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## Welcome to Drug Calculations for Nurses

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Please Register this software!

Click on an under-lined word for help on a topic



## Customising

Selecting [Change General Settings](#) from the tool bar opens a screen which enables the user to change features of the program.

Selecting [Change Drug Categories](#) presents a list of categories of drugs which may be selected for use in the construction of tablet and fluid questions.

New drugs and even sets of questions may be introduced to the program with the accompanying program Teachers Tools. Teachers Tools provides access to the drug database which is used for constructing questions. Drugs may be added, deleted, changed or re-categorised. A utility allow the user to create tests using the question generator or simply by typing their own. These can be included in the menu of the Drug Calculations For Nurses program or saved as text files with optional answer keys and solutions. The test may then be formatted using any word processor.

## General Settings:

### Question Construction

A 'tick' will appear in the check box if the option is enabled:

#### Use all metric units for metric conversion:

If unchecked only units, milliunits and microunits are used in the construction of metric conversion questions (these appear to be the most common units used in drug calculations). Various other units are used if this option is checked.

#### Use abbreviations for metric units:

If checked metric abbreviations e.g. 'ml' are used in tablet and fluid questions instead of prefixes e.g. 'millilitre'.

#### Use Generic and trade names for drugs:

If checked both generic and trade names may be used in tablet and fluid drug questions. If unchecked only generic names are used.

## Saving options

The options chosen may be saved or just used for the current session. If at any time the user is unhappy with the selection then 'Restore default' will return values to the original values. The screen can be closed with no changes made, by clicking the terminate button on the top right hand side of the window.



## Calculating Flow Rates

Intravenous fluid must be given at a specific rate, neither too fast nor too slow. The specific rate may be measured as ml/hour, L/hour or drops/min. To control or adjust the flow rate only drops per minute are used.

The burette contains a needle or plastic dropper which gives the number of drops per ml (the drop factor). A number of different drop factors are available (determined by the length and diameter of the needle).

Common drop factors are:

10 drops/ml (blood set), 15 drops / ml (regular set), 60 drops / ml (microdrop).

To measure the rate we must know:

- (a) the number of drops
- (b) time in minutes.

The formula for working out flow rates is:

$$\frac{\text{volume (ml)} \times \text{drop factor (drops/ml)}}{\text{time (min)}} = \text{drops / minute}$$

**Example:**

1500 ml IV Saline is ordered over 12 hours. Using a drop factor of 15 drops / ml, how many drops per minute need to be delivered?

$$\frac{1500 \times 15}{12 \times 60} = 31 \text{ drops per minute}$$

(12 hours = 12 X 60)



## Calculating Fluid Dosages

This formula is used to calculate the the amount of medication in solution for oral, intramuscular, intravenous or subcutaneous injection to be administered when given a doseage, stock dose and volume.

$$\frac{\text{Required Dose}}{\text{Stock Dose}} \times \frac{\text{Stock Volume}}{1} = \text{Volume to be given}$$

**N.B. Units for required dose and stock dose must be the same.**

### **Example 1:**

A client is ordered 15mg of stemetil. You have 2ml of solution on hand which contains 25 mg Stemetil. What volume of solution would you give?

$$\frac{15 \text{ mg}}{25 \text{ mg}} \times \frac{2}{1} = \frac{30}{25} = \frac{6}{5} = 1.2 \text{ ml}$$

### **Example 2:**

A dose of 75 mg of pethidine has been ordered. It is available in ampoules containing 100 mg in 2 ml. What volume must be administered?

$$\frac{75 \text{ mg}}{100 \text{ mg}} \times \frac{2}{1} = \frac{150}{100} = 1.5 \text{ ml}$$



## Metric Conversions

There are many occasions when it is necessary to convert one unit of measurement to another when undertaking drug calculations.

The metric system is based on a number of basic measures or units e.g.

| <u>Quantity</u> | <u>Unit</u> | <u>Symbol</u> |
|-----------------|-------------|---------------|
| Length          | metre       | m             |
| Mass            | gram        | g             |
| Volume          | litre       | l             |
| Time            | second      | s             |

Large and small quantities of these units often have a prefix to make writing quantities more compact for example 0.000001g may be written as 1 mcg or 1 $\mu$ g.

Some common units of measurement are:

| <u>Prefix</u> | <u>symbol</u> | <u>multiplication factor</u> |
|---------------|---------------|------------------------------|
| mega          | M             | 1,000,000                    |
| kilo          | k             | 1000                         |
| hecto         | h             | 100                          |
| deka          | da            | 10                           |
| Unit          |               | 1                            |
| deci          | d             | 0.1                          |
| centi         | c             | 0.01                         |
| milli         | m             | 0.001                        |
| micro         | mc or $\mu$   | 0.000001                     |

Converting a number from one metric unit to another involves moving the decimal place to the left or the right.

To work out how many decimal places to move:

1. Write the metric scale
2. Identify the two units in the problem
3. Count the number of units from the unit given to the unit desired
4. Move the decimal point the number of places from the given unit to the desired unit

**Example 1:**

Convert 0.1 grams to milligrams.

The decimal place is moved 3 places to the right.

Mg - - kg hg dag **g** dg cg **mg** - -  $\mu$ g

$$0.1 \text{ g} = 100 \text{ mg}$$

**Example 2:**

Convert 375 millilitres to litres.

The decimal place is moved 3 places to the left.

kl - - hl dal **l** dl cl **ml** - -  $\mu$ l

$$375 \text{ ml} = 0.375 \text{ l}$$



## Ordering and Registration

This software is shareware not freeware.

If you use and / or enjoy this software please register it.

Registration will ensure that you are not bugged by 'pesky' reminders to register. It will also enable the author to continue developing software for nurses.

### Support and enquiries:

The author welcomes enquiries and feedback about this software.

email : [rlakeman@xtra.co.nz](mailto:rlakeman@xtra.co.nz)

A WWW page will be set up in the near future.

The latest version is available from Simtel.Net:

For Windows 3.1:

Via WWW: <http://www.simtel.net/pub/simtelnet/win3/health/>

Via FTP: <ftp://ftp.simtel.net/pub/simtelnet/win3/health/>

For Windows 95:

Via WWW: <http://www.simtel.net/pub/simtelnet/win95/health/>

Via FTP: <ftp://ftp.simtel.net/pub/simtelnet/win95/health/>

### Registration costs:

**\$50 Individual user licence \***

This licence applies to individual users e.g. students.

**\$150 Site licence [\$25 per additional computer] \***

This licence applies to institutions such as hospitals, universities or polytechnics. Holders of a site licence may install this software on one machine for public access e.g. in a library. A cost of \$25 applies for each additional computer this software is installed on.

\* New Zealand Currency.

### How to register:

1. Drug Calculations for Nurses is distributed through a number of agencies:



Register with the author:  
Send cheque or money order to:

R Lakeman  
100 Duchess Cres  
HASTINGS  
New Zealand  
ph: (06) 876 2310  
email: rlakeman@xtra.co.nz

Or

If in the United Kingdom contact:  
Open Software Library  
164 Windsor Road  
Ashton-in-Makerfield  
WIGAN WN4 9ES  
ph: +44-(0)1942-7123845  
fax/BBS: +44-(0)1942-722984  
email: Info@osl.u-net.com  
WWW: <http://www.osl.u-net.com/>

3. Be to sure to include the following details with payment:
  - Registration Name (name of individual or institution - Max 35 Characters)
  - Individual or site licence (indicate number of users)
  - Return address (snail mail or email)
  - Whether you wish to be notified of updates
  
4. A unique password will be sent to you (snail mail or email) which you can enter into the password field of the registration screen. You must be sure to enter both the name and password correctly on this screen.



## Calculating Tablet Dosages

This formula is used to calculate the number of tablets to be administered when given the required dose.

$$\frac{\text{Required Dose}}{\text{Stock Dose}} = \text{Number of tablets to be given}$$

**N.B. Units for required dose and stock dose must be the same.**

### Example 1:

A client is ordered 150mg of aspirin. 300 mg aspirin tablets are available. How many tablets would you give?

$$\frac{150 \text{ mg}}{300 \text{ mg}} = 0.5 \text{ tablet}$$

### Example 2:

How many tablets containing 62.5 mcg will be required to give a dose of 0.125 mg?

#### **STEP 1 : CONVERT TO SAME UNITS**

Convert 0.125mg to mcg.

The decimal place is moved 3 places to the right.

$$\begin{array}{cccccccccccc} \text{Mg} & - & - & \text{kg} & \text{hg} & \text{dag} & \text{g} & \text{dg} & \text{cg} & \text{mg} & - & - & \mu\text{g} \\ 0.125 \text{ mg} & = & (0.125 * 1000 \text{ mcg}) & & & & & & & & & & \\ & & = & 125 \text{ mcg} & & & & & & & & & \end{array}$$

#### **STEP 2: CALCULATE**

$$\frac{125}{62.5} = 2 \text{ tablets}$$



## The Main Menu

### Selecting an exercise

Use the scroll bars to browse the menu of exercises. Use the arrow keys to scroll up and down the menu when it has focus.

A brief description of the exercise will appear below the menu.

To select an exercise, either double click the selected text with the mouse or, click the "Accept" button (Shortcut alt-A).

This version of Drug Calculations For Nurses comes with six exercises in which questions are randomly generated:

Metric Conversions

Tablet dosages

Fluid dosages

IV Flow rates

Counting IV drops

Setting an IV

Additional preset exercises may also be included. These are created with the program "Test Construction Set".

### Quitting

Click on the "Quit" button (Shortcut alt-Q)

### The tool bar

The menus on the tool bar allow the user to customise aspects of the operation of the program.



## The question screen

### Starting an exercise

Click the "Start" button to begin an exercise.

### Answering a question

For most questions, answers are keyed into the "Answer Box". When satisfied with an answer click the "Next" Button. If no answer has been entered, a "pass" on that question is registered in the score box. Otherwise the user is told whether they have answered the question correctly.

Setting IV flow rates requires that the user adjust an IV burette by using the scroll bars at the bottom of the burette. When satisfied that the correct rate has been established click the "Accept" button.

There is no limit to the number of questions that are generated (in the registered version). When finished click the "Quit" button.

### Online help

The Drug Calculation program generates both questions and solutions. If help is available the "Show Me" button will be visible. Click this button to open a scrolling box which includes the question and solution. Use the scroll bars to scroll down the page. Click the "OK" button to move on to the next question. A "pass" on that question is registered in the score box.

### The Calculator

Click the calculator icon to view and use the online calculator.

Clicking "Always on top" under the "Options" menu in the title bar of the calculator ensures that the calculator remains visible at all times. If this option is set a tick will appear next to the option.





