

Drug calculations is an essential skill all nurses and healthcare practitioners need. The only way to get good at it is through practice. Administration of medications is a major component of the registered nurse's role within all clinical setting. Therefore, this critical skill is required by nurses to ensure patient safety and reduce drug administration errors. This skill involves performing tasks such as calculating a drug dose, infusion rates, concentration and safely and accurately

Drug calculations for health professionals

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Oral tablets

$$\text{Dose Required} = \frac{\text{Strength Required}}{\text{Strength in Stock}}$$

Liquids, Mixtures and Solutions

$$\text{Volume Required} = \frac{\text{Strength Required}}{\text{Strength in Stock}} \times \text{Volume of Stock Solution}$$

I.V. Rate when asked to infuse over (x) hours

$$\text{Rate (ml/hr)} = \frac{\text{Volume (mls)}}{\text{Time (hours)}}$$

I.V. Rate when asked to infuse over (x) minutes

$$\text{Rate (ml/hr)} = \frac{\text{Volume (mls)} \times 60}{\text{Time (minutes)}}$$

I.V infusions using drip rates

$$\text{Rate (drops/min)} = \frac{\text{Volume (mls)} \times \text{Drop factor}}{\text{Time (minutes)}}$$

Concentration of a solution

$$\text{Concentration (mg/ml)} = \frac{\text{Amount of drug (mg)}}{\text{Volume (ml)}}$$

PRACTICE DRUG CALCULATIONS

Questions

Part 1: Conversions, orals and solutions

Question 1

Convert the following:

- (a) 0.75 g to mg
- (b) 0.044 Litre to mls
- (c) 1385 micrograms to mg
- (d) 632 mg to grams
- (e) 280 micrograms to mg

Question 2

A patient is prescribed 0.125 mg of digoxin orally once daily. How many tablets should you give?

(Stock strength = digoxin 62.5 microgram)

Question 3

A patient is prescribed insulin 22 units subcutaneously. How many mls should you give?

(Stock strength = 10 mL vial of 100 units in 1 mL)

Question 4

You have a stock vial of Tobramycin (80 mg in 3 mL) and need to draw up a dose of 320 mg for your patient. How many mls should you draw up to give this patient?

Question 5

You are required to administer 180 mg hydrocortisone intravenously, how many mls should you give?

(Stock strength = hydrocortisone 100 mg in 2 mL)

Question 6

To administer heparin 2500 units, how many mls is required?

(Stock strength = heparin 5000 units in 0.2 mL)

Question 7

A patient is prescribed pantoprazole 40 mg once daily in the morning for 5 days.

- a) How many tablets should you give the patient every morning?
- b) What is the total number of 5 mg tablets required to complete the course?

(Stock strength = pantoprazole 20 mg tablets)

Part 2: IV Rate, Drip Rates and Concentration

Calculate the infusion rate in drops per minute for the following drug orders

Volume	Time to be administered (hrs)	Drop factor	Rate (drop/min)
500	2	20	
1500	8	60	
800	5	60	
1000	8	20	
140	1	15	

Calculate the infusion rate in mls /hr for the following drug orders

Volume (ml)	Time to be administered	Rate (ml/hr)
150	2.5 hr	
220	30 minutes	
800	5hrs	
360	40 minutes	
140	27 mins	

Calculate the concentration of the following drug

Name of drug	Amount in vial	Volume of diluent (ml)	Concentration (mg/ml)
Ceftriaxone	2g	100	
Piperacillin and Tazobactam	4.5g	100	
Vancomycin	2.4 g	250	
Flucloxacillin	1g	40	
Pantoprazole	40 mg	10	

REFLECTION

Date:

What I learned from this drug calculation activity

How will I apply knowledge learnt to my clinical practice