

**The risk of
Cardiovascular Disease
within eight years – according to the Framingham studies**

MANUAL for the use of the program **CVD** for the HP49G(+)
(Version 3.1 - 14-June-2004)
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Introduction

The Framingham study followed about 5000 men and women living in Framingham, MA, USA, for more than 30 years to attempt to identify persons at high risk for cardiovascular disease. This includes coronary heart disease, atherothrombotic brain infarction, hypertensive heart disease and intermittent claudication.

The risk factors identified in the study were systolic blood pressure, cigarette smoking, electrocardiographic evidence of hypertrophy (increase in thickness) of the left ventricle of the heart, glucose intolerance (diabetes) and blood cholesterol. A general logistic function was computed to predict the several different cardiovascular diseases and to identify people at high risk who need preventive treatment.

The program is using this general risk function to calculate the probability of developing cardiovascular disease in 8 years. The risk of an individual is compared with the probability by age and sex of having cardiovascular disease in 8 years of the general population (incidence per 1,000).

The output of the program CVD1 is:

% RISK1, the percentage risk of the individual

% NORM, the percentage risk in the general population

RISK1 / NORM, the relative risk of the individual compared to the general population.

After pressing OK a graph is drawn of % risk against age of either the male or female population and the % risk of the individual is plotted in this graph.

The What-if function of the program (CVD2) may be used to predict what happens as the value of one or more risk factors would be changed, as for example by stopping smoking.

It also serves to determine what are the most effective measures at this particular age to reduce the risk. For example, at the higher ages the weight of blood cholesterol in the general equation is reduced. Aside from the preventive viewpoint the 'What-if' may serve a considerable pedagogic function for the individual concerned.

Reference: *A general Cardiovascular Risk Profile: The Framingham Study.*
Epidemiology, 38, 46-51, 1976.

User Guide

CVD1 Press this label to start with a new client, entering the following values as requested:

"NAME"	- The client's name (max 15 chars.)	
AGE	- in years (from 35 to 70)	
	(months as a decimal fraction)	
CHO	- Cholesterol level in g % (mg/ml)	
	(if given in mmol, multiply with 38.6)	
BP	- Blood pressure in mm Hg	
SEX	- Male	= 1
	- Female	= 0
SMO	- Smoker	= 1
	- Non smoker	= 0
LVH	- Left ventr. hypertrophy	= 1
	- No left ventr. hypertrophy	= 0
GI	- Glucose intolerance	= 1
	- No glucose intolerance	= 0

Pressing ENTER or OK after each entry. No new input leaves values unchanged. Navigate with the arrow-keys, and make corrections, until pressing ENTER (_OK) without making an entry. CANCEL aborts. Press the soft menu keys to toggle the sign of the various risk factors.

The program calculates & shows the CVD risk and the normal value & then plots this risk together with the curve of normal values. The results are left on the stack, after leaving the plot screen (by pressing CANCEL or _ON).

The plot can be reviewed at any time by: LEFT-ARROW or by: LEFT-SHIFT PICTURE.

CVD2 Press this label if you want to make a what-if calculation, e.g. stop smoking. Enter the changed values as in CVD1. The program plots the what-if results, as with CVD1 and shows them on the stack. Then plots the graph with the new value added. This program can be repeated any number of times for other what-if calculations.

PLT If your plot is cluttered by using CVD2 several times then PLT can be used to make a fresh plot as after use of CVD1.

OUT Press this label if you wish to review the already calculated risks.

HELP Simple HELP file, with page switching by pressing the ENTER key.

SDAT Pressing this label saves clients data in a file, later to be retrieved and run again.

- G DAT** Retrieves formerly saved data and outputs the results again. Can be followed by CVD2.
- purge** Used to purge a client's file.
- PPNT** This label plots a point after input of the values of AGE and RISK e.g.:
55.6 ENTER 10.7 PPNT -> plots this point.
- PRED** Gives a prediction of the expected value of risk corresponding to an age (between 35 and 70): 55.6 PRED -> 8.45 – Thus:
AGE ENTER PRED PPNT plots a curve point.