Week Four

1. write the desired answer unit(s) on the left
2. Enter a conversion factor that contains the desired answer unit(s)
3. Enter the given quantity and units to be converted to the right.

Example: Convert 37g to Kg.

1. write desired unit on left

$Kg =$

2. Enter conversion factor so that desired answer is at the top.

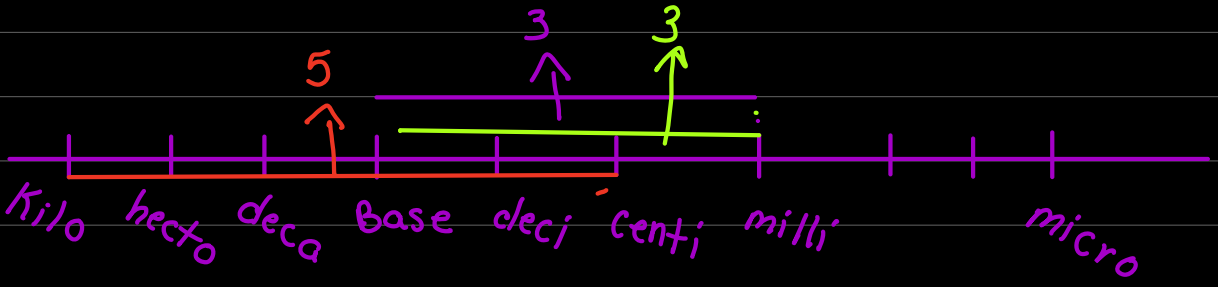
$$Kg = \frac{1\ kg}{1000\ g}$$

3. Enter the given quantity on the right.

$$Kg = \frac{1\ kg}{1000\ g} \times \frac{37\ g}{1}$$

4. Complete the multiplication by multiplying straight across.

$$Kg = \frac{1\ kg}{1000\ \cancel{g}} \times \frac{37\ \cancel{g}}{1} = \frac{37\ kg}{1000} = 0.037\ g$$



1. .700 mg
2. 1/2 L
3. 3.02568 cm

0.7 g

500 mL

0.025 68 km

.700

1/2 L = 0.500

1. ordered 0.6g PO daily
   on hand 600 mg
   > How many tablets

$0.6\,g = \frac{600}{}\,mg \qquad 0.\underbrace{600}_{3} = 1\ tablet$

when measuring liquids, the order will state (mg) to give but you WILL have to measure the dosage in (mL).

Example: Drug states its unit dosage is 100 mg per 2 mL that means every 2 mL of fluid in the bottle has 100 mg of medicine desolved in it.

- If you need 100 mg pour 2 mL
- If you need 200 mg pour 4 mL.

Example 2:

ordered: Drug A 350 mg daily. Dose concentration: 250 mg per 5 mL
Estimation: 5 mL isnt going to be enough. (only 250 mg, we need 350 mg).
If we double it to 10 mL than we have to double to 500 mg. (Thats to much)
So... good estimation is more than 5mL but less than 10 mL.

Oral syringes: 3mL to 5 mL
medicine cups: 30 mL
medication cups have calibration markings at every 5mL

ordered: diphenhydramine oral solution 15 mg po every hs
How many mL do you give?

Facts: 12.5 mg = 5 mL

$$\frac{mL}{dose} = \frac{5\ mL}{12.5\ mg} \times \frac{15\ mg}{dose} = \frac{75}{12.5}\ mL = 6\ mL\ per\ dose$$

ordered: Augmentin susp 500 mg po 4 times a day
on hand: Augmentin susp 250 mg | 5 mL

$$\frac{mL}{dose} = \frac{5\ mL}{250\ mg} \times \frac{500\ mg}{dose} = \frac{2500\ mL}{250} = 10\ mL \text{ per dose}$$

ordered: lithium citrate 6 mEq po tid
on hand: lithium citrate 8 mEq | 5 mL
How much would you give the patient?

$$\frac{mL}{dose} = \frac{5\ mL}{8\ mEq} \times \frac{6\ mEq}{dose} = \frac{30\ mL}{8} = 3.75\ mL = 3.8\ mL$$

ordered: Potassium chloride 25 mEq po daily.
on hand: 40 mEq | 15 mL
How many mL do you give? Round to the tenth.

$$\frac{mL}{dose} = \frac{15\ mL}{40\ mEq} \times \frac{25\ mEq}{dose} = \frac{375\ mL}{40} = 9.375\ mL = 9.4\ mL$$

Along with estimating doses, verifying safe dose ranges (SDR) for medications is another technique that protects patients and nurses from medication dose calculation errors.

FDA approves guidelines for safe dosages.

Ex: For adult use, 20 mg per day

Ex: Safe dosage range is 10 - 20 mg per day

Ex: SDR is 1-2 mg per kg of body weight per day.

To Calculate SDR

1. Calculate the low safe dose
2. Calculate the high safe dose
3. Evaluate the order in relation to the SDR and frequency schedule

* SDR is usually for a 24-hour day but order is written per dose.

* Frequency Schedule: The number of times at which the total daily / individual dose

4. Decision:

* Hold the medication and contact the prescriber if the order is not within the SDR or frequency.
* Give the medication because the order is within the SDR and Freq.

Example:

ordered: Drug Y, 550 mg q6h

SDR: 25-30 mg per Kg per day in 4 doses

Patients weight: 180 lb

Available: Drug Y, 0.5 g tab

1000 mg = 1 g

2.2 lb = 1 Kg

Freq matches

a) weight in Kg

$$Kg = \frac{1\ Kg}{2.2\ lb} \times \frac{180\ lb}{\text{weight}} = \frac{180}{2.2} = 81.8\ Kg$$

b) SDR low and high dose based on weight

Low:

$$\frac{mg}{day} = \frac{25\ mg}{Kg \times day} \times \frac{81.8\ Kg}{1} = \frac{2,045}{day} \simeq 2,045\ mg\ per\ day$$

high:

$$\frac{mg}{day} = \frac{30\ mg}{Kg \times day} \times \frac{81.8\ Kg}{1} = 2,454\ mg\ per\ day$$

c) daily dose ordered

500 mg x 4 doses a day = 2200 mg per day

e) Is the order safe?

Low: 2,045 mg

High: 2,454 mg

> 2,200 mg ordered

Yes it is safe

f) How many mL will you give?

$$mL = 2\ mL \times 550\ mg = 1100\ mL = 22\ mL\ per\ dose.$$

dose 50mg/ dose 50

Exercise 1:

ordered: Drug Y, 200 mg bid for a child that weighs 60 pounds.

SDR: 5-10 mg per day in 2-3 divided doses. (dosage matches)

Round to 1 decimal place as needed.

KEY: 2.2 lb = 1 Kg

a) what is the childs weight in Kilograms?

$$Kg = \frac{1\ Kg}{2.2\ lb} \times \frac{60\ lb}{1} = \frac{60\ Kg}{2.2} = 27.3\ Kg$$

b) what is the min SDR for this child?

$$\text{Low: } \frac{mg}{dose} = \frac{5\ mg}{Kg \times day} \times \frac{27.3\ Kg}{1} = 136.5\ mg \text{ per dose}$$

should be mg/day

Why: Kg x day ?

c) what is the max SDR for this child?

$$\text{Max} = \frac{mg}{dose} = \frac{10\ mg}{Kg \times day} \times \frac{27.3\ kg}{1} = 273\ mg \text{ per dose}$$

d) what is the dosage ordered per day?

200 mg per dose bid (2 times daily)

200 mg X 2 = 400 mg daily.

e) Is the ordered dose safe? ordered: 400 mg per day

SDR = 5-10 mg per day in 2-3 divided doses

Low = 136.5 mg per day

High = 273 mg per day

NO this is NOT SAFE

f) If the order is safe, how many tabs would you administer?

ZERO-order is NOT SAFE!

ordered: Tylenol, 0.5 g q6h

SDR: 10-15 mg per Kg q6h → times match

Patient Weighs: 24 Kg

Key: 2.2 lb = 1 Kg

1000 mg = 1 g

q6h = 4x in 24 hrs (1 day)

a) what is the weight in Kg?

24 Kg (given to us in description)

b) what is the SDR?

Low: $\frac{mg}{day} = \frac{10\ mg}{Kg} \times \frac{24\ Kg}{1} \times \frac{4}{1\ day} = 960\ mg\ per\ day$

High: $\frac{mg}{day} = \frac{15\ mg}{Kg} \times \frac{24\ Kg}{1} \times \frac{4}{1\ day} = 1440\ mg\ per\ day$

c) what is the dosage per day in mg?

0.5 g x 4 a day = 2 g per day

$mg = \frac{1000\ mg}{1\ g} \times \frac{2\ g}{1} = 2000\ mg\ per\ day$

d) Is the ordered dosage within SDR?

ordered: 0.5 g q6h = 2000 mg day

Low: 960 mg per day

High: 1440 mg per day

NO THIS IS NOT SAFE

order: Drug X, 50 mg q4h for a patient that weighs 72.7 Kg

SDR: 3-7 mg per day in 4-6 divided doses → times match

What is the Safe Dosage Range?

Low: $\frac{mg}{day} = \frac{3\ mg}{Kg \times day} \times \frac{72.7\ Kg}{1} = 218.1\ mg\ per\ day$

High: $\frac{mg}{day} = \frac{7\ mg}{Kg \times day} \times \frac{72.7\ Kg}{1} = 508.9\ mg\ per\ day$