**Supplementary Material**

Supplementary Table S1 ICD codes for ASCVD and N people

|  |  |  |
| --- | --- | --- |
| **icd.code** | **N** | **description** |
| G45.0 | 86 | Vertebro-basilar artery syndrome |
| G45.1 | 85 | Carotid artery syndrome (hemispheric) |
| G45.2 | 2 | Multiple and bilateral precerebral artery syndromes |
| G45.3 | 219 | Amaurosis fugax |
| G45.4 | 104 | Transient global amnesia |
| G45.8 | 226 | Other transient cerebral ischaemic attacks and related syndromes |
| G45.9 | 6651 | Transient cerebral ischaemic attack, unspecified |
| G46.0 | 20 | Middle cerebral artery syndrome |
| G46.1 | 63 | Anterior cerebral artery syndrome |
| G46.2 | 67 | Posterior cerebral artery syndrome |
| G46.3 | 21 | Brain stem stroke syndrome |
| G46.4 | 29 | Cerebellar stroke syndrome |
| G46.5 | 25 | Pure motor lacunar syndrome |
| G46.7 | 264 | Other lacunar syndromes |
| G46.8 | 9 | Other vascular syndromes of brain in cerebrovascular diseases |
| I11.0 | 215 | Hypertensive heart disease with (congestive) heart failure |
| I11.00 | 27 | Hypertensive heart disease with (congestive) heart failure -- Reduced Left Ventricular Ejection Fraction (ISD Extension) |
| I11.01 | 16 | Hypertensive heart disease with (congestive) heart failure -- Preserved Left Ventricular Ejection Fraction (ISD Extension) |
| I11.09 | 41 | Hypertensive heart disease with (congestive) heart failure -- No information on Left Ventricular Ejection Fraction (ISD Extension) |
| I11.9 | 375 | Hypertensive heart disease without (congestive) heart failure |
| I13.0 | 6 | Hypertensive heart and renal disease with (congestive) heart failure |
| I13.00 | 1 | Hypertensive heart and renal disease with (congestive) heart failure -- Reduced Left Ventricular Ejection Fraction (ISD Extension) |
| I13.09 | 1 | Hypertensive heart and renal disease with (congestive) heart failure -- No information on Left Ventricular Ejection Fraction (ISD Extension) |
| I13.1 | 10 | Hypertensive heart and renal disease with renal failure |
| I13.2 | 11 | Hypertensive heart and renal disease with both (congestive) heart failure and renal failure |
| I13.21 | 3 | Hypertensive heart and renal disease with both (congestive) heart failure and renal failure -- Preserved Left Ventricular Ejection Fraction (ISD Extension) |
| I13.9 | 28 | Hypertensive heart and renal disease, unspecified |
| I20.0 | 14034 | Unstable angina |
| I20.00 | 889 | Unstable angina -- Clinical statement - 'troponin positive' - (THIS EXTENSION NOW OBSOLETE) (ISD Extension) |
| I20.01 | 1391 | Unstable angina -- Clinical statement - 'troponin negative' - (THIS EXTENSION NOW OBSOLETE) (ISD Extension) |
| I20.02 | 365 | Unstable angina -- Coder knows troponin was measured but has no clinical statement of 'troponin positive' or 'troponin negative - (THIS EXTENSION NOW OBSOLETE) (ISD Extension) |
| I20.09 | 775 | Unstable angina -- Coder does not know if troponin was measure OR coder knows troponin not measured - (THIS EXTENSION NOW OBSOLETE) (ISD Extension) |
| I20.1 | 418 | Angina pectoris with documented spasm |
| I20.8 | 2814 | Other forms of angina pectoris |
| I20.9 | 67164 | Angina pectoris, unspecified |
| I21.0 | 3879 | Acute transmural myocardial infarction of anterior wall |
| I21.00 | 1236 | Acute transmural myocardial infarction of anterior wall -- Non-ST Elevated Myocardial Infarction (NSTEMI) (ISD Extension) |
| I21.01 | 2382 | Acute transmural myocardial infarction of anterior wall -- ST Elevated Myocardial Infarction (STEMI) (ISD Extension) |
| I21.09 | 265 | Acute transmural myocardial infarction of anterior wall -- MI with no statement of ST elevation or non-elevation (ISD Extension) |
| I21.1 | 6167 | Acute transmural myocardial infarction of inferior wall |
| I21.10 | 810 | Acute transmural myocardial infarction of inferior wall -- Non-ST Elevated Myocardial Infarction (NSTEMI) (ISD Extension) |
| I21.11 | 3454 | Acute transmural myocardial infarction of inferior wall -- ST Elevated Myocardial Infarction (STEMI) (ISD Extension) |
| I21.19 | 272 | Acute transmural myocardial infarction of inferior wall -- MI with no statement of ST elevation or non-elevation (ISD Extension) |
| I21.2 | 560 | Acute transmural myocardial infarction of other sites |
| I21.20 | 165 | Acute transmural myocardial infarction of other sites -- Non-ST Elevated Myocardial Infarction (NSTEMI) (ISD Extension) |
| I21.21 | 304 | Acute transmural myocardial infarction of other sites -- ST Elevated Myocardial Infarction (STEMI) (ISD Extension) |
| I21.29 | 62 | Acute transmural myocardial infarction of other sites -- MI with no statement of ST elevation or non-elevation (ISD Extension) |
| I21.3 | 223 | Acute transmural myocardial infarction of unspecified site |
| I21.30 | 473 | Acute transmural myocardial infarction of unspecified site -- Non-ST Elevated Myocardial Infarction (NSTEMI) (ISD Extension) |
| I21.31 | 36 | Acute transmural myocardial infarction of unspecified site -- ST Elevated Myocardial Infarction (STEMI) (ISD Extension) |
| I21.39 | 69 | Acute transmural myocardial infarction of unspecified site -- MI with no statement of ST elevation or non-elevation (ISD Extension) |
| I21.4 | 3384 | Acute subendocardial myocardial infarction |
| I21.40 | 306 | Acute subendocardial myocardial infarction -- Non-ST Elevated Myocardial Infarction (NSTEMI) (ISD Extension) |
| I21.41 | 16 | Acute subendocardial myocardial infarction -- ST Elevated Myocardial Infarction (STEMI) (ISD Extension) |
| I21.49 | 24 | Acute subendocardial myocardial infarction -- MI with no statement of ST elevation or non-elevation (ISD Extension) |
| I21.9 | 7163 | Acute myocardial infarction, unspecified |
| I21.90 | 16627 | Acute myocardial infarction, unspecified -- Non-ST Elevated Myocardial Infarction (NSTEMI) (ISD Extension) |
| I21.91 | 1100 | Acute myocardial infarction, unspecified -- ST Elevated Myocardial Infarction (STEMI) (ISD Extension) |
| I21.99 | 1120 | Acute myocardial infarction, unspecified -- MI with no statement of ST elevation or non-elevation (ISD Extension) |
| I22.0 | 218 | Subsequent myocardial infarction of anterior wall |
| I22.00 | 30 | Subsequent myocardial infarction of anterior wall -- Non-ST Elevated Myocardial Infarction (NSTEMI) (ISD Extension) |
| I22.01 | 36 | Subsequent myocardial infarction of anterior wall -- ST Elevated Myocardial Infarction (STEMI) (ISD Extension) |
| I22.09 | 10 | Subsequent myocardial infarction of anterior wall -- MI with no statement of ST elevation or non-elevation (ISD Extension) |
| I22.1 | 428 | Subsequent myocardial infarction of inferior wall |
| I22.10 | 28 | Subsequent myocardial infarction of inferior wall -- Non-ST Elevated Myocardial Infarction (NSTEMI) (ISD Extension) |
| I22.11 | 92 | Subsequent myocardial infarction of inferior wall -- ST Elevated Myocardial Infarction (STEMI) (ISD Extension) |
| I22.19 | 2 | Subsequent myocardial infarction of inferior wall -- MI with no statement of ST elevation or non-elevation (ISD Extension) |
| I22.8 | 483 | Subsequent myocardial infarction of other sites |
| I22.80 | 77 | Subsequent myocardial infarction of other sites -- Non-ST Elevated Myocardial Infarction (NSTEMI) (ISD Extension) |
| I22.81 | 9 | Subsequent myocardial infarction of other sites -- ST Elevated Myocardial Infarction (STEMI) (ISD Extension) |
| I22.89 | 5 | Subsequent myocardial infarction of other sites -- MI with no statement of ST elevation or non-elevation (ISD Extension) |
| I22.9 | 548 | Subsequent myocardial infarction of unspecified site |
| I22.90 | 643 | Subsequent myocardial infarction of unspecified site -- Non-ST Elevated Myocardial Infarction (NSTEMI) (ISD Extension) |
| I22.91 | 22 | Subsequent myocardial infarction of unspecified site -- ST Elevated Myocardial Infarction (STEMI) (ISD Extension) |
| I22.99 | 31 | Subsequent myocardial infarction of unspecified site -- MI with no statement of ST elevation or non-elevation (ISD Extension) |
| I23.1 | 14 | Atrial septal defect as current complication following acute myocardial infarction |
| I23.2 | 42 | Ventricular septal defect as current complication following acute myocardial infarction |
| I23.4 | 1 | Rupture of chordae tendineae as current complication following acute myocardial infarction |
| I23.5 | 7 | Rupture of papillary muscle as current complication following acute myocardial infarction |
| I23.6 | 9 | Thrombosis of atrium, auricular appendage, and ventricle as current complications following acute myocardial infarction |
| I23.8 | 29 | Other current complications following acute myocardial infarction |
| I24.0 | 1020 | Coronary thrombosis not resulting in myocardial infarction |
| I24.1 | 58 | Dressler syndrome |
| I24.8 | 2912 | Other forms of acute ischaemic heart disease |
| I24.9 | 1218 | Acute ischaemic heart disease, unspecified |
| I25.0 | 250 | Atherosclerotic cardiovascular disease, so described |
| I25.1 | 94143 | Atherosclerotic heart disease |
| I25.2 | 64485 | Old myocardial infarction |
| I25.3 | 257 | Aneurysm of heart |
| I25.4 | 271 | Coronary artery aneurysm and dissection |
| I25.5 | 480 | Ischaemic cardiomyopathy |
| I25.50 | 86 | Ischaemic cardiomyopathy -- Reduced Left Ventricular Ejection Fraction (ISD Extension) |
| I25.59 | 82 | Ischaemic cardiomyopathy -- No information on Left Ventricular Ejection Fraction (ISD Extension) |
| I25.6 | 34 | Silent myocardial ischaemia |
| I25.8 | 3251 | Other forms of chronic ischaemic heart disease |
| I25.9 | 75338 | Chronic ischaemic heart disease, unspecified |
| I50.0 | 4326 | Congestive heart failure |
| I50.00 | 1688 | Congestive heart failure -- Reduced Left Ventricular Ejection Fraction (ISD Extension) |
| I50.01 | 494 | Congestive heart failure -- Preserved Left Ventricular Ejection Fraction (ISD Extension) |
| I50.09 | 5793 | Congestive heart failure -- No information on Left Ventricular Ejection Fraction (ISD Extension) |
| I50.1 | 15838 | Left ventricular failure |
| I50.10 | 3501 | Left ventricular failure -- Reduced Left Ventricular Ejection Fraction (ISD Extension) |
| I50.11 | 496 | Left ventricular failure -- Preserved Left Ventricular Ejection Fraction (ISD Extension) |
| I50.19 | 3967 | Left ventricular failure -- No information on Left Ventricular Ejection Fraction (ISD Extension) |
| I50.9 | 3178 | Heart failure, unspecified |
| I50.90 | 1525 | Heart failure, unspecified -- Reduced Left Ventricular Ejection Fraction (ISD Extension) |
| I50.91 | 507 | Heart failure, unspecified -- Preserved Left Ventricular Ejection Fraction (ISD Extension) |
| I50.99 | 4104 | Heart failure, unspecified -- No information on Left Ventricular Ejection Fraction (ISD Extension) |
| I63.0 | 53 | Cerebral infarction due to thrombosis of precerebral arteries |
| I63.1 | 15 | Cerebral infarction due to embolism of precerebral arteries |
| I63.2 | 370 | Cerebral infarction due to unspecified occlusion or stenosis of precerebral arteries |
| I63.3 | 133 | Cerebral infarction due to thrombosis of cerebral arteries |
| I63.4 | 116 | Cerebral infarction due to embolism of cerebral arteries |
| I63.5 | 865 | Cerebral infarction due to unspecified occlusion or stenosis of cerebral arteries |
| I63.6 | 7 | Cerebral infarction due to cerebral venous thrombosis, non-pyogenic |
| I63.8 | 3319 | Other cerebral infarction |
| I63.9 | 11136 | Cerebral infarction, unspecified |
| I64.0 | 8261 | Stroke, not specified as haemorrhage or infarction |
| I65.0 | 150 | Occlusion and stenosis of vertebral artery |
| I65.1 | 28 | Occlusion and stenosis of basilar artery |
| I65.2 | 4409 | Occlusion and stenosis of carotid artery |
| I65.3 | 21 | Occlusion and stenosis of multiple and bilateral precerebral arteries |
| I65.8 | 16 | Occlusion and stenosis of other precerebral artery |
| I65.9 | 8 | Occlusion and stenosis of unspecified precerebral artery |
| I66.0 | 60 | Occlusion and stenosis of middle cerebral artery |
| I66.1 | 80 | Occlusion and stenosis of anterior cerebral artery |
| I66.2 | 77 | Occlusion and stenosis of posterior cerebral artery |
| I66.3 | 41 | Occlusion and stenosis of cerebellar arteries |
| I66.4 | 440 | Occlusion and stenosis of multiple and bilateral cerebral arteries |
| I66.8 | 10 | Occlusion and stenosis of other cerebral artery |
| I66.9 | 244 | Occlusion and stenosis of unspecified cerebral artery |
| I69.3 | 550 | Sequelae of cerebral infarction |
| I69.4 | 2754 | Sequelae of stroke, not specified as haemorrhage or infarction |
| I70.2 | 1501 | Atherosclerosis of arteries of extremities |
| I70.20 | 272 | Atherosclerosis of arteries of extremities |
| I70.21 | 167 | Atherosclerosis of arteries of extremities |
| I70.8 | 293 | Atherosclerosis of other arteries |
| I70.80 | 101 | Atherosclerosis of other arteries |
| I70.81 | 7 | Atherosclerosis of other arteries |
| I70.9 | 102 | Generalized and unspecified atherosclerosis |
| I70.90 | 55 | Generalized and unspecified atherosclerosis |
| I70.91 | 1 | Generalized and unspecified atherosclerosis |
| I73.9 | 26659 | Peripheral vascular disease, unspecified |
| I79.2 | 894 | Peripheral angiopathy in diseases classified elsewhere |

Table S2 – Changes in risk classification and drug eligibility according to sensitivity analysis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sensitivity analysis** | **Risk category** | **N**  | **Absolute change (N)** | **Percentage age change from baseline** |
| Baseline analysis as described in manuscript (*used as denominator throughout*) | Very high risk | 188,367 |  |  |
| High risk | 25,957 |  |  |
| **Total eligiblea** | **80,830** |  |  |
| Moderate risk | 51,450 |  |  |
| Maximal ICD-Codes* I10-120 (hypertensive disease and ischaemic heart disease)
* I60-I66 (all cerebrovascular disease)
* I70-I79 (atherosclerosis, aortic and other aneurysms, PVD, arterial embolism and thrombosis and capillary diseases)
 | Very high risk | 197,233 | 8,866 | 4.71 |
| High risk | 21,017 | -4,940 | -19.03 |
| **Total eligiblea** | **82,994** | **2,164** | **2.68** |
| Moderate risk | 47,524 | -3,926 | -7.63 |
| Microalbuminuria only | Very high risk | 175,092 | -13,275 | -7.05 |
| High risk | 32,428 | 6,471 | 24.93 |
| **Total eligiblea** | **77,521** | **-3,309** | **-4.09** |
| Moderate risk | 58,254 | 6,084 | 13.22 |
| Retinopathy, including background retinopathy (>R1) | Very high risk | 189,090 | 723 | 0.38 |
| High risk | 25,478 | -479 | -1.85 |
| **Total eligiblea** | **80,914** | **84** | **0.10** |
| Moderate risk | 51,206 | -244 | -0.47 |
| Age risk factor ≥60y | Very high risk | 198,141 | 9,774 | 5.19 |
| High risk | 22,901 | -3,056 | -11.77 |
| **Total eligiblea** | **84,729** | **3,899** | **4.82** |
| Moderate risk | 44,732 | -6,718 | -13.06 |
| Age risk factor ≥70y | Very high risk | 178,070 | -10,297 | -5.47 |
| High risk | 29,643 | 3,686 | 14.20 |
| **Total eligiblea** | **76,722** | **-4,108** | **-5.08** |
| Moderate risk | 58,061 | 6,611 | 12.85 |
| SBP ≥130mmHg | Very high risk | 192,315 | 3,948 | 2.10 |
| High risk | 25,257 | -700 | -2.70 |
| **Total eligiblea** | **82,626** | **1,796** | **2.22** |
| Moderate risk | 48,202 | -3,248 | -6.31 |
| SBP ≥140mmHg | Very high risk | 185,618 | -2,749 | -1.46 |
| High risk | 26,506 | 549 | 2.12 |
| **Total eligiblea** | **79,558** | **-1,272** | **-1.57** |
| Moderate risk | 53,650 | 2,200 | 4.28 |
| LDL-C ≥2.0mmol/L | Very high risk | 194,027 | 5,660 | 3.00 |
| High risk | 23,961 | -1,996 | -7.69 |
| **Total eligiblea** | **83,009** | **2,179** | **2.70** |
| Moderate risk | 47,786 | -3,664 | -7.12 |
| LDL-C ≥3.0mmol/L | Very high risk | 187,164 | -1,203 | -0.64 |
| High risk | 26,277 | 320 | 1.23 |
| **Total eligiblea** | **80,294** | **-536** | **-0.66** |
| Moderate risk | 52,333 | 883 | 1.72 |
| TC ≥5.0mmol/L | Very high risk | 180,526 | -7,841 | -4.16 |
| High risk | 28,353 | 2,396 | 9.23 |
| **Total eligiblea** | **77,419** | **-3,411** | **-4.22** |
| Moderate risk | 56,895 | 5,455 | 10.58 |
| TC ≥4.0mmol/L | Very high risk | 200,716 | 12,349 | 6.56 |
| High risk | 21,603 | -4,354 | -16.77 |
| **Total eligiblea** | **85,624** | **4,794** | **5.93** |
| Moderate risk | 43,455 | -7,996 | -15.54 |
| **Eligibility Thresholds** b **- excluding those with:** |
| HbA1c ≤48mmol/mol (≤6.5%) | **Total eligiblea** | **44,392** | **-38,602** | **-45.08** |
| HbA1c ≤53mmol/mol(≤7%) | **Total eligiblea** | **27,159** | **-55,835** | **-66.40** |
| HbA1c ≤58mmol/mol(≤7.5%) | **Total eligiblea** | **16,181** | **-66,813** | **-79.98** |
| ≥80y | **Total eligiblea** | **63,739** | **-19,255** | **-21.14** |
| ≥85y | **Total eligiblea** | **73,021** | **-9,973** | **-9.66** |
| ≥90y | **Total eligiblea** | **78,350** | **-4,644** | **-3.06** |

a = Total eligible only includes those people who are drug-naïve or on metformin monotherapy.

b = characteristics not included in risk stratification criteria (hence risk categories not reported). People above/below specified cut off excluded (having previously been either drug-naïve or on metformin monotherapy and eligible).

Supplementary Table S3 – ATC codes used for drugs that affect CVD risk

|  |  |
| --- | --- |
| **Drug/Drug Class** | **ATC Code** |
| All cardiovascular drugs | C |
| Lipid modifying drugsStatinsOther lipid modifying agents (incl. PSCK-9 inhibitors) | C10AAC10AX |
| Anti-hypertensivesAnti-hypertensivesDiureticsBeta-blockersCalcium channel blockersAgents acting on RAA system | C02C03C07C08C09 |
| Anti-platelet agentsAspirinP2Y12 inhibitorsOther anti-platelets | B01AC06, N02BA01B01AC04, B01AC22, B01AC24B01AC07, B01AC09, B01AC11, B01AC13, B01AC16, B01AC17, B01AC21  |
| Anti-coagulants | B01AA, B01AE, B01AF |