

# Principles of Pharmacy practice

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Some fundamentals of measurements and calculations.

Interpretation of prescription or medication orders.

The metric system.

Calculation of doses.

Reducing and enlarging formulas.

Density, specific gravity and specific volume.

Percentage and ratio strength calculation.

# Introduction

Pharmacy: it is a science and art of manufacturing and administration of drugs

- aa. or (ana) of each •
- ad (ad) up to; to make •
- disp. (dispensatur) dispense •
- d.t.d. (dentur tales give of such doses) •
- ft (fiat) make •
- M. (mice) mix •
- q.s. (quantum a sufficient quantity) •
- Sig. (Signa) write (directions) •
- 
- A.M. (ante meridiem) morning •
- aq. (aqua) water •
- b.i.d. (bis in die) twice a day •
- d (die) day •
- dil. (dilutus) dilute •
- et and •
- h. or hr. (hora) hour •
- tsp. teaspoonful •
- a.c. (ante cibos) before me •

# abbreviations

Gm	gram	•
ml	milliliter	•
fl	fluid dram = 5 ml	•
flJss orfJss	half-fluidounce (15 ml)	•
Dose		•
Tab.	Tablet	•
Cap.	Capsule	•
Amp.	Ampoule	•
Ung.	Ointment	•
Gutt	drop	•
I.M	intramuscular	•
I.V.	Intravenous	•
t.i.d.	Three times daily	•

# Pharmaceutical measurements

Volume ; •

1- by using graduated cylinders and graduated pipettes •

2 – volumetric measurement ( accurate measurement ); by using •  
volumetric flasks and volumetric pipettes .

Weighing: •

1-Sensitive balance of at least 4 divisions (0.0000 ) •

2- by using pharmacy balance which almost having an error of measurement •  
therefore we can overcome this problem by applying Aliquot method of  
weighing ( by addition of inert substance to satisfy the low sensitivity of the  
balance.

Sensitivity Requirement (SR): ***it is defined as the load that will cause a change of one division on the index plate of the balance*** •

•

## 2- interpretation of medical prescription

the traditional symbol  $R_x$  (meaning “recipe,” “take thou,” or “you take”) •

Components of a typical prescription. Parts labeled are as follows: •

(1) Prescriber information and signature •

(2) Patient information •

(3) Date prescription was written •

(4) symbol (the Superscription), meaning “take thou,” •

“you take,” or “recipe” •

(5) Medication prescribed (the Inscription) •

(6) Dispensing instructions to the pharmacist (the Subscription) •

(7) Directions to the patient (the Signa) •

(8) Special instructions. It is important to note that for any Medicaid or •

Medicare prescription and according to

individual state laws, a handwritten language by the prescriber, such as “Brand •  
necessary,” may be

# Prescription accuracy

It is the responsibility of the pharmacist to ensure that each prescription and medication order received is correct in its form and content; is appropriate for the patient being treated; and is subsequently filled, labeled, dispensed, and administered accurately. In essence, each medication should be:

- therapeutically appropriate for the patient;
- prescribed at the correct dose;
- dispensed in the correct strength and dosage form;
- correctly labeled with complete instructions for the patient or caregiver; and
- for the patient in a hospital or other health care facility, each medication must be administered to the correct patient, at the correct time, and by the correct rate and route of administration.

# Metric system

the international system unit of measurement

Volume; •

Liter = 1000 ml •

ml = 1000 microliter •

Weight; •

Kilogram = 1000 gm •

gm = 1000 mg •

gm = 1000 micro. •

Addition; •

*Add 1 kg, 250 mg, and 7.5 g. Express the total in grams* •

•  
*1000.0*

*0.250* •

*7.500* •

*1007.750 gm* •



# Calculation of doses

The ***dose of a drug is the quantitative amount administered or taken by a patient for the intended medical effect*** •

***single dose, the amount taken at one time*** •

***daily dose; or a total dose, the amount taken during the course of therapy.*** •

***dosage regimen*** ;The schedule of dosing (e.g., *four times per day for 10 days*) •

The ***usual adult dose of a drug is the amount that ordinarily produces the medicinal effect*** intended in the adult patient •

. The ***usual pediatric dose is similarly defined for the infant or child*** •  
patient

**The minimum concentration effect (MCE)** ;An average blood serum •  
concentration of a drug can be measured, and the minimum  
the drug's concentration determined that can be expected to produce  
desired effects in a patient.

# ROUTE OF ADMINISTRATION REPRESENTATIVE DOSAGE FORMS

Oral Tablets, drops,	capsules, lozenges, solutions,	•
	(mouth, GI tract) syrups, and suspensions	•
Sublingual Tablets (under the tongue)	tablet	•
Parenteral	(injection) Solutions and suspensions	•
Epicutaneous/ Transdermal	Ointments, creams, powders, lotions, aerosols, (skin) and patches	•
Conjunctival (eye)	Solutions, suspensions, and ointments	•
Intranasal (nose)	Solutions, sprays, and ointments	•
Intrarespiratory	(lungs) Aerosols and inhalant solutions	•
Rectal (rectum) suspensions	Ointments, creams, suppositories, solutions and	•
•		
Vaginal (vagina) gels,	Ointments, creams, tablets, suppositories, solutions, and emulsion foams	•
Urethral (urethra)	Solutions and suppositories	•

# Calculation of doses in practice

**Number of doses = Total quantity / Size of dose •**

**Size of dose = Total quantity / Number of doses •**

**Total quantity = number of doses x size of dose •**

# Reducing & enlarging of formulas

Pharmacists may have to reduce or enlarge formulas for pharmaceutical preparations in the course of their professional practice or manufacturing activities.

Factor of reducing or enlarging =

Quantity of formula desired / Quantity of formula given

To correct the formula; factor X amount of each drug

*If a formula for 1000 mL contains 6 g of a drug, how many grams of drug are needed to prepare 60 mL of the formula?*

$$60 / 1000 = 0.06$$

0.06 X 6 gm = 0.36 gm of drug needed to prepare 60 ml

# Density and specific gravity

Density (d) is mass per unit volume of a substance ( gm /ml). •

***Specific gravity (sp gr) is a ratio, expressed decimally, of the weight of a substance to the weight*** of an equal volume of a substance chosen as a standard (water). •

Specific gravity = Weight of substance /Weight of equal volume of water •

Sp.gr. Has no unit of expression because it is a ratio and it is measured by pycnometer. •

# Applications of specific gravity

1- pharmaceutical applications ; •

determination of weight by volume •

2- clinical application ; •

diagnosis of disease by measuring urine •

sp.gr.

# Percentage and ratio strength

The term *percent and its corresponding sign (%) mean “by the hundred” or “in a hundred,”* •

*Percent weight-in-volume (w/v) expresses the number of grams of a constituent in 100 mL* •

of solution or liquid preparation and is used regardless of whether water or another liquid is the solvent or vehicle. •  
Expressed as: % w/v.

*Percent volume-in-volume (v/v) expresses the number of milliliters of a constituent in 100* •

*mL of solution or liquid preparation. Expressed as: % v/v.* •

*Percent weight-in-weight (w/w) expresses the number of grams of a constituent in 100 g of* •

solution or preparation. Expressed as: % w/w. •

EXAMPLES OF PHARMACEUTICAL  
DOSAGE FORMS IN WHICH THE ACTIVE  
INGREDIENT IS OFTEN CALCULATED AND  
EXPRESSED ON A PERCENTAGE BASIS

**PERCENTAGE BASIS EXAMPLES OF APPLICABLE •  
DOSAGE FORMS**

**Weight-in-volume;** Solutions (e.g., ophthalmic, •  
nasal, otic, topical, large-volume parenterals) and  
lotions

**Volume-in-volume;** Aromatic waters, topical •  
solutions, and emulsions

**Weight-in-weight ;** Ointments, creams, and gels •



# Ratio strength

The concentrations of weak solutions are frequently expressed in terms of ratio strength. •

It is 1 part of solute per number parts of solvent •

As 1: 20 ,1:1000 •

0.02% = 1: 5000 •