monthly basis.
4. Normal prescriptions should be filed securely for two years and special prescriptions for 5 years.
5. Prescriptions, patient and medication related records and information should be documented and kept in a secure place that is easily accessible only to the authorized personnel.

CASE SENARIO: Read the following case scenario to understand the six steps of good dispensing:

PRESCRIPTION PAPER Code: 0124

Institution Name: Bole 17 Health Center Tel. No 011552---

Patient's full Name: Hana Metasebia

Sex: F Age: 29 Weight: 68 Card No.10 964/03

Region: A.A Town: A.A Woreda Bole Kebele 17

House No. 6245 Tel. No: 09123….□ Inpatient □ Outpatient

Diagnosis, if not ICD: Osteomyelitis, Vaginal Candidiasis , Minor Skin abrasion

Drug Name, Strength, Dosage Form, Dose, Frequency, Duration, Quantity, How to use & other information	Price (dispensers use only)
Rx 1. Ampicillin capsule, 2 qid # 56	
2. Gentian violet solution # 1 bottle	
3. Clotrimazole 500 mg vaginal tablet, once a day for seven consecutive days	
4. Diclofenac e/c 50 mg # 10 tabs	

Prescriber's	Dispenser's
Full name Taddese Tilahun	Marta Tarekegn
Qualification HO	Druggist
Registration # 661/2003	772/1998
Signature signed	Date: May 7, 2012

See overleaf

Step 1: Evaluation and interpretation of a prescription

1. Interpreting the type of treatment

Marta understands the patient's conditions from prescription i.e Osteomyelitis, Vaginal candidiasis and minor skin abrasion. Based on Standard Treatment Guideline for Health center 2010, she correlates Hana's condition with prescribed medicines.

Then, she decides for Osteomyelitis- Cloxacillin 500mg po every six hours for 3-6 weeks, for Vaginal candidiasis- Clotrimazole 100mg vaginal tablet once a day, at bedtime, for seven consecutive days and for minor skin abrasion genital violate. Therefore, Marta politely advises Mr. Tadesse to change Ampicillin with cloxacillin

Marta excused Hana for delay and called to Mr. Tadesse.After soft greeting with Tadesse, she explained him about Hana's medicines based on formulary and STG for health Center. Mr. Tadesse thanked and asked Marta to send Hana back. Hana got the following corrected prescription and brought to Marta.

Corrected Prescription Paper

PRESCRIPTION PAPER Code: 0124

Institution Name: Bole 17 Health Center Tel. No 011552---

Patient's full Name: Hana Metasebia

Sex: F Age: 29 Weight: 68 Card No.10 964/03

Region: A.A Town: A.A Woreda Bole Kebele 17

House No. 6245 Tel. No: 09123…. Inpatient Outpatient

Diagnosis, if not ICD: Osteomyelitis, Vaginal Candidiasis , Minor Skin abrasion

Drug Name, Strength, Dosage Form, Dose, Frequency, Duration, Quantity, How to use & other information	Price (dispensers use only)
Rx 1. Cloxacillin 250mg capsule , 2 caps po qid for 07 days #56 capsules	
1. Gentian violet 1% solution, apply gently on the lesion #1 bottle	
2. Clotrimazole 100 mg vaginal tablet, once a day for seven consecutive days	
3. Diclofenac e/c tablet , 50 mg 1 tab po tid # 10 tabs	
Price	

Prescriber's	Dispenser's
Full name Taddesse Tilahu	Marta Tarekegn
Qualification HO	Druggist
Registration 661/2003	772/1998
Signature (signed)	Date: May 7, 2012

2. Evaluation

2.1. Marta ensured the legality of the prescription by checking the titer (signature) of Tadesse and the

	Prescriber's	Dispenser's
Full name	Taddesse Tilahu	Marta Tarekegn
Qualification	HO	Druggist
Registration	661/2003	772/1998
Signature	(signed)	Date: May 7, 2012

2. Evaluation

2.1. Marta ensured the legality of the prescription by checking the titer (signature) of Tadesse and the

heading of prescription. She also checked the prescription is authentic.

2.2 Marta confirmed the legibility, completeness & correctness of the prescription. She evaluated

the prescription but all information is not filled.

2.3. Identifying the patient: Marta identified Patient name, Hana Metasebia from prescription. She is

a five month pregnant and also she did not encounter any allergy and had no history of

ulcerative, renal and hepatic problems.

2.4. Identifying the medicine

The prescribed medicines were:

1. Cloxacillin capsule,
2. Gentian violet solution
3. Clotrimazole 100 mg PV
4. Diclofenac e/c 50 mg

a) Checking the dosage form

The four prescribed medicines were prescribed in appropriate dosage form i.e cloxacillin 250 mg capsule, Gentian violet solution, clotrimazole vaginal tablet, diclofenac enteric coated (e/c) tablet

b) Strength

The four prescribed medicines were prescribed in appropriate strength i.e cloxacillin 250 mg capsule, Gentian violet 1% solution, Clotrimazole 100 mg vaginal tablet, Diclofenac 50 mg enteric coated (e/c) tablet.

c) Appropriateness of dosage

Hana is 29 years old and she did not have renal and hepatic problems. So according to Health center Formulary

i. Cloxacillin 500 mg (2 capsule of 250 mg capsule) every 6 hour
ii. Clotrimazole vaginal tablet (100mg once a day),at bedtime, for seven consecutive days::
iii. Diclofenac 50 mg e/c tablet every 8 hour

d) Method of administration

cloxacillin 250 mg capsule and diclofenac 50 mg e/c tablet are administered orally

Gentian violet 1% solution is applied topically

Clotrimazole 100mg vaginal tablet is administered vaginally

e) Duration of treatment

Cloxacillin for Osteomyelitis for 3-6 weeks

Clotrimazole vaginal tablets (100mg once a day), at bed time, for seven consecutive days.

Marta confirms the appropriateness of all prescribed medicine for Hana based on Standard treatment guideline for Health center (2010) and Health center

Formulary and also Marta discussed with senior pharmacist who works in this health center.

2.5. Therapeutic aspects

i. the safety of the medicine
   - Hana told Marta that she is not allergic to any medicines she used to take before and she also added she has no any ulcerative, renal as well as hepatic problems and she was not alcohol addict.
   - Even though Hana never encountered any allergic conditions before ,it advisable to tell the possible allergy due to Cloxacillin

ii. Possible contra-indications
   - based on the health center's formulary four of the indicated medications do not contraindicate with second trimester pregnancy

iii. Drug-drug interactions,
   - Based on Health Center Formulary there is no interaction among the four medicines::
   - Hana told that she is not taking other medications
   - Since Hana is pregnant Marta advised not to use any medications during pregnancy without consulting health professionals
   - Marta advised not to take any alcohol

iv. Drug/food interaction,
   - Food affects the bioavalability of Cloxacillin. If it's taken with food,its absorption will be lowered and Hana may not respond to the therapy, futher this may cause cloxacillin resistance. Therefore Marta advised Hana to take cloxacillin 1 hour before meals

v. Drug/disease interactions-no identified drug disease interaction

vi. Treatment duplications – since Hana told Marta that she is not taking any medicines, there is no treatment duplication

2.6 Cost of medicine and availability of cheaper alternatives identified

Any problems with the prescriber and a solution should be worked out in consultation with the prescriber and patient.

- Before dispensing to Hana Marta carefully observed step 1(before going to step 2) and she referred formulary and standard treatment guideline for health Center and adjusted accordingly

Step 2: The selection and manipulation of the medicine

- While counting, using dry and clean spoon count from clean counting tray to pre-pack.

Step 3: The labeling and supply of the medicine in an appropriate container

The dispensing label shall bear at least the following information:

- the generic name of the product or each active ingredient, where applicable
- the strength, dose, frequency of administration and total quantity
- expiry date
- prescriber's name
- the name of the person for whom the medicines are dispensed
- the directions for use
- the name and business address of the dispenser
- date of dispensing, and special precautions as applicable

Fore example: the label for cloxacillin may be written as following:

Bole 17 Health Center : c.l 011552---
CLOXACILLIN 250 mg capsule, #56 caps

በየቀኑ ምግብ ከመብላት በፊት አንድ ሰዓት ቀደም ብሎ፡-
2 ፍሬ ጠዋት በ 1:00 ሰዓት ይዋጡ::
2 ፍሬ ቀን በ 7:00 ሰዓት ይዋጡ::
2 ፍሬ ማታ በ 1:00 ሰዓት ይዋጡ::
2 ፍሬ ሌሊት በ 7:00 ሰዓት ይዋጡ::

- **ለ 7 ተከታታይ ቀናት ሳያቋርጡ ሰዓቱን ጠብቀዉ ይዉሰዱት!!**
- **ተሸለኞል በማለት (የህመም ምልክት ስለጠፋ ብቻ) ከባለሙያ ምክር ውጭ አያቋርጡ!!**
- **ከታዘዘው አስበልጠው/አሳንሰው አይውሰዱ!!**
- **ከሌላ ሰው ጋር አይጋሩት!!**
- **በራሱ መያዣ በደንብ ተከድኖ ብርሃን በማይደረስበት ደረቅና ቀዝቃዛ ቦታ ያስቀምጡ!!**
- **ካለ ባለሙያ ትእዛዝ ሌላ መድሃኒት አይውሰዱ!!**
- **መድሃኒቱን ወሰደዉ የማሳከክ (allergy) እና ሌሎች ያልተለመዱ አደገኛ ምልክቶች ካጋጠሞት ለባለሙያዉ ቶሎ ያማክሩ!!**

የታዘዘለት ሰዉ ስም፡ ሀና መታሰቢያ
ያዘዘዉ ባለሙያ ስም፡ ታደሴ ጥለሁን (ጤ/መ)
ቀን : ሐምሌ 19/2003

መድኃኒቱ አገልግሎት የማይሰጥበት ቀን፡ ሰኔ 2004 ዓ.ም
ሕጻናት በማይደርሱበት ቦታ ይቀመጥ!!

Step 4: The provision of information and instructions to a client

- Name and description of the medicine
- Intended use of the medicine and expected out come
- Dosage form, dose, route of administration
- Duration of therapy with emphasis given to completing the entire course especially for antibiotics
- Expected time to see a response of the medication and instructions on what to do if the medicine appears not to have the desired effect.
- The time the medicine should be taken in relation to other medicines, food, life style interactions etc

- Clear instructions on measurement and administration of medicine. If necessary a demonstration such as opening and closing containers or using an aerosol may be necessary.
- Explanation of harmless effects of the medication such as urine discoloration,
- Common severe side or adverse effects or interactions and therapeutic interactions that may be encountered, including their avoidance and the action that required if they occur
- Storage instructions
- Advice regarding keeping medicines out of reach and sight of children, and clarification on the consequences of sharing medication or keeping extra doses at home

• Prescription repeats information

Step 5: Recording the transaction:

Page _____

Example: Prescription Registration Book (PRB)

Name of Health Facility: Bole 17 Health Center, Region, **A.A**, Town: **A.A**

S.N.	Prescription No.	Date	Patient Information					Diagnosis	Description of Medicine Dispensed					Prescriber Information		Dispenser Information		Remark		
			Name of Patient	Sex	Age	Weight	Medical Record No.		Medicine Name	Strength	Dosage Form	Qty in BU*	Total Qty (Page/ Day)in BU*	Prescriber name	Qualification	Dispenser name	Qualification	Credit	Free	prisoner
1	0124	18/10/11	Hana M	F	29	68	10/964/9	Osteomyelitis	cloxacillin	250mg	Capsule	**56**	**112**	TT		MT				
								Vaginal candidiasis	Clotrimazole	100mg	Vaginal tablet	7	7	TT		MT				
								inor skin brasion	Gentian Violet	1%	Solution%	**1**	1	TT		MT				
									Diclophenac	50mg	tablet	10	40	TT		MT				
2	875	18/10/11	AAA	F	23	56	342	Arthritis	Ibuprofen	200mg	Capsule	45	45	TT		MT				
3	678	18/10/11	TTT	F	45	87	765	Celulitis	Cloxacillin	250mg	Capsule	**56**		TT		MT				
									Diclophenac	50mg	Tablet	10		TT		MT				
4	789	1/1/03	YXT	M	60	88	654	UTI	Amoxicillin	500mg	Capsule	**21**		TT		MT				
									Diclophenac	50mg	Tablet	20		TT		MT				

BU* = basic unit (e.g. tablet, capsule, tube, sachet, vial etc)

Please note in this example that the total in BU per page on 10/10/11 for Cloxacillin is 56cap + 56cap = 112 capsules (shown in bold). Also note on the same date (page) 4 people have been served with 6 different types of medicines.

Step 6: Prescription filing

Prescription shall be documented separated by day, month and year dispensed and archive for minimum of two years.

Dispensing for in-patients

There are three basic techniques for hospital medicine distribution to in-patients:

A) Bulk ward stock order system

In a ward stock system, the pharmacy functions as a ware house and dispense bulk containers on requisition without reviewing individual medicine orders for appropriateness. The main advantage is shorter turnaround time between prescribing and administering the medicine. The use of stock medications should be minimized, although it is appropriate and desirable for certain situations:

- In life threatening emergency situations, medicines should be kept in patient care areas as a time saving measure.
- High volume, low-cost medicines can be dispensed if there is low risk of medication error.

B) Individual medicine order system

The individual medicine order system closely resembles dispensing to our patients: a course of therapy is dispensed according to a written prescription

for an individual patient. Compared to ward stock distribution the advantages are:

- The pharmacy professional can review the appropriateness of therapy.
- A patient-specific medication profile can be maintained.
- Pharmacy charges to patients are facilitated.
- Closer control of inventory is possible

C) Unit dose system

The preferred system from a patient care perspective is the unit dose system, in which there is the lowest possibility for error. Commonly a twenty-four-hour supply is provided. It minimizes unnecessary expense if treatment is changed. But it requires that the pharmacy be opened for 24 hours (see annex-6).

Extemporaneous compounding

An extemporaneous prescription is the type of prescription in which the prescriber selects the medicines, doses and dosage form desired and the pharmacy professional prepares the medication.

The pharmacy professional is expected to prepare small quantities of non-sterile products, including creams, ointments, suppositories, mixtures, suspensions and solutions and/or total potential nutrition. The following should be taken into consideration during extemporaneous compounding of prescriptions.

Conditions required for the extemporaneous preparation

- Identify dosage forms
- Do not attempt to make extemporaneous compounding in normal dispensary area
- Identify potentially harmful ingredients and products e.g. podophyllin, and ensure they are dealt with safety, including storage and transport

Preparing the formulation appropriately

- Select correct formulations for specified products
- Assess formulations used in workplace or use reference sources
- Interpret common terminology and abbreviations, e.g. ingredients, instructions, dosage forms, quantities
- Identify problem formulations, e.g. incorrect proportions, medicine instability, vehicle instabilities, inaccuracies, precipitations, compatibilities/incompatibilities.
- Identify what each ingredient is in the formulation- stabilizers, therapeutic agents, preservatives, vehicles, diluents, antioxidants, suspending agents, flavoring agents.
- Follow manufactures' guidelines, or appropriate reference source, for dilution of solutions, suspensions & ointments

Compounding medicines

- Calculate quantities of ingredients & end product to 100% accuracy, and document this
- Produce clear labels for end products, including full patient instructions, expiry dates, storage information and any supplementary advisory labels
- Check each ingredient to ensure it is fit to use, e.g. check expiry date, signs of degradation, and store correctly (temperature & protection from light & moisture), stability if packaging already opened.
- Check whether the ingredient is of pharmaceutical grade.
- Ensure equipment(see annex-10) and work area are appropriate, clean & tidy e.g. ointment slab cleaned
- Personnel should be appropriately prepared for formulation production, e.g. hand washing, appropriate clothing

- Use appropriate compounding technique to prepare product
- Weigh or measure correct quantity of ingredients
- Undertake a visual final check for product, e.g. check for particulate contamination, uniform mixing, and aesthetically pleasing products
- Pack each compounded product in container suitable for type, quantity, intended use & storage requirements of product, e.g. protected from light & moisture, container suited to product & use
- Attach labels securely, without obscuring relevant information, e.g. graduations on syringes, poison bottle ribs
- Comply with optimal storage conditions regarding: temperature, light, moisture, type of container, transport of product
- Clean all equipment after use
- Record the details
- Issue items for users with appropriate instruction for use

Dispensing aids and materials

The following are commonly used dispensing aids and materials (see annex for pictures 1):

- Triangular tablet counters,
- Capsule counter,
- Pan weighing scales
- Electronic tablet counters.
- Dispensing spoon,
- Measuring cylinder
- Spatula,
- Mortar and pestle
- Balance.

Aids for counting tablets and capsules include triangular tablet counters, capsule counter, spatula, weighing scales and electronic tablet counters.

Triangular Tablet Counter is an equilateral triangle made of wood, metal or plastic with raised edges along two sides. Metal or plastic counters preferred because these surfaces can be easily cleaned or washed between uses for different products. The tablets are counted by counting the number of rows of tablets and then pouring them in to the container using a raised edge as a guide. Capsule counter is a metal tray which consists of 10 rows of grooves. The capsules are poured on to the tray and using a spatula, lined up in the grooves. Each complete row will contain capsules so the number of complete rows multiplied by 10 gives the number of capsules.Pan Weighing 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 or the same tablet or capsule can then be counted by adding to the other scale pan until a balanced positions is reached.

Electronic Tablet Counter is a machine used when prepackaging is done on a large scale in a teaching hospital for both ward and outpatient departments. But is difficult to clean, may not identify damaged tablets and is expensive for medicine retail outlets.

Dispensing balance, mortar and pestle, measuring cylinders, etc. are useful aids for compounding medicine products.

Dispensing balance is used for weighing ingredients and final medicine products. Class A and class B types of balances are commonly used in pharmacies.

Mortar and pestle are used to reduce the size of powders, mix powders, mix

powders and liquids, and make emulsions.

For measuring liquids in dispensing, conical and cylindrical measures can be used. Whichever type of measure is chosen always ensure that:

- The measure is vertical when reading meniscus
- The measure is thoroughly drained
- Select the smallest measure which will hold the desired volume
- Volume should be measured by difference for viscous liquids.

Some tips to the pharmacy professionals for efficient dispensing

- After receiving the prescription, check it for legality, validity, completeness, appropriateness and safety.
- Always handle only one prescription at a time.
- Check expiry dates and use FEFO.
- Check and double check (if possible) the medicines for accuracy of identity, strength, and dosage form.
- Do not be distracted while dispensing.
- Check that you are removing the right medicines from the shelf.
- Check that the medicine being dispensed is actually the one prescribed.
- Do not keep medicines in your pockets.
- Never dispense any prescription medicines, the names of which have been written on a piece of paper, or not signed by the prescriber.
- Properly pack and label the dispensed medicines
- Communicate to the patient the correct way to take medication.
- Give verbal instructions.
- Use symbolic instructions in case of illiteracy.
- Use auxiliary labels if required. In case of illiterate patients or patients familiar with only the regional language, devise a system of pasting specific colored labels/stickers on strips/ bottles to make it easier to

identify the product.

- Repeat orally the labeled instructions, if possible, in laymen's terms.
- Do not disturb any other pharmacy staff person, dispensing or preparing a bill.
- Make the patient repeat the advice to ensure that he/she has understood them.
- Emphasize the need for adherence.
- Inculcate awareness in patients about the importance of therapy. Patient information leaflets can be provided along with a particular medicine or for a particular illness.
- Provide warnings and cautions.
- Give special attention to certain cases-
    - ☛ Those with visual impairment
    - ☛ Illiterates.
    - ☛ Those taking multiple medications.
    - ☛ Special group of patients (pregnant, children and elderly patients, patients with liver and kidney problem)
- Medicines that are dispensed loose (from bulk containers, i.e. tablets/ capsules/ eye applicaps), should be packed properly in appropriate packing material, and adequately labeled.
- OTC medicines are requested, the pharmacy professionals can evaluate if the product requested, is appropriate for the patient's condition, and advise accordingly.

Other aspects of dispensing

Dispensing errors

Dispensing errors are errors that occur during the dispensing process in the pharmacy. They are different from prescribing errors or errors during consumption of medicine.

Table 2.3.Common dispensing errors

Dispensing errors	Reason for error
Misreading the prescription	Maybe due to a large number of prescriptions, illegible handwriting, careless attitude of dispensing staff, or a bad dispensing environment.
Errors during verbal communication	Due to sound-alike names. E.g. metolazone/methazolamide(See annex-9)
Picking error - picking the next medicine	Due to similar packing or not being on the shelf attentive or due to some distractions.
Counting error i.e. dispensing the wrong quantity of medicines	Due to interruption during counting or because of work overload/ rush hours
Billing error - entering details on the bill incorrectly. For example, the name or strength of the medicine, or entering the patient's name incorrectly.	Due to distraction or inattention while billing, or having the bill prepared by a newly appointed staff member who is not well familiar with the billing system.
Packing error - i.e., mix up of parcels, or putting somebody else's medicine in the parcel	Careless attitude or distractions during packing.
Delivery error i.e., delivering the parcel to the wrong person	Due to similar patient names or same total on the bill, or due to distractions while handing over the parcel.
Expiry error i.e., dispensing expired medicines	Regular shelf checking for expiry is not done. Each strip/bottle is not checked for date of expiry while dispensing.
Similarity error i.e., two medicine strips look similar, and the wrong one is dispensed (different medicine or different strength)	Improper attention/careless attitude while dispensing, not checking carefully. The letters or writing on the strip are not easy to read (name of medicine and potency). Strip or cut strip may accidentally be put in a box of a similar looking product.

Picking Errors

Sometimes manufacturer's packs of different medicines can be of similar design, and may lead to picking errors.

Example Picking error
You go to pick up Metronidazole (Manufactured by cadila) suspension from the shelf and end up picking Cotrimoxazole suspension because both medicines have similar type of bottle packing material. Now, that is not a justified excuse.
Due to similar packing, you could pick the bottle next to the one you actually intended to pick. That is why you need to be very alert while removing medicines. Check the medicine details against the prescription before you remove it from the shelf. Even if you are in a hurry, take the time to confirm that you are picking the right medicine from the shelf.
Remember that, clients depend on you for the right medicine be aware of each action at every step while dispensing.

Reasons for picking errors

- Not concentrating on the work/task and thinking/dreaming of something else.
- Distractions due to gossiping, talking with other staff, friends at the counter, or watching TV in the pharmacy.
- Extra workload, doing things at very high speed, or in confusion.
- Assuming that a box picked up is correct, and not verifying it while picking.

➢ A different medicine placed in the usual place of the required medicine.

Activity

Maintain a register/chart to record dispensing errors occurring in your pharmacy, with the possible cause/reason for the error. Try to work out systems/processes, to avoid such errors in future.

Table 2.4. Example of dispensing errors record book

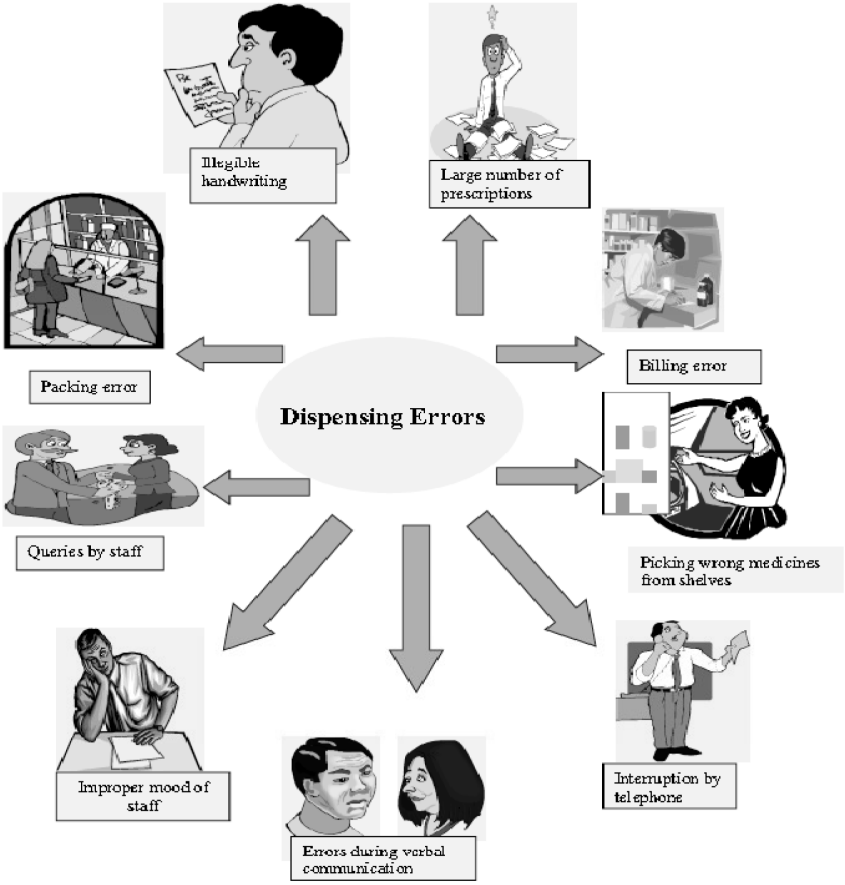
Sr No.	Data	Type of error	Consequence to patients	Pharmacy professionals involved	Possible cause/reason for error	Recorded by	Corrective steps Taken
1	12/06/05	Billing error	overcharged	Ato Belay	Distraction due to query from staff	Ato Abebe	Extra cash charged to client was returned

NB. At the end of every month, go through the dispensing errors register.

Table 2.5.What to Check

What To Check	Corrective Measures
1. Check which errors are occurring most commonly	Concentrate on these errors, and instruct/train staff, to take measures so that such errors do not occur again.
2. Try and identify the underlying causes of these errors	Take corrective measures to be overcome these errors
3. Check if a particular staff is more commonly involved with these errors	Tell these staff members to be more careful and attentive. Arrange refresher training for these individuals to help them overcome the problem of making frequent errors.

Figure 2. 4. Common dispensing error



It would be unrealistic to state that no error will ever occur in the pharmacy. Some error is possible/likely to occur sometime or the other. The aim, however, should be to keep errors down to a minimum.

Refusal to dispense prescriptions

The pharmacy professionals should politely refuse to dispense a prescription if:

- Essential information is missing or doubtful, and the prescriber cannot be contacted.
- Safety of the medicines is doubtful.

- The prescription does not conform to legal requirements.
- fake or illegal alteration of the prescription is suspected, particularly prescriptions calling for large quantities of potent medicines and prescriptions written by unfamiliar prescribers for patients unknown to the pharmacy professionals or for any other reason that is apparent, and which prohibits the pharmacy professionals from dispensing the medicines prescribed.

Case study 2.3.

Ato Abebe, pharmacist, has filled some prescriptions for carbimazole on one working day. On the same day a customer, epileptic patient, presented him a prescription for carbamazepine. Glancing at it, Abebe thinks it is carbimazole once again, and that is what he dispensed. The patient went to his prescriber with complaints of no improvement. Comment on this case.

Discussion: Ato Abebe, the pharmacist, failed to read and understand the prescription correctly. This has led to failure of treatment regimen prescribed for the epileptic patient. Because of the existence of similarity with the names of some medicines, it is important to read and understand the prescribed medicines carefully and correctly.

Case study 2.4.

Woizero Aster went to a medicine shop and made verbal request for ampicillin and cough syrup for her 8 years old daughter with complaints of cough and poor appetite. As she did not have enough amount of money, she wanted to purchase only ten capsules of ampicillin and one bottle of cough syrup suspension. The dispenser fulfilled her request. Comment.

Discussion: Woizero Aster made a verbal request for a prescription medicine (ampicillin) and an OTC cough syrup.The dispenser should have asked her a

prescription at least for ampicillin. Secondly, dispensing inadequate quantity of ampicillin even with prescription is irrational. Such clients should be referred to authorized prescribers.

Case study 2.5.

An extemporaneous prescription order calls for 200ml of a 1 in 5000ml solution of a medicine. A busy pharmacy professional prepared it by taking 5 ml of a 4%w/v stock solution and 195 ml of the appropriate diluent. Comment on the strength of the finished product.

Discussion: A 1 in 5000 ml solution contains 1gm in 5000ml. Two hundred ml of this solution will contain 40mg which is equal to 1ml of a 4% w/v stock solution. The solution prepared by the pharmacy professional is five times stronger than what has been prescribed.

Case study 2.6.

A prescription that calls for atenolol 50 mg. tablets is presented to a pharmacy. The total quantity to be dispensed is not indicated. One Tab. BID po for 4 weeks is written after Sig. All other information is complete. The pharmacy professional dispensed 28 atenolol 50 mg tablets. Comment.

Discussion:The total quantity dispensed is not correct. According to the prescription 56 tablets (2 tablets a day for 4 weeks or 28 days) should be dispensed.

Case study 2.7.

A client presented an ordinary prescription that calls for 20 diazepam 10 mg. and 10 paracetamol 500 mg. tablets to a pharmacy. The pharmacy professional dispensed both medicines with appropriate instructions for use. Comment.

Discussion:Diazepam is a psychotropic medicine that should be prescribed by using prescription paper for narcotic and psychotropic medicines. The

pharmacy professionals should not dispense such medicines based on ordinary prescriptions or verbal requests.

2.3. The Dispenser

The dispenser is a person who is authorized to dispense medicines and medical supplies to end users. Depending on the level of dispensaries, pharmacy professionals of varying level of qualification may be licensed for dispensing practices. All licensed private pharmacies, medicine shops and rural medicine vendor are required to work under the technical leadership of registered pharmacists, druggists and pharmacy technicians, respectively, as per the proclamation No. 661/2002. Previously, nurses and health assistants were eligible to obtain a license for and are still working particularly in rural medicine vendor shops. Druggists and pharmacy technicians may also work in pharmacies under the supervision of the pharmacist.

The medicine outlets within public health institutions are to be managed by appropriately qualified staff such as a pharmacist or druggists. The dispensing of medicines (except emergency medicines) in ordinary private clinics is, however, illegal. The responsibility for the correctness and quality of medicines supplied, therefore, lies entirely on the person dispensing them. All of the resources required to deliver a medicine to the patient may be wasted if dispensing does not ensure that the correct medicine is given to the right patient in an effective dosage and amount, with clear instructions, and in packaging that maintains the integrity of the medicine. Since the dispenser is often the last person to see the patient before the medicine is used, it is important that the dispensing process be efficient, as it affects medicine use.

The dispenser or dispensing team should have knowledge, skills and attitudes to carry out the dispensing process rationally. These include:

- Knowledge about the medicines being dispensed (common use, usual dosage, precautions about the method of use, common side effects, common interactions with other medicines or food, storage condition)
- 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, •
- Sufficient training according to the level of the health institution and medicine retail outlet
- Knowledge about national polices and working guidelines
- Good knowledge of societal norms and cultural values
- Good working relation with other health care professionals
- Good administrative knowledge and skill
- Fair attitude towards patient interest and commercial pressure
- Respect to pharmacy law and professional code of ethics.
- Good knowledge on medicine supply management
- Knowledge on quality assurance of services
- Good clinical knowledge

The pharmacy professional has a crucial function in the health care system in:

1. Availing medicines with acceptable quality, safety and efficacy
2. Managing stock of medicines in the dispensary
3. Dispensing of medicines with required information and follow up
4. Keeping records of patients and dispensed medicines
5. Providing drug information to patients and other health professionals
6. Participating in the therapy teams to suggest recommendations on treatment choices ,dosages ,drug interactions ,untreated conditions etc
7. Monitoring of drug use practice in the facility
8. Ensuring compliance with treatment guidelines.

Case study 2.8:

Ato Tamiru is a licensed druggist working in his private drug store. His wife assists him although she is not pharmacy or health care professional. On a day Ato Tamiru was out of the drug store, she dispensed an expired gentamicin kept on the shelf for a patient.

Discussion: First of all, allowing non-professionals to dispense medicines is illegal. Secondly, expired medicines should be stored in a separate place and be reported to the concerned regulatory body timely. Dispensing expired medicines is also illegal. It is important to check the expiry date of the stock regularly

3.MEDICINE INFORMATION

3.1. Importance of medicine information

Information about medicines is rapidly expanding because of new medicine products entering into medicine markets and new information about the medicines, which are already in use.

Persons involved in medicine dispensing have to up-to-date themselves with medicine information in order to provide information to patients, other health care professional and to a general public. Pharmacy professionals particularly are in close working relationships with prescribers, where they can give advice in the following areas:

- Medicine choice, e.g. during pregnancy, breast feeding, etc.
- Dose interval and regimen
- Route of administration
- Adverse drug reactions
- Medicine interactions (drug-drug, medicine-diet, medicine-disease interactions)
- Duration of therapy
- Formulations
- Storage
- Cost

All these information are essential for promotion of rational medicine therapy through improving prescribing behavior, medicine administration and use.

Patients or care providers usually require information on the prescription or over-the-counter medicines in the following areas:

- Type of medicine and how it works
- Amount to be taken

- Frequency of administration
- Duration of therapy
- Side effects
- Storage condition
- Other precautions and other

It is also possible that pharmacy professional or other professionals involved in medicine dispensing may want to write a material on medicines, and consult health administrators and policy makers on matters related to medicines, which requires to have a thorough knowledge on them.

3.2. Sources of medicine information

Although basic information about medicines is obtained through training in pharmacy profession, additional knowledge can be gained from various sources. These sources of medicine information can be classified into primary, secondary and tertiary.

Primary sources: provide new medicine information mainly based on research in journals. Such sources include health journals such as the Ethiopian pharmaceutical Journal, the Ethiopian Medical Journal, the Ethiopian Journal of Health Development, Lancet, and others. It is important to assess the reputability of the journal and time of publication.

Secondary sources: provide reviews of articles that appear in primary sources. Examples include medicine information bulletins, adverse medicine reaction bulletin, hospital formularies, etc.

Tertiary sources: include standard reference books such as British National Formulary, basic and clinical pharmacology, dispensing for pharmaceutical students, medical dictionary, etc. The selection of a particular source of information depends on the type of information required. Tertiary sources are

used first than secondary or primary sources as they provide a broad overview of particular subject area. It should also be remembered that standard books are published at longer time intervals than journals.

Medicine information inquiries that are beyond the ability of medicine dispensers can be referred to the nearest medicine information centers (DICs). The main aim of these centers is to provide accurate and precise medicine information for health professionals and the general public. Medicine information supplied by the pharmaceutical industries either in the form of leaflets in the packages or via their representatives is being used by many clients. The impact of pharmaceutical industry, which has several channels of influence, is great. Health professionals should develop critical attitudes towards information provided by pharmaceutical industry as their information may be biased.

3.3. Dissemination of medicine information

Dissemination of medicine information to health care professionals, patients and the general public is an important responsibility of pharmacy professionals. Both verbal and written communication skills may be used for this purpose.

Verbal communication to medicine information must be:

- Clear and fluent by understandable language
- Well-organized on important details
- With confidence done by maintaining eye contact during face-to-face communication

It is necessary to avoid:

- Emotion
- Negligence
- Medical languages

- Unnecessary details

Written communication of medicine information must be:

- Well-organized
- Readable and clear
- Complete

Medicine information may be provided either directly in response to a specific enquiry (reactive type) or that provided other than in response to a specific enquiry (proactive type).

In both types the following approaches may be involved:

- Identifying the enquirer
- Establishing the degree of urgency of the enquiry
- Obtaining the full background information
- Using the most appropriate source of information and
- Delivering the response

Adverse drug reactions reporting system is an area of medicine information that has been given little attention yet. Obviously, medicines not only produce the desired effects, but also undesired effects. It is possible that medicines produce initially unanticipated effects (adverse or potentially useful) after their approval for marketing. Such effects can best be identified by pharmacy professionals, prescribers because of their close proximity with patients. Pharmacy professionals have a moral responsibility to report adverse drug reactions to the concerned body by using a special form designed and distributed for this purpose by EFMHACA (See annex 3 &4).

Case study 3.1.

A male patient that had chlamydial infection and dyspepsia came to a pharmacy with a prescription for tetracycline capsules and an antacid (magnesium

hydroxide suspension). Because the dispenser was busy, no instruction about the usage was given to the patient. After two weeks, the patient consulted his prescriber for no improvement of the chlamydial infection although he was taking both medicines together for the specified duration. Comment.

Discussion: Tetracycline and antacid were prescribed for chlamydial infection and dyspepsia, respectively. Loss of the efficacy of tetracycline was possibly due to its interaction with magnesium hydroxide, which decreases the absorption of tetracycline when taken together. Therefore, instruction on how to take medicines is important for avoiding such type of medicine interactions.

Case study 3.2.

Woizero Tigist, who is a pregnant, collected 30 tablets of ferrous sulfate from a medicine shop and kept them on her bed. Her 4-year old child ingested half of the tablets at once and suffered seriously as a result of it. Comment.

Discussion: Iron tablets at high dose can be dangerous particularly in children. Keeping such medicines out of reach of children should be emphasized while dispensing them.

4. QUALITY ASSURANCE OF MEDICINES AND DISPENSING PRACTICE

The assessment and assurance of the quality of medicines is an integral part of national medicine control system, without which, any health service is evidently compromised. Medicine control Authority of each country has the responsibility for the development of guidelines, norms and administrative regulations for quality surveillance.

In general, the manufacturers and the distributors (including importers, wholesalers and medicine retail outlets) are responsible for the quality of medicines they manufacture or distribute. The desired quality of medicines can be achieved by strict adherence to specifications recommended by medicine control authority. It is evident that the quality of dispensed medicines can be determined by the quality of dispensing process.

Dispensing practice should mean more than simple issuance of the prescribed or requested items in order to achieve the desired therapeutic goal. The quality and quantity of the dispensed items as well as appropriate medicine information mainly determine the success of medicine therapy.

4.1.Quality Assurance of Medicines

Quality specifications comprise a set of properly selected standards with associated methods of analysis which are used to assess the integrity of medicines and starting materials. The selection of methods and procedures used in specifications must be based on their utility for the purpose of quality assurance of medicines. The tests may involve simplified tests (basic tests) or sophisticated analytical examinations.

Because sophisticated analytical examinations require special skills and well-equipped laboratories, simplified tests are commonly used in dispensaries for verifying the quality of dispensed medicines. Such tests may usually serve to ascertain the absence of gross degradation, contamination or damage.

Some indicators of quality problems that can be ascertained by simplified test such as physical inspection are show in table 4.1. When a product fails the basic tests, it should not be used until its quality is established by analytical examination. It is important to note that the shelf-life of medicines may be markedly shortened by improper storage conditions. Therefore, the expiry date information of a medicine product may not guarantee the quality of it. Any quality problem of medicine product should be reported to the concerned body immediately.

Table 4.1. Common quality problem indicators for different pharmaceutical products Types of products

Type of Products	Common Problem indicators
All products	-Broken or tipped packaging (Vials bottles, boxes etc) -Missing, incomplete or unreadable label(s)
Liquid products	Discoloration, Cloudiness, Sediment, Broken seal on bottle, Cracks in ampoule, bottle or vial, Dampness, or moistures in the packaging , leakage, caking
Light sensitive products (such as x-ray films)	Torn or ripped packaging
Latex products	Dry, Brittle, Cracked
Lubricated latex products	-Sticky packaging, Discolored products or lubricant, Stained packaging, Leakage of the lubricant (moist or damp packaging)
Pills (Tablets)	-Discoloration, Crumbled pills, Missing pills (form blister pack) -Stickiness (especially coated tablets), Unusual smell
Injectables	-Liquid does not return to suspension after shacking sterile products -Torn or ripped packaging, Missing parts, Broken or bent parts -Moisture inside the packaging, Stained packaging -Particulate matter -Growth
Capsules	Discoloration, Stickiness, Crushed capsules
Tubes	Sticky tube(s), Leaking contents, Perforation of holes in the tube
Foil packs	Perforation(s):- packaging
Chemical Reagents	Discoloration

4.2. Techniques for Quality Medicines Dispensing

The main aim of quality dispensing is to maintain the quality of the dispensed medicines for their specified shelf-life and ensure appropriate use of the medicine by the patients. An important aspect of quality dispensing concerns the packaging and storage of medicines. The techniques that lead to quality dispensing may be accumulated through training and/or experience.

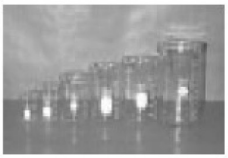
The most useful techniques to ensure quality in dispensing include:

- Maintenance of records on what medicines and products have been issued.
- Maintenance by the pharmacy department of a daily list of medicines in stock to inform prescriber which medicines are available thereby ensuring that only these medicines are prescribed.
- A two prescription system whereby two separate prescriptions are written one for medicines available in the pharmacy and one for those that are not but can be ordered which helps to avoid rewriting of prescriptions.
- Adherence to specifications for storage conditions.
- Adherence to specifications for containers for repackaging
- Keep written procedures for compounding
- Dispensing only one prescription at a time
- Avoid dispensing when dizzy, in stress, etc.
- Double checking of the name, dosage form, strength amount to be dispensed as well as the information on the label
- Organize Medicine and Therapeutic Committee at health institution level and participate.

Annex-1: Dispensing aids and materials

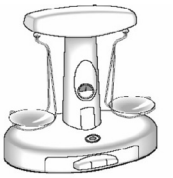
Annex 1. Dispensing aid and materials

Erlenmeyer flasks

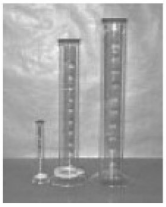


Beakers

Prescription Bottles

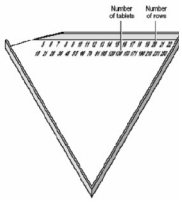


Class B Dispensing balance



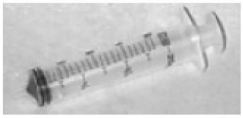
Graduated Cylinders

Conical Graduates

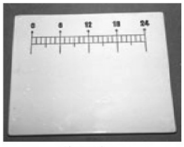


Counting triangle

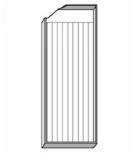
Volumetric Flasks



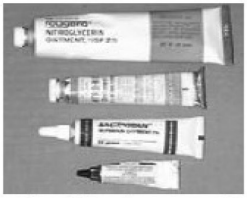
Hypodermic syringes



Ointment slap



Capsule counter



Collapsible ointment tubes

Annex-2: Standard Prescription Paper

PRESCRIPTION PAPER Code_____

Institution Name: _____Tel. No… ……
Patient's full Name: _____
Sex: ___ Age:___ Weight: _____ Card No. _____
Region: _____Town _____ Woreda_____Kebele _____
House No. Tel. No: ☐ Inpatient ☐ Outpatient
Diagnosis, if not ICD _____

Drug Name, Strength, Dosage Form, Dose, Frequency, Duration, Quantity, How to use & other information ℞	Price (dispensers use only)
Total Price	

Prescriber's Dispenser's

Full name _____ _____
Qualification _____ _____
Registration #_____ _____
Signature _____ _____
Date: _____ _____

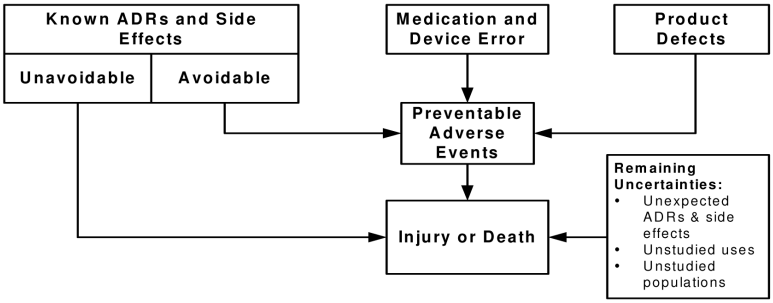
See overleaf

Please Note the Following Information

1. **Prescriptions:**
   - are valid only if it has the seal of the health institution
   - filled and blank are legal documents, treat them as fixed assets
   - written and verbal information to the client complement one another
2. **The prescriber:**
   - drug treatment is only one of the treatment options
   - write the prescription correctly and legibly
   - diagnosis and other parts of the prescription have to be complete
   - abbreviations are NOT recommended
   - please accept prescription verification call from the dispenser
3. **The Dispenser:**
   - check legality of the prescription
   - check completeness and accuracies before dispensing
   - check for whom the medicine is being dispensed: actual client o care taker
   - if in doubt about the contents of the prescription; verify with the prescriber
   - containers used for packaging must be appropriate for the product
   - labels of drugs should be clear, legible and indelible
   - drugs should be dispensed with appropriate information and counseling
   - keep filled prescriptions at least for 2 years
4. **Minimum drug label information** should include the following:
   - Patient name
   - Generic name, strength and dosage form of the medicine
   - Dose, Frequency and Duration of use of the medicines
   - Quantity of the medicine dispensed
   - How to take or administer the medicine?
   - Storage condition

Annex-3: Tips for Managing Adverse Drug Reactions (ADRs)

1. Prevention of Adverse Drug Reactions
   (Adverse Drug Events)



2. Alphabetical Classification of ADRs

- Type A—Augmented pharmacological response
  - ☛ Pharmacodynamic (e.g., bronchospasm from beta-blockers)
- Type B—Bizzare, often allergic, response
  - ☛ Medicine-induced diseases (e.g., antibiotic-associated colitis)
  - ☛ Allergic reactions (e.g., penicillin anaphylaxis)
  - ☛ Idiosyncratic reactions (e.g., aplastic anemia with chloramphenicol)
- Type C—Continuous or long term (time related)
  - ☛ Osteoporosis with oral steroids
- Type D—Delayed (lag time)
  - ☛ Teratogenic effects with anticonvulsants or lisinopril
- Type E—Ending of use (withdrawal)
  - ☛ Withdrawal syndrome with benzodiazepines
- Type F—Failure of efficacy (no response)
  - ☛ Resistance to antimicrobials

Steps

1. Using relevant and updated references or checklist always
2. Consistently following the 6 steps of dispensing
3. Competency Required of Pharmacy Professional

What are the expected basic skills of a dispenser regarding an ADR:

- Recognition of an ADR:-
- Prevention of an ADR
- Proper dispensing and counseling
- Manage an ADR
- Timing
- Grading an ADR by severity (Grade I, Grade II, Grade III, Grade IV)
- Advice to the health care provider and the patients
- Recording and Reporting of an ADR.

☛ Subjective report; A patient complaint (sign and symtom)

☛ Objective report; direct observation of events

4. Recognition of the ADR

- Medication order screening;

☛ look for abrupt medication discontinuation, abrupt dosage reduction, order for special tests

- Medication utilization reviews

5. Prevention of the ADR/Adverse Event

- Following the 6 steps of dispensing
- Proper advising/ counseling checklist(guide)

Types of medication errors

- Medicine prescribed but not given
- Administration of a medicine not prescribed
- Medicine given to the wrong patient
- Wrong medicine or IV fluid administered
- Wrong dose or strength given
- Wrong dosage form given
- Administration of medicine or dose that differs from written order

- Medicine given for wrong duration
- Wrong preparation of a dose (e.g., incorrect dilution)
- Incorrect administration technique (e.g., unsterile injection)
- Medicine given to a patient with known allergy
- Wrong route of administration used
- Wrong time or frequency of administration

✓ **Causes of medication errors**

Human factors

- Heavy staff workload and fatigue
- Inexperience, lack of training, poor handwriting, and oral orders

Workplace factors

- Poor lighting, noise, interruptions, excessive workload

Pharmaceutical factors

- Excessive prescribing
- Confusing medicine nomenclature, packaging, or labeling
- Increased number or quantity of medicines per patient
- Frequency and complexity of calculations needed to prescribe, dispense, or administer a medicine
- Lack of effective policies and procedures

Being Vigilant!!!!!!

Before prescribing/dispensing/administering a medicine:

- Is this the correct drug for the patient's clinical condition?
- Is this the correct dose, route, and interval?
- Does the patient have any medical or physical conditions that would affect the pharmacokinetic aspects of the drug, patients with renal or liver dysfunction.

- Does the patient have an allergy to this medication or a chemically similar drug?
- Is the patient on another drug (or herbal product) that would cause a significant drug interaction?
- Is the drug being prescribed a “high-risk” drug for producing ADRs? Amino glycosides, Antineoplastics ,warfarin.
- Is the patient a" high-risk” population group? pregnant , breastfeeding women, the elderly, children
- Is the drug being prescribed of right quality?
- Is the drug being administered correctly?

6.Managing ADRs

Side effects can be classified into 3 based on:

- time of their occurrence
- Severity

6.1 THE FIRST TYPE:

- Time : Early
- Severity : uncomfortable for the patient, but not dangerous.

6.2 SECOND TYPE:

- Timing : Early
- Severity : potentially serious side effects

6.3 THIRD TYPE:

- Side effects occurring later during treatment

This method can help in giving priorities for tailoring advises to the urgent needs of patients. Specially, this method can also be used for counseling patients taking chronically administered drugs such as antihypertensive.

7.Reporting ADRs Using the National ADR Reporting Form (see annex 3)

Annex-4: Adverse drug event Reporting Form

Food Medicine and Health Care Administration and Control Authority of Ethiopia (FMHACA)
Adverse Drug Event reporting form

Patient Name (abbreviation)	Card No	Age, Date of birth	Sex	Weight	Height

Ethnic group	Substance of abuse

Information on suspected drug/vaccine **S=suspected drug** **C=concomitantly used drugs**

Drug name(write all information including brand name batch no and manufacturer	S/C	Dose/dosage form, route, frequency	Date drug taking was started (D/M/Y)	Date drug reaction started (D/M/Y)	Date drug taking was stopped (D/M/Y)	Indication (Reason for drug use)

Adverse drug event description(include all available laboratory test results)

Reaction necessitated:	Reaction subsided after D/C of suspected drug?
Discontinuation of drug/s □ YES □ No	□ YES □ No □ Information not available
Hospitalization prolonged □ YES □ No	Reaction reappeared after restart of suspected drug?
	□ YES □ No □ Information not available

Treatment of reaction:

Outcome: □ Died due to the adverse event □ Died, drug may be contributory □ Not yet recovered
□ Recovered without sequelae □ Recovered with squelae □ Unknown

Squelae:

Relevant medical conditions such as allergies, renal disease, liver disease, other chronic diseases, pregnancy etc

Reported by: Name	Profession:	Email address:	Telephone

Name of health institution: Date

24	Samuel Asfaha	Medco Biomedical College	Pharmacist
25	Asfaw Regassa	Oromia Regional Health Bureau	Pharmacist
26	Lealem Sisay	Amanuel Mental Specialized Hospital	Pharmacist
27	Elias Geremew	MSH/SPS	Pharmacist
28	Endalkachew Admassu	Gondar University	Pharmacist
29	Balemlay Tilahun	Rift Valley University College, Adama Camps	Pharmacist
30	Fitsum Abraha	Tsion Pharmacy	Pharmacist
31	Mohamd Hajihyder Ali (D/r)	Amanuel Mental Specialized Hospital	Consultant Psychiatrist
32	Netsanet Behabtu	FMHACA	Pharmacist
33	Solomon Getnet	Addis Ababa Health Bureau	Pharmacist
34	Kebede Abera	Addis Ababa University, School of Pharmacy	Pharmacist
35	Tenaw Andualem	MSH/SPS	Pharmacist
36	Kibrnesh Bezu	Axum Pharmacy	Pharmacist
37	Andamlak Dinku	Kenema No.2 Pharmacy	Pharmacist
38	Asnakech Alemu	FMHACA	Pharmacist
39	Yonas Yilma (Dr)	Gondar University	Surgeon

Food, Medicine and Health Care Administration and Control Authority (FMHACA) of Ethiopia

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Annex- 5: Filled Prescription Paper Registration Book (PRB)

Page _____

Filled Prescription paper Registration Book (PRB)

Name of Health Facility _____, Region, _____, Town_____

S.N.	Prescription No.	Date	Patient Information					Diagnosis	Description of Medicine Dispensed					Prescriber Information		Dispenser Information		Remark			
			Name of Patient	Sex	Age	Weight	Medical Record No.		Medicine Name	Strength	Dosage Form	Qty in BU*	Total Qty Page/ Day)in BU*	Prescriber Name	Qualification	Dispenser name	Qualification	Credit	Free	prisoner	cash

BU* = basic unit (e.g. tablet, capsule, tube, sachet, vial etc)

Annex-6: Daily Medicine Requisition Form from In- patient Pharmacy

Institution name _____ Date _____

Department _____

S.No	Bed No.	Card No.	Description of prescribed medicine	Date	Quantity of prescribed medicine per unit dose & administration hour						Total Dispensed basic unit	Unit price	Total price	Remark

The undersigned has received the above mentioned items in good condition from the Hospital in patient Pharmacy

Head nurse _____ Hospital Pharmacy professional_____

Signature _____ Signature

_____

Annex-7: Medicines Dispensing Guide

Medicines Dispensing Guide

1. **Display name and profession badge on your gown at all times:**
2. **Make sure dispensary is clean and organized:**
3. **Introduce yourself, call the client by name and identify:**
   - Identify whether client or care taker.
4. **Ask if s/he has the time to discuss about medicine counseling needs:**
5. **Explain the importance of the counseling session:**
   - Listen and learn reasons for doing and not doing
6. **Ask the client about the medicine and the condition being treated:**
   - The purpose is to know the gap that needs to be filled
   - Verify what the client knows or understands about the disease and medicine
   - Encourage the client to speak
7. **Ask the client if s/he has any concerns prior to providing information:**
   - Often, clients will not speak unless they are asked
8. **Listen and respond with empathy:**
   - Relationship predicts adherence
9. **Use appropriate labeling:**
   - Reinforce verbal with written information the client can understand
10. **Use appropriate verbal and body language during counseling:**
    - Use simple and easy to understand verbal and written information
    - Simple and understandable information promotes adherence
11. **Use appropriate dispensing aids:**
12. **Check the drug three times before dispensing:**
    - While picking from the shelf; labeling, counting/measuring and handing over to the client; and returning back to the shelf
13. **Manage the counseling session:**
    - Keep extra conversation to a minimum
    - Use "small talk" to start the counseling session
14. **Organize the information in an appropriate manner:**
    - Most important information should be provided at the beginning and repeated at the end.
15. **Offer for follow up (if needed):**
    - For refill or to determine how the client has improved
    - Should be voluntarily and flexible timing
    - Let clients know you are concerned about them
16. **Solicit satisfaction and knowledge on services provided:**
17. **Use special counseling techniques to certain groups such as**
    - Persons with sensory, functional or cognitive impairment or taking psychiatric medications
    - young and elderly Patients
    - language barriers and low literacy
18. **Document client counseling services provided:**

Note:

- Counseling needs depend on the type of the disease, the medicine, time and severity of illness
- Make sure clients know how to take their medicines and what to do if problems occur

Adapted from Bruce Berger's effective Patient Counseling.

Annex-8: Medicines Use Counseling Guide

Medicines Use Counseling Guide

1. **Check for any allergies in general and this medicine in particular:**
   - Ask for any allergies
   - Obtain past medicines use history
2. **Tell name and indication of the medicine:**
   - Name is important in case of emergency and visit to more than one provider
   - Indication reinforces diagnosis and creates confidence
3. **Tell route and frequency of administration:**
   - Prevents taking by the wrong route
   - Inform if first time or reinforce what they know.
   - Note: "Take one tablet after meals" may not work since not everyone eats three meals a day
4. **Tell the client how long to take the medicine:**
   - Helps to eliminate unrealistic expectations
   - Ensures reaching treatment goals
   - Prevents emergence of microbial resistance
5. **Tailor medicine regimen to daily routine:**
   - Ask the daily routine before suggesting a plan
   - Link taking a dose with regular daily task and effect of the medicine
   - Should not assume a common routine (e.g., eating three meals a day; sleeping night times, etc.)
6. **Ask if the client has problem taking this medicine:**
   - Complexity of the dosage regimen affects adherence
   - Is there special preference for a dosage form?
   - Consider total cost of care, not just the cost of the drug alone
7. **Tell how long it will take for the medicine to show an effect:**
   - If not told, the client may believe the medicine is not working and may stop taking, or increase dose with subsequent toxicity
8. **Tell how many times and when to refill:**
   - Number of refills. Check if there is inconvenience.
9. **Emphasize benefits of the medicine:**
   - Discuss benefits before potential side-effects
10. **Discuss major side effects of the medicine:**
    - Side effects that are common and how long they will stay
    - Measures to recognize, prevent, or manage side effects and adverse effects
    - Tell what to do if side effects don't go away or become intolerable
    - Encourage the patient to report side/adverse effects of the drugs
11. **Discuss drug-drug, drug-food, drug-disease, drug-herb interactions:**
    - Ask if client is taking other medicines; discuss interference of other drugs, food or condition with current medicine and/or condition being treated
12. **Discuss precautions and measures to improve treatment outcome:**
    - Decreased salt intake, dietary requirements, self-monitoring, recommended exercises, activities to avoid, etc.
    - Don't assume the client may have prior information; it is good to repeat and discuss precautions
13. **Discuss storage recommendations, supplementary instructions:**
    - Shake well, refrigerate, avoid heat and humidity, etc.
    - Duration of use after opening container
14. **Discuss religious and cultural issues that may affect medicines use :**
    - Fasting and holy water, dosage forms preferences, etc.
15. **Demonstrate and provide adequate information about special dosage forms:**
    - Metered dose inhalers, suppositories, eye drops, ear drops, topical, transdermal patches, injections, sublingual tablets, nasal sprays, sustained-release tablets/capsules, etc.
16. **Educate techniques for self-monitoring:**
    - Diabetes: signs and symptoms of hypo- and hyper-glycemia; use of blood glucose monitoring devices
    - Warfarin therapy: to watch for excessive bleeding
    - Hypertension: use of blood pressure monitors
17. **Ask if there are any additional concerns or questions:** listen respectfully and carefully
18. **Ask client to repeat key information to check how instructions are understood:**
    - Could you tell me how you are going to take your medicine?
    - Praising has been shown to reinforce adherence
19. **Provide your telephone number and encourage to contact you, if the need arises**

Annex-9: Counseling Points for Selected Dosage Forms

1. Procedure for Dispensing Tablets or Capsules

1. Issue whole packs whenever possible.
2. If necessary, count out desired number of units using a spatula or spoon on counting tray or clean sheet of paper. Avoid touching product with your hands as contamination may result.
3. Recount number of units before packing into the final container (envelope).
4. Pack the medicine properly. Avoid paper packaging for loose tablets and capsules
5. Prepare a label or select the appropriate pre-printed label for the drug preparation to be dispensed.
6. Countercheck the product to make sure that package and label contain the correct medicine, strength, quantity, dosage form, and directions for use.

2. Procedure for Dispensing Liquids and Powders for Reconstitution

1. Prepare a label or select the appropriate pre-printed label for the preparation to be dispensed.
2. Countercheck the product to make sure that package and label contain the correct medicine, strength, quantity, dosage form, and directions for use.
3. Issue whole packs unless an exception is absolutely necessary.
4. Instruct the patient on how to reconstitute powders according to the manufacturer's instructions, if required(see example below)

Tips for Proper Dispensing of Pediatric Powder for Suspension (Pfs) for Oral Use

a) Use freshly boiled and cooled water (FBC)
b) Add the FBC gently bit by bit shaking each time after each bit and finally exactly to the mark on the bottle
c) FBC is added only once to each bottle
d) Do not add water (FBC) to all bottles at the same time, meaning this has to be only after the first reconstituted bottle is completed
e) Shake each time before use
f) Use only volume measuring device recommended by the dispenser to pour the accurate dose
g) 'Do not use after _____days
h) Provide the general warnings and find recommended warning label wordings that apply to a specific drug
i) Praise your child for becoming willing to take the dose and the fact syrups are not candies but harmful medications if taken inappropriately

3.Counseling Points for Administration of Eye Drops

1. Wash your hands.
   - Emphatically advice the need for thorough hand washing before application and importance of eye hygiene in prevention of contamination of the remaining doses and avoidance of re-infection and relapse of the problem
2. Open the closure. Do not touch the dropper opening.
3. Look upward.
4. Pull the lower eyelid down to make a ‘gutter’.
5. Bring the dropper as close to the `gutter' as possible without touching it or

the eye.

6. Apply the prescribed amount of drops in the 'gutter'.
   - Be vigilant on the issue of systemic side effects after application into the eye Educating the patient on the needs to close the tubes immediately after each use
7. Close the eye for about two minutes. Do not shut the eye too tight; Excess fluid can be removed with a tissue.
8. Eye-drops may cause a burning feeling but this should not last for more than a few minutes. If it does last longer consult a doctor or dispenser.
9. If more than one kind of eye-drop is used wait at least five minutes before applying the next drops.
10. When giving eye-drops to children:
    - Let the child lie back with head straight.
    - The child's eyes should be closed.
    - Drip the amount of drops prescribed into the corner of the eye.
    - Keep the head straight.

Important!!!!

- Identify the type of eye preparation (lotion, solution, ointment, etc)
- Eye drops are generally instilled into the pocket formed by gently pulling down the lower eyelid and keeping the eye closed for as long as possible after application;
- One drop is all that is needed. A small amount of eye ointment is applied similarly; the ointment melts rapidly and blinking helps to spread it.
- When two different eye-drop preparations are used at the same time of day, dilution and overflow may occur when one immediately follows the other. The patient should therefore leave an interval of at least 5 minutes between the two.

4. Counseling Points for Administration of Eye ointment

1. Wash your hands.
2. Tilt the head backwards a little.
3. Take the tube in one hand, and pull down the lower eyelid with the other hand, to make a 'gutter'. Do not touch anything with the tip of the tube.
4. Bring the tip of the tube as close to the 'gutter' as possible.
5. Apply the amount of ointment prescribed.
6. Close the eye for two minutes.
7. Remove excess ointment with a tissue.
8. Clean the tip of the tube and close it.

5. Counseling Points for Administration of Ear drops

1. Warm the ear-drops by keeping them in the hand or the armpit for several minutes. Do not use hot water tap, no temperature control!
2. Tilt head sideways or lie on one side with the ear upward.
3. Gently pull the lobe to expose the ear canal.
4. Apply the amount of drops prescribed.
5. Wait five minutes before turning to the other ear.
6. Use cotton wool to close the ear canal after applying the drops ONLY if the manufacturer explicitly recommends this.
7. Ear-drops should not burn or sting longer than a few minutes. If it does last longer consult a doctor or dispenser.

6. Counseling Points for Administration of Nasal drops

1. Blow the nose.
2. Sit down and tilt head backward strongly or lie down with a pillow under the shoulders; keep head straight.
3. Insert the dropper one centimeter into the nostril.
4. Apply the amount of drops prescribed.
5. Immediately afterward tilt head forward strongly (head between knees).

6. Sit up after a few seconds; the drops will then drip into the pharynx.
7. Repeat the procedure for the other nostril, if necessary.
8. Rinse the dropper with boiled water.

7. Counseling Points for Administration of Nasal spray

1. Blow the nose.
2. Sit with the head slightly tilted forward.
3. Shake the spray.
4. Insert the tip in one nostril.
5. Close the other nostril and mouth.
6. Spray by squeezing the vial (flask, container) and sniff slowly.
7. Remove the tip from the nose and bend the head forward strongly (head between the knees).
8. Sit up after a few seconds; the spray will drip down the pharynx.
9. Breathe through the mouth.
10. Repeat the procedure for the other nostril, if necessary.
11. Rinse the tip with boiled water.

8. Counseling Points for Administration of Aerosol

1. Cough up as much sputum as possible.
2. Shake the aerosol before use.
3. Hold the aerosol as indicated in the manufacturer's instructions (this is usually upside down).
4. Place the lips tightly around the mouthpiece.
5. Tilt the head backward slightly.
6. Breathe out slowly, emptying the lungs of as much air as possible.
7. Breathe in deeply and activate the aerosol, keeping the tongue down.
8. Hold the breath for ten to fifteen seconds.
9. Breathe out through the nose.
10. Rinse the mouth with warm water.

9. Counseling Points for Administration of Suppositories

1. Defecate and wash your hands.
2. Remove the covering (unless too soft).
3. If the suppository is too soft let it harden first by cooling it (fridge or hold under cold running water, still packed!) then remove covering.
4. Remove possible sharp rims by warming in the hand.
5. Moisten the suppository with cold water.
6. Lie on your side and pull up your knees.
7. Gently insert the suppository, rounded end first, into the back passage.
8. Remain lying down for several minutes.
9. Wash your hands.
10. Try not to have a bowel movement during the first hour.

10. Counseling Points for Administration of Vaginal tablet with Applicator

1. Wash your hands.
2. Remove the wrapper from the tablet.
3. Place the tablet into the open end of the applicator.
4. Lie on your back, draw your knees up a little and spread them apart.
5. Gently insert the applicator with the tablet in front into the vagina as far as possible, do NOT use force!
6. Depress the plunger so that the tablet is released.
7. Withdraw the applicator.
8. Discard the applicator (if disposable).
9. Clean both parts of the applicator thoroughly with soap and boiled, lukewarm water (if not disposable).
10. Wash your hands.

For vaginal tablets without applicator

- Wash your hands.
- Remove the wrapper from the tablet.
- Dip the tablet in lukewarm water just to moisten it.
- Lie on your back, draw your knees up and spread them apart.
- Gently insert the tablet into the vagina as high as possible, do NOT use force!
- Wash your hands.

Counseling Points for Applying vaginal creams ointments and gels

(Most of these drugs come with an applicator)

1. Wash your hands.
2. Remove the cap from the tube containing the drug.
3. Screw the applicator to the tube.
4. Squeeze the tube until the required amount is in the applicator.
5. Remove the applicator from the tube (hold the cylinder).
6. Apply a small amount of cream to the outside of the applicator.
7. Lie on your back, draw your knees up and spread them apart.
8. Gently insert the applicator into the vagina as far as possible, do NOT use force.
9. Hold the cylinder and with the other hand push the plunger down thus inserting the drug into the vagina.
10. Withdraw the applicator from the vagina.
11. Discard the applicator if disposable or clean thoroughly (boiled water) if not.
12. Wash your hands.

Annex-10: Tips for Managing Drug Interactions

1. Using relevant and updated references or checklist
2. Consistently following the 6 steps of dispensing
3. Ask the patient what additional drugs he/she is taking(using) at home
    - On OTC basis
    - On Prescription only basis (POM)
    - Herbal or traditional medicines
    - Recreational drugs
4. Assessing if the current medications on the prescription interact with each other or with those mentioned in # 3.
5. Determine the **type of interaction** (Pharmacokinetic or Pharmacodynamic; Drug –Drug, or Drug – food, or Drug – Laboratory value, Drug- Disease interactions)
6. Ruling out whether the interaction is **significance** or not; with emphasis given to the significant types
7. If the drugs interact, listing all the possible **consequences** of the interaction
    - Enhanced toxicity
    - Therapeutic failure including drug resistance
    - Beneficial effect etc
8. **Recognizing** the interaction /s/ by assessing **sign and symptoms** of the interaction
9. **Management** of the interaction
    - Timing between doses of each interacting drugs or foods
    - Dose adjustment
    - Switching to/substitute with safer alternative
    - Effective counseling, etc…
10. **Documentation and Reporting** of drug interactions

Annex-11: Medicines with sound alike and look alike spellings which are potentially prone for medication error

S.No.	Intended Medicine	Mistaken for
1.	Acetylcholine Chloride	Acetylcysteine
2.	Acetylsalicylic acid	Acetylsalicylic acid+Caffeine+Paracetamol
3.	Adenosine	Adrenaline
4.	Alfuzosin	Alfuzosine
5.	Aluminum Hydroxide+ Magnesium Hydroxide	Aluminum Hydroxide+ Magnesium Hydroxide +simethicone
6.	Aluminum Hydroxide+ Magnesium Hydroxide +simethicone	Aluminum Hydroxide+ Magnesium Hydroxide +simethicone +Algenic acid
7.	Amantadine	Amiodarone
8.	Amiloride	Amlodipine
9.	Amiodarone	Amantadine
10.	Amitriptyline	Ampicillin
11.	Amoxicillin	Amphotericin
12.	Ampicillin	Amitriptyline
13.	Azathioprine	Azidothymidine
14.	Azathioprine	Azithromycin
15.	Azathioprine	Azidothymidine
16.	Azathioprine	Azithromycin
17.	Azidothymidine	Azithromycin
18.	Azidothymidine	Azathioprine
19.	Beclomethasone	Dexamethasone,
20.	Benoxinate	Benzhexol
21.	Betamethasone	Dexamethasone,
22.	Salicylic acid + Betamethasone Dipropionate	Salicylic acid + Beclomethasone Dipropionate
23.	Betamethasone	Beclomethasone
24.	Betamethasone	Dexamethasone,
25.	Bromazepam	Bromocriptine
26.	Bupropion	Buspirone
27.	Captopril or Hydrochlorthiazide	Captopril+Hydrochlorthiazide
28.	Cefaclor	Any one of these medicines can be mistaken for any others in the family.
29.	Cefadroxil	
30.	Cefixime	
31.	Cefotaxime	
32.	Cefpodoxime	
33.	Cefprozil	
34.	Ceftazidime	
35.	Ceftriaxone	
36.	Cefuroxime	

37.	Cephalexin	
38.	Cephazoline	
39.	Chlorambucil	Chloramphenicol
40.	Chloramphenicol	Chlorpheniramine
41.	Chlordiazepoxide	Chlorpromazine
42.	Chlorpheniramine	Chloramphenicol
43.	Chlorpromazine	Chlorpropamide
44.	Chlorpromazine	Chlordiazepoxide
45.	Clindamycine	Erythromycin or any macrilide
46.	Clomiphene	Clomipramine
47.	Clonazepam	Clonidine
48.	Clonazepam	clozapine
49.	Clonidine	Clozapine
50.	Cyclopentolate	Cyclophosphamide
51.	Cycloserine	Cyclosporine
52.	Daunomycin	Daunorubicin
53.	Dexamethasone	Beclomethasone
54.	Dexamethasone	Betamethasone
55.	Dexamethasone	Desoximethasone
56.	Diazepam	Diazoxide
57.	Dimenhydrinate	Diphenhydramine
58.	Dobutamine	Dopamine
59.	Ephedrine	Epinephrine
60.	Ergotamine	Ergometrine
61.	Fluvastatin	Fluvoxamine
62.	Folic Acid	Folinic Acid
63.	Gatifloxacin	Gemifloxacin
64.	Gentamicin	Gentian violet
65.	Glibenclamide	Any one of these medicines can be mistaken for any other in the family.
66.	Glimepride	
67.	Glipizide	
68.	Glipizide	
69.	Glyceryl Trinitrate	Glycerin
70.	Hydrochlorthiazide or Captopril	Captopril+Hydrochlorthiazide
71.	Hexetidine	Hexidine
72.	Hyoscine (Scopolamine) Butylbromide,	Hyoscine(Scopolamine) Hydrobromide,
73.	Isotretinoin	Tretinoin
74.	Lamivudine	Lamotrigine
75.	Mebendazole	Metronidazole
76.	Medroxyprogesterone	methylprednisolone

77.	Metformin	Metronidazole
78.	Methyldopa	Levodopa
79.	Methylprednisolone	methyltestosterone
80.	Methyltestosterone	Medroxyprogesterone
81.	Metronidazole	Metformin
82.	Metronidazole	Mebendazole
83.	Misoprostol,	Mifeprostone
84.	Niclosamide	Nicotinamide
85.	Penicillin	Penicillamine
86.	Pentobarbital	Phenobarbital
87.	Primaquine	Primidone
88.	Procainamide	Procaine
89.	Procaine	Procaine Pencillin
90.	Propofol	Propranolol
91.	Quinidine	Quinine
92.	Spectinomycin	Streptomycin
93.	Sulfadiazine	Sulfasalazine
94.	Tetracycline HCL	Tetracaine HCL
95.	Tramadol	Trazodone
96.	Tretinoin	Isotretinoin
97.	Telbivudine	Teltorodine
98.	Vinblastine	Vincristine

Annex-12: Equipments and Materials for Compounding in Health Facilities

SN	Equipment/ Material	Description
1.	Working bench	Level, smooth, impervious, free of cracks and crevices and non-shedding; covered with protector sheets of plastic, rubber or absorbable paper
2.	Mortar and pestle	250 ml capacity or more; glass type and porcelain type
3.	Water distillator	Stainless steel of 20 liter capacity or more
4.	Water bath	Stainless steel of 4 openings or more
5.	Electrical hotplate	Various Sizes and Features
6.	Evaporating dish	Stainless steel (glazed inside) and porcelain type; with/without handling
7.	Spatula	Stainless steel and plastic type, flexible and non-flexible, different blade lengths.
8.	Gloves	disposable, non-sterile
9.	Glass rod	Different length and thicknesses
10.	Wash bottle	250ml capacity, polyethylene
11.	Funnel	Glass type and plastic type (polyethylene)
12.	Beakers	Glass type; different capacity
13.	Volumetric flask	Glass type; different capacity
14.	Balances	Prescription, torsion, triple beam, electronic; capacities of not less than 300 gm; sensitivity of not less than 0.1 mg.
15.	Ointment tile	Glass type
16.	micropipettes	Glass type; different capacities (less than 1ml); with pipette bulb
17.	Pipettes	Glass type; different capacities (1ml-100ml); with pipette bulb
18.	Cylindrical graduate	Glass and plastic type; different capacity
19.	Conical graduate	Glass and plastic type; different capacity
20.	Weighing dishes	Plastic, aluminum, stainless steel type
21.	Weighing paper	Normal paper; grease-proof for semisolids
22.	Thermometers	
23.	Scientific calculator	

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