**Parenteral Dosage Calculations**

**PNUR 145 – Week 9**

Parenteral dosages are used for medications that enter the body through a route other than the gastro-intestinal tract. The medications are administered by a subcutaneous, intramuscular or intradermal injection using a syringe. The medications may also be given through IV. Parenteral medications come in liquid form.

To calculate parenteral dosages, we use the same formula as before:

\[
\frac{D}{H} \times Q = X
\]

- **D** = desired dose
- **H** = dose on hand
- **Q** = quantity (this is usually in mL for parenteral medications)
- **X** = amount to be drawn into a syringe and given to the patient

**Tips for Calculations:**

- Make sure that all measurements are in the **same units**. If necessary, convert to the unit on hand.
- Try to reduce the numbers in the \( \frac{D}{H} \times Q \) part of the formula **before** performing the division or multiplication. Remember that any number on the “top” (i.e. the D or the Q) can be reduced with any number on the bottom (i.e. the H).
- You can get rid of decimals in the \( \frac{D}{H} \) by multiplying **both** the top and bottom by the same multiple of 10.
- Always check for a **reasonable answer**. Does the calculated amount make sense?
**Example:**
The physician orders erythromycin 0.4 g IV today. The drug is supplied in vials containing 500 mg/10 mL. How many milliliters of the drug should you prepare to be given to the patient?

| Givens:                        | D = 0.4 g  
|                               | H = 500 mg  
|                               | Q = 10 mL   |
| Need to know (specify unit):   | X = Number of milliliters that should be prepared. |
| Math tools:                   | We notice that the dosage on hand is in milligrams while the dosage ordered is in grams. Therefore, we should convert the 0.4 g into milligrams first. Then we can use our formula: $$\frac{D}{H} \times V = X$$ |
| Solution:                     | Step 1: Unit conversion.  
|                               | 0.4 g $\times \frac{1000 \text{ mg}}{1 \text{ g}} = 400 \text{ mg}$  
|                               | Step 2: Dosage calculation.  
|                               | $$x = \frac{D}{H} \times Q$$  
|                               | $$x = \frac{400 \text{ mg}}{500 \text{ mg}} \times 10 \text{ mL}$$  
|                               | $$x = \frac{4}{5} \times 10 \text{ mL}$$  
|                               | $$x = \frac{40}{5} \text{ mL}$$  
|                               | $$x = 8 \text{ mL}$$  

Therefore, the nurse should prepare 8 mL of erythromycin to be given to the patient through IV.
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**Practice Exercises:**

Calculate the appropriate parenteral dosage.

1. **Order:** Kefzol 500 mg q6h  
   **Have:** Kefzol 225 mg/mL  
   **Give:** __________________

2. **Order:** Bretylium 0.08 g IV  
   **Have:** Bretylium 50 mg/mL  
   **Give:** __________________

3. **Order:** Phenergen 25 mg  
   **Have:** Phenergen 50 mg/5mL  
   **Give:** __________________

4. **Order:** Heparin 500 units  
   **Have:** 1000 units per milliliter  
   **Give:** __________________

5. **Order:** Heparin 1500 units  
   **Have:** Heparin 1000 units/2mL  
   **Give:** __________________

6. **Order:** Penicillin G 100 000 units  
   **Have:** 1 000 000 units/5 mL  
   **Give:** __________________

7. **Order:** 125 mcg IM daily  
   **Have:** 2.5 mg/5 mL  
   **Give:** __________________
8. The order says “erythromycin suspension 500 mg PO q6h”. The supply on hand is erythromycin 200 mg/5 mL. How many milliliters of medication should be given to the patient per dose?

9. The doctor orders “valporic acid 0.02 g PO TID.” The bottle of valporic acid on hand says 25 mg/5mL. How milliliters should be given per dose and in one day?

10. The physician ordered “penicillin V potassium 400 000 units PO QID”. You have penicillin V potassium 200 000 units/5 mL. How many milliliters should be given to the patient per dose and in one day?

Answers:

1. 2.2 mL
2. 1.6 mL
3. 2.5 mL
4. 0.5 mL
5. 3 mL
6. 0.5 mL
7. 0.25 mL
8. 12.5 mL
9. 4 mL per dose, 12 mL daily.
10. 10 mL per dose, 40 mL daily.