

Online Appendix Table 1: Cardiovascular event diagnostic and procedure codes* (1)

<i>Diagnoses and Procedures</i>	<i>ICD-9-CM-A[#]</i>	<i>ICD-10-A 2nd edition</i>
Acute coronary heart disease	410x to 414x (excluding 412)	I20x to I25x except I252
Previous coronary heart disease	412	I252
Cardiac arrest	4275	I46x, R96, R98
Ischaemic stroke or transient ischaemic attack or documented atherosclerotic cerebrovascular disease	434x, 436x, 4371, 4373, 438x, 435x	I63x, I64x, I66x, I670, I671, I693, I694, I698, G45x (except G453), G46x
Peripheral arterial disease (PAD)	433x, 441x, 442x, 444x, 4439, 44021 to 44024	I65x, I71x, I72x, I74x, I739, I7021, E1051, E1052, E1151, E1152, E1451, E1452
Coronary procedures	360x, 361x, 362x	3850500, 3530400-3530501, 3531000-3531005, 3849700-3850304, 9020100-9020103, 3863700, 3845619, 3865308
Peripheral arterial procedures (due to atherosclerotic PAD or embolism)	380x, 381x, 3922 to 3926, 3928	3270000-3354200, 3335400, 9021100-9021210, 9022900, 3530000-3530305, 3530600-3530905, 3531200-3531501, 3850500, 3380000-3380612, 9023000

*Cardiovascular event definition was based on the Framingham study and updated and adapted by Diabetes Cohort Study and PREDICT teams with acknowledgement to Dr Sue Wells and Jo Broad. Additional analyses used the outcomes of myocardial infarction (ICD9 codes 410, 4275 and 798; ICD10(v2) codes I21-24, I46, R96 and R98) and stroke (ICD9 code 434; ICD10(v2) codes I63 and I64) consistent with codes from verified diagnoses in the UKPDS (2). Death from 'diabetes with vascular complication' (ICD10 E1159 and E1459) was also included as an audit of all deaths in the cohort during 2005 revealed that this code was often used for CV events, particularly myocardial infarction.

[#] x denotes any suffix or numbers (3)

References:

1. Elley CR, Kenealy T, Robinson E, Drury PL: Glycated haemoglobin and cardiovascular outcomes in people with Type 2 diabetes: a large prospective cohort study. *Diabetic Medicine* 25:1295-1301, 2008
2. Anonymous: UK Prospective Diabetes Study (UKPDS). VIII. Study design, progress and performance. *Diabetologia*. 34:877-890, 1991
3. US Dept of Health and Human Services: International Classification of Diseases, Ninth Revision, Clinical Modification. Washington, DC, Public Health Service, US Dept of Health and Human Services, 1988

Online Appendix Table 2: 5-year CV and CHD risk equations with and without blood pressure lowering medication information, and internal validation

Equation		Harrell's C	R ² (95% C.I.)
(A) DCS 5-year cardiovascular risk	5-year CVD risk =100*(1- (0.8156**exp(agediag*0.04093 + sex*-.16542 + smoker1*0.10296 +smoker2*0.23131 + HbA1c*0.05874 +systolic*0.00290+ Maori*0.20598 + East Asian*-.09536+ Pacific *0.06798 + Indo-Asian*0.25619+ Other*0.22218 + cholratio*0.02015 + malb1*0.21857 + malb2*0.69659 + duration *0.05795 - 3.62948747)))	0.673	0.201 (0.19, 0.22)
(B) DCS 5-year cardiovascular risk, including antihypertensive medication status	5-year CVD risk =100*(1- (0.817**exp(agediag*0.0417 + sex*-.17301+ smoker1*0.07998 +smoker2*0.24776 + HbA1c *0.05667 systolic *0.00489+ Maori *0.20283 + East Asian *-.0311 + Pacific *0.08045 + Indo-Asian *0.28188+ Other*0.2464 + cholratio*0.01628 + malb1*0.189 + malb2*0.6275 + duration *0.05778 + antihyp*0.79968 + antihyp*systolic *-0.00444 - 4.00425997)))	0.676	0.207 (0.19, 0.23)
(C) DCS 5-year risk of first myocardial infarction	5-year MI risk =100*(1- (0.9248**exp(agediag*0.05251 + sex*-.25276 + smoker1*0.08549+smoker2 *0.35338 + HbA1c *0.06457 + systolic *0.00153+ Maori *0.11973 + East Asian *-.17086+ Pacific *-0.09025 + Indo-Asian *0.11869+ Other*0.19179 + cholratio*0.03762 + malb1*0.21629 + malb2*0.66917 + duration *0.06905 - 4.23497)))	0.705	0.272 (0.25, 0.30)
(D) DCS 5-year risk of first myocardial infarction, including antihypertensive medication status	5-year MI risk =100*(1- (0.9230**exp(agediag*0.05274+ sex*-.26065 + smoker1*0.07915+smoker2 *0.34834 + HbA1c *0.05962 + systolic *0.00516+ Maori *0.16271 + East Asian *-.15539+ Pacific *-0.03224 + Indo-Asian *0.09004+ Other*0.21986 +cholratio*0.03545 + malb1*0.17951 + malb2*0.61812 + duration *0.06931 +antihyp*0.99161 + antihyp*systolic *- 0.00592- 4.8066)))	0.710	0.279 (0.25, 0.31)

Variable definitions:

‘agediag’ Age in years at diagnosis; ‘sex’ 1 for female, 0 for male; ‘smoker1’ 1 for previous smoker, 0 otherwise; ‘smoker2’ 1 for current smoker, 0 otherwise; ‘HbA1c’ HbA1c% value; ‘systolic’ Systolic blood pressure mmHg; ‘Maori’ 1 for Maori, 0 otherwise; ‘East Asian’ 1 for East Asian, 0 otherwise; ‘Pacific’ 1 for Pacific Islander, 0 otherwise; ‘Indo-Asian’ 1 for Indo-Asian, 0 otherwise; ‘Other’ 1 for Other ethnicity (not European, Maori, Pacific, East Asian or Indo-Asian), 0 otherwise; ‘cholratio’ Total cholesterol/HDL cholesterol ratio; ‘malb1’

Online Appendix Table 3: Characteristics at baseline of the northern derivation cohort and the southern validation cohort

<i>Characteristic</i>	<i>Northern cohort (N=36,127)</i>	<i>Southern cohort (N= 12598)</i>
Age, years. <i>Median (IQR)*</i>	59.2 (50.4, 69.3)	61.5 (52.3,70.6)
Age at diagnosis, years. <i>Median (IQR)</i>	54 (45, 64)	56 (47,65)
Diabetes duration, years. <i>Median (IQR)</i>	3 (1, 7)	3 (1,8)
Women. <i>N (%)</i>	18,527 (51%)	6,342 (50%)
<i>Ethnicity:</i>		
European <i>N (%)</i>	16,194 (45%)	7,634 (61%)
Maori <i>N (%)</i>	6,493 (18%)	1,369 (11%)
Pacific Islander <i>N (%)</i>	7,303 (20%)	1,316 (10%)
Indo-Asian <i>N (%)</i>	1,896 (5%)	678 (5%)
East Asian <i>N (%)</i>	1,960 (5%)	512 (4%)
Other ethnicity <i>N (%)</i>	2,281 (6%)	1,089 (9%)
Lowest socioeconomic quintile† <i>N (%)</i>	14,562 (40%)	2,731 (21.7%)
Body mass index. <i>Median (IQR)</i>	30.8 (26.9, 35.6)	30.1 (26.5,34.8)
Systolic BP, mmHg. <i>Mean (SD)</i>	137.4 (18.7)	139.6 (19.4)
Diastolic BP, mmHg. <i>Mean (SD)</i>	80.9 (10.6)	81.0 (10.7)
Total cholesterol, mmol/L. <i>Mean (SD)</i>	5.33 (1.12)	5.54 (1.12)
HDL cholesterol, mmol/L. <i>Mean (SD)</i>	1.32 (0.47)	1.30 (0.45)
Total cholesterol:HDL ratio. <i>Mean (SD)</i>	4.39 (1.49)	4.59 (1.52)
HbA _{1c} , %. <i>Median (IQR)</i>	7.2 (6.4, 8.6)	7.0 (6.1,8.0)
Current smoker. <i>N (%)</i>	5,433 (15%)	1,741 (13.8%)
Previous smoker. <i>N (%)</i>	7,553 (21%)	3,829 (30.4%)
Microalbuminuria.‡ <i>N (%)</i>	8,970 (25%)	3,041 (24.14%)
Macroalbuminuria. ‡ <i>N (%)</i>	2,973 (8%)	913 (7.3%)

* (IQR) = (inter-quartile range) †Socioeconomic status is measured using NZDep(21)

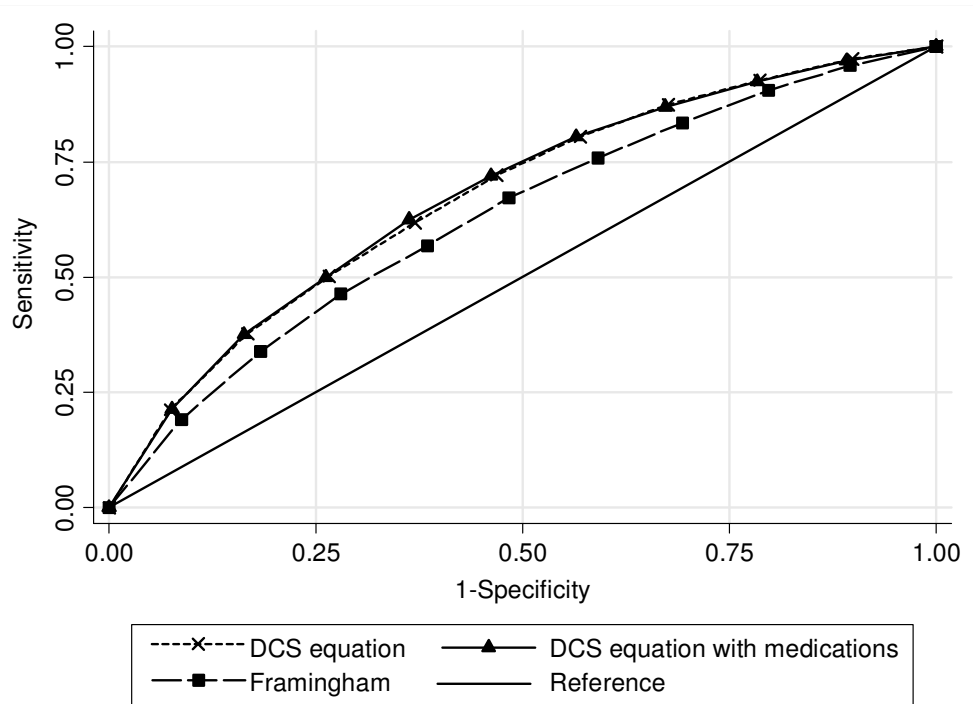
‡ Microalbuminuria indicates a urine albumin creatinine ratio of ≥ 2.5 mg/mmol in men or ≥ 3.5 mg/mmol in women; Macroalbuminuria indicates a urine albumin creatinine ratio of ≥ 30 .

Online Appendix Table 4: Diabetes Cohort Study estimates of 5-year CHD risk of a 55 year-old man (current smoker, SBP 140, TC:HDL 5, diabetes duration 5 years) compared with estimates using the UKPDS CHD equation

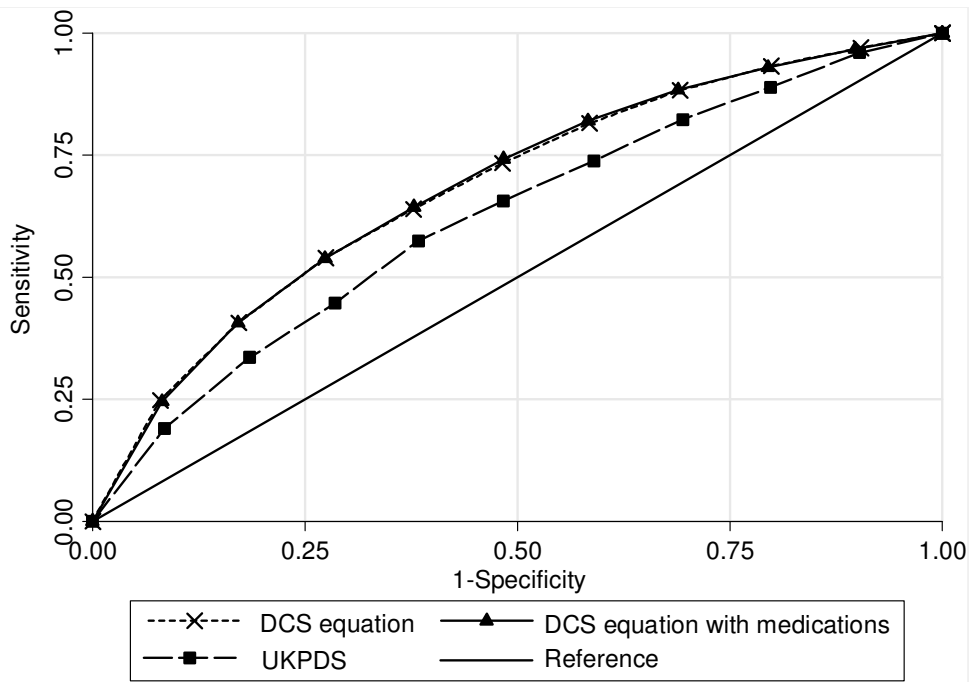
<i>Ethnicity</i>	<i>HbA1c (%)</i>	<i>Albuminuria</i>	<i>BP-lowering medication</i>	<i>DCS CHD 5 yr risk</i>	<i>DCS CHD 5 yr risk *</i>	<i>UKPDS CHD 5 yr risk</i>
European	6	No	No	7%	6%	6%
European	6	Micro†	No	8%	7%	6%
European	9	Macro‡	Yes	13%	13%	9%
Indian	6	No	No	8%	7%	6%
Indian	9	Macro	Yes	17%	17%	9%
Maori	6	No	No	8%	7%	6%
Maori	9	Micro	No	11%	10%	9%
Maori	9	Macro	Yes	17%	18%	9%
Pacific	6	No	No	6%	6%	6%
Pacific	9	Micro	No	9%	9%	9%
Pacific	9	Macro	Yes	12%	13%	9%

*Equation includes blood pressure lowering medication status. †'Micro' refers to microalbuminuria indicating a urine albumin creatinine ratio of ≥ 2.5 mg/mmol in men or ≥ 3.5 mg/mmol in women, and < 30 mg/mmol in both; ‡'Macro' refers to macroalbuminuria indicating a urine albumin creatinine ratio of ≥ 30 mg/mmol.

Online Appendix Figure 1a: Receiver operating curves of the Diabetes Cohort Study 5-year CVD equations (with and without medications included) vs the Framingham 5-year CVD equation when applied to the validation cohort



Online Appendix Figure 1b: Receiver operating curves of the Diabetes Cohort Study 5-year CHD equations (with and without medications included) vs the UKPDS 5-year CHD equation when applied to the validation cohort



Online Appendix Figure 2: Risks observed in the validation cohort compared with those predicted by the Diabetes Cohort Study (DCS) equation (A) and the Framingham equation.

