Appendices from Heart paper published online Nov 2006/ print Feb 2007 modified to include rheumatoid arthritis Oct 2013 onwards.*

Appendix 1.
The ASSIGN score and the Framingham cardiovascular score

(a) The ASSIGN score
Note the following abbreviations apply below: tc=total cholesterol, hdlc=HDL-cholesterol, sbp=systolic blood pressure, family=family history, cpd=cigarettes per day, SIMDSC10=Scottish Index of Multiple Deprivation score divided by 10, RA=rheumatoid arthritis.
Both sexes
If RA then cpd=cpd+10
Men
The betas (log hazard ratios) for each risk factor are: b_{age}=0.05698, b_{tc}=0.22286, b_{hdlc}=-0.53684, b_{sbp}=0.01183, $b_{diabetes}$=0.81558, b_{family}=0.27500, b_{cpd}=0.02005, $b_{SIMDSC10}$=0.06296.
For each person, define:
L=b_{age}*age+b_{tc}*tc+b_{hdlc}*hdlc+b_{sbp}*sbp+$b_{diabetes}$*diabetes+b_{family}*family+b_{cpd}*cpd+b_{cpd}*cpd+$b_{SIMDSC10}$*SIMDSC10.
An asterix denotes multiplication. Evaluate L at the mean values:
Lbar=b_{age}*48.8706+b_{tc}*6.22520+b_{hdlc}*1.35042+b_{sbp}*133.810+$b_{diabetes}$*0.0152905+b_{family}*0.263762+
b_{cpd}*7.95841+$b_{SIMDSC10}$*2.74038.
Let A=L-Lbar and B=exp(A). Then the ASSIGN score is P=100*(1-(0.8831^B)), where 0.8831 is the 10y survival rate, free from CVD, for men in SHHEC.
Women
Similarly, b_{age}=0.07203, b_{tc}=0.12720, b_{hdlc}=-0.55836, b_{sbp}=0.01064, $b_{diabetes}$=0.97727, b_{family}=0.49159, b_{cpd}=0.02724, $b_{SIMDC10}$=0.09386.
Define L, A, and B as for men.
Lbar=b_{age}*48.7959+b_{tc}*6.40706+b_{hdlc}*1.62837+b_{sbp}*130.115+$b_{diabetes}$*0.0127275+b_{family}*0.326328+
b_{cpd}*6.44058+$b_{SIMDSC10}$*2.82470.
Then P=100*(1-(0.9365^B)), where 0.9365 is the 10y survival rate, free from CVD, for women in SHEC.
Note: this algorithm should be considered as being in the public domain and no special permission is needed to use it, but its origin should be acknowledged. See 'Authors and copyright' on ASSIGN-SCORE.COM website.

(b) The Framingham cardiovascular risk score for both sexes (from Anderson et al 1991)[4]
Define variables: LVH=left ventricular hypertrophy, liprat=totchol/hdl; female=1 only if the person is female (else zero); diabetes=1 only if the person has diabetes (else zero);
logage=log(age); logsbp=log(SBP);lograt=log(liprat); agefem=logage*female; and diabfem=diabetes*female.
Then define,
mu=18.8144-1.2146*female-1.8443*logage+0.3668*agefem-1.4032*logsbp-0.3899*smoker-0.5390*lograt -
0.3036*diabetes-0.1697*diabfem-0.3362*LVH.
Let sigma=exp(0.6536-0.2402*mu).
Let u=(log(10)-mu)/sigma.
Let new=-exp(u).
Then the Framingham score is pcvd=100*(1-exp(new)).
Note: these values are quoted solely for comparison with ASSIGN. For information on Framingham scoring, readers should consult the original sources quoted.

*Note on rheumatoid arthritis October 2013.
Rheumatoid arthritis was not recorded as a baseline risk factor in the SHHEC study from which the ASSIGN score was derived. Risk assessment for patients in general practice with this diagnosis was included in the British NHS Quality and Outcomes Framework (QOF) for 2013. Rheumatoid arthritis is alleged from some studies to have a cardiovascular risk equivalent to diabetes mellitus, modern drug treatment reduces this considerably. Diabetes mellitus has a very large risk equivalent in SHHEC, placing most subjects in the high-risk category (ASSIGN score >20). Patients with this diagnosis are usually targeted for secondary prevention. An equivalent loading for rheumatoid arthritis in SHHEC is therefore inappropriate. In the QRISK algorithm for subjects in the QRESEARCH general practice cohort (Hippisley-Cox 2008, 2010), diagnosed rheumatoid arthritis has a cardiovascular risk equivalent to light smoking (<10cigarettes a day) versus non-smoking. The effects of rheumatoid arthritis and smoking are multiplicative, so ASSIGN Version 1.5 scoring from October 2013 has been modified to add to the risk estimate in rheumatoid arthritis sufferers by the equivalent of adding ten cigarettes a day (cpd) to their actual intake. Note that this ASSIGN score change only affects patients with diagnosed rheumatoid arthritis–no difference for anybody else.

Appendix 2.

Family history questions:

1. Have either of your parents developed heart disease *or stroke* before the age of 60?
2. Have any of your brothers or sisters developed heart disease *or stroke* before the age of 60?
3. *Have any of your father's or mother's brothers and sisters, or any of their children* developed heart disease or stroke before the age of 60? If yes, how many of them?*
   *that is, uncles, aunts or first cousins of the participants.

Normal print is the original question in the Scottish Heart Health Study questionnaire (which also asked about number of sibs). *Italic print shows modifications for the ASSIGN score.* Accept a positive family history for "yes" as an answer to either question 1 or question 2 or both. Question 3 is superfluous for this purpose if the answer to one of the other questions is "yes". If "no" for both, accept a positive family history from question 3 only if two or more of these more distant relative are affected.

For the ASSIGN score, unknown family history should be coded as "no" but it is a powerful contributor to risk, so the question should not be omitted when assessing cardiovascular risk.