Dosage by body weight calculations are required when medication dosage depends on the weight of the patient. Drug orders for pediatric and geriatric medications are often calculated based on weight.

To do the required calculations, we recall our basic formula for dosages:

The desired dose can be calculated using the following formula:

\[
\text{Weight (kg)} \times \text{Desired dose (per kg)} = \text{Required Dosage}
\]

Once you have the desired dose, you can calculate the amount to be given to the patient using the familiar \(\frac{D}{H} \times Q\) formula.

\[
\frac{\text{Desired Dose}}{\text{Dose on hand}} \times \text{Quantity} = \text{amount to be given}
\]

Tips for Calculations:
- Make sure that all measurements are in the same units. If necessary, convert units to be the same.
- To convert from pounds to kilograms, divide the number of pounds by 2.2 lb/kg.
- To convert from kilograms to pounds, multiply the number of kilograms by 2.2 lb/kg.
- Always check for a reasonable answer. Does the calculated amount make sense?

Example 1:
The physician orders Kantrex, which has a recommended dose of 2.5 milligrams per kilogram every 8 hours. The client weighs 38 pounds. What amount of medication should be given per dose?

**Givens:** Desired dose: 2.5 mg/kg q8h
Weight: 38 lb

**Need to know (specify unit):** Amount to be given: ? (mg)
Solution: Step 1: Weight conversion

We notice that the recommended dose of medication is per kilogram. However, we know the patient's weight in pounds. Therefore, we must first convert 38 lb to kilograms.

\[
38 \text{ lb} \div 2.2 \text{ lb/kg} = 17.27 \text{ kg [rounded to the nearest hundredth]}
\]

Step 2: Calculate the amount to be given.

The desired dose is 2.5 mg per kilogram and the patient weighs 17.27 kg.

\[
2.5 \text{ mg/kg} \times 17.27 \text{ kg} = 43 \text{ mg [rounded to the nearest one]}
\]

Therefore, the patient should be given 43 mg of medication per dose.

Example 2:
The pediatrician has ordered 4 mg/kg of theophylline anhydrous for a child weighing twenty-five kilograms. The tablets on hand are 400 mg per tablet. How many tablets should you give to the child?

Givens: Desired dose: 4 mg/kg
- Weight: 25 kg
- Dose on hand: 400 mg/tablet

Need to know (specify unit): Amount to be given: ? (tabs)

Solution: Step 1: Calculate the total desired dose:

\[
4 \text{ mg/kg} \times 25 \text{ kg} = 100 \text{ mg}
\]

Step 2: Calculate the amount to be given:

We will use the \( \frac{D}{H} \times Q \) formula.

The desired dose is 100 mg. The dose on hand is 400 mg in a quantity of 1 tablet.

\[
\frac{100 \text{ mg}}{400 \text{ mg}} \times 1 \text{ tab} = \frac{1}{4} \text{ tab}
\]

Therefore, the nurse should administer 0.25 (or one quarter) of a tablet to the child.
DOSAGES BY BODY WEIGHT
PNUR 145 WORKSHEET

Practice Exercises:
1. The physician orders Proventil syrup orally at 0.1 mg/kg three times per day. The patient weighs 26 pounds. How much syrup should be given to the patient at one time? What is the daily dose?
2. The physician’s order states, “Augmentin 350 mg p.o. q8h” for a child with an upper respiratory infection. The child weighs 30 pounds. Augmentin is available as 125 mg/5 mL.
   a) What is the individual dose?
   b) What amount of medication is required for a 10-day treatment plan?
3. Solumedrol 2 mg/kg is ordered for a child weighing 72 lb. Solumedrol is available as 125 mg/2 mL. How many milliliters must the nurse administer?
4. The physician’s order states, “Amoxil 300 mg po q12h” for a child weighing 40 lb. Amoxil is available on hand as 125 mg/5 mL. The recommended oral dosage is 25-50 mg/kg for 24 hours.
   a) What is the child’s weight in kilograms?
   b) What is the safe single-dose range for this child?
   c) How many milliliters will you give to the child per individual dose?
5. The physician’s order asks for 300 mg ibuprofen. The patient weighs 55 lb. The bottle states that the recommended dose for ibuprofen is 5 – 10 mg/kg/dose every 6 hours. You have ibuprofen on hand as 100 mg/5 mL.
   a) What is the safe single-dose range for this child?
   b) Is the ordered amount within the safe range?
   c) How much medication will you give to the patient at one time?
6. The physician orders amoxicillin 500 mg PO q6h for a child weighing 36 lb. Amoxicillin is available in 250 mg capsules. The medication label states that the recommended daily oral dosage is 15 – 50 mg/kg/24 h in divided doses every six hours.
   a) What is the safe single-dose range for this child?
   b) Is the ordered amount within the safe range?
   c) How much medication will you give to the patient at one time?
7. The physician orders morphine sulfate 1.2 mg IV q4h for pain. You have morphine sulfate available on hand as 0.5 mg/mL. The child weighs 23 lb. The recommended single dose is 0.1 to 0.2 mg/kg q4h.
   a) What is the safe single-dose range for this child?
   b) Is the ordered amount within the safe range?
   c) How much medication will you draw up and add to the IV at one time?
8. The physician orders 200 mL D₅LR over 3 hours for a child weighing 33 lb. At what flow rate (mL/h) should the IV pump be set?

Answers:
1. 1.2 mg
2. a) 14 mL b) 420 mL
3. 1 mL
4. a) 18.18 kg b) 455–909 mg c) 12 mL
5. a) 125–250 mg b) no c) Do not give medication as it is outside the safe range.
6. a) 245–818 mg b) yes c) 2 capsules
7. a) 1–2 mg b) yes d) 2.4 mL
8. 67 mL/h