Calculation of Doses: General considerations

劑量計算：一般考量

Objectives

- Differentiate between the various kinds of doses.
- Describe the primary routes of drug/dose, administration and, for each, the dosage forms utilized.
- Perform calculations of doses involving household measures.
- Perform calculations pertaining to the quantity of a dose, the dosage regimen, and the supply of medication required for the prescribed period.

Dose definitions

- The **dose** of a drug:
  - is the **quantitative amount administered or taken** by a patient for the intended medicinal effect.
  - may be expressed as:
    - a **single dose**, the amount taken at one time;
    - a **daily dose**;
    - a **total dose**, the amount taken during the time-course of therapy.
- A **daily dose**:
  - may be subdivided and taken in divided doses,
  - **two or more times per day** depending on the characteristics of the drug and the illness.
- The **schedule of dosing** {e.g., four times per day for 10 days) is referred to as the **dosage regimen**.

CALCULATIONS CAPSULE

Doses

Given two factors in the following equation, by rearrangement, the third may be calculated:

$$\text{Number of doses} = \frac{\text{Total quantity}}{\text{Size of dose}}$$

In using the equation, the total quantity and the size of dose must be in the same unit of measure.

- Drug **doses vary greatly** between drug substances; some drugs have **small doses**, other drugs have relatively **large doses**.
- The **dose of a drug** is based on:
  - its biochemical and pharmacologic activity,
  - its physical and chemical properties,
  - the dosage form used,
  - the route of administration,
  - various patient factors.
- The dose of a drug for a **particular patient** may be determined in part on the basis of the patient's **age**, **weight**, **body surface area**, general physical health, **liver and kidney function** (for drug metabolism and elimination), and the **severity of the illness** being treated.

- The **usual adult dose** of a drug is the amount that ordinarily produces the medicinal effect intended in adults.
- The **usual pediatric dose** is similarly defined for the infant- or child-patient.
- The **usual dosage range for a drug** indicates the quantitative range or amounts of the drug that may be prescribed within the guidelines of **usual medical practice**.
- Drug use and dose information is provided in :
  - the package labeling and inserts that accompany manufacturers' pharmaceutical products
  - References:
    - Facts and Comparisons,
    - Physicians' Desk Reference
    - Pediatric Dosing Handbook,
    - Geriatric Dosage Handbook ,
    - Drug Information Handbook

- The dose response of individuals may vary (**Fig. 7.1**) and may require dosage adjustment in a given patient.
- As in the treatment of **cancer patients:** combinations of drugs are used.
  - Many anticancer drugs are administered cyclically, usually for **21 to 28 days**, with a rest period between dosing cycles to allow recovery from the **toxic effects** of the drugs.
  - anticancer drugs are **most commonly dosed** on the basis of the patient's **body surface area**.

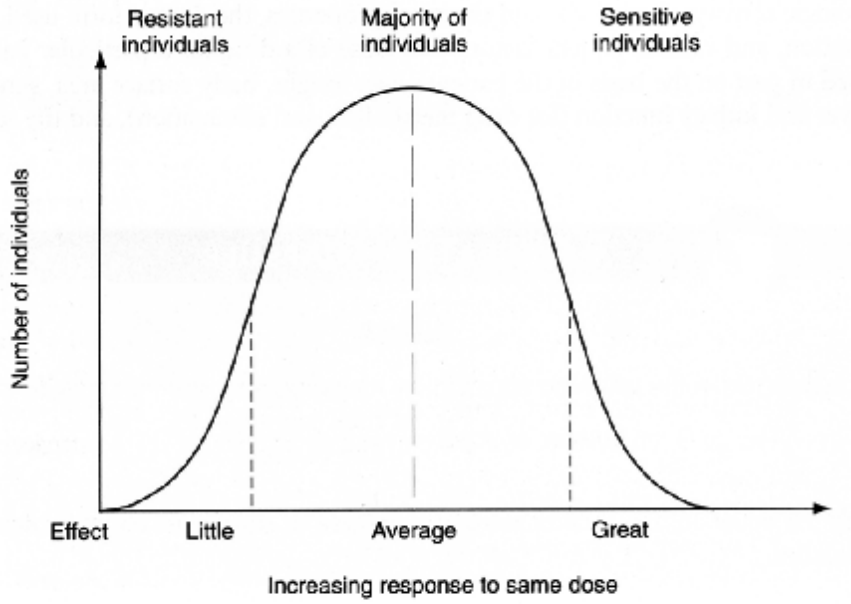

FIGURE 7.1 Drug effect in a population sample.

- The **median effective dose** of a drug is the amount that produces the desired intensity of effect in 50% of the individuals tested.
- The **median toxic dose** of a drug is the amount that produces toxic effects in 50% of the individuals tested.
- Drugs intended to **produce systemic effects** must be **absorbed** or placed directly into the **circulation** and distributed in adequate concentrations to the **body's cellular sites of action**.
- For certain drugs, a correlation exists between **drug dosage**, the **drug's blood serum concentration** after administration, and the presentation and degree of **drug effects**.
- The **minimum effective concentration (MEC)**:
  - the minimum concentration that can be expected to produce the drug's desired effects in a patient.
- The **minimum toxic concentration (MTC)** :
  - The base level of blood serum concentration that produces dose-related **toxic effects**.

- **Appropriate drug dosage** should result in blood serum drug concentrations that are **above the MEC** and **below the MTC** for the period of time that drug effects are desired.
- As shown in **Figure 7.2** for a hypothetical drug, the serum concentration of the drug:
  - reaches the MEC 2 hours after its administration
  - achieves a peak concentration in 4 hours,
  - falls below the MEC in 10 hours.

- If it would be desired to **maintain** the drug serum concentration above the MEC for a longer period of time, a **second dose** would be required at about an **8-hour** time frame.
  - For certain drugs, a larger than usual initial dose may be required to achieve the desired blood drug level.
    - This dose is referred to as the **priming or loading dose**.
  - Subsequent **maintenance doses**, similar in amount to usual doses, are then administered according to the dosage regimen to sustain the desired drug blood levels or drug effects.

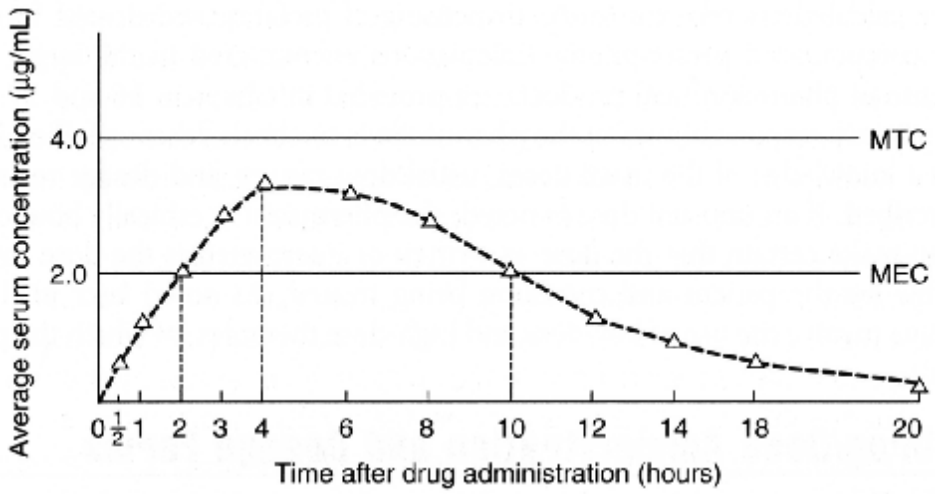

FIGURE 7.2 Example of a blood level curve for a hypothetical drug as a function of the time after oral administration. MEC, minimum effective concentration; MTC, minimum toxic concentration.

- To achieve the desired drug blood level **rapidly**, the **loading dose** may be administered as an **injection** or **oral liquid**, whereas the subsequent **maintenance doses** may be administered in other forms, such as tablets or capsules.
- Certain biologic or immunologic products, such as **vaccines**, may be administered in **prophylactic doses** to protect the patient from contracting a specific disease.
- **Antitoxins**, may be administered in **therapeutic doses** to counter a disease after exposure or its contraction.
- The doses of some biologic products, e.g., **insulin**, are expressed in **units of activity**, derived from biologic assay methods.

- Most **pharmaceutical products** are prepared on a **large scale** within the **pharmaceutical manufacturing industry** for distrlbution to institutional and community pharmacies.
  - are used in filling prescriptions and medication orders in the pharmacy.
- On a **smaller scale**, many hospital pharmacists and some community pharmacists manufacture bulk quantities of a limited number of products for use in their practices.
- **Community and hospital pharmacists:**
  - fill prescriptions and medication orders requiring compounding; i.e., the fabrication of a pharmaceutical product from individual ingredients, carefully weighed, measured, and mixed.

- This chapter presents **dosage calculations** relevant to the **dispensing of prefabricated dosage forms** and the **preparation** of compounded prescriptions.
- Calculations encountered in the **large- and small-scale manufacture** of pharmaceutical products are provided in Chapter 16 and 17.
- an introduction to **pharmacokinetic dosing** is presented in Chapter 22.
- Pharmacokinetic dosing takes into account a patient's ability to eliminate drugs from the body due to **impaired renal function**, which oftentimes necessitates a **reduction in dosage**.

Routes of Drug/Dose Administration and Dosage Forms

- Doses of drugs are administered by a variety of dosage forms and routes of administration, as shown in Table 7.1.
- Dosage forms also contain ***pharmaceutical ingredients,*** which provide the physical features, stability requirements, and aesthetic characteristics desired for optimal therapeutic effects.
  - pharmaceutical ingredients are solvents, vehicles, preservatives, stabilizers, solubilizers, binders, fillers, disintegrants, flavorants, colorants, and others.

TABLE 7.1 SELECTED ROUTES OF ADMINISTRATION AND REPRESENTATIVE DOSAGE FORMS

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

Routes of Drug/Dose Administration and Dosage Forms

- With *added pharmaceutical ingredients, the quantity of an active ingredient in a dosage form represents only a portion (often a small portion) of the total weight or volume of a product.*
- *For example, a tablet with 10 mg of drug actually could weigh many times that amount because of the added pharmaceutical ingredients.*

Dose Measurement

- In the institutional setting, doses are measured and administered by professional and paraprofessional personnel.
  - A variety of measuring devices :
    - calibrated cups for oral liquids (Fig. 7.3)
    - syringes and intravenous sets for parenteral medication.
- In the home setting, the adult patient or a child's parent generally measures and administers medication. Exceptions occur when home health care personnel are involved in a patient's care.
  - Liquid dosage is usually measured in "household" terms, most commonly by the teaspoonful and tablespoonful.
  - An oral dispenser (Fig. 7.4) finds use in administering calibrated quantities of liquid medication to children.
- For calculating dosages, useful equivalent measures are provided in Table 7.2.

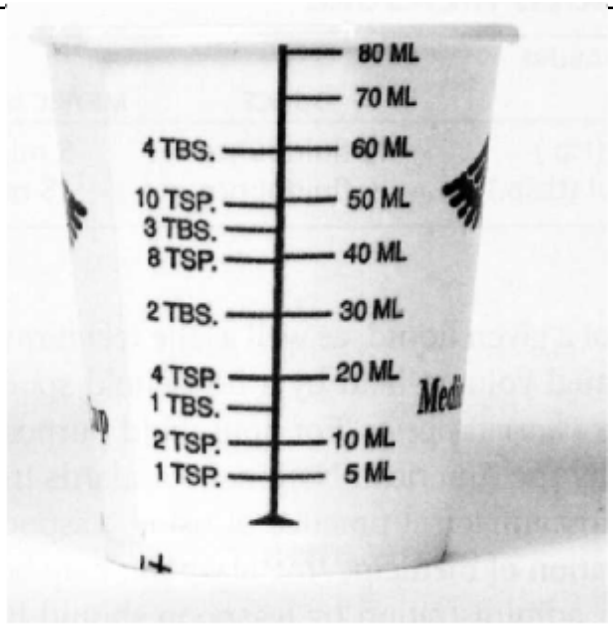

FIGURE 7.3 An example of a calibrated medication cup for administering oral liquid medication.

FIGURE 7.4 An example of a calibrated Exacta-Med® Oral Dispenser for administering liquid medication to pediatric patients. *(Courtesy of BAXA Corporation.)*

- One of the primary responslbilities of the pharmacist is to **check doses** specified in prescriptions based on a knowledge of the usual doses, usual dose ranges, and dosage regimens of the medicines prescribed.
- If an **unusual dose** is noted, the pharmacist is ethically bound to **consult the physician** to make certain that the dose as written or interpreted is the dose intended and that it is suitable for the patient and condition being treated.

Teaspoon and Tablespoon

- In *calculating* doses, pharmacists and physicians accept a capacity of 5 mL for the teaspoonful and 15 mL for the tablespoonful.
- It should be noted that the capacities of household teaspoons may vary from 3 to 7 mL and those of tablespoons may vary from 15 to 22 mL.
- Such factors as viscosity and surface tension of a given liquid, as well as the technique of the person measuring the liquid, can influence the actual volume held by a household spoon.

- American Standard Teaspoon:
  - According to the United States Pharmacopeia, "For household purposes,
  - established by the American National Standards Institute
  - as containing 4.93 ± 0.24 mL.
- Any dropper, syringe, medicine cup, special spoon, or other device used to administer liquids should deliver 5 mL wherever a teaspoon cailbration is indicated."
- In general, pharmaceutical manufacturers use the 5-mL teaspoon and the 15-mL tablespoon as a basis for the formulation of oral liquid preparations.

TABLE 7.2 USEFUL APPROXIMATE EQUIVALENT OF HOUSEHOLD MEASURE

HOUSEHOLD MEASURE (ABBREVIATION)	OUNCE	METRIC MEASURE
1 teaspoonful (tsp.)	≈ 1/6 fluidounce ≈	5 mL
1 tablespoonful (tbsp.)	≈ 1/2 fluidounce ≈	15 mL

The Drop as a Unit of Measure

- The drop (abbreviated *gtt):*
  - is used as a measure for small volumes of liquid medications.
- A drop does not represent a definite quantity, because drops of different liquids vary greatly.

- Through habit and tradition, the ʒ -symbol (fluidram) is used by many physicians in the Signa portion of the prescription when indicating **teaspoonful dosage**.
- Doses less than a teaspoonful (usually for children) are often indicated on the labeling as fractions of a teaspoonful, as 1/4 or 1/2 of a teaspoonful.
- Special medicinal spoons for such amounts are available or standard household (kitchen) measuring spoons may be used.

- the official medicine dropper:
  - the United States Pharmacopeia defines
  - constricted at the delivery end to a round opening with an external **diameter** of about **3 mm**.
  - when held vertically, delivers water in drops, each of which weighs between **45 and 55 mg**.
  - is calibrated to deliver approximately **20 drops of water per millilter** (i.e., 1 mL of water = 1 gram or 1000 mg ÷ 50 mg (ave.)/drop = 20 drops).

- The size of drops varies materially from one liquid to another.
- The "drop" should not be used as a measure until the volume that it represents has been determined for each specific liquid.
- This determination is made by calibrating the dispensing dropper.
- The calibrated dropper is the only one that should be used for the measurement of medicine.
- Most manufacturers include a specially calibrated dropper along with their prepackaged medication for use by the patient in measuring dosage.
- Examples of **specially calibrated droppers** are shown in **Figure 7.5**.

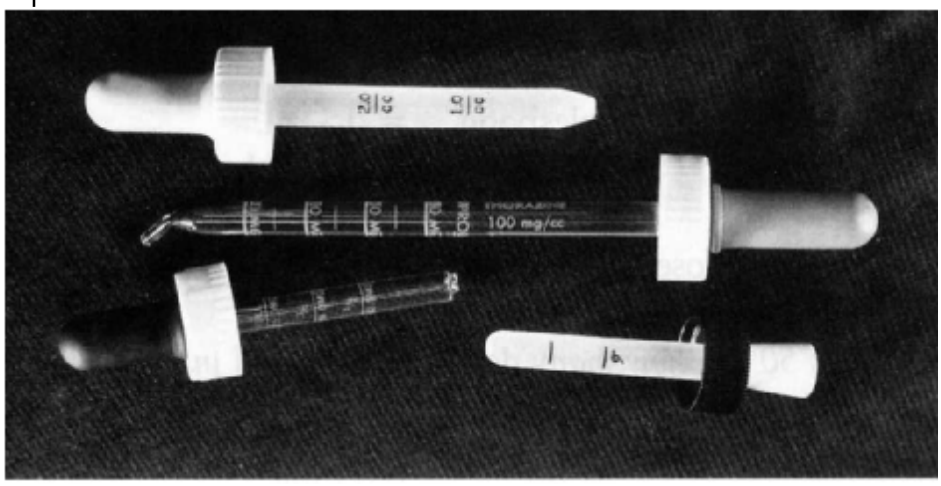

FIGURE 7.5 Examples of calibrated droppers used in the administration of pediatric medications.

- A dropper may be calibrated by counting the drops of a liquid as they fall into a graduate until a measurable volume is obtained.
- The number of drops per unit volume is then established (e.g., 20 drops/mL).
- Example: *If a pharmacist counted 40 drops of a medication infilling a graduate cylinder to the 2.5 mL mark, how many drops per milliliter did the dropper deliver?*

$$\frac{40\,(drops)}{x\,(drops)} = \frac{2.5\,(mL)}{1\,(mL)}$$

$$x = 16\,drops/mL, answer.$$

Case in Point 7.1 A physician asks a pharmacist to calculate the dose of a cough syrup so that it may be safely administered dropwise to a child. The cough syrup contains the active ingredient dextromethorphan HBr, 30 mg/15 mL, in a 120-mL bottle.

Based on the child's weight and literature references, the pharmacist determines the dose of dextromethorphan HBr to be 1.5 mg for the child.

The medicine dropper to be dispensed with the medication is calibrated by the pharmacist and shown to deliver 20 drops of the cough syrup per 1 mL.

Calculate the dose, in drops, for the child.

$$\frac{30\,mg}{15\,mL} = \frac{1.5\,mg}{x\,mL}, \; x = 0.75\,mL$$

$$\frac{20\,drops}{1\,mL} = \frac{x\,drops}{0.75\,mL}, \; x = 15\,drops\ of\ cough\ syrup, answer.$$

General Dose Calculations

- A pharmacist often needs to calculate:
  - The size of a dose
  - The number of doses
  - The total quantity of medication to dispense
- The following equation is useful:

$$Number of doses = \frac{Total\ amount}{Size\ of\ dose}$$

Calculations of the **Number of Doses**

Examples: If the dose of a drug is 200 mg, how many doses are contained in 10 g?

$$Number\ of\ doses = \frac{10,000\,(mg)}{200\,(mg)} = 50\ doses, answer.$$

solving by dimensional analysis:

$$\frac{1\ dose}{200\ mg} \times \frac{1000\ mg}{1\ g} \times 10\ g = 50\ doses, answer.$$

If 1 tablespoon is prescribed as the dose, approximately how many doses will be contained in 1 pint of the medicine?

1 tablespoon =15 mL

1 pint = 473 mL

$$Number\ of\ doses = \frac{473\,mL}{15\,mL} = 31.5\ or\ 31\ doses,\ answer.$$

If the dose of a drug is 50 μg, how many doses are contained in 0.020 g?

$$Number\ of\ doses = \frac{20\,mg}{0.05\,mg} = 400\ doses,\ answer.$$

Calculations of the Size of a Dose

$$Size\ of\ dose = \frac{Total\ amount}{Number\ of\ doses}$$

Examples: *How many teaspoonfuls would be prescribed in each dose of an elixir if 180 mL contained 18 doses?*

$$Size\ of\ dose = \frac{180\,(mL)}{18} = 10\,mL = 2\ teaspoons,\ answer.$$

*How many drops would be prescribed in each dose of a liquid medicine, if **15 mL** contained **60 doses**? The dispensing dropper calibrates **32 drops/mL**.*

15 mL = 15 X 32 drops = 480 drops

$$Size\ of\ dose = \frac{480\,(drops)}{60} = 8\,drops, answer.$$

solving by dimensional analysis:

$$\frac{1\,mL}{32\,drops} \times \frac{1}{60\,doses} \times 15\,mL = 8\,drops\,/\,dose, answer.$$

Calculations of the Total Quality of Product

Total amount = number of doses X size of dose

- Examples: *How many milliliters of a liquid medicine would provide a patient with 2 tablespoonfuls twice a day for 8 days?*

  Number of doses =16

  Size of dose = 2 tablespoonfuls or 30 mL

  Total amount = 16 X 30 mL = 480 mL, answer.

- *How many milliliters of a mixture would provide a patient with a **teaspoonful dose** to be taken **3 times a day for 16 days**?*

  Number of tsp doses = 16 X 3 = 48 tsp
  Total amount = 48 X 5 mL = 240 mL, answer.

- *How many **grams** of a drug will be needed to prepare **72 dosage forms** if each is to contain **30 mg**?*

  Number of doses=72
  Size of dose = 30 mg
  Total amount = 72 X 30 mg = 2160 mg = 2.16 g, answer,

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*It takes approximately **4 g** of ointment to cover an adult patient's leg. If a physician prescribes an ointment for a patient with total leg eczema to be applied **twice a day for 1 week**, which of the following product sizes should be dispensed: 15 g, 30 g, or 60 g?*

Number of doses= 2 per day X 7 days =14
Size of dose = 4 g
Total amount = 14 X 4 g = 56 g; thus, 60 g product size, answer.

Additional Examples of Calculations of Dose

$$\text{Quantity in each dose} = \frac{\text{Quantity in total amount}}{\text{Number or doses}}$$

If 0.050 g of a substance is used in preparing 125 tablets, how many micrograms are represented in each tablet?

0.05 =50 mg= 50,000 ug

$$\frac{50,000}{125} = 400\ \mu g,\ answer.$$

Or, solving by dimensional analysis:

$$\frac{1,000,000\ \mu g}{1\ g} \times \frac{1}{125\ tablets} \times 0.050\ g = 400\ \mu g\ /\ tablet,\ answer.$$

If a preparation contains 5 g of a drug in 500 mL, how many grams are contained in each tablespoonful dose?

$$1\ tablespoonful = 15\ mL$$

$$\frac{500\ (mL)}{15\ (mL)} = \frac{5\ (g)}{x}$$

$$x = 0.15\ g,\ answer.$$

A cough mixture contains 48 mg of hydromorphone hydrochloride in 8 fl. oz. How many milligrams of hydromorphone hydrochloride are in each 2-teaspoonful (tsp) dose?

- 1 fl. oz. = 6 tsp
- 8 fl. oz. = 48 tsp
- 48 tsp÷ 2 = 24 doses
- 48 mg ÷ 24 =2 mg, answer.

$$\frac{48\ (tsp)}{2\ (tsp)} = \frac{48\ (mg)}{x\ (mg)}$$

$$x = 2\ mg,\ answer.$$

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*How many milligrams of hydrocodeine bitatrate and guaifenesin will be contained in **each dose** of the following prescription?*

Hydrocodeine Bitatrate	*0.12 g*
Guaifenesin	*2.4 g*
Cherry Syrup ad	*120.0 mL*

Sig. Teaspoonful for cough.

- 1 teaspoonful = 5 mL
- 120÷5 = 24 doses
- 0.12 g÷24 = 0.005 g = 5 mg of hydrocodeine bitatrate,
- 2.4 g÷24 = 0.1 g = 100 mg guaifenesin, answers.

$$\frac{120\,(mL)}{5\,(mL)} = \frac{0.12\,(g)}{x\,(g)}$$

$x = 0.005\ g = 5\ mg\ of\ hydrocodeine\ bitatrate$

$$\frac{120\,(mL)}{5\,(mL)} = \frac{2.4\,(g)}{y\,(g)}$$

$y = 0.1\ g = 100\ mg\ guaifenesin,\ answers$

Determine the Quantity of an Ingredient in a Specified Total Amount, Given the Quantity of the Ingredient in Each Specified Dose.

- **Quantity in total = Quantity in dose X Number of doses**

$$\frac{\text{Size of dose}}{\text{Total amount}} = \frac{\text{Quantity of ingredient in each dose}}{x}$$

x = Quantity in total amount

*How many grams of a drug substance are required to make **120 mL of a solution** each teaspoonful of which contains 3 mg of the drug substance?*

1 teaspoonful = 5 mL

$$\frac{5\,(\text{mL})}{120\,(\text{mL})} = \frac{3\,(mg)}{x\,(mg)}$$

$x = 72$ mg or 0.072 g, answer.

*A physician ordered **500-mg capsules** of tetracycline to be taken **twice a day for 10 days**. How many total **grams** of tetracycline would be prescribed?*

- Size of dose= 500 mg
- Total number of doses = 2 (a day) X 10 (days) = 20 doses
- Total quantity = 500 mg X 20 (doses)
  = 10,000 mg
  = 10 g, answer.

Dosing Options

Low-Dose and High-Dose Therapies

- The administration of doses that are much smaller or much larger than the usual *dose* of a drug is referred to as *low-dose* or *high-dose* therapy, respectively.
- The example of low-dose therapy is:
  - the use of **aspirin** in 81-mg amounts (rather than the usual dose of 325 mg) to **lower the risk of heart attack and clot-related stroke**.
  - the use of low-dose **postmenopausal hormone therapy**, in which doses often 50% smaller than standard doses are administered.
- The example of high-dose therapy is:
  - the chemotherapeutic treatment of cancer, in which there is an attempt, through increased dose intensity, to kill tumor cells.
  - the investigational use of up to 1000 mg/day of **vitamin E** (compared with the recommended daily allowance of 15 mg/day) to prevent the **progression of hardening of the arteries** .
- Pharmacists must be aware of the use of high-dose therapies while remaining vigilant in protecting patients against unintended high doses and consequent drug overdose.

Example Calculations of Low-Dose and High-Dose Therapies

- ***If a patient is changed from a daily standard-dose postmenopausal product containing 0.625 mg of conjugated estrogens (CE) to a low-dose formulation containing 0.35 mg CE, how many milligrams less of CE would the patient take per week?***
  - *0.625 mg — 0.35 mg = 0.275 mg X 7 (days) = 1.925 mg conjugated estrogens, answer*

- ***To reduce the inflammation of an optic nerve, a patient is administered high-dose prednisone, 900 mg/day for 5 days by intravenous infusion. The usual daily dose of prednisone is 5 to 60 mg/day, depending on the condition being treated. Calculate the doses that the patient received, as a multiple of the highest usual daily dose.***
  - ***900 mg/ 60 mg= 15, multiple of the highest usual dose, answer.***

Fixed-Dose Combination Products

- A variety of prescription and nonprescription products are available containing two or more therapeutic agents in fixed-dose combinations.
- An advantage of combination products :
  - two or more needed drugs may be taken in a single dose, which may be more convenient, enhance compliance,
  - be less expensive for the patient than taking the same drugs individually.
- A disadvantage:
  - is the relative inflexibility in dosing compared with individual drug dosing.

Fixed-Dose Combination Products

- Whether the fixed-dose combination is a liquid (e.g., a syrup) or a solid (e.g., a tablet) dosage form, when a dose is taken, the component drugs are taken in a fixed-dose ratio.
- To provide some options in dosing, many combinations of prescription drugs are formulated into different strengths.
  - For example, capsules containing amlodipine and benazepril HCl (LOTREL), two drugs used in the treatment of **hypertension**, are available in strengths of 2.5 mg/10 mg, 5 mg/ 10 mg, 5 mg/20 mg, and 10 mg/20 mg. The prescriber can select the desired combination.

Example Calculation Based on Fixed-Dose Combination Products

- ***Valsartan and hydrochlorothiazide tablets are available separately or in combination in strengths of 80 mg/12.5 mg, 160 mg/12.5 mg, and 160 mg/25 mg. If a patient was receiving the lowest-dose combination product and the physician wished to double the dose of hydrochlorothiazide, what is the option?***
  1. An additional prescription for 12.5 mg of hydrochlorothiazide
  2. or individual prescriptions for 80 mg of valsartan and 25 mg of hydrochlorothiazide may be written, answer.

Splitting Tablets

- A number of tablets are ***scored,*** or grooved to allow breaking into approximately equal pieces (usually halves).
  - allows dosage flexibility, particularly when a patient is started at a half dose and then is titrated up to a full dosage level.
  - also enables a patient to take a product at a strength that is not otherwise available.
- Some patients use tablet-splitting devices to cut scored or unscored tablets for economic reasons.

Splitting Tablets

- For some medications, the price of tablets of twice the strength required is similar to the lower-strength tablets, and the patient can double his or her supply by tablet splitting.
  - Unfortunately, this practice often results in unequal portions of tablets and thus in uneven doses.
- Patients may not be aware that many solid dosage forms should not be cut or crushed but must remain intact for proper drug absorption.

Example Calculation Based on Tablet Splitting

- **A patient attempted to split in half 20-mg unscored tablets of a drug, resulting in "half-tablets" *differing by 1.5 mg* in drug content. Assuming a whole tablet was uniform in drug content, calculate the amount of drug in each "half tablet."**
  - If L = larger "half" and S = smaller "half,"
  - then
    $$\begin{aligned} L+S &= 20 \text{ mg} \\ \underline{L-S} &= \underline{1.5 \text{ mg}} \\ 2L &= 21.5 \text{ mg} \end{aligned}$$
  - L = 10.75 mg and
  - S = 20 mg — 10.75 mg = 9.25 mg, answers.
  - Proof: 10.75 mg — 9.25 mg = 1.5 mg difference in drug content and 10.75 mg + 9.25 mg = 20 mg total drug content

Special Dosing Regimens

- Certain drugs have unique dosing regimens.
  - Eg: chemotherapeutic agents (discussed in Chapter 8) and oral contraceptives.
- In the case of oral contraceptives, the prescribed regimen is based on a 28-day dosing cycle of 21 consecutive days of tablets containing a combination of estrogenic and progestational drugs followed by 7 consecutive days of tablets containing nondrug material.
- One tablet is taken daily, preferably at approximately the same time. The tablets generally are color coded and packaged in special dispensers to facilitate compliance.

Example Calculation Based on Special Dosing Regimen

- ***The* ORTHO *TRI-CYCLEN* LO *28-day regimen* consists *of norgestimate (N), ethinyl estradiol (EE), and nonmedicated tablets as* follows:**

  7 *white tablets containing 0.18 mg (N)+ 0.025 mg (EE);*

  7 *light blue tablets containing 0.215 mg (N) + 0.025 mg (EE); 7 dark blue tablets containing 0.25 mg (N) + 0.025 mg* (EE)

  7 *green tablets containing 0 mg (N) + 0 mg (EE).*

  How *many* milligrams *each* of *norgestimate and ethinyl estradiol are taken* during *each 28-day cycle?*

  - Norgestimate: 0.18 mg X 7 = 1.26 mg
    0.215 mg X 7 = 1.505 mg
    0.25 mg X 7 = 1.75 mg
    4.515 mg norgestimate and
  - Ethinyl estradiol: 0.025 mg X 7 = 0.175 mg
    025 mg X 7 = 0.175 mg
    0.025 mg X 7 = 0.175 mg
    0.525 mg ethinyl estradiol,

answers.