

Tables for:

**Framingham-Based Tools to Calculate the Global Risk of Coronary Heart Disease**

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**Table 1. Tools to Assess Risk of Coronary Heart Disease**

Name	Type of Tool	Clinical Input Required in Addition to Core Data*	Output		Treatment Information	How to Obtain
			Outcome <sup>†</sup>	Risk Description		
Framingham Risk Tables	C	DBP HDL LDL Diabetes status	MI Sudden death Angina	10-year absolute risk in 18 categories; comparators of average risk and low risk for individuals of same age and gender; risk factors color coded to indicate relative severity	No	Circulation 1998; 97:1837-47 <sup>[20]</sup> <a href="http://www.nhlbi.nih.gov/about/framingham/risktmn.pdf">http://www.nhlbi.nih.gov/about/framingham/risktmn.pdf</a>
New Zealand Risk Tables	C	DBP HDL Diabetes status	MI Sudden death Angina Stroke/TIA	5-year absolute risk in 8 categories (2.5%, 2.5% to 5%; 5% to 10%; 10% to 15%; 15% to 20%; 20% to 25%; 25% to 30%; >30%); no comparators, but risk color coded and given qualitative description ranging from mild to very high	Yes; chart listing the number of CHD events prevented with treatment and the NNT for each risk level.	BMJ 2000;320:709-10 <sup>[51]</sup> at <a href="http://www.bmj.com">www.bmj.com</a> ; <a href="http://www.nzgg.org.nz/gL_complete/bloodpressure/table">www.nzgg.org.nz/gL_complete/bloodpressure/table</a>
Modified Sheffield Tables	C	DBP HDL Diabetes status	MI Sudden death Angina	10-year absolute risk in 3	Yes; advice at bottom of table on when	BMJ 2000;320:671-6 <sup>[52]</sup> ; at <a href="http://www.bmj.com">www.bmj.com</a>

				categories (<15%, >15%, >30%); no comparators	to treat BP and high cholesterol.	
Joint British Societies Coronary Risk Prediction Charts	C	HDL Diabetes status	MI Sudden death	10-year absolute risk in 4 categories (<15%, 15% to 20%, 20% to 30%, >30%); no comparators	No	BMJ 2000;320:705-8 <sup>[53]</sup> ; Heart 29 <sup>[54]</sup> ;www.hyp.ac.uk/bhs/riskvie resources_prediction_chart.htm
Joint European Societies Coronary Risk Chart	C	None	MI Sudden death	10-year absolute risk in 5 categories (<5%, 5% to 10%, 10% to 20%, 20% to 40%, >40%); no comparators, but risk color coded and given qualitative description ranging from low to very high	No	Atherosclerosis 1998;140: 199
Canadian Risk Nomogram	C	HDL Diabetes status LVH	MI Sudden death Angina	5- and 10-year absolute risk in 1% increments; comparison to individual of same age and gender with no risk factors can be read from nomogram	No	CMAJ 1997; 157:422-8 <sup>[56]</sup>
British Cardiac Risk Assessor	S	DBP HDL Diabetes status LVH	MI Sudden death Angina Stroke	10-year absolute risk of CHD; no comparators	No	www.hyp.ac.uk/bhs/managemt
BMJ Cardio Risk Manager	S	DBP HDL Diabetes status LVH History of Afib History of	MI Sudden death Angina Stroke	10-year absolute risk; comparator of average risk for individual of	Yes; allows estimation of reduced risk with treatment intervention. Personalized	www.bmjbooks.com

		CVD		same age and gender	report for patients.	
Birmingham Heartlands Calculator	S	HDL Diabetes statusLVH	MI#Sudden death Angina Stroke/TIA CHF PVD	Individual year and 10-year absolute risks; comparator of average risk for individual of same age and gender; graphical depiction of attributable risks of risk factors	Yes; graphical presentation of expected risk reduction with medication.	Modern Hypertension Management 1999;1:10-13 <sup>[57]</sup>
Stat Cardiac Risk for Palm	H	DBP HDL Diabetes status	MI Sudden death Angina	10-year absolute risk; comparators of average risk and low risk for individuals of same age and gender	No	www.statcoder.com
FramPlus	H	HDL Diabetes statusLVH.	MI Sudden death Angina	5- and 10-year absolute risk; no comparators, but risk given qualitative description ranging from low to high	Yes; brief non-personalized advice for risk reduction.	www.medicine21.com/heartGP
National Cholesterol Education Program Risk Calculator	W, S, H	DBP HDL, Diabetes status	MI Sudden death	10-year absolute description; comparators of average risk and low risk for individuals of same age and gender with written description; description of what constitutes elevated risk factor levels	Yes; handheld tool provides non-personalized guideline-based advice on cholesterol management.	www.nhlbi.nih.gov/guidelines/cholesterol/index.htm
Risk Calculator from theCenter	W	DBP HDL Diabetes	MI Sudden death	10-year absolute risk	Yes; guideline-	www.cardiacrisk.org.uk/

for Cardiovascular Sciences at the University of Edinburgh		status LVH Premature FH	Angina Stroke/TIA	and NNT; comparator of individual with single lower risk factor level	based management and referral program for physicians; personalized report for patients.	
Healing Hearts Risk Calculator	W	HDL Diabetes status LVH	CHD outcomes, not otherwise specified	10-year absolute or relative risk; Comparators of average and low risk for individuals of same age and gender	No, although web-links through same site.	<a href="http://www.healing-hearts.net/risk.htm">www.healing-hearts.net/risk.htm</a>
Heart to Heart: a tool for improving communication and decision making about heart disease prevention	W, H	HDL Diabetes statusLVH	MI Sudden death Angina	10-year absolute risk, although time frame adjustable; written description; comparators of low risk for individuals of same age and gender; risk and risk factors color coded to indicate relative severity; additionally qualitative description ranging from low to high	Yes; evidence-based decision guide with interactive navigation of information on risk reduction strategies and their effects. Personalized report for patients.	<a href="http://www.med-decisions.com">www.med-decisions.com</a>
American Heart Association's Calculator	W	HDL Diabetes status no diabetes only Use of BP meds	MI Sudden death	10-year absolute risk; written description; comparators of average risk and low risk for individuals of same age and gender	No, although web-links through same site.	<a href="http://www.americanheart.org">www.americanheart.org</a>

C, static risk chart; S, spreadsheet calculator; W, web-based calculator; H, handheld computer program; SBP, systolic blood pressure; CVD, cardiovascular

disease; CHD, coronary heart disease; HDL, high-density lipoprotein cholesterol; LDL, low-density lipoprotein cholesterol; Afib, atrial fibrillation; CHF, congestive heart failure; PVD, peripheral vascular disease.

\*All tools require clinical input of core data including age, gender, SBP, total cholesterol, and smoking status. Additional input listed in column.

†Angina includes both stable and unstable angina; MI includes both nonfatal and fatal myocardial infarction.

‡Birmingham Heartlands calculator makes 3 separate calculations: CHD (MI, Sudden Death, Angina), Stroke/TIA, CVD (MI, Sudden Death, Angina, Stroke/TIA, CHF, PVD).

All web addresses active at time of search: April 28, 2002.

**Table 2. Studies that Compare Various Framingham-based Risk Tools (Charts and Tables) with Full Framingham Equation Calculations**

Study	Site	Patients	Risk Tool Scorers	Risk Tools	Reference Standard (Percent of Indeterminate Reference Calculations Due to Missing Data)	Data Sources	Tool Score Done Without Knowledge of Standard Score?
Durrington et al., 1999 <sup>[32]</sup>	Single lipid clinic in Manchester, UK	570 referred patients without CVD	Computer operator	Modified Sheffield tables, Joint European charts	CHD risk from Framingham equation including LVH (20%)	Chart, H & P, ECG, fasting labs	Unclear
Wierzbicki et al., 2000 <sup>[35]</sup>	Three hospital CVD prevention clinics in UK	400 consecutive patients without CVD on stage II NCEP diet	Medical students	Original New Zealand tables, Modified Sheffield tables, Joint British charts, Joint European charts	CHD risk from Framingham equation including LVH (.5%)	Chart, exam, ECG, fasting labs	Unclear
Wallis et al., 2000 <sup>[34]</sup>	Random sample of Scottish population aged 35-64	1,000 randomly selected participants without CVD	7 physicians	Modified Sheffield tables	CHD and CVD risk from Framingham equation assuming no LVH (not given, but analysis included only adults with complete lipid data)	Survey H & P, labs (no ECG)	Yes, physicians who "were blind to calculated risk estimates" did risk tool assessments
Game et al., 2001 <sup>[23]</sup>	Diabetes clinics at Birmingham	906 consecutive patients	Computer operators	Framingham tables, Original New	CHD and CVD risk from Framingham	"Clinical and nonfasting	Unclear

	Heartlands Hospital in UK	with diabetes and no previous CVD		Zealand tables, Original Sheffield tables, Modified Sheffield tables, Joint British charts, Joint European charts, Canadian tables	equation 15%, but analysis included only adults aged 40-70 years without LVH	lab data**	
Jones et al., 2001 <sup>[31]</sup>	12 primary care practices with 46 physicians in Birmingham, UK	691 adults selected by their primary care physicians for prevention of CVD	2 "observers"	Framingham tables, Original New Zealand tables, Revised New Zealand tables, Original Sheffield tables, Modified Sheffield tables, Original Joint British charts, Revised Joint British charts, Joint European charts, Canadian tables	CHD and CVD risk from Framingham equation 6%, but analysis included only adults aged 30-70 years without LVH	"Clinical and nonfasting lab data**"	Unclear
McManus et al., 2002 <sup>[33]</sup>	18 general practices in West Midlands, UK	180 "records" selected randomly from patient lists	18 physicians and 18 nurses	Original New Zealand tables, Modified Sheffield tables, Joint British guidelines, Joint European guidelines	CHD risk from Framingham equation including LVH (% indeterminate not given)	Chart	Yes, researchers independently reviewed records for Framingham equation data

CVD, cardiovascular disease; CHD, coronary heart disease; LVH, left ventricular hypertrophy; H & P, history and physical examination; cat, categories; TC, total cholesterol; HDL, high-density lipoprotein cholesterol.

\*The protocol for both Birmingham studies<sup>[23,31]</sup> required clinicians to record

clinical risk factors for CVD on self-adhesive labels that were attached to laboratory requests.

**Table 3. Accuracy of Several Common Framingham Risk Tools\***

<b>Risk Tools</b>	<b>Sensitivity, %*</b>	<b>Specificity, %*</b>	<b>Percent of Indeterminate Calculations Due to Missing Risk Tool Data, %</b>	<b>Reference Standard Cutpoint (Annual Risk), %</b>
<b>Joint British charts</b>				
Wierzbicki et al., 2000 <sup>[35]</sup>	100	100	~5	CHD risk >3
Game et al., 2001 <sup>[23]</sup>	77	99	~15	CHD risk >3
Jones et al., 2001 <sup>[31]</sup>	85	99	~5	CHD risk >3
McManus et al., 2002 <sup>[33]</sup>	80	91	49	CHD risk >3
<b>Joint European charts</b>				
Durrington et al., 1999 <sup>[32]</sup>	Unclear	Unclear	41%	CHD risk >2
Wierzbicki et al., 2000 <sup>[35]</sup>	95	100	~5	CHD risk >2
Game et al., 2001 <sup>[23]</sup>	89	72	~15	CHD risk >2
Jones et al., 2001 <sup>[31]</sup>	75	86	~5	CHD risk >2
McManus et al., 2002 <sup>[33]</sup>	63	73	17	CHD risk >2
<b>New Zealand tables</b>				
Wierzbicki et al., 2000 <sup>[35]</sup>	56	100	~5	CHD risk > 2
Game et al., 2001 <sup>[23]</sup>	94	58	~15	CHD risk >2
Jones et al., 2001 <sup>[31]</sup>				
(8 categories)	83	79	~5	CHD risk >2
McManus et al., 2002 <sup>[33]</sup>	68	75	49	CHD risk >4
<b>Modified Sheffield tables</b>				
Durrington et al., 1999 <sup>[32]</sup>	Unclear	Unclear	33	CHD risk >3
Wierzbicki et al., 2000 <sup>[35]</sup>	64	100	~5	CHD risk >3
Wallis et al., 2000 <sup>[34]</sup>	82	99	0 <sup>†</sup>	CHD risk >3
Game et al., 2001 <sup>[23]</sup>	96	92	~15	CHD risk >3

Jones et al., 2001 <sup>[31]</sup>	91	96	~5	CHD risk >3
McManus et al., 2002 <sup>[33]</sup>	61	88	11	CHD risk >3
Canadian tables				
Game et al., 2001 <sup>[23]</sup>	5	100	~15	CHD risk >3
Jones et al., 2001 <sup>[31]</sup>	3	100	~5	CHD risk >3
Framingham tables				
Game et al., 2001 <sup>[23]</sup>	95	83	~15	CHD risk >2.7
Jones et al., 2001 <sup>[31]</sup>	67	98	~5	CHD risk >2.7

CHD, coronary heart disease; CVD, cardiovascular disease.

\*The reference standard is the full Framingham equation; sensitivity and specificity estimates do not account for indeterminate values of either the risk tool or the reference standard.

†Only participants who had complete data from a larger survey study were selected.

**Table 4. Current Guidelines for Cardiovascular Risk Reduction**

<b>Risk Factor or Risk Intervention</b>	<b>Treatment Guideline</b>	<b>10-year Risk Cutoffs for Determining Appropriate Treatment</b>
Cholesterol	National Cholesterol Education Program (NCEP) <sup>[1]</sup>	10%/20%
Blood pressure	The sixth report of the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure <sup>[4]</sup>	NA; although guideline encourages counting risk factors (which roughly correlates to 10%/20% of NCEP)
Smoking	Surgeon General's Report on Smoking <sup>[58]</sup>	NA; any tobacco use requires intervention
Aspirin use	US Preventive Services Task Force Report on Aspirin for the Prevention of Cardiovascular Disease <sup>[2]</sup>	2%/6%/10%