Medicines Management Year 3

HS564: Exam Workshop (Calculations)

University of Essex

Contents:

ANSWERS: Available on the Numeracy Moodle Page – Section 'Year 3: Practise Your Drug Calculations – Mental Health: 24 November Workshop Resources'
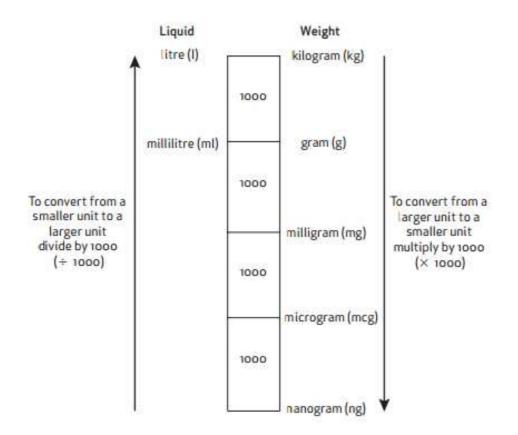
Drug calculations

N is for **Need**; **H** is for **Have**; **S** is for the **stock volume**

Put them together and you get

$$\frac{N}{H} \times \frac{S}{1} = \text{The correct dose for the patient}$$

The ladder to Successful Nursing

Liquid		Weight
litre (l)		kilogram (kg)
	1000	
millilitre (ml)		gram (g)
	1000	
		milligram (mg)
	1000	
		microgram (mcg)
	1000	
		nanogram (ng)

To convert from a smaller unit to a larger unit divide by 1000 (÷ 1000)

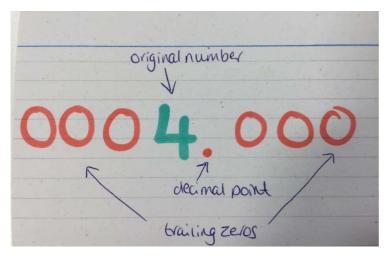To convert from a larger unit to a smaller unit multiply by 1000 (× 1000)

Unit Conversions

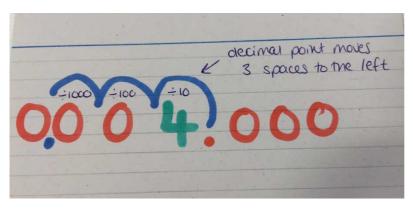### Converting a smaller unit into a larger unit

Convert 4 micrograms to milligrams

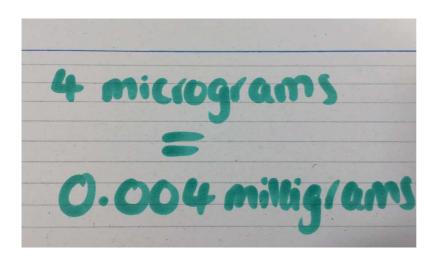1) Identify the calculation. In this case, we need to **divide** 4 by 1,000

2) Write down your original number and add the decimal point and some 'trailing zeros'.

3) Move the decimal point 3 spaces to the **left.**

4) Extract the new number. This is your answer.

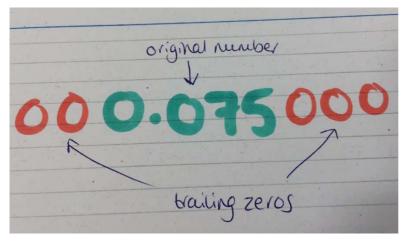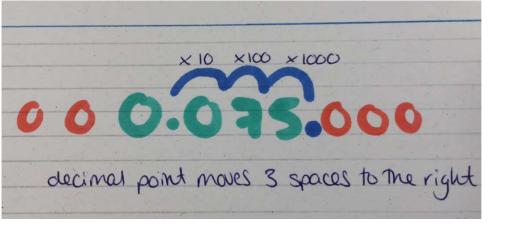**Converting a larger unit into a smaller unit**

Convert 0.075 milligrams to micrograms

1)   Identify the calculation. In this case, we need to **multiply** 0.075 by 1,000
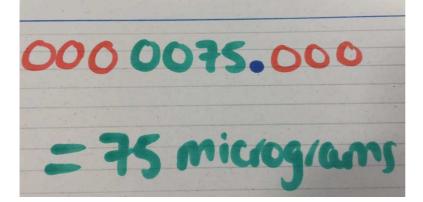
2)   Write down your original number and add the decimal point and some 'trailing zeros'

3)   Move the decimal point 3 spaces to the **right**

4)   Extract   the   new   number.   This   is   your   answer!

How to deal with the zeros

If we convert 30 micrograms to milligrams using the 'moving the decimal point' method, our written calculation will probably go through the following stages:

1) 30 micrograms

2) 00030.000 (add trailing and leading zeros)

3) 00.030 000 (move the decimal point)

4) Identify which zeros are necessary

Additional **leading zeros** – must be removed		Trailing zeros – must be removed
	00.030000	

One leading zero **before** the decimal point is **essential for numbers less**

Placeholder zero – affects the value of the 3 – ESSENTIAL!

5) Final answer: 0.03 milligrams

A final word about units…

LETTERS

We welcome all readers' letters, but reserve the right to edit them or withhold names and addresses. Please write to: **The Editor, Nursing Standard, The Heights, 59-65 Lowlands Road, Harrow-on-the-Hill, Middlesex HA1 3AW. email: letters@rcnpublishing.co.uk**

Please keep letters to a maximum of 150 words, and include your full name, address and a daytime telephone number

Drug calculations can be dangerous if units are not included in the sums

I read the first part of your series on drug calculations with interest (art&science May 14).

I always try to do drug calculations in two ways so that I can double-check my answer. This does not mean mistakes are impossible, but it does make them less likely. If a colleague calculates one way, I check using a different method, although 'the formula' is not usually one of them.

In maths and science I was always taught to include the units in any calculation. Work with units omitted would have red lines through it and comments such as: 'Is it two pigs, two grams, two litres or what?' The difference between 2g and 2mcg could be life or death, yet we frequently fail to include the units.

We should be taught, and need to remember, that the numbers only have a meaning if they relate to something.
Felicity Hall, Sheffield

Exam Guidance

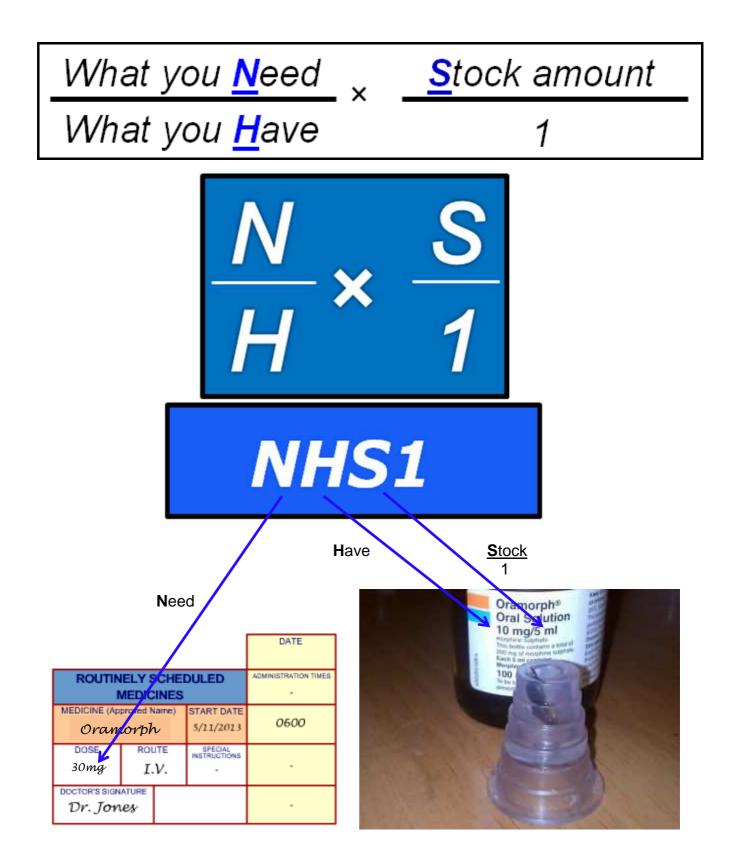**Warning!**

You must clearly state the unit of measurement in your answer. The answer of 200 would not be correct, as this does not state whether this is units, grams or sack loads of the drug! (Wright 2011:23)

N.B. Incorrect units (e.g. writing mg instead of ml) or decimal points e.g. (0,3 instead of 0.3) will lose you the whole mark for the question, even if the numerical value is correct.

A standard formula is available for calculating drug and IV medication doses. <u>You do not necessarily need to use it. However, if you do, you MUST master how to apply it.</u>

Tablets, Capsules, Liquid Medicines and Injections – NHS1

$$\frac{\text{What you } \underline{N}\text{eed}}{\text{What you } \underline{H}\text{ave}} \times \frac{\underline{S}\text{tock amount}}{1}$$

$$\frac{N}{H} \times \frac{S}{1}$$

NHS1

Need

Have

Stock
1

	DATE
ROUTINELY SCHEDULED MEDICINES	ADMINISTRATION TIMES ·
MEDICINE (Approved Name) *Oramorph*	START DATE 5/11/2013	0600
DOSE *30mg*	ROUTE *I.V.*	SPECIAL INSTRUCTIONS -	·
DOCTOR'S SIGNATURE *Dr. Jones*		·

Oramorph®
Oral Solution
10 mg/5 ml

Exam Technique: IMPORTANT!

MEDICATION CALCULATIONS
a step-by-step approach

identify purpose of question

what are you being asked to calculate (mLs, tabs, capsules)?

check the units: prescription & stock

do you need to convert?

calculate necessary

unit conversion

solve your formula/calculation

set up your **formula/calculation**

choose your strategy

NHS1, repeated addition, proportional reasoning...

think
does your answer make sense?

use a different strategy to **check your answer**

check your units

are they correct & legible?

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UNIT CONVERSIONS

1. Convert the following quantities into milligrams:

a) 0.78 grams

b) 1025 micrograms

c) 0.02 grams

d) 0.007 grams

2. Convert the following quantities into grams:

a) 3675 milligrams

b) 7 milligrams

c) 25 milligrams

d) 40 milligrams

3. Convert the following quantities into micrograms:

a) 0.25 milligrams

b) 0.625 milligrams

c) 1.03 milligrams

d) 0.5 milligrams

4. Convert the following quantities into millilitres:

a) 2.4 litres

b) 0.75 litres

c) 0.03 litres

d) 0.567 litres

5. Convert the following quantities into litres:

a) 965 millilitres

b) 4 millilitres

c) 450 millilitres

d) 600 millilitres

As you approach registration, it is important that you begin to look beyond the arithmetic of calculating medication and other prescribed substances. This includes the expectation that you will be able to identify and minimise risks to patients, clients, friends and colleagues. The interests and safety of patients and clients must always be your first consideration (University of Dundee 2010).

The Medication Calculations section of the exam will test more than your ability to use formulae to calculate dosages. You will need to be prepared to apply the principles of administering medication in accordance with the Standards for Medicines Management (NMC 2007), including deciding whether to administer a prescribed substance or not, with reasons for your decision.

TABLETS AND CAPSULES

1. Ruby needs Amitriptyline 75mg. On hand are 25mg tablets; how many do you give?

2. Mabel needs 200 milligrams of Sodium Valproate. 100 milligram tablets are available. How many tablets will you give?

3. Illia has been prescribed Disulfiram 800mg as an alcohol deterrent compound. In stock is 200mg tablets. How many tablets are required?

4. Asenapine 5mg is prescribed to treat severe manic episodes associated with bipolar; tablets available are 5mg each. How many tablets will you give?

5. A client is prescribed Trimipramine 50mg to treat depression with additional sleep disturbances as a result. In stock are 25mg tablets. How many tablets are required?

6. A client needs Amisulpride 600mg to manage symptoms of schizophrenia. 400mg scored tablets are available. How many tablets will you give?
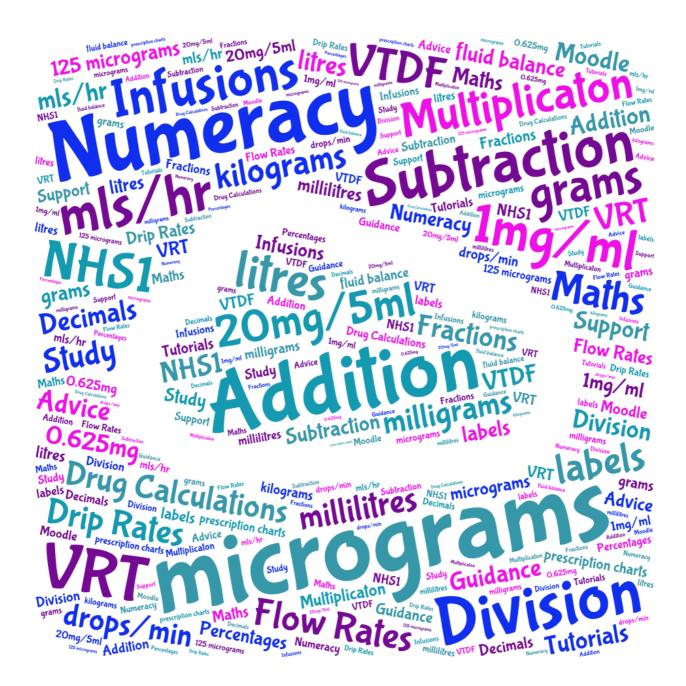
ANSWERS TO ALL QUESTIONS ARE AVAILABLE ON THE NUMERACY MOODLE PAGE IN THE SECTION 'YEAR 3: PRACTISE YOUR DRUG CALCULATIONS'

Liquid Medicines

1. Your patient has been prescribed 5mg diazepam PO. The solution available is 2mg/5ml. How many millilitres should you administer?

2. A patient requires 15mg Aripiprazole PO. The stock dose available is 1mg/ml. What volume would you administer?

3. You need to administer 600mg Amisulpride PO. The stock dose available is 100mg/ml. What volume would you give?

4. Obinze needs 150mg Promazine Hydrochloride PO.The stock dose available is 50mg/5ml. What volume would you administer?

5. Max is prescribed 12.5mg Chlorpromazine Hydrochloride PO as a liquid. The solution available is 25mg/5ml. What volume would you administer?

6. A patient needs 1.2g Sulpiride PO. The stock dose available is 200mg/5ml. What volume would you administer?

Injections

1. A patient requires 400mg Zuclopenthixol Decanoate IM. The stock dose available is 500mg/ml. What volume would you administer?

2. A patient needs 720mg of a drug. The stock drug is available in liquid form, 360mg/1mls. What volume do you administer?

3. Your patient requires 9.75mg Aripiprazole IM. The stock dose available is 7.5mg/ml. What volume would you administer?

4. Digoxin ampoules contain 0.5 milligrams in 2 ml. How much do you give if a patient is written up for 350 micrograms?

5. A client is ordered 50 milligrams of Aminophylline intravenously. 250 milligrams in 10 millilitres of liquid for IV Injection is available. How many millilitres will you administer?

Still worried? Contact me to ask about extra support and resources:

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