

Infusion Rates

● SKILL SNAPSHOT

Purpose

- Calculates and programs the prescribed volume or medication dose over the correct time.

When to use

- Any continuous, intermittent, weight-based, gravity, or pump-controlled IV infusion.

Supplies needed

- Order/MAR; concentration and bag volume; patient weight in kg; calculator; smart pump/drug library; tubing drop factor for gravity.

● PREP + PATIENT SETUP

- Verify order units, concentration, total volume, time, dose limits, weight, renal/hepatic factors, and line restrictions.
- Use only a current measured weight in kilograms for weight-based dosing.

● VAULT TIP

- Keep units attached to every number. If the final unit is not the unit ordered, the setup is wrong.

● STEP-BY-STEP

1. Identify what the order asks: mL/hr, dose/time, dose/kg/time, total volume over time, or drops/min.
2. Standardize units before calculating. Convert hours/minutes, mg/mcg, and lb/kg explicitly.
3. For volume over time: $\text{mL/hr} = \text{total mL} \div \text{hours}$.
4. For gravity tubing: $\text{drops/min} = \text{mL} \times \text{tubing drop factor} \div \text{minutes}$; round to a whole drop per policy.
5. For dose-based infusion: determine concentration first, such as mg/mL or mcg/mL.
6. Calculate required dose per time, including weight when ordered, then divide by concentration to obtain mL/time.
7. Use dimensional analysis and write units through every step; the unwanted units must cancel.
8. Estimate whether the answer is clinically reasonable. Compare with standard range, maximum, and previous rate.
9. Have a qualified clinician independently calculate high-alert, pediatric, vasoactive, insulin, heparin, or other policy-defined infusions.
10. At bedside, verify patient, drug, concentration, route/lumen, and line compatibility.
11. Program smart pump using correct care area and drug-library entry. Enter dose, concentration, weight, rate, and VTBI exactly.
12. Trace line from bag to patient; compare pump screen with order before START.
13. Recalculate after any concentration, weight, unit, or bag-size change. Monitor response and remaining volume.

● SAFETY REMINDERS

- Never mix pounds and kilograms or mg and mcg.
- Do not bypass smart-pump limits without resolving the reason.
- A correct calculation can still be unsafe if concentration or patient is wrong.
- High-alert rates require independent verification.

● COMMON MISTAKES

- Using minutes as hours.
- Calculating before finding concentration.
- Wrong weight or unit conversion.
- Programming rate in the VTBI field.

● DOCUMENTATION

- Solution/drug and concentration.
- Calculation inputs and verified rate.
- Pump settings, VTBI, route/lumen.
- Independent check when required.
- Patient response and rate changes.