Supplementary

Appendix 1. Definition of CVD History

A previous history of CVD or heart failure was defined as: a) a hospital admission for CVD or heart failure recorded between 1 January 1988 and 31 December 2011 according to the International Classification of Disease 9 (ICD-9) and International Classification of Disease - 10-Australian Modification (ICD-10-AM) listed below; or b) dispensing of loop diuretics (frusemide or bumetanide) or metolazone between 1 July 2006 and 31 December 2006. Loop diuretics are uncommonly used for conditions other than heart failure in New Zealand.

The following ICD 9 codes were used to identify a hospitalisation for CVD or heart failure between 1 January 1988 and 30 June 2001:

'A_' _-Diagnosis codes:

412, 430, 431, 436, 438, 4111, 4131, 4139, 4148, 4149, 4230, 4275, 4280, 4281, 4289, 4292, 4295, 4296, 4353, 4358, 4359, 4370, 4376, 4378, 4379, 4400, 4401, 4408, 4409, 4411, 4413, 4414, 4415, 4416, 4439, 4440, 4441, 4449, 25070, 25071, 36234, 40291, 40491, 40493, 41011, 41041, 41071, 41081, 41091, 41181, 41189, 41400, 41401, 41402, 41403, 41411, 41419, 42971, 42979, 43300, 43310, 43320, 43330, 43380, 43390, 43391, 43400, 43401, 43411, 43490, 43491, 44020, 44021, 44022, 44023, 44024, 44100, 44101, 44102, 44103, 44421, 44422, 44481, 44489

'O_'-Operation/procedure codes:

3572, 3601, 3603, 3605, 3606, 3607, 3611, 3612, 3613, 3614, 3615, 3616, 3699, 3732, 3800, 3810, 3812, 3814, 3815, 3816, 3818, 3820, 3832, 3836, 3842, 3844, 3846, 3848, 3869, 3922, 3925, 3926, 3928, 3929, 3952, 3956, 3957, 3959, 3999

'V_'-Supplementary classification/health factors:

V434, V4581, V4582

The ICD-10AM codes used to identify a history of CVD or heart failure between 1 July 2001 and 31 December 2011 are:

Diagnosis	**ICD-10-AM codes**
Myocardial infarction	I210, I211 - I214, I219 - I221, I228, I229
Unstable angina	I200
Other coronary heart disease	I201, I208, I209, I230- I236, I238, I240, I248, I249, I250-I256, I258, I259, I2510-I2513, I460, I469
Ischaemic stroke	I630 - I636, I638, I639, I64, I660-4, I668, I669, I693, I694, I698
Haemorrhagic stroke	I600 - I616, I618, I619, I690, I691
Transient ischaemic attack	G450 - G453, G458 - G468
Peripheral vascular disease	E1050 - E1052, E1059, E1150 - E1152, E1159, E1451, E1452, E1459, I650-I653, 1658, 1659, 1670, I7020, I7021 - I7024, I7100 - I7103, I711, I713, I715, I718, I739 - I745, I748, I749
Congestive heart failure	I110, I130, I132, I50, I500, I501, I509
CVD-related procedures	3270000 - 3270011, 3270300, 3270800 - 3270803, 3271200, 3271201, 3271500 - 3271503, 3271800, 3271801, 3273000, 3273001, 3273300, 3273301, 3273600, 3273900, 3274200, 3274500, 3274800, 3275100, 3275101 - 3275103, 3275400 - 3275402, 3275700, 3275701, 3276300 - 3276314, 3276316 - 3276319, 3305000, 3305500, 3307500, 3308000, 3310000, 3311200, 3311500, 3311800, 3312100, 3312400, 3312700, 3313000, 3315100, 3315400, 3315700, 3316000, 3316300, 3317800, 3318100, 3350000, 3350600, 3350601, 3350900, 3351200, 3351500, 3351501, 3351800, 3352100, 3352400, 3352700, 3353000, 3353001, 3353300, 3353600, 3353900, 3354200, 3354800, 3354801, 3354802, 3354803, 3355100, 3355400, 3530306, 3530307, 3530400, 3530401, 3530500, 3530501, 3530906, 3530907, 3530908, 3530909, 3531000, 3531001, 3531002, 3531003, 3531004, 3531005, 3531200, 3531201, 3531500, 3531501, 3845619, 3849700, 3849701, 3849702, 3849703, 3849704, 3849705, 3849706, 3849707, 3850000, 3850001, 3850002, 3850003, 3850004, 3850300, 3850301, 3850302, 3850303, 3850304, 3850500, 3850700, 3850800, 3850900, 3863700, 9020100, 9020101, 9020102, 9020103, 9022900, 9023000,
Other	I672, I700, I701, I708, I709, I714, Z951, Z955, Z958, Z959

Haemorrhagic stroke and heart failure are included in the CVD definition for a range of reasons. Firstly, most vascular risk factors are also risk factors for haemorrhagic stroke and heart failure. In addition, heart failure is frequently the first hospitalised presentation of ischaemic heart disease if ischaemic disease has previously manifest as silent myocardial infarction or as angina which was managed in the community. Coding and indeed diagnosis of heart failure aetiology

can be difficult so it has been common practice to include heart failure of any cause, and it would also be difficult to justify someone requiring hospitalisation for heart failure as not having CVD. There has been diagnostic uncertainty in the past between haemorrhagic vs ischaemic stroke, and ICD-10 coding can be equally ambiguous. The proportion of strokes that are haemorrhagic is low, so consistent with other groups using routinely collected health data for research, we chose to include haemorrhagic in the definition of stroke.

Supplementary Table 1. Adjusted hazard ratios for fatal or first non-fatal CVD events within 5 years in women and men without adjustment for gout or gout-associated predictors

	Women	Men
Predictor		
Age Bands		
< 40	0.25 (0.23-0.28)	0.22 (0.20-0.24)
40-49	1	1
50-59	1.86 (1.73-2.00)	2.02 (1.91-2.13)
60-69	3.67 (3.42-3.94)	3.28 (3.10-3.46)
70-79	7.72 (7.19-8.29)	5.84 (5.51-6.18)
Ethnicity		
Māori	1.83 (1.73-1.94)	1.62 (1.54-1.71)
New Zealand European	1	1
Pacific peoples	1.32 (1.24-1.41)	1.21 (1.14-1.28)
Indian	1.00 (0.92-1.10)	1.25 (1.17-1.33)
Chinese	0.61 (0.55-0.68)	0.53 (0.48-0.58)
Other [a]	0.74 (0.67-0.82)	0.73 (0.67-0.79)
Deprivation quintile (per quintile)	1.11 (1.10-1.13)	1.10 (1.09-1.11)
Diabetes	1.94 (1.82-2.07)	1.96 (1.85-2.07)
Atrial fibrillation [b]	2.05 (1.85-2.27)	1.51 (1.38-1.64)
Medication dispensing [c]		
Blood pressure lowering	1.87 (1.79-1.97)	1.55 (1.49-1.61)
Lipid lowering	0.93 (0.89-0.98)	0.96 (0.92-1.00)
Antiplatelet	1.28 (1.22-1.35)	1.18 (1.13-1.24)
Anticoagulation	1.41 (1.24-1.61)	1.43 (1.30-1.58)

Cox-proportional hazards model for fatal or first non-fatal CVD events adjusted for age, ethnicity, level of deprivation, history of diabetes, hospitalisation for atrial fibrillation and dispensing of blood pressure lowering, lipid lowering, antiplatelet and anticoagulant medications. [a] includes non-Chinese and non-Indian Asian, Middle Eastern, Latin American, African and others not specified. [b] hospitalisation for atrial fibrillation (primary or secondary diagnosis). [c] dispensing of these medications at least once in the previous 6 months prior to 1 January 2012..

Supplementary Table 2. The interaction between ethnicity and gout and their association with CVD events (Model 1).

a) Men

		No interaction term			**Interaction with gout**		
		Hazard ratio	Coefficient	Standard error	Hazard ratio	Coefficient	Standard error
Ethnicity	New Zealand European	1	-	-	1	-	-
	Māori	1.59	0.463307	0.026836	1.58	0.455047	0.029910
	Pacific peoples	1.18	0.161817	0.029340	1.18	0.164186	0.033327
	Indian	1.25	0.225279	0.034606	1.22	0.200144	0.036445
	Chinese	0.53	-0.635920	0.050054	0.51	-0.670349	0.053316
	Other	0.73	-0.319622	0.041001	0.69	-0.365529	0.043809
Gout		1.18	0.163144	0.024462	1.12	0.110410	0.034854
Interaction	Māori	-	-	-	1.06	0.062667	0.062789
	Pacific	-	-	-	1.03	0.026732	0.063009
	Indian	-	-	-	1.30	0.261960	0.111105
	Chinese	-	-	-	1.38	0.324610	0.154597
	Other	-	-	-	1.53	0.426641	0.123109
Summary							
With gout	Māori	**1.87 (1.75, 2.00)**	0.62645	0.0339	**1.87 (1.71, 2.06)**	0.62812	0.0481
	Pacific	**1.38 (1.29, 1.48)**	0.32496	0.0351	**1.35 (1.23, 1.48)**	0.30133	0.0471
	Indian	**1.47 (1.36, 1.60)**	0.38842	0.0428	**1.77 (1.45, 2.16)**	0.57251	0.0101
	Chinese	**0.62 (0.56, 0.70)**	-0.47278	0.0559	**0.79 (0.60, 1.04)**	-0.23533	0.1420
	Other	**0.86 (0.78, 0.94)**	-0.15648	0.0478	**1.19 (0.95, 1.48)**	0.17152	0.1112
Without gout	Māori	1.59			1.58		
	Pacific	1.18			1.18		
	Indian	1.25			1.22		
	Chinese	0.53			0.51		
	Other	0.73			0.69		

All coefficients and hazard ratios are adjusted for all other variables in the risk model however only the relevant subset are shown here. The 95% CIs around the total effects including the interaction term calculated from standard errors that have assumed independence between the three contributing standard errors.

b) Women

		No interaction term			Interaction with gout		
		Hazard ratio	Coefficient	Standard error	Hazard ratio	Coefficient	Standard error
Ethnicity	New Zealand European	1	-	-	1	-	-
	Māori	1.79	0.582542	0.029874	1.83	0.603552	0.030945
	Pacific peoples	1.29	0.255390	0.033173	1.31	0.268637	0.034770
	Indian	1.00	0.004505	0.046976	1.00	0.003103	0.048110
	Chinese	0.61	-0.494157	0.053714	0.61	-0.487570	0.054621
	Other	0.74	-0.305667	0.052197	0.74	-0.307619	0.053404
Gout		1.34	0.291862	0.041270	1.53	0.426032	0.066181
Interaction	Māori	-	-	-	0.76	-0.273721	0.102284
	Pacific	-	-	-	0.82	-0.193339	0.100054
	Indian	-	-	-	1.00	-0.003305	0.215391
	Chinese	-	-	-	0.83	-0.187161	0.300766
	Other	-	-	-	1.03	0.031361	0.250049
Summary							
With gout	Māori	**2.40 (2.18, 2.63)**	0.874404	0.0482	**2.13 (1.83, 2.48)**	0.755863	0.0768
	Pacific	**1.73 (1.57, 1.91)**	0.547252	0.0499	**1.65 (1.43, 1.91)**	0.501323	0.0732
	Indian	**1.34 (1.19, 1.52)**	0.296367	0.0626	**1.53 (1.03, 2.27)**	0.42583	0.2009
	Chinese	**0.82 (0.72, 0.93)**	-0.202295	0.0677	**0.78 (0.44, 1.37)**	-0.248699	0.2891
	Other	**0.99 (0.87, 1.12)**	-0.013805	0.0662	**1.16 (0.73, 1.85)**	0.149774	0.2363
Without gout	Māori	1.79			1.83		
	Pacific	1.29			1.31		
	Indian	1.00			1.00		
	Chinese	0.61			0.61		
	Other	0.74			0.74		

All coefficients and hazard ratios are adjusted for all other variables in the risk model however only the relevant subset are shown here. The 95% CIs around the total effects including the interaction term calculated from standard errors that have assumed independence between the three contributing standard errors.