QRISK® 2010

Annual Update Information

Revision History

Revision date	Document Version	Summary of Changes
01January 2010	V1.0	First issue.

Contents

1 Purpose of document

This document details the annual update for QRISK®2 (2010) cardiovascular risk prediction algorithm derived from the QResearch® database. The annual update will be released in January 2010 and will go live on the QRISK website www.qrisk.org on 01 April 2010. Suppliers are invited to synchronise their implementation of QRISK2 on 01 April 2010 for consistency of implementation across the NHS and to minimise support calls regarding discrepancies.

1.1 Why are annual updates required?

Annual updates for QRISK®2 are required because of:

- **Changes in population characteristics** - for example, incidence of cardiovascular disease (CVD) is falling; obesity is rising; smoking rates are falling;
- **Improvements in data quality** - for example the recording of exposures and also clinical outcomes becomes more complete over time. This is especially true for recording of ethnicity data which is becoming more complete as shown in the table in the appendix. There is more than twice the volume of data available now for patients from non-white sub groups – for QRISK2 (2008) we had 197,723 person years compared with 483,616 for QRISK2 (2010).
- **Changes in requirements** for how the risk prediction scores can be used - for example, QRISK®2 is now included in QOF and it would be helpful for clinicians assessing patients if the upper age limit extended beyond 74 years.

These factors require us to re-fit the QRISK®2 algorithm to the latest version of the QResearch® database each year to ensure the algorithm keeps up to date. If the algorithm is not re-calculated, then its performance would gradually decay and its clinical value would diminish as a result. We have therefore re-fitted the algorithm using a two thirds sample of the QResearch® database (version 26, 01 Oct 2009) and incorporated this into the annual update of the software.

1.2 What are the changes for QRISK2 (2010)?

1. **Age range**: have re-modeled QRISK®2 (2010) so that it now applies to patients aged 30-84 years. We have updated the fractional polynomial terms for age and body mass index to take better account of the broader age range. There is also an additional age interaction term with chronic renal disease which tends to increase risk among younger patients with this condition.

2. **Clinical Values**: instead of age-sex reference tables for body mass index, cholesterol/HDL ratio and systolic blood pressure, the software now includes three simple predictive

algorithms which predict the likely values based on a patients age, sex, ethnic group, smoking status, presence of diabetes and treated hypertension. These predicted values can be used to calculate an estimated QRISK2 score where the clinical values are missing.

3. **Townsend postcode table**: we have included the annual update to the postcode table.

4. **Age/sex/ethnicity reference values**: QRISK®2 (2010) now includes data on the average risk for a patient of the same age, sex and ethnic group as any individual patient. These data are particularly useful for explaining risk to younger patients who might fall below the 20% threshold recommended by NICE but still may have particularly high risks compared with patients of similar age, sex and ethnicity.

5. **Read code lists**: the code lists are identical to the original search definition document (v2.7) except for (a) the change in definition of smoking which now includes one additional code (see v2.8).

1.3 How well does QRISK2 2010 perform?

We have validated the QRISK®2 2010 algorithm using a one third sample of version 26 of the QResearch® database and found the statistical measures of accuracy (i.e. discrimination and calibration) are equivalent to those obtained QRISK®2 2008 algorithm when applied to the population of patients aged 30-84 years. The results are shown in the appendix.

1.4 How will patient scores be affected?

QRISK2 (2010) is an annual update and hence a minor modification and hence a minor improvement. The vast majority of patients will have similar scores using QRISK®2 (2008) and QRISK®2 (2010). Approximately 96% of patients will have 2010 scores within 2% of the 2008 value (ie a patient may have had a QRISK2 (2008) score of 17% but a QRISK2(2010) score of 18%) or vice versa . However, 3% of patients are likely to have scores which are different by more than 2%

These tend to be patients:

- From non-white ethnic groups
- At the extremes of the previous age range i.e. those aged 35-40 and 70-74 years
- Those at high risk because of multiple risk factors especially those younger patients.

Where scores increase this seems to be for: Chinese males, men with type 2 diabetes, men with particularly high systolic blood pressure and women at the extremes of age

1.5 When will the next update for QRISK2 be available?

We will issue the annual update for QRISK2 (2011) in January 2011 for implementation on 01 April 2011. It is expected that the input parameters will remain the same although we expect minor changes to the coefficients.

2 Appendix

Table 1: Incidence rate of CVD per 1,000 person years in QRISK2 (2008) and QRISK2 (2010). Note that the rates are 35-74 for 2008 and 30-84 for 2010.

	QRISK2 (2008) patients aged 35-74 years				QRISK2 (2010) - patients aged 30-84 years			
	person years	incident cases CVD	Rate per 1000 person years	95% confidence intervals	person years	incident cases CVD	Rate per 1000 person years	95% confidence intervals
Women								
White or not recorded	5,537,244	40,278	7.27	(7.20 to 7.35)	8,328,995	64,469	7.74	(7.68 to 7.80)
Indian	21,654	186	8.59	(7.44 to 9.92)	61,013	394	6.46	(5.85 to 7.13)
Pakistani	10,981	115	10.47	(8.72 to 12.57)	27,487	246	8.95	(7.90 to 10.14)
Bangladeshi	6,707	67	9.99	(7.86 to 12.69)	12,890	88	6.83	(5.54 to 8.41)
Other Asian	8,097	45	5.56	(4.15 to 7.44)	22,596	75	3.32	(2.65 to 4.16)
Caribbean	25,126	209	8.32	(7.26 to 9.53)	47,999	259	5.4	(4.78 to 6.09)
Black African	12,869	33	2.56	(1.82 to 3.61)	31,733	61	1.92	(1.50 to 2.47)
Chinese	5,863	18	3.07	(1.93 to 4.87)	13,349	33	2.47	(1.76 to 3.48)
Other	16,563	91	5.49	(4.47 to 6.75)	42,714	166	3.89	(3.34 to 4.52)
total women	**5,645,105**	**41,042**	**7.27**	**(7.20 to 7.34)**	**8,588,775**	**65,791**	**7.66**	**(7.60 to 7.72)**
Men								
White or not recorded	5,190,709	54,705	10.54	(10.45 to 10.63)	7,749,078	75,842	9.79	(9.72 to 9.86)
Indian	20,150	285	14.14	(12.59 to 15.89)	57,134	603	10.55	(9.74 to 11.43)
Pakistani	9,726	175	17.99	(15.51 to 20.87)	27,390	360	13.14	(11.85 to 14.57)
Bangladeshi	5,976	119	19.91	(16.64 to 23.83)	14,444	189	13.09	(11.35 to 15.09)
Other Asian	5,725	75	13.10	(10.45 to 16.43)	17,166	140	8.16	(6.91 to 9.62)
Caribbean	18,888	141	7.46	(6.33 to 8.80)	33,849	222	6.56	(5.75 to 7.48)
Black African	11,014	44	3.99	(2.97 to 5.37)	28,361	91	3.21	(2.61 to 3.94)
Chinese	4,585	17	3.71	(2.30 to 5.96)	9,644	40	4.15	(3.04 to 5.65)
Other	13,798	106	7.68	(6.35 to 9.29)	35,847	203	5.66	(4.94 to 6.50)
total	**5,280,571**	**55,667**	**10.54**	**(10.45 to 10.63)**	**7,972,913**	**77,690**	**9.74**	**(9.68 to 9.81)**

Table 2: Validation statistics for QRISK2 (2008) compared with QRISK2 (2010). The table shows measures of the performance of the scores ie how accurate the scores are at identifying high risk patients and distinguishing them from low risk patients and how much of the 'variation' in risk is explained by the scores themselves. High values for these scores are better than low values.

		Women			Men		
		Mean	**95% LCL**	**95% UCL**	**Mean**	**95%LCL**	**95%UCL**
QRISK2 (2008)	R^2	0.509	0.504	0.514	0.460	0.455	0.466
	D statistic	2.083	2.063	2.104	1.890	1.870	1.910
	ROC value	0.853	0.851	0.855	0.830	0.828	0.832
QRISK2 (2010)	R^2	0.514	0.509	0.519	0.459	0.454	0.464
	D statistic	2.106	2.085	2.127	1.885	1.866	1.905
	ROC value	0.853	0.851	0.855	0.830	0.828	0.833