Resources ❖ Ressources

Clinical calculators for hand-held computers

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Hand-held computers provide assistance at the point of care for a variety of common clinical decisions. They could help you save time and reduce errors in determining therapy.[1]

Clinical calculators are popular applications among those who use hand-held computers or personal digital assistants (PDAs). They can be especially useful for family physicians. Clinical calculators can quickly execute a number of formulas for patient management. At the very least they can check and confirm calculations done the traditional way.

Dozens of medical calculators do single functions, from timing labour contractions to determining IV rates. This article describes several multifunction medical calculators for the Palm operating system (OS) that were available at no cost at the time of writing.

MedCalc is one of the best-known Palm OS calculators for physicians. The program was written by Mathias Tschopp, MD, and is available from his website at medcalc.med-ia.net. MedCalc focuses primarily on internal medicine. The version available at the time of writing had 76 formulas, and the list is growing. Formulas can be grouped by type on the home menu screen (eg, Renal, Electrolytes, Cardiology). References for the formulas and even a few practice tips are included. The program is available in English and French.

MedCalc will also let you specify your preference for units. You can change units on the fly and mix them (eg, calculate body mass index by entering height in inches and weight in kilograms). While few family physicians will want to know the cardiac valve area, there are useful formulas that estimate creatinine clearance, anion gap determination, pregnancy dates, steroid equivalency, Apgar scores, coronary artery disease risk, and the Glasgow coma scale. I recently cared for a hospital patient with hyponatremia and used MedCalc to get a formula that accurately predicted the change in serum sodium based on patient age, weight, and type of infusion administered. MedCalc also offers some evidence-based medicine formulas, such as number needed to treat and pretest and posttest probabilities. It has an infusion manager that can quickly determine required IV rates to provide dosages.

The main program takes only 244 K of memory. It also uses MathLib, a program that does a variety of math functions and can be shared by other applications. MedCalc is very easy to use. Most people will be able to work with it completely without instruction. It even allows you to save values on specific patients for later reference. A user group serves those interested in enhancing functionality.

MedCalc should not be confused with MediCalc, a similar but older program designed by David Monbaron. That program, while still available, has not been maintained since it became freeware in 2000. The source code is made available if you have the time and talent to reconfigure it at http://www.angelfire.com/ms/medicalc/.

MedMath, a similar program from Dr Phillip Cheng, has been around since 1999. It can be downloaded from http://smi-web.stanford.edu/people/pcheng/medmath/index.html. It is a much smaller program than MedCalc, requiring only 40 K of memory and needing no math library files. It runs on virtually all Palm devices, even those with older OS versions. It offers 34 formulas that are essentially a subset of those in MedCalc. It has the handy feature of including a numeric keypad on the screen so you can avoid writing numbers altogether. (MedCalc can summon up the Palm keyboard, but the process needs to be repeated for each field, which is quite clumsy.) You can file your favourite formulas or review the last ones used. MedMath allows for either SI or conventional units. The program does not save patient data and is available in English only.

Archimedes is the newest PDA medical calculator. It is available free from Skyscape, a large publisher of medical software for hand-held computers (**www.skyscape.com**). This offering has a few features that make it an attractive alternative. For starters, it looks better on colour screens, which are rapidly becoming standard in entry-level PDAs. It, too, remembers the last few calculations you did so the formulas you use most are readily available. It also has a link that can take you to other Skyscape titles on your PDA. To reduce screen clutter with the dozens of formulas, they can be viewed by system. You can get a formula by typing the first few letters of its name and the software will present options to choose from, something MedCalc does as well. If you get totally lost, you can search for formulas you need. There are some imperial and metric converters for length, mass, and temperature. There is a help function that often provides normal ranges for the values you are interested in. Archimedes takes up just over 660 Kb of memory.

Archimedes also has some drawbacks. You cannot file the calculations in your own categories, so you will be always wading through formulas you might never need. It also does not have some formulas that are especially useful to family physicians, such as a coronary risk calculator or a pregnancy calculator. There is no ability to use SI units, so if your laboratory reports in this system (as most Canadian ones do), you are out of luck with Archimedes. It also does not appear to be available in French either.

All the above products run on PDAs using the latest version of the Palm OS, version 5. These products are constantly being updated, so missing features are often added to new versions.

If you want to browse single-function programs, many free PDA calculators perform specialized medical functions. A good place to start browsing would be **http**://**pda.tucows.com/palm/calc_med.html**.

It is a little frustrating, but none of the calculators mentioned here check your entries for errors. If you make a mistake and input an impossible value, each will faithfully calculate a ridiculous result. This would be a simple thing to correct, and we hope such a feature could be incorporated into future releases. As they all remind you, clinical judgment must prevail. As useful as hand-held computers are, you should not base patient care decisions solely on what your PDA tells you! ❧

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Reference
1. Rothschild JM, Lee HT, Bae T, Bates DW. Clinician use of a palmtop drug reference guide. *J Am Med Informatics Assoc* 2002;9(3):223-9.

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