SUPPLEMENTARY DATA

Development and validation of a cardiovascular risk score for patients in the community after acute coronary syndrome

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APPENDIX A   Comparison of patient characteristics in derivation and validation cohorts

	Derivation cohort PREDICT	Validation cohort CDCS
n	13,703	2,014
Men	9,390 (69%)	1,448 (72%)
Age, years	63 (55-70)	67 (58-76)
≥ 70 years	3,578 (26%)	857 (43%)
Ethnicity		
European	7,966 (58%)	1,852 (92%)
NZ Māori	2,190 (16%)	61 (3%)
Pacific	1,754 (13%)	33 (1.6%)
Indian	1,266 (9%)	15 (0.7%)
Chinese/Other Asian	527 (4%)	43 (2.1%)
NZDep Index, quintile		
1 (least deprived)	2,258 (17%)	
2	2,332 (17%)	
3	2,352 (17%)	100%*
4	2,882 (21%)	
5 (most deprived)	3,879 (28%)	
Medical history		
Current smoker	2,095 (15%)	125 (6%)
Diabetes	4,597 (34%)	319 (16%)
Atrial fibrillation	1,954 (14%)	107 (5%)
Heart failure	2,476 (18%)	686 (34%)
Charlson comorbidity index (v2011)		
0	10,107 (74%)	
1-2	2,533 (19%)	Not available
≥3	1,063 (8%)	
Year of risk assessment		
2002-2006	-	1104 (55%)
2007-2011	6,269 (46%)	910 (45%)
2012-2016	7,434 (54%)	-
Most recent ACS event		
STEMI	3,838 (28%)	463 (23%)

NSTEMI	6,501 (47%)	1,027 (51%)
Unstable angina	3,364 (25%)	524 (26%)
Years since most recent ACS event	1.9 (0.5. 5.3)	0.35 (0.32, 0.38)
ACS within last 6 months	3,235 (24%)	2,008 (99.7%)
within last 3 months	1969	27
within last 3-6 months	1266	1981
ACS in last 6-12 months	1,724 (13%)	6
ACS in last 12-18 months	1,140 (8%)	-
ACS in last 18-24 months	839 (6%)	-
ACS in last 2-3 years	1,324 (10%)	-
ACS in last 3-5 years	1,814 (13%)	-
ACS 5+ years ago	3,627 (27%)	-
<u>Clinical measurements</u>		
Body mass index, kg/m^2	29 (26-33)	27 (24-30)
< 20	209 (2%)	56 (3%)
20 – 25	2,101 (15%)	584 (29%)
25 – 30	4,694 (34%)	867 (43%)
30 – 35	3,211 (23%)	354 (18%)
35 - 40	1,414 (10%)	86 (4%)
≥ 40	968 (7%)	48 (2%)
Unknown	1,106 (8%)	19 (1%)
Systolic BP, mmHg	130 (120-140)	130 (114-142)
< 100	270 (2%)	77 (4%)
100-120	2,784 (20%)	548 (6%)
120-140	6,479 (47%)	692 (34%)
140-160	3,186 (23%)	480 (24%)
≥ 160	984 (7%)	217 (11%)
TC:HDL	3.6 (2.9-4.4)	4.2 (3.4-5.2)
LDL, mmol/L	2.2 (1.7, 2.9)	2.9 (2.2, 3.6)
Unknown	5.6%	27%
HbA1c, mmol/mol - diabetes	55 (47-67)	
Unknown	1.0%	100%*
HbA1c, mmol/mol – no diabetes	40 (37-42)	
Unknown	34%	100%*

Creatinine, µmol/L	84 (72-97)	90 (80-110)
<100	9,624 (70%)	1,142 (57%)
100-149	2,225 (16%)	739 (37%)
≥150	503 (4%)	132 (7%)
Unknown	1,351 (10%)	1
Medications (prior 6 months)		
BP lowering	11,980 (87%)	1,852 (92%)
Lipid lowering	11,488 (84%)	1,764 (88%)
Anticoagulant	922 (7%)	166 (8%)
Antiplatelets	11,239 (82%)	1,786 (89%)
Follow-up		
Total follow-up, years	3.5 (1.6-5.5)	3.8 (2.3-5.6)
Any death	1,514 (11%)	441 (22%)
Non-fatal or fatal CVD	3,612 (26%)	859 (43%)
At 5 years	3,142 (23%)	712 (35%)
First event (within 5 years)**		
CV death	141 (4.5%)	99 (14%)
MI	1,202 (38%)	276 (39%)
Unstable angina	358 (11%)	182 (26%)
Stroke	301 (10%)	56 (8%)
Heart failure	534 (17%)	67 (9%)
Angina or other CHD	404 (13%)	Not coded
TIA or other cerebrovascular	76 (2.4%)	32 (4%)
PVD	126 (4.0%)	Not coded

Values are n (%) or median (inter-quartile range). BP=blood pressure, CV=cardiovascular, NZ=New Zealand, TC:HDL=ratio of total to high-density lipoprotein.
*The CDCS did not collect data on NZ Deprivation Index or HbA1c so all subjects were allocated to a median NZDep quintile of 3 and to the missing HbA1c category. ** When multiple CVD events were recorded during the same admission, events were prioritised in the order presented in the table.

APPENDIX B   ICD-10-AM codes used in this study to define history and outcome of CVD

History of atherosclerotic CVD

	ICD-10-AM codes
Myocardial infarction	NSTEMI: I214, I222 STEMI: I210-I213, I220-I221, I228-I229 Old or unspecified MI: I219, I252
Unstable angina	I200
Other coronary heart disease	Angina pectoris: I201, I208, I209 Complications of acute MI: I230-I236, I238 Other forms of acute IHD: I240, I248, I249 Atherosclerotic disease of native or graft vessels: I250, I2510-I2513 Aneurysm of heart or coronary artery: I253, I254 Ischaemic cardiomyopathy: I255 Silent MI, chronic IHD: I256, I258, I259 Cardiac arrest: I460, I469 NB: Dispensing of at least one anti-anginal medication on at least 3 occasions in the last 5 years was included in this definition.
Ischaemic stroke	Cerebral infarction: I630-I636, I638, I639 Stroke, not specified as haemorrhage or infarction (as these are usually ischaemic): I64 Sequelae of stroke: I693, I694
Haemorrhagic stroke	Subarachnoid haemorrhage: I600-I609 Intracerebral haemorrhage: I610-I616, I618, I619 Sequelae of haemorrhage: I690, I691
Transient ischaemic attack	Artery syndromes: G450-G453 Other or unspecified: G458, G459
Other cerebrovascular disease (CeVD)	Vascular syndromes of the brain: G460-G468 Occlusion and stenosis of cerebral arteries, not resulting in cerebral infarction: I651, I660-I664, I668, I669 Dissection of cerebral arteries, non-ruptured: I670 Cerebral atherosclerosis: I672 Sequelae of other and unspecified CeVD: I698
Peripheral vascular disease	Occlusion and stenosis of pre-cerebral arteries, not resulting in cerebral infarction: I650, I652, I653, I658, I659

	Atherosclerosis of peripheral vessel, including aorta: I700, I701, I7020-I7024, I708, I709 Aortic aneurysm, rupture or dissection: I7100-I7103, I711, I713-I716, I718 PVD, unspecified: I739 Arterial embolism and thrombosis: I740-I745, I748, I749 Diabetes mellitus with peripheral or other circulatory complications: E1050-E1052, E1150-E1152, E1350-E1352, E1451, E1452
Coronary procedures	PCI: 3530400, 3530500, 3531000-3531002, 3830000, 3830600-3830602, 3830900, 3831200, 3831201, 3831500,3831800, 9021800,9021801, Z955 Bypass graft or repair: 3849700-3849707, 3850000-3850004, 3850300-3850304, 3850500, 3863700, 9020100-9020103, Z951 Other: 3530401, 3530501, 3531003-3531005, 3845619, 3850500, 3850700, 3850800, 3850900
Peripheral procedures	Aneurysm excisions, repairs and replacements, bypasses, endarterectomies and patch grafts, resections and re-anastamoses, involving the following arteries. Carotid: 327000-3270011, 3270300, 3310000, 3350000 Aorta: 3270800-3270803, 3311200, 3311500, 3311800, 3312100, 3315100, 3315400, 3315700, 3316000, 3350900, 3351200, 3351500 Femoral: 3271200-3271201, 3271500-3271503, 3271800-3271801, 3273900, 3274200, 3274500, 3274800, 3275100-3275103, 3275400-3275402, 3275700-3275701, 3351501, 3352100, 3354200 Mesenteric : 3273000-3273001, 3273300-3273301, 3273600, 3353001, 3353300, 3353600 Other: 3276300-3276303, 3276305-3276314, 3276316-3276319, 3305000, 3305500, 3307500, 3308000, 3312400, 3312700, 3313000, 3316300, 3317200, 3317800, 3318100, 3350600-3350601, 3351800, 3352400, 3352700, 3353000, 3353900, 3354800-3354803, 3355100, 3355400, 3530000, 3530301, 3530304, 3530306, 3530307, 3530600-3530602, 3530700. 3530701, 3530900-3530902, 3530906-3530909, 3531200, 3531201, 3531500, 3531501, Z958, Z959 Bypass: 9021100-9021106, 9021200-9021210, 9022900, 9023000, 9023100

Outcome of CVD

Fatal or non-fatal	ICD-10-AM codes related to hospital discharge or mortality records
Myocardial infarction	As for history except I219, I252 (old or unspecified MI)
Unstable angina	As for history
Other coronary heart disease	As for history except I250, I2510-I2513, I258, I259 (atherosclerotic disease of native or graft vessels)
Ischaemic stroke	As for history except I693, I694 (sequelae of stroke)
Haemorrhagic stroke	As for history except I690, I691 (sequelae of stroke)
Transient ischaemic attack	As for history
Other cerebrovascular disease (CeVD)	As for history except I698 (sequelae of CeVD)
Peripheral vascular disease	As for history except I700, I701, I7020, I708, I709 (other); I714, I716 (aneurysm without rupture)
Coronary procedures	As for history except 3530401, 3530501, 3531003-3531005, 3845619, 3850500, 3850700, 3850800, 3850900 (other coronary procedures); Z951, Z955 (autopsy)
Peripheral procedures	As for history except Z958, Z959 (autopsy)
Other CVD (**fatal events only**)	E1053, E1059, E1153, E1159, E1353, E1359, E1453, E1459, I250, I2510-I2513, I258, I259, I461, I672, I690, I691, I693, I694, I698, I700, I701, I7020, I708, I709, I714, I716.

APPENDIX C   Medication groups

	Name
Blood pressure lowering	Beta-blocker
	Angiotensin-converting enzyme inhibitor
	Angiotensin receptor blocker
	Calcium channel blocker
	Thiazide
	Other anti-hypertensive agent: amiloride, clonidine, clopamide, hydralazine, methyldopa, triamterene
Lipid lowering	Statin
	Other lipid lowering: acipimox, bezafibrate, cholestyramine, clofibrate, colestipol, ezetimibe, gemfibrozil, nicotinic acid
Anticoagulation	Warfarin
	Dabigatran (the only subsidised formulation of a non-vitamin K oral anticoagulant available in NZ during the period of data collection in this study)
Antiplatelet	Aspirin
	Clopidogrel
	Dipyridamole
	Prasugrel
	Ticagrelor
	Ticlopidine
	NB: low molecular weight heparin is not part of standard general practice in NZ.

APPENDIX D   Multivariable model of time to subsequent cardiovascular event within 5 years

Variable	Levels	Adjusted Hazard Ratio (95% confidence interval)
Patient factors		
Male		1.09 (1.01, 1.17)
Age, years	30-50	1
	50-59	1.13 (0.98, 1.29)
	60-69	1.50 (1.31, 1.71)
	70-79	2.04 (1.77, 2.35)
Ethnicity	European	1
	NZ Māori	1.11 (1.01, 1.22)
	Pacific	0.99 (0.89, 1.11)
	Indian	1.02 (0.90, 1.16)
	Chinese/Asian	0.71 (0.57, 0.88)
NZ Deprivation quintile		1.10 (1.07, 1.13)
Medical history		
Current smoker		1.31 (1.19, 1.44)
Diabetes		1.35 (1.23, 1.48)
AF		1.32 (1.21, 1.44)
Heart failure		2.06 (1.90, 2.23)
Time since ACS	< 6 months	1.37 (1.25, 1.49)
	6-12 months	1.24 (1.12, 1.38)
	1-5 years	1
	≥5 years	0.88 (0.81, 0.96)
Type of ACS	Unstable angina	1
	NSTEMI	0.98 (0.90, 1.07)
	STEMI	0.85 (0.77, 0.93)
Clinical factors		
Body mass index, kg/m^2	<20	0.98 (0.73, 1.32)
	20-25	1.03 (0.92, 1.14)
	25-30	1
	30-35	0.96 (0.88, 1.05)
	35-40	0.96 (0.85, 1.08)
	≥40	0.98 (0.86, 1.12)
	Unknown	1.06 (0.91, 1.22)

Systolic BP, mmHg	<100	1.13 (0.90, 1.43)
	100-120	1
	120-140	0.95 (0.87, 1.04)
	140-160	0.99 (0.89, 1.09)
	≥160	1.16 (1.02, 1.32)
Laboratory values		
Total:HDL cholesterol		1.07 (1.04, 1.09)
HbA1c, mmol/mol	< 40	1
	40-65	1.10 (0.99, 1.23)
	≥ 65	1.42 (1.23, 1.64)
	Unknown	1.11 (1.00, 1.24)
Creatinine, μmol/L	<100	1
	100-149	1.21 (1.11, 1.32)
	≥150	1.81 (1.58, 2.08)
	Unknown	1.03 (0.92, 1.15)
Medications		
BP lowering		1.19 (1.04, 1.37)
Lipid lowering		0.94 (0.84, 1.05)
Antiplatelet or anticoagulant		1.01 (0.90, 1.13)
Baseline survival, 5 years		0. 7375466

NZ=New Zealand, BP=blood pressure, MI=myocardial infarction, HDL=high-density lipoprotein.

APPENDIX E   Predictors by outcome within 5 years in the derivation cohort

Variable	Levels	Experienced outcome, n=10,561	Did not experience outcome, n=3,142
Patient factors			
Male		7304 (69)	2086 (66)
Age, years	30-50	1324 (13)	265 (8)
	50-59	2997 (28)	643 (21)
	60-69	3777 (36)	1119 (36)
	70-79	2463 (23)	1115 (36)
Ethnicity	European	6308 (60)	1658 (53)
	NZ Māori	1546 (15)	644 (21)
	Pacific	1273 (12)	481 (15)
	Indian	989 (9)	277 (9)
	Chinese/Asian	445 (4)	82 (3)
NZ Deprivation quintile, mean (SD)		3.2 (1.45)	3.6 (1.39)
Medical history			
Current smoker		1579 (15)	516 (16)
Diabetes		3113 (30)	1484 (47)
Atrial fibrillation		1232 (12)	722 (23)
Heart failure		1344 (13)	1132 (36)
Time since ACS	< 6 months	2382 (23)	853 (27)
	6-12 months	1292 (12)	432 (14)
	1-5 years	3974 (38)	1143 (36)
	≥5 years	2913 (28)	714 (23)
Type of ACS	Unstable angina	2548 (28)	816 (26)
	NSTEMI	4899 (46)	1602 (51)
	STEMI	3114 (30)	724 (23)
Clinical factors			
Body mass index	<20 kg/m^2	166 (2)	43 (1)
	20-25 kg/m^2	1652 (16)	449 (14)
	25-30 kg/m^2	3672 (35)	1022 (33)
	30-35 kg/m^2	2444 (23)	767 (24)
	35-40 kg/m^2	1037 (10)	377 (12)
	≥40 kg/m^2	688 (7)	280 (9)

	Unknown	902 (9)	204 (7)
Systolic BP, mmHg	<100	198 (2)	72 (2)
	100-120	2149 (20)	635 (20)
	120-140	5105 (48)	1374 (44)
	140-160	2428 (23)	758 (24)
	≥160	681 (6)	303 (10)
Laboratory values			
Total:HDL cholesterol, mean (SD)		3.8 (1.20)	3.9 (1.31)
HbA1c, mmol/mol	< 40	2711 (26)	476 (15)
	40-65	4597 (44)	1450 (46)
	≥ 65	820 (8)	504 (16)
	Unknown	2433 (23)	712 (23)
Creatinine, µmol/L	<100	7758 (73)	1866 (59)
	100-149	1567 (15)	658 (21)
	≥150	237 (2)	266 (9)
	Unknown	999 (10)	352 (11)
Medications			
BP lowering		9106 (86)	2874 (92)
Lipid lowering		8807 (83)	2681 (85)
Antiplatelet or anticoagulant		8872 (84)	2752 (88)

Values are n (%) unless otherwise stated

APPENDIX F   Investigation of model interactions

Interactions to assess were decided *a priori*, with each considered separately in the multivariable Cox model. Interaction terms with a p-value <0.01 in the multivariable model were investigated further for their impact on the relative risks before deciding whether to include them in the final model.

Interactions to be assessed were:

    a) Lipid lowering medication x TC:HDL
    b) BP lowering medication x SBP category
    c) Ethnicity x diabetes status
    d) Ethnicity x BMI category
    e) Sex x diabetes

a) Lipid lowering medication x TC:HDL
There was no statistically significant interaction in the multivariable model (p=0.49).

b) BP lowering medication x SBP category
There was no statistically significant interaction in the multivariable model (p=0.89).

c) Ethnicity x diabetes status
There was a potentially significant interaction between Pacific * diabetes (adjHR = 0.76, 95% CI 0.62-0.92, p=0.006), which would attenuate the CVD risk associated with diabetes among Pacific peoples. Compared to a model without interactions between ethnic group and diabetes, the change in coefficients mean that a model with the interactions slightly decreases the absolute risk estimate for Māori and Pasifika with diabetes, and increases the risk estimate for Māori and Pasifika without diabetes. In contrast, it increases the risk estimate for Indian and Chinese/Other Asian people with diabetes and decreases the risk estimate for people in these groups without diabetes. Europeans with diabetes have a higher estimated risk in the model with this interaction term than in the model without. As the risk estimates would change for all ethnic groups even though the interaction was potentially statistically significant for only one group, it was decided to not include the interaction term in the final model.

d) Ethnicity x BMI category
There was no statistically significant interaction in the multivariable model (p=0.06)

e) Sex x diabetes
There was no statistically significant interaction in the multivariable model (p = 0.87)

Potentially significant interactions with ethnicity

Only point estimates are shown as they are what will impact on the risk score

Ethnicity and diabetes

		No interaction terms		Interaction with diabetes	
		Hazard ratio	Coefficient	Hazard ratio	Coefficient
Ethnicity	Māori	1.11	0.105383	1.19	0.176285
	Pacific	0.99	-0.006559	1.16	0.151835
	Indian	1.02	0.023097	0.91	-0.097658
	East Asian	0.71	-0.343475	0.68	-0.388105
Diabetes		1.35	0.300077	1.43	0.356807
Interaction with ethnicity	Māori	-	-	0.86	-0.151469
	Pacific	-	-	**0.76**	**-0.277897**
	Indian	-	-	1.17	0.153150
	East Asian	-	-	1.05	0.052628
Summary					
With diabetes	Māori	1.50	0.405460	1.46	0.381623
	Pacific	1.34	0.293518	1.26	0.230745
	Indian	1.38	0.323174	1.51	0.412299
	East Asian	0.96	-0.043398	1.02	0.021330
Without diabetes	Māori	1.11		1.19	
	Pacific	0.99		1.16	
	Indian	1.02		0.91	
	East Asian	0.71		0.68	

All coefficients and hazard ratios are adjusted for all other variables in the risk model however only a selection are shown here

APPENDIX G   Sensitivity analyses

a) After excluding people missing BMI or creatinine, n=11,344

Variable	Levels	Adjusted Hazard Ratio (95% confidence interval)
Patient factors		
Male		1.06 (0.97, 1.15)
Age, years	30-50	1
	50-59	1.17 (1.01, 1.35)
	60-69	1.51 (1.31, 1.74)
	70-79	1.93 (1.66, 2.26)
Ethnicity	European	1
	NZ Māori	1.07 (0.96, 1.19)
	Pacific	0.95 (0.84, 1.06)
	Indian	1.03 (0.90, 1.17)
	Chinese/Asian	0.71 (0.57, 0.89)
NZ Deprivation quintile		1.10 (1.07, 1.13)
Medical history		
Current smoker		1.32 (1.19, 1.47)
Diabetes		1.32 (1.19, 1.46)
AF		1.33 (1.21, 1.46)
Heart failure		2.09 (1.92, 2.28)
Time since ACS	< 6 months	1.39 (1.26, 1.52)
	6-12 months	1.22 (1.09, 1.37)
	1-5 years	1
	≥5 years	0.89 (0.80, 0.98)
Type of ACS	Unstable angina	1
	NSTEMI	0.97 (0.88, 1.06)
	STEMI	0.83 (0.75, 0.92)
Clinical factors		
Body mass index, kg/m^2	<20	1.05 (0.77, 1.43)
	20-25	1.03 (0.92, 1.15)
	25-30	1
	30-35	0.97 (0.88, 1.07)
	35-40	0.96 (0.85, 1.09)

	≥40	1.03 (0.90, 1.19)
	Unknown	-
Systolic BP, mmHg	<100	1.09 (0.84, 1.41)
	100-120	1
	120-140	0.93 (0.84, 1.02)
	140-160	0.97 (0.87, 1.08)
	≥160	1.20 (1.04, 1.38)
Laboratory values		
Total:HDL cholesterol		1.06 (1.03, 1.09)
HbA1c, mmol/mol	< 40	1
	40-65	1.11 (0.98, 1.25)
	≥ 65	1.46 (1.25, 1.71)
	Unknown	1.15 (1.02, 1.30)
Creatinine, µmol/L	<100	1
	100-149	1.22 (1.12, 1.34)
	≥150	1.87 (1.63, 2.15)
	Unknown	-
Medications		
BP lowering		1.12 (0.96, 1.31)
Lipid lowering		0.97 (0.85, 1.10)
Antiplatelet or anticoagulant		1.01 (0.88, 1.15)

b) Patients entering the cohort after the introduction of screening for diabetes was introduced in 2014. Of 3619 patients, 89 did not have a measure of HbA1c, leaving a cohort of 3530 with no missing data on HbA1c.

Variable	Levels	Adjusted Hazard Ratio (95% confidence interval)
Patient factors		
Male		1.05 (0.84, 1.31)
Age, years	30-50	1
	50-59	1.29 (0.88, 1.88)
	60-69	1.51 (1.03, 2.21)
	70-79	2.11 (1.40, 3.17)
Ethnicity	European	1
	NZ Māori	1.35 (1.01,1.80)
	Pacific	1.38 (0.99, 1.91)
	Indian	1.01 (0.69, 1.49)
	Chinese/Asian	0.68 (0.36, 1.26)
NZ Deprivation quintile		1.05 (0.97, 1.15)
Medical history		
Current smoker		1.18 (0.90, 1.55)
Diabetes		1.42 (1.08, 1.88)
AF		1.29 (1.01, 1.65)
Heart failure		2.33 (1.83, 2.96)
Time since ACS	< 6 months	1.53 (1.20, 1.96)
	6-12 months	1.04 (0.75, 1.42)
	1-5 years	1
	≥5 years	0.96 (0.68, 1.34)
Type of ACS	Unstable angina	1
	NSTEMI	0.90 (0.69, 1.19)
	STEMI	0.81 (0.59, 1.12)
Clinical factors		
Body mass index, kg/m^2	<20	1.30 (0.59, 2.87)
	20-25	1.01 (0.74, 1.38)
	25-30	1
	30-35	0.89 (0.68, 1.17)
	35-40	0.80 (0.56, 1.15)

	≥40	0.78 (0.53, 1.16)
	Unknown	0.79 (0.49, 1.27)
Systolic BP, mmHg	<100	0.80 (0.37, 1.77)
	100-120	1
	120-140	0.92 (0.71, 1.21)
	140-160	1.15 (0.86, 1.55)
	≥160	1.32 (0.90, 1.92)
Laboratory values		
Total:HDL cholesterol		1.06 (0.99, 1.14)
HbA1c, mmol/mol	< 40	1
	40-65	1.01 (0.77, 1.33)
	≥ 65	1.47 (0.99, 2.17)
	Unknown	-
Creatinine, µmol/L	<100	1
	100-149	1.32 (1.03, 1.70)
	≥150	1.58 (1.09, 2.29)
	Unknown	0.84 (0.27, 2.66)
Medications		
BP lowering		1.19 (0.79, 1.78)
Lipid lowering		0.91 (0.64, 1.29)
Antiplatelet or anticoagulant		0.84 (0.56, 1.25)

APPENDIX H   RISK SCORES

5-year risk of a fatal or non-fatal CVD event

	Coefficient	EXAMPLE	
		Patient A	Variable x coefficient
Male	0.081610672	Female	0
Age 50-59 years	0.119286797		0
Age 60-69 years	0.404605239	65 years old	0.404605239
Age 70-79 years	0.712618612		0
East Asian	-0.343475180		0
Indian	0.023096928	Indian	0.023096928
Māori	0.105383462		0
Pacific	-0.006558638		0
Deprivation, per quintile	0.092195916	Q5	0.4609796
Current smoker	0.269219624	Non-smoker	0
Diabetes	0.300077392	No diabetes	0
Atrial fibrillation	0.277377484	Not in AF	0
Heart failure	0.721588644	With heart failure	0.721588644
ACS within last 6 mths	0.312352943	65 days ago	0.312352943
ACS in last 6-12 mths	0.217361972		0
ACS 5+ years ago	-0.127669592		0
Prior ACS was NSTEMI	-0.019439784	NSTEMI	-0.019439784
Prior ACS was STEMI	-0.162354686		0
BMI < 20 kg/m^2	-0.016809677		0
BMI 20-25 kg/m^2	0.024913478		0
BMI 30-35 kg/m^2	-0.038068191		0
BMI 35-40 kg/m^2	-0.043920808		0
BMI ≥ 40 kg/m^2	-0.021965124		0
BMI not recorded	0.053631133	BMI not available	0.053631133
SBP < 100 mmHg	0.122860149		0
SBP 120-140 mmHg	-0.048141686	SBP = 118 mmHg	0
SBP 140-160 mmHg	-0.012938273		0
SBP ≥160 mmHg	0.148431220		0
TC:HDL, per unit	0.063583597	TC:HDL = 3.3	0.2098259

HbA1c 40-65 mmol/mol	0.097170489		0
HbA1c ≥65 mmol/mol	0.350079360		0
HbA1c not recorded	0.108350343	HbA1c not recorded	0.108350343
Creatinine 100-149 µmol/L	0.193636939	Creatinine = 52	0
Creatinine ≥ 150 µmol/L	0.595222744		0
Creatinine not recorded	0.026249535		0
BP lowering	0.175886952	Taking ACEi & BB	0.175886952
Lipid lowering	-0.060366705	Taking a statin	-0.060366705
Antiplatelet/anticoagulant	0.007374964	Taking antiplatelet	0.007374964
		Prognostic Index	2.397886
Mean prognostic index	1.538164		
Baseline survival	0.7375466		

PREDICT-ACS risk score

5-year risk of CVD event $= 1 - \text{Baseline survival}^{\exp(\text{prognostic index} - \text{mean prognostic index})}$

$$= 1 - 0.7375466^{\exp(\text{prognostic index} - 1.538164)}$$

Thus Patient A's 5-year risk of a broadly defined fatal or non-fatal CVD event

$$= 1 - 0.7375466^{\exp(2.397886 - 1.538164)}$$

$$= 0.5128619$$

$$= 51\%$$

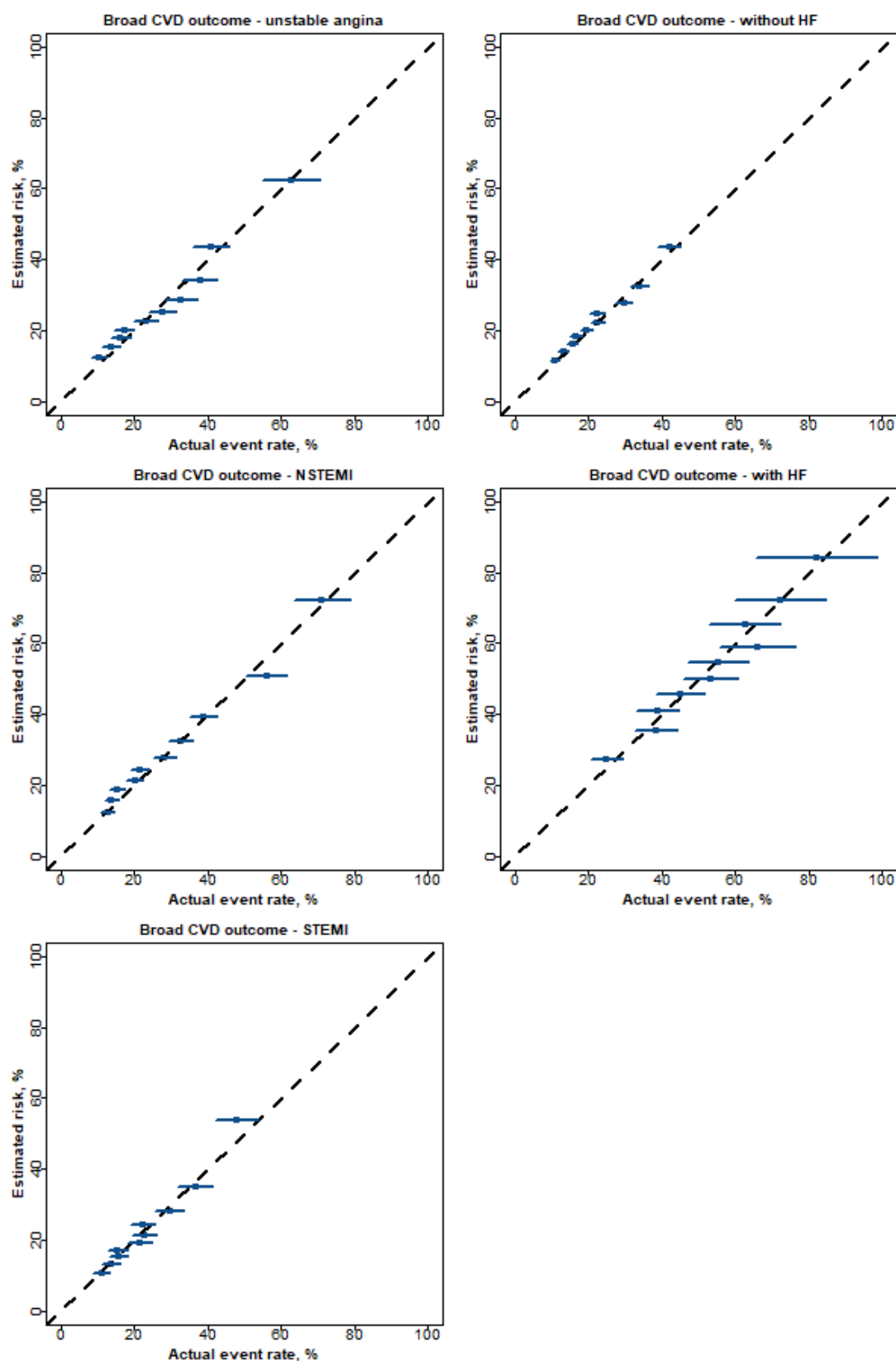NB: This patient was admitted for heart failure 3.5 years after risk assessment, and died 1.1 years later.
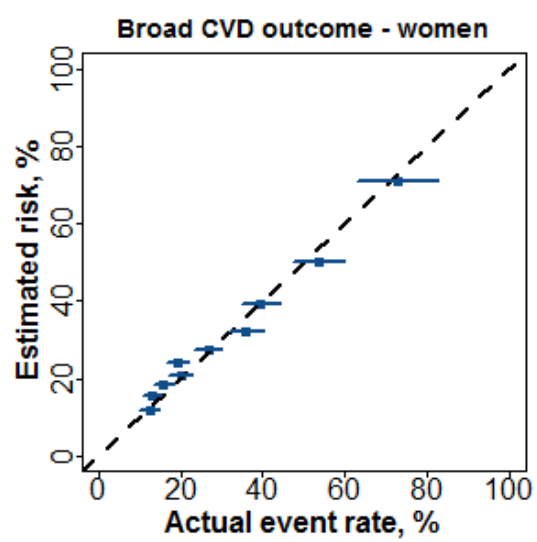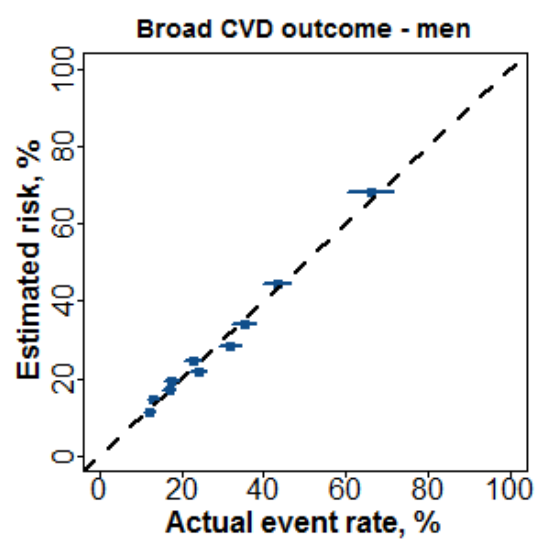
APPENDIX I   MODEL PERFORMANCE

		Mean (95% confidence interval)
Apparent performance		
Model fit*	Cox & Snell R^2, %	11.72 (11.69, 11.75)
	Nagelkerke R^2, %	11.83 (11.79, 11.86)
Discrimination	Harrell c-statistic	0.694 (0.684, 0.703)
	Gönen & Heller k-statistic	0.661 (0.654, 0.668)
Calibration	Expected v observed plots	Excellent
Internal validation		
Model fit	Cox & Snell R^2, %	11.96 (11.93, 11.99)
	Nagelkerke R^2, %	12.07 (12.03, 12.10)
Discrimination	Harrell c-statistic	0.695 (0.686, 0.705)
	Gönen & Heller k-statistic**	Mean = 0.663
		Standard error not calculated due to extreme time needed (and no evidence it will differ substantially from Apparent Performance)
External validation		
Discrimination	Harrell c-statistic	0.675 (0.654, 0.697)
	Gönen & Heller k-statistic	0.654 (0.638, 0.670)
Calibration	Expected v observed plots	Extremely good
		Slope of the linear predictor = 0.98

*confidence intervals derived from 1000 bootstrap samples
** mean derived from 1000 bootstrap samples

APPENDIX J **Stratified analyses of calibration when applying the score in the derivation (PREDICT) cohort**

Broad CVD outcome - unstable angina

Broad CVD outcome - without HF

Broad CVD outcome - NSTEMI

Broad CVD outcome - with HF

Broad CVD outcome - STEMI

Broad CVD outcome - men

Broad CVD outcome - women

APPENDIX K   Stratified analyses of calibration when applying the score in the validation (CDCS) cohort

Broad CVD outcome - men

Broad CVD outcome - women