

IV MEDICATION CALCULATION FORMULAS

Review HESI for additional mathematical conversions such as ratio or dimensional analysis.

Conversion Steps:

1. Convert weight:
 - a. Pounds to kg: Divide pounds by 2.2 kg
2. Convert medication: Multiply by 1000
 - a. grams to mg
 - i. 1 gram X 1000 = 1000 mg
 - b. mg to mcg
 - i. 1 mg X 1000 = 1000 mcg
3. Convert medication concentration:
$$\frac{\text{Amount of medication in solution (gram, mg, mcg)}}{\text{Volume of solution (mL, liters)}}$$
4. Use desired mathematical conversions (ratio, equation, dimensional analysis)

Configuration to find drops per minute (gtt/min)

1. Figure drops per minute (gtt/min) based on drop factor tubing:
 - a.
$$\text{gtt/min} = \frac{\text{total volume (mL)} \times \text{drop factor (gtt/mL)}}{\text{total time (minutes/hr)}}$$
2. Figure drops per minute if an infusion rate is given:
 - a.
$$\text{gtt/min} = \frac{\text{infusion rate (mL/hr)} \times \text{drop factor (gtt/mL)}}{\text{total time (minutes/hr)}}$$

Configuration to find mg/hr or units/hr (insulin or heparin drips)

- Follow the conversion steps listed above.
1. Calculate the medication concentration.
 2. Formula:
$$\text{mL/hr} = \frac{\text{medication dose (mg/hr or units/hr)}}{\text{medication concentration (mg/mL or units/mL)}}$$

Configuration to find mcg/kg/min with known infusion rate.

- Follow the conversion steps listed above.
 - If a weight is not given, leave it out of the equation. Basically mcg/min.
1.
$$\text{mcg/kg/min} = \frac{\text{med concentration (mcg/mL)} \times \text{infusion rate (mL/hr)}}{\text{weight (kg)} \times 60 \text{ (min/hr)}}$$
 2.
$$\text{mcg/min} = \frac{\text{med concentration (mcg/mL)} \times \text{infusion rate (mL/hr)}}{60 \text{ (min/hr)}}$$

Configuration to find infusion rate for ordered mcg/kg/hr or mcg/min.

- Follow the conversion steps listed above.
 - If a weight is not given, leave it out of the equation.
1. mcg/kg/min to find mL/hr: Used when you know the patient weight.
 - a.
$$\frac{\text{weight (kg)} \times \text{medication dosage (mcg/kg/min)} \times 60 \text{ (min/hr)}}{\text{medication concentration (mcg/mL)}}$$
 2. mcg/min to find mL/hr: Used when you do not have a patient weight.
 - a.
$$\frac{\text{medication dosage (mcg/min)} \times 60 \text{ (min/hr)}}{\text{medication concentration (mcg/mL)}}$$