



## Dosage Calculations VI – Introduction to IV

### FLOW RATES

If a certain amount of liquid (drug) has to be administered by IV over a set time period, it is important to know the IV flow rate to program the pump to infuse. IV flow rate is given in either  $\text{mL}/\text{hour}$  or  $\text{mL}/\text{min}$  most commonly. The equation for flow rate is:

$$\text{flow rate} = \frac{\text{volume}}{\text{time}}$$

This equation can be remembered by comparing it to the units  $\text{mL}/\text{hour}$  and  $\text{mL}/\text{min}$ : both are a unit of volume divided by a unit of time.

When an IV has to be regulated or adjusted manually, we need to use the drop rate (or drip rate), which is expressed in  $\text{gtt}/\text{min}$ . To calculate the drop rate we must know the volume to be administered, the drop factor of the IV set (given in  $\text{gtt}/\text{mL}$  or  $\text{gtt}/\text{cc}$ ), and the time in minutes over which the drug is to be administered. (The abbreviation *gtt* is from the Latin *guttae*, which means “drops”.) It is not possible to administer a fraction of a drop, so round answers for these problems up or down to the nearest whole number.

$$\text{drop rate} = \frac{\text{volume} \times \text{drop factor of IV set}}{\text{period of time}}$$

Note that the equation for drop rate can also be expressed as flow rate times drop factor.

\*\*\* Micro drip IV tubing has a drop factor of  $60 \text{ gtt}/\text{cc}$  and macro drip IV tubing has a drop factor of 10, 15 or  $20 \text{ gtt}/\text{cc}$ .

### Calculate the correct rates.

- 1) Order: Infuse 1000 ml NS solution over 4 hours. Calculate the IV pump flow rate.
- 2) Administer doxycycline hyclate 100 mg IVPB mixed in 50 ml NS over 45 minutes. Calculate the IV flow rate.
- 3) Order: Infuse two liters of IV fluid every 10 hours. At what rate would the IV pump be set?



- 4) The loading dose is to be administered over 3 minutes. The available loading dose is a 50 mL IVPB. At what rate should the IVPB be infused?
- 5) Calculate the drip rate for 200 mL of saline solution to be given over 30 minutes with a delivery rate of 15 gtt/mL.
- 6) Calculate the IV drip rate for 300 mL of 0.9% NaCl IV over 120 minutes. The drop factor is 20 gtt/mL.
- 7) Calculate the drip rate for 400 mls of blood to be given over 4 hours with an IV set delivering 20 gtt/mL.
- 8) You need to administer 100 mls of IV Fluids over 2 hours. The drop factor is 15. What is the required rate in gtt/min?
- 9) Calculate the drip rate for 3 litres of IV Fluids to be given over seven and a half hours by an IV set delivering 10 gtt/mL.

Help us to make this worksheet better!

If there are other types of questions you'd like more practice with, let us know! Tell us in the Learning Centre, or email us at [lifesciencetutor@vcc.ca](mailto:lifesciencetutor@vcc.ca). Include an example of the kinds of problems you'd like to see.

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## SOLUTIONS

(1) 4 ml/min or 250 ml/hr (2) 1 ml/min (3) 200 ml/hr (4) 17 ml/min (5) 100 gtt/min  
(6) 50 gtt/min (7) 33 gtt/min (8) 13 gtt/min (9) 67 gtt/min

