METHODS FOR CALCULATING DRUG DOSAGES

When approaching mathematical problems, you may use multiple methods to find the correct answer. Some methods will be easier for you than others; decide which works best and stick with it. There are four methods by which to calculate drug dosages for the nonparenteral (oral) route of administration:

1. Ratio and proportion
2. Formulation
3. Dimensional analysis
4. Fractions

The ratio and proportion method uses two ratios (comparisons between two things) and a proportion (statement saying those two ratios are equal). The formulation method involves inserting numerical values into a **formula** (rule prescribing how to calculate a dosage) to arrive at the correct dosage. Dimensional analysis is a method based on the premise that any number can be multiplied by 1 without changing its value. The fraction method uses two equivalent proportions to find the answer.

Regardless of the method chosen, you follow the same basic steps. First, you must accurately read the drug label. Second, convert the numbers to the same unit of measurement. Third, using the preferred method, write the problem on paper. Finally, check and check again to confirm that your calculations are correct. You may choose one method of calculation and use another to check the accuracy of your results.

Figure 8-1 shows a sample drug label. The quantity is sometimes in tablets, capsules, milliliters, or another unit, and each label has its own equivalents. As discussed in Chapter 5, the manufacturer, lot number, and expiration dates are included on the label, as well as the name, dosage, form, and route of the drug. Most of this information is needed to calculate the dosage. The prescriber usually states the number of milligrams (or other unit of measurement) of a medication to administer, but unless you know what is in the container holding the ordered medication, you will not have the necessary numbers for the calculations. Now you are ready to learn how to calculate dosages.

Ratio and Proportion Method

The ratio and proportion method uses ratios, which are comparisons between two objects (numbers in this case). For example, if you have four pieces of pepperoni pizza and three pieces of cheese pizza, the ratio would be written as 4:3, or it may be written as 4/3. A proportion is a statement saying that two ratios are equal and, in this case, would be written as 4:3::8:6 or 4/3 = 8/6.

Example: The medication order is for 400 mg. The available medication is 300 mg in 1 mL.

Step 1: Write the ratio that you know (what is available).

$$\frac{300 \text{ mg}}{1 \text{ mL}}$$

FIGURE 8-1: Sample drug label. The drug label should include (A) the brand (trade) name, (B) generic name, (C, D) drug strength and drug form, route of administration if other than oral, total amount of medication in the container, directions for reconstitution if necessary, (E) manufacturer, (F) National Drug Code (NDC), (G) expiration date, and (H) lot number.