PRACTICE DRUG CALCULATIONS – SECTION 1

Questions		Answers
1	Convert the following: (a) 0.05 g to mg (b) 0.025 Litre to mLs (c) 1575 micrograms to mg (d) 750 mg to grams	
2	A patient is prescribed 0.25 mg of digoxin orally once daily. How many tablets should you give? (Stock = digoxin 250 microgram tablets)	
3	A patient is prescribed insulin 22 units subcutaneously. How many mLs should you give? (Stock = 10 mL vial of 100 units in 1 mL)	
4	You draw up 10 mL of 2 % lidocaine in a syringe. How many mg of lidocaine is there in 10 mL?	
5	You have a stock vial of diclofenac (75 mg in 3 mL) and need to draw up a dose of 50 mg for your patient. How many mLs should you draw up to give this dose?	
6	A patient weighing 60 kg is prescribed intravenous dopamine 4 micrograms/kg/minute. Calculate the infusion rate in mLs/hour. (Stock = dopamine 200 mg in 50 mL glucose 5%)	
7	What is the total daily dose in mg, when drug B is prescribed to an adult weighing 75 kg at dose of 40 micrograms/kg/day in 3 divided doses?	

8	How many mg is required for a single dose in Q7 above?	
9	To administer 500 micrograms of adrenaline intravenously, how many mLs should you give? (Stock = adrenaline 10 mL solution of 1 in 10 000)	
10	To administer 400 micrograms of folic acid syrup orally, how many mLs should you give? (Stock = folic acid 2.5 mg in 5 mLs)	
11	If you want to administer 3 mg / kg of 1 % lidocaine to a 72 kg man, how many mLs should you give?	
12	To prepare 62.5 micrograms of digoxin for intravenous administration, how many mLs should you give? (Stock = digoxin 500 micrograms in 2 mL)	
13	You are required to administer 150 mg hydrocortisone intravenously, how many mLs should you give? (Stock = hydrocortisone 100 mg in 2 mL)	
14	To administer heparin 3500 units, how many mLs is required? (Stock = heparin 5000 units in 1 mL)	
15	A child weighing 19 kg requires 400 micrograms/kg of adrenaline 1 in 1000 for nebulisation with a maximum dose of 5 mg. a) What dose should be prescribed for this child? b) How many mLs of adrenaline is required?	

16	A patient weighing 65 kg is prescribed intravenous aminophylline 500 micrograms/kg/hour. Calculate the infusion rate in mLs/hour. (Stock = aminophylline 500 mg in 500 mL sodium chloride 0.9%)	
17	A patient weighing 75 kg is prescribed intravenous phenytoin 1500 mg. Over how many minutes can you give the infusion over so that the maximum rate of 50 mg/minute is achieved?	
18	A patient weighing 80 kg is prescribed subcutaneous tinzaparin 175 units/kg once daily. How many mLs should be administered to the patient? (Stock = tinzaparin 20 000 units in 2 mL)	
19	A patient is prescribed prednisolone 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 = prednisolone 5 mg tablets)	
20	You are required to administer 8 mmols of magnesium sulphate intravenously. How many mLs of magnesium sulphate should you draw up for further dilution? (Stock = magnesium sulphate 5 g in 10 mLs; where 1 g = 4 mmols of magnesium)	

ANSWERS TO QUESTIONS IN SECTION 1

1	(a) 50 mg 0.05 g X 1000 = 50 mg (b) 25 mLs 0.025 L X 1000 = 25 mLs (c) 1.575 mg 1575 micrograms ÷ 1000 = 1.575 mg (d) 0.75 g 750 mg ÷ 1000 = 0.75 g
2	One tablet NB The correct way of writing the dose on the drug chart is 250 micrograms
3	0.22 mL (22 units ÷ 100 units) X 1 mL = 0.22 mL
4	200 mg 2 % = 2 g lidocaine in 100 mL Therefore 0.2 g in 10 mL 0.2 g X 1000 = 200 mg
5	2 mL (50 mg ÷ 75 mg) X 3 = 2 mL
6	3.6 mL/hour 60 kg X 4 micrograms= 240 micrograms/min To convert to micrograms/hour: 240 micrograms X 60 = 14 400 micrograms/hour To convert to mg/hour: 14 400 micrograms ÷ 1000 = 14.4 mg/hour To convert to mLs/hour:

	(14.4 mg ÷ 200 mg) X 50 mL = 3.6 mL/hour
7	3 mg 75 kg X 40 micrograms = 3000 micrograms which is equal to 3 mg
8	1 mg 3 mg per day ÷ 3 doses = 1 mg
9	5 mL 1 in 10 000 = 1 in 10 000 = 1 g in 10 000 mLs, which is the same as: 1000 mg in 10 000 mLs = 1 mg in 10 mLs Convert this to micrograms: 1 mg in 10 mLs = 1000 micrograms in 10 mLs Therefore (500 micrograms ÷ 1000 micrograms) X 10 mLs = 5 mLs
10	0.8 mL 2.5 mg in 5 mLs = 2500 micrograms in 5 mL (400 micrograms ÷ 2500 micrograms) X 5 mL = 0.8 mL
11	21.6 mLs 3 mg X 72 kg = 216 mg 1 % = 1 g in 100 mLs = 1000 mg in 100 mLs (216 mg ÷ 1000 mg) X 100 mLs = 21.6 mLs
12	0.25 mL (62.5 micrograms ÷ 500 micrograms) X 2 mL = 0.25 mL
13	3 mL (150 mg ÷ 100 mg) X 2 mL = 3 mL
14	0.7 mL (3500 units ÷ 5000 units) X 1 mL = 0.7 mL

15	a) 5 mg b) 5 mL a) 400 microgram X 19 kg = 7600 micrograms which is equivalent to 7.6 mg; however maximum dose is 5 mg. b) 1 in 1000 = 1 g in 1000 mL Equivalent to 1000 mg in 1000 mL (5 mg ÷ 1000 mg) X 1000 mL = 5 mL
16	32.5 mL / hour 500 micrograms X 65 kg = 32 500 micrograms/hour = 32.5 mg/hour (32.5 mg ÷ 500 mg) X 500 mL = 32.5 mL/hour
17	30 minutes To give 1500 mg at a maximum rate of 50 mg/minute: 1500 mg ÷ 50 mg = 30 minutes
18	1.4 mL 175 units X 80 kg = 14 000 units (14 000 units ÷ 20 000 units) X 2 mL = 1.4 mL
19	a) 8 tablets 40 mg ÷ 5 mg = 8 b) 40 tablets 8 x 5 = 40
20	4 mLs 1 g = 4 mmols therefore 2 g = 8 mmols (2 g ÷ 5 g) X 10 mL = 4 mLs

PRACTICE DRUG CALCULATIONS – SECTION 2

Questions		Answers
1	What does IV adrenaline 1 in 10 000 represent? Express in milligrams and millilitres?	
2	What dose of enoxaparin is required to treat a deep vein thrombosis for a patient weighing 74 kg with normal renal function? Write your answer to the nearest 10 mg. (BNF dose 1.5 mg/kg subcutaneously every 24 hours)	
3	The dietician asks you to calculate how many kcals a patient has received via IV fluids. So far today, 2 L of 5% glucose has been administered to the patient. (Each gram of glucose represents 4 kcal)	
4	What is the dose of lidocaine in millilitres using 1 % lidocaine and 2 % lidocaine for a patient requiring 186 mg for local anaesthesia?	1% 2%
5	A 7-year-old child is prescribed IV aciclovir for the treatment of herpes simplex at a dose of 250 mg/m^2 every 8 hours. How many mg is required for a single dose? (Weight = 25 kg and height = 1.24 m) To ascertain body surface area (m^2) click on the following link: https://bnfc.nice.org.uk/guidance/body-surface-area-in-children-image.html	

6	How would you express 5 000 000 micrograms in milligrams?	
7	A 26-year-old patient is diagnosed with diabetic ketoacidosis and you wish to start a fixed rate intravenous insulin infusion at 0.1 units/kg/hr, as per Trust policy. How much insulin per hour will you prescribe for an 85 kg patient?	
8	A patient is prescribed morphine 7.5 mg IV. How many mLs needs to be drawn up into a syringe, if the morphine ampoule contains 2 mL of 10 mg/mL?	
9	You prescribe 1 litre 0.9% sodium chloride over 8 hours. How many millilitres per hour is this equivalent to?	
10	A patient requires an IV infusion of glyceryl trinitrate (GTN) at a rate of 100 micrograms/minute. You only have three ampoules of GTN. How many hours would an infusion using these three ampoules last for? (Stock = GTN ampoules of 10 mg/10 mL)	

ANSWERS TO QUESTIONS IN SECTION 2

1	1000 mg in 10 000 mL 1 in 10 000 = 1 g in 10 000 mL Convert this to mg 1 g X 1000 = 1000 mg in 10 000 mL NB This can be simplified to 1 mg in 10 mL
2	110 mg 1.5 mg X 74 kg = 111 mg 110 mg to the nearest 10 mg
3	400 kcal 5% Glucose = 5 g in 100 mL Therefore 2 litres contain 2 Litres = 2000 mL (2000 mL ÷ 100 mL) X 5 g = 100 g 100 g X 4 kcal = 400 kcal
4	Lidocaine 1 % = 18.6 mL Lidocaine 1% = 1 g in 100 mL = 1000 mg in 100 mL (186 mg ÷ 1000 mg) X 100 mL = 18.6 mL Lidocaine 2% = 9.3 mL Lidocaine 2% = 2 g in 100 mL = 2000 mg in 100 mL (186 mg ÷ 2000 mg) X 100 mL = 9.3 mL
5	230 mg Body surface area for a child weighing 25 kg is 0.92 m^2 (see BNF) 250 mg X 0.92 m^2 = 230 mg

6	5000 mg To convert to mg 5 000 000 micrograms ÷ 1000 = 5000 mg
7	8.5 units per hour 0.1 units / kg / hr = 0.1 units X 85 kg = 8.5 units / hour
8	0.75 mL (7.5 mg ÷ 10 mg) X 1 mL = 0.75 mL
9	125mL / hour 1 Litre = 1000 mL 1000 mL ÷ 8 hours = 125 mL / hour
10	5 hours 1 ampoule = 10 mg in 10 mL 3 ampoules = 30 mg in 30 mL Convert this to micrograms 30 mg X 1000 = 30 000 micrograms at a rate of 100 micrograms/minute therefore 30 000 micrograms ÷ 100 micrograms = 300 minutes Convert to hours 300 minutes ÷ 60 minutes = 5 hours

Adapted from calculations questions clinical skills lab Whipp's Cross Hospital 2003 by J Hewitt and Dr E Tsarfati 2013. Additional questions and review by H Walker and S Lau.

Additional questions reviewed and updated by Uzma Shaikh and Thanam Ravagan in June 2020.

REFLECTIVE RECORD

Reflections from prescribing exercise

Date

What I learned from this activity:

Am I going to change anything as a result of this session? / How will I apply learning to my clinical practice?