**SUPPLEMENTAL MATERIALS**

**eTable 1. List of Variable and Endpoint Codes**

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| **Variable** | **Code(s)** | **Code Description** |
| Atrial fibrillation | 427.3x | ICD-9 Diagnosis |
| I48 | ICD-10 Diagnosis |
| Ischemic stroke | 433.01, 433.11, 433.21, 433.31, 433.81, 433.91, 434.01, 434.11, 434.91, 436.x | ICD-9 Diagnosis |
| I63 | ICD-10 Diagnosis |
| Hemorrhagic stroke | 430.xx-432.xx | ICD-9 Diagnosis |
| I60-I62 | ICD-10 Diagnosis |
| Systemic embolism | 444.0x, 444.01  444.09, 444.1, 444.2x, 444.21, 444.22, 444.8x, 444.81, 444.89,  444.9 | ICD-9 Diagnosis |
| I74 | ICD-10 Diagnosis |
| Deep vein thrombosis | 451.11, 451.19, 451.2  451.81, 451.83, 451.84, 451.89, 451.9, 452, 453.1, 453.2, 453.3, 453.4, 453.40, 453.41, 453.42, 453.82, 453.83, 453.84, 453.85, 453.86, 453.87, 453.89, 453.9 | ICD-9 Diagnosis |
| I80-I82 | ICD-10 Diagnosis |
| Pulmonary embolism | 415.1x | ICD-9 Diagnosis |
| I26 | ICD-10 Diagnosis |
| Mitral stenosis | 394.0x, 394.2x, 396.0x, 396.1x, 746.5x, 996.02, 996.71 | ICD-9 Diagnosis |
| I05, I08.0, I08.1, I08.3, I08.8, I08.9, I34.2, Q23.2 | ICD-10 Diagnosis |
| Heart valve/complications | 093.2, 394.x - 397.x, 424.x, 746.3 - 746.6, V42.2, V43.3, 35.20  35.22, 35.23, 35.24,  35.97 | ICD-9 Diagnosis and Procedure |
| Z95.2-Z95.4  T82.0, T82.22, T82.827, T82.837, T82.847, T82.857, T82.867, T82.897, T82.9 | ICD-10 Diagnosis |
| Aortic valve replacement | 33405, 33406, 33410, 33411, 33412, 33413 | CPT-4 Procedure |
| 33405, 33406, 33410, 33411, 33412, 33413 | CPT-4 Procedure |
| Transcatheter aortic valve replacement | 33361-33369 | CPT-4 Procedure |
| Pulmonary valve replacement | 33475 | CPT-4 Procedure |
| Mitral valve replacement | 33430 | CPT-4 Procedure |
| Tricuspid valve replacement | 33465 | CPT-4 Procedure |
| Valvotomy/valvuloplasty for mitral stenosis | 33420, 33422, 33425, 33426, 33427, 92987 | CPT-4 Procedure |
| Heart failure | 398.91, 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, 425.4 - 425.9, 428.x | ICD-9 Diagnosis |
| I09.9, I11.0, I13.0, I13.2, I25.5, I42.0, 142.5-I42.9, I43.x, I50.x, P29.0 | ICD-10 Diagnosis |
| Hypertension | 401.x, 402.x - 405.x | ICD-9 Diagnosis |
| I10.x, I11.x-I13.x, I15.x, I16.x | ICD-10 Diagnosis |
| Diabetes mellitus | 250.0 - 250.3, 250.4 - 250.9 | ICD-9 Diagnosis |
| E10.0, E10.1, E10.9, E11.0, E11.1, E11.9, E12.0, E12.1, 12.9, E13.0, E13.1, E13.9, E10.2-E10.8,  E11.2-E11.8, E12.2-E12.8, E13.2-E13.8, E14.0-E14.9 | ICD-10 Diagnosis |
| Stroke | 433.x1, 434.x1, 436 | ICD-9 Diagnosis |
| I60.x, I61.x, I62.x, I63.x | ICD-10 Diagnosis |
| Transient ischemic attack | 435.x | ICD-9 Diagnosis |
| G45.0, G45.1, G45.2, G45.4, G45.8, G45.9 | ICD-10 Diagnosis |
| Bariatric surgery | 43842, 43843, 43845-43858, 43631-43635, 43659, 43770-43775, 43886-43999, S2083 | CPT-4 Procedure |
| 43842, 43843, 43845-43858, 43631-43635, 43659, 43770-43775, 43886-43999, S2083 | CPT-4 Procedure |
| Peripheral vascular disease | 440.0, 440.1, 440.2, 440.20, 440.21, 440.22, 440.23, 440.29, 440.4, 443.8, 443.81, 443.82, 443.89, 443.9 | ICD-9 Diagnosis |
| E08.51, E08.52, E09.51, E09.52, E10.51, E10.52, E11.51, E11.52, E13.51, E13.52, I70.0, I70.1, I70.201, I70.202, I70.203, I70.208, I70.209, I70.211, I70.212, I70.213, I70.218, I70.219, I70.221, I70.222, I70.223, I70.228, I70.229, I70.231, I70.232, I70.233, I70.234, I70.235, I70.238, I70.239, I70.241, I70.242, I70.243, I70.244, I70.245, I70.248, I70.249, I70.25, I70.291, I70.292, I70.293, I70.298, I70.299, I70.92, I73.81, I73.89, I73.9, I79.1, I79.8 | ICD-10 Diagnosis |
| Myocardial infarction | 410.01, 410.11, 410.21, 410.31, 410.41, 410.51, 410.61, 410.71, 410.81, 410.91, 412 | ICD-9 Diagnosis |
| I21, I21.0, I21.01, I21.02, I21.09, I21.1, I21.11, I21.19, I21.2, I21.21, I21.29, I21.3, I21.4, I22, I22.0, I22.1, I22.2, I22.8, I22.9, I23, I23.0, I23.1, I23.2, I23.3, I23.4, I23.5, I23.6, I23.7, I23.8, I25.2 | ICD-10 Diagnosis |
| Percutaneous coronary intervention | 00.60, 00.61, 00.62, 00.63, 00.64, 00.65, 00.66, 00.67, 00.68, 36.0x, 36.03, 36.04, 36.06, 36.07, 36.09, 39.50, 92928, 92929, 92933, 92934,  92937, 92938, 92941, 92943, 92944, 92980,  92981, 92982,92984, 92995, 92996, C9600, C9601,C9602, C9603,C9604, C9605,C9606, C9607,C9608, G0290,G0291 | ICD-9 Procedure/CPT-4/HCPCS |
| 0270, 0271, 0272,0273, 027F, 027G,027H, 027J, 027K,027L, 027P, 027Q,027R, 027S, 027T,027U, 027V, 027W,027X, 02C0, 02C1,02C2, 02C3, 02CP,02CQ, 02CR, 02CS,02CT, 02CV, 02CW,0370 – 0379, 037A – 037D, 037F – 037H,037J – 037N, 037P – 037V, 03CM3ZZ, 03CN3ZZ, 03CP3ZZ, 03CQ3ZZ, 0470 – 0479, 047A – 047F, 047H, 047J – 047N, 047P – 047W, 047Y,0570 – 0579, 057A – 057D, 057F – 057H,057L – 057N, 057P – 057T, 057V, 057Y,0670 – 0673, 0675 – 0679, 067B – 067D,067F – 067H, 067J, 067M – 067N, 067P – 067T, 067V, 067Y, 3E07017, 3E070PZ,3E07317, 3E073PZ,4A030B1, 4A030BF,4A033B1, 4A033BF,4A040B1, 4A040B3,4A043B1, 4A043B3,4A140B1, 4A140B3,4A143B1, 4A143B3, 92928, 92929, 92933, 92934, 92937, 92938, 92941, 92943,92944, 92980, 92981, 92982,92984, 92995, 92996, C9600, C9601,C9602, C9603,C9604, C9605,C9606, C9607,C9608, G0290,G0291 | ICD-10 Procedure/CPT-4/HCPCS |
| Coronary artery bypass grafting | 36.1x, 33510, 33511,33512, 33513, 33514, 33516, 33517, 33518, 33519, 33521, 33522, 33523, 33533, 33534, 33535, 33536, 33572, S2205, S2206, S2207, S2208, S2209, G8158, G8159 | ICD-9 Procedure/CPT-4/HCPCS |
| 0210x, 0211x, 0212x, 0213x, 33510, 33511,33512, 33513, 33514, 33516, 33517, 33518, 33519, 33521, 33522, 33523, 33533, 33534, 33535, 33536, 33572, S2205, S2206, S2207, S2208, S2209, G8158, G8159 | ICD-10 Procedure/ CPT-4/HCPCS |
| Gastrointestinal bleeding | Per Cunningham Algorithm | ICD-9 Diagnosis |
| Per Cunningham Algorithm cross-walked using CMS General Equivalence Mapping from cms.gov | ICD-10 Diagnosis |
| Acute kidney injury | 580.x, 584.x | ICD-9 Diagnosis |
| N00, N00.1, N00.2, N00.3, N00.4, N00.5, N00.6, N00.7, N00.8, N00.9, N01, N01.0, N01.1, N01.2, N01.3, N01.4, N01.5, N01.6, N01.7, N01.8, N01.9, N17, N17.0, N17.1, N17.2, N17.8, N17.9 | ICD-10 Diagnosis |
| Chronic kidney disease | 016.00, 016.01, 016.02, 016.03, 016.04, 016.05, 016.06, 095.4, 189.0, 189.9, 223.0, 236.91, 249.40, 249.41, 250.40, 250.41, 250.42, 250.43, 271.4, 274.10, 283.11, 403.01, 403.11, 403.91, 404.02, 404.03, 404.12, 404.13, 404.92, 404.93, 440.1, 442.1, 572.4, 580.0, 580.4, 580.81, 580.89, 580.9, 581.0, 581.1, 581.2, 581.3, 581.81, 581.89, 581.9, 582.0, 582.1, 582.2, 582.4, 582.81, 582.89, 582.9, 583.0, 583.1, 583.2, 583.4, 583.6, 583.7, 583.81, 583.89, 583.9, 584.5, 584.6, 584.7, 584.8, 584.9, 585.1, 585.2, 585.3, 585.4, 585.5, 585.6, 585.9, 586, 587, 588.0, 588.1, 588.81, 588.89, 588.9, 591, 753.12, 753.13, 753.14, 753.15, 753.16, 753.17, 753.19, 753.20, 753.21, 753.22, 753.23, 753.29, 794.4 | ICD-9 Diagnosis |
| N07.1, N07.2, N07.3, N07.4, N07.5, N07.6, N07.7, N07.8, N07.9, N08, N13.1, N13.2, N13.30, N13.39, N14.0, N14.1, N14.2, N14.3, N14.4, N15.0, N15.8, N15.9, N16, N17.0, N17.1, N17.2, N17.8, N17.9, N18.1, N18.2, N18.3, N18.4, N18.5, N18.6, N18.9, N19, N25.0, N25.1, N25.81, N25.89, N25.9, N26.1, N26.9, Q61.02, Q61.11, Q61.19, Q61.2, Q61.3, Q61.4, Q61.5, Q61.8, Q62.0, Q62.2, Q62.10, Q62.11, Q62.12, Q62.31, Q62.32, Q62.39, R94.4, M10.379, M10.38, M10.39, M32.14, M32.15, M35.04, N00.0, N00.1, N00.2, N00.3, N00.4, N00.5, N00.6, N00.7, N00.8, N00.9, N01.0, N01.1, N01.2, N01.3, N01.4, N01.5, N01.6, N01.7, N01.8, N01.9, N02.0, N02.1, N02.2, N02.3, N02.4, N02.5, N02.6, N02.7, N02.8, N02.9, N03.0, N03.1, N03.2, N03.3, N03.4, N03.5, N03.6, N03.7, N03.8, N03.9, N04.0, N04.1, N04.2, N04.3, N04.4, N04.5, N04.6, N04.7, N04.8, N04.9, N05.0, N05.1, N05.2, N05.3, N05.4, N05.5, N05.6, N05.7, N05.8, N05.9, N06.0, N06.1, N06.2, N06.3, N06.4, N06.5, N06.6, N06.7, N06.8, N06.9, N07.0, A18.11, A52.75, B52.0, C64.1, C64.2, C64.9, C68.9, D30.00, D30.01, D30.02, D41.00, D41.01, D41.02, D41.10, D41.11, D41.12, D41.20, D41.21, D41.22, D59.3, E08.21, E08.22, E08.29, E08.65, E09.21, E09.22, E09.29, E10.21, E10.22, E10.29, E10.65, E11.21, E11.22, E11.29, E11.65, E13.21, E13.22, E13.29, E74.8, I12.0, I13.11, I13.2, I70.1, I72.2, K76.7, M10.30, M10.311, M10.312, M10.319, M10.321, M10.322, M10.329, M10.331, M10.332, M10.339, M10.341, M10.342, M10.349, M10.351, M10.352, M10.359, M10.361, M10.362, M10.369, M10.371, M10.372, N18.6, N18.3, N18.4 | ICD-10 Diagnosis |
| End-stage renal disease | 585.5, 585.6 | ICD-9 Diagnosis |
| N18.5, N18.6 | ICD-10 Diagnosis |
| Liver disease | 070.22, 070.23, 070.32, 070.33, 070.44, 070.54, 070.6, 070.9, 456.0 - 456.2, 570.x, 571.x, 572.2 - 572.8, 573.3, 573.4, 573.8, 573.9, V42.7 | ICD-9 Diagnosis |
| K730, K731, K732, K738, K739, B150, B159, B160, B161, B162, B169, B170, B1710, B1711, B172, B178, B178, B179, B180, B181, B182, B188, B189, K7030, K740, K7460, K7469 | ICD-10 Diagnosis |
| Coagulopathy | 286.x, 287.1, 287.3 - 287.5 | ICD-9 Diagnosis |
| D65-D68.x, D69.1, D69.3-D69.6 | ICD-10 Diagnosis |
| Gastroesophageal reflux disease/Heartburn | 530.81, 787.1 | ICD-9 Diagnosis |
| K21, K21.9, R12 | ICD-10 Diagnosis |
| Anemia | 280.0, 280.1 - 280.9, 281.x | ICD-9 Diagnosis |
| D50.0, D50.1, D50.8, D50.9, D51.0, D51.1, D51.2, D51.3, D51.8, D51.9, D52.0, D52.1, D52.8, D52.9, D53.0, D53.1, D53.2, D53.8, D53.9, D55.0, D55.1, D55.2, D55.3, D55.8, D55.9, D56.0, D56.1, D56.2, D56.3, D56.4, D56.5, D56.8, D56.9, D57.00, D57.01, D57.02, D57.1, D57.20, D57.211, D57.212, D57.219, D57.3, D57.40, D57.411, D57.412, D57.419, D57.80, D57.811, D57.812, D57.819, D58.0, D58.1, D58.2, D58.8, D58.9, D59.0, D59.1, D59.2, D59.3, D59.4, D59.5, D59.6, D59.8, D59.9, D60.0, D60.1, D60.8, D60.9, D61.01, D61.09, D61.1, D61.2, D61.3, D61.810, D61.811, D61.818, D61.82, D61.89, D61.9, D62, D63.0, D63.1, D63.8, D64.0, D64.1, D64.2, D64.3, D64.4, D64.81, D64.89, D64.9 | ICD-10 Diagnosis |
| Asthma | 493.00, 493.01, 493.02, 493.10, 493.11, 493.12, 493.20, 493.21, 493.22, 493.81, 493.82, 493.90, 493.91, 493.92 | ICD-9 Diagnosis |
| J45, J45.2, J45.20, J45.21, J45.22, J45.3, J45.30, J45.31, J45.32, J45.4, J45.40, J45.41, J45.42, J45.5, J45.50, J45.51, J45.52, J45.9, J45.90, J459.01, J459.02, J459.09, J45.99, J45.990, J45.991, J45.998 | ICD-10 Diagnosis |
| Chronic obstructive pulmonary disease | 490, 491.0, 491.1, 491.8, 491.9, 492.0, 492.8, 491.20, 491.21, 491.22, 494.0, 494.1, 496 | ICD-9 Diagnosis |
| J44, J44.0, J44.1, J44.9 | ICD-10 Diagnosis |
| Sleep apnea | 327.2x | ICD-9 Diagnosis |
| G47.3, G47.30, G47.31, G47.32, G47.33, G47.34, G47.35, G47.36, G47.37, G47.39 | ICD-10 Diagnosis |
| Smoker | 305.1, 649.00, 649.01, 649.02, 649.03, 649.04, 989.84 | ICD-9 Diagnosis |
| F17.20, F17.200, F17.201, F17.203, F17.208, F17.209, F17.21, F17.210, F17.211, F17.213, F17.218, F17.219, F17.29, F17.290, F17.291, F17.293, F17.298, F17.299, Z72.0 | ICD-10 Diagnosis |
| Hemorrhoids | 455.x | ICD-9 Diagnosis |
| K64.0, K64.1, K64.2, K64.3, K64.4, K64.8, K64.9 | ICD-10 Diagnosis |
| Alcohol abuse | 265.2, 291.1 - 291.3, 291.5 - 291.9, 303.0, 303.9, 305.0, 357.5, 425.5, 535.3, 571.0 - 571.3, 980.x, V11.3 | ICD-9 Diagnosis |
| K700, K7010, K7011, K702, K7030, K7031, K7040, K7041, K7041, K709 | ICD-10 Diagnosis |
| Anxiety | 293.84, 300.00, 300.01, 300.02, 300.09, 300.10, 300.20, 300.21, 300.22, 300.23, 300.29, 300.3, 300.5, 300.89, 300.9, 308.0, 308.1, 308.2, 308.3, 308.4, 308.9, 309.81, 313.0, 313.1, 313.21, 313.22, 313.3, 313.82, 313.83 | ICD-9 Diagnosis |
| F06.4, F40.00, F40.01, F40.02, F40.10, F40.11, F40.210, F40.218, F40.220, F40.228, F40.230, F40.231, F40.232, F40.233, F40.240, F40.241, F40.242, F40.243, F40.248, F40.290, F40.291, F40.298, F40.8, F40.9, F41.0, F41.1, F41.3, F41.8, F41.9, F42, F42.2, F42.3, F42.4, F42.8, F42.9, F43.0, F43.10, F43.11, F43.12, F44.9, F45.8, F48.8, F48.9, F93.8, F99, R45.2, R45.5, R45.6, R45.7 | ICD-10 Diagnosis |
| Depression | 296.2, 296.3, 296.5, 300.4, 309.x, 311 | ICD-9 Diagnosis |
| F20.4, F31.3-F31.5, F32.x, F33.x, F34.1, F41.2, F43.2 | ICD-10 Diagnosis |
| Psychosis | 293.8, 295.x, 296.04, 296.14, 296.44, 296.54, 297.x, 298.x | ICD-9 Diagnosis |
| F20.x, F22.x-F25.x, F28.x, F29.x, F30.2, F31.2, F31.5 | ICD-10 Diagnosis |
| Osteoarthritis | 715.x | ICD-9 Diagnosis |
| M05.00, M05.011, M05.012, M05.019, M05.021, M05.022, M05.029, M05.031, M05.032, M05.039, M05.041, M05.042, M05.049, M05.051, M05.052, M05.059, M05.061, M05.062, M05.069, M05.071, M05.072, M05.079, M05.09, M05.20, M05.211, M05.212, M05.219, M05.221, M05.222, M05.229, M05.231, M05.232, M05.239, M05.241, M05.242, M05.249, M05.251, M05.252, M05.259, M05.261, M05.262, M05.269, M05.271, M05.272, M05.279, M05.29, M05.30, M05.311, M05.312, M05.319, M05.321, M05.322, M05.329, M05.331, M05.332, M05.339, M05.341, M05.342, M05.349, M05.351, M05.352, M05.359, M05.361, M05.362, M05.369, M05.371, M05.372, M05.379, M05.39, M05.40, M05.411, M05.412, M05.419, M05.421, M05.422, M05.429, M05.431, M05.432, M05.439, M05.441, M05.442, M05.449, M05.451, M05.452, M05.459, M05.461, M05.462, M05.469, M05.471, M05.472, M05.479, M05.49, M05.50, M05.511, M05.512, M05.519, M05.521, M05.522, M05.529, M05.531, M05.532, M05.539, M05.541, M05.542, M05.549, M05.551, M05.552, M05.559, M05.561, M05.562, M05.569, M05.571, M05.572, M05.579, M05.59, M05.60, M05.611, M05.612, M05.619, M05.621, M05.622, M05.629, M05.631, M05.632, M05.639, M05.641, M05.642, M05.649, M05.651, M05.652, M05.659, M05.661, M05.662, M05.669, M05.671, M05.672, M05.679, M05.69, M05.70, M05.711, M05.712, M05.719, M05.721, M05.722, M05.729, M05.731, M05.732, M05.739, M05.741, M05.742, M05.749, M05.751, M05.752, M05.759, M05.761, M05.762, M05.769, M05.771, M05.772, M05.779, M05.79, M05.80, M05.811, M05.812, M05.819, M05.821, M05.822, M05.829, M05.831, M05.832, M05.839, M05.841, M05.842, M05.849, M05.851, M05.852, M05.859, M05.861, M05.862, M05.869, M05.871, M05.872, M05.879, M05.89, M05.9, M06.00, M06.011, M06.012, M06.019, M06.021, M06.022, M06.029, M06.031, M06.032, M06.039, M06.041, M06.042, M06.049, M06.051, M06.052, M06.059, M06.061, M06.062, M06.069, M06.071, M06.072, M06.079, M06.08, M06.09, M06.1, M06.20, M06.211, M06.212, M06.219, M06.221, M06.222, M06.229, M06.231, M06.232, M06.239, M06.241, M06.242, M06.249, M06.251, M06.252, M06.259, M06.261, M06.262, M06.269, M06.271, M06.272, M06.279, M06.28, M06.29, M06.30, M06.311, M06.312, M06.319, M06.321, M06.322, M06.329, M06.331, M06.332, M06.339, M06.341, M06.342, M06.349, M06.351, M06.352, M06.359, M06.361, M06.362, M06.369, M06.371, M06.372, M06.379, M06.38, M06.39, M06.80, M06.811, M06.812, M06.819, M06.821, M06.822, M06.829, M06.831, M06.832, M06.839, M06.841, M06.842, M06.849, M06.851, M06.852, M06.859, M06.861, M06.862, M06.869, M06.871, M06.872, M06.879, M06.88, M06.89, M06.9, M08.00, M08.011, M08.012, M08.019, M08.021, M08.022, M08.029, M08.031, M08.032, M08.039, M08.041, M08.042, M08.049, M08.051, M08.052, M08.059, M08.061, M08.062, M08.069, M08.071, M08.072, M08.079, M08.08, M08.09, M08.1, M08.20, M08.211, M08.212, M08.219, M08.221, M08.222, M08.229, M08.231, M08.232, M08.239, M08.241, M08.242, M08.249, M08.251, M08.252, M08.259, M08.261, M08.262, M08.269, M08.271, M08.272, M08.279, M08.28, M08.29, M08.3, M08.40, M08.411, M08.412, M08.419, M08.421, M08.422, M08.429, M08.431, M08.432, M08.439, M08.441, M08.442, M08.449, M08.451, M08.452, M08.459, M08.461, M08.462, M08.469, M08.471, M08.472, M08.479, M08.48, M08.80, M08.811, M08.812, M08.819, M08.821, M08.822, M08.829, M08.831, M08.832, M08.839, M08.841, M08.842, M08.849, M08.851, M08.852, M08.859, M08.861, M08.862, M08.869, M08.871, M08.872, M08.879, M08.88, M08.89, M08.90, M08.911, M08.912, M08.919, M08.921, M08.922, M08.929, M08.931, M08.932, M08.939, M08.941, M08.942, M08.949, M08.951, M08.952, M08.959, M08.961, M08.962, M08.969, M08.971, M08.972, M08.979, M08.98, M08.99, M15.0, M15.1, M15.2, M15.3, M15.4, M15.8, M15.9, M16.0, M16.10, M16.11, M16.12, M16.2, M16.30, M16.31, M16.32, M16.4, M16.50, M16.51, M16.52, M16.6, M16.7, M16.9, M17.0, M17.10, M17.11, M17.12, M17.2, M17.30, M17.31, M17.32, M17.4, M17.5, M17.9, M18.0, M18.10, M18.11, M18.12, M18.2, M18.30, M18.31, M18.32, M18.4, M18.50, M18.51, M18.52, M18.9, M19.011, M19.012, M19.019, M19.021, M19.022, M19.029, M19.031, M19.032, M19.039, M19.041, M19.042, M19.049, M19.071, M19.072, M19.079, M19.111, M19.112, M19.119, M19.121, M19.122, M19.129, M19.131, M19.132, M19.139, M19.141, M19.142, M19.149, M19.171, M19.172, M19.179, M19.211, M19.212, M19.219, M19.221, M19.222, M19.229, M19.231, M19.232, M19.239, M19.241, M19.242, M19.249, M19.271, M19.272, M19.279, M19.90, M19.91, M19.92, M19.93, M45.0, M45.1, M45.2, M45.3, M45.4, M45.5, M45.6, M45.7, M45.8, M45.9, M47.011, M47.012, M47.013, M47.014, M47.015, M47.016, M47.019, M47.021, M47.022, M47.029, M47.10, M47.11, M47.12, M47.13, M47.20, M47.21, M47.22, M47.23, M47.24, M47.25, M47.26, M47.27, M47.28, M47.811, M47.812, M47.813, M47.814, M47.815, M47.816, M47.817, M47.818, M47.819, M47.891, M47.892, M47.893, M47.894, M47.895, M47.896, M47.897, M47.898, M47.899, M47.9, M48.8X1, M48.8X2, M48.8X3, M48.8X4, M48.8X5, M48.8X6, M48.8X7, M48.8X8, M48.8X9 | ICD-10 Diagnosis |
| Headache | 339, 339.0, 339.00, 339.01, 339.02, 339.03, 339.04, 339.05, 339.09, 339.1, 339.10, 339.11, 339.12, 339.2, 339.20, 339.21, 339.22, 339.3, 339.4, 339.41, 339.42, 339.43, 339.44, 339.8, 339.81, 339.82, 339.83, 339.84, 339.85, 339.89, 346, 346.0, 346.00, 346.01, 346.02, 346.03, 346.1, 346.10, 346.11, 346.12, 346.13, 346.2, 346.20, 346.21, 346.22, 346.23, 346.3, 346.30, 346.31, 346.32, 346.33, 346.4, 346.40, 346.41, 346.42, 346.43, 346.5, 346.50, 346.51, 346.52, 346.53, 346.6, 346.60, 346.61, 346.62, 346.63, 346.7, 346.70, 346.71, 346.72, 346.73, 346.8, 346.80, 346.81, 346.82, 346.83, 346.9, 346.90, 346.91, 346.92, 346.93 | ICD-9 Diagnosis |
| G43.001, G43.009, G43.011, G43.019, G43.101, G43.109, G43.111, G43.119, G43.401, G43.409, G43.411, G43.419, G43.501, G43.509, G43.511, G43.519, G43.601, G43.609, G43.611, G43.619, G43.701, G43.709, G43.711, G43.719, G43.A0, G43.B0, G43.C0, G43.D0, G43.A1, G43.B1, G43.C1, G43.D1, G43.801, G43.809, G43.811, G43.819, G43.821, G43.829, G43.831, G43.839, G43.901, G43.909, G43.911, G43.919, G44.001, G44.009, G44.011, G44.019, G44.021, G44.029, G44.031, G44.039, G44.041, G44.049, G44.051, G44.059, G44.091, G44.099, G44.1, G44.201, G44.209, G44.211, G44.219, G44.221, G44.229, G44.301, G44.309, G44.311, G44.319, G44.321, G44.329, G44.40, G44.41, G44.51, G44.52, G44.53, G44.59, G44.81, G44.82, G44.83, G44.84, G44.85, G44.89 | ICD-10 Diagnosis |
| Diverticulitis | 562.00, 562.02, 562.10, 562.12 | ICD-9 Diagnosis |
| K57.00, K57.10, K57.12, K57.20, K57.30, K57.32, K57.40, K57.50, K57.52, K57.80, K57.90, K57.92 | ICD-10 Diagnosis |
| Crohns or ulcerative colitis | 555.x, 556.x | ICD-9 Diagnosis |
| K5000, K50011, K50012, K50012, K50013, K50013, K50014, K50014, K50018, K50019, K5010, K50111, K50112, K50112, K50113, K50113, K50114, K50114, K50118, K50119, K5080, K50811, K50812, K50812, K50813, K50813, K50814, K50814, K50818, K50819, K5100, K51011, K51012, K51012, K51013, K51013, K51014, K51014, K51018, K51019, K5120, K51211, K51212, K51212, K51213, K51213, K51214, K51214, K51218, K51219, K5130, K51311, K51312, K51312, K51313, K51313, K51314, K51314, K51318, K51319, K5140, K51411, K51412, K51412, K51413, K51413, K51414, K51414, K51418, K51419, K5150, K51511, K51512, K51512, K51513, K51513, K51514, K51514, K51518, K51519, K5180, K51811, K51812, K51812, K51813, K51813, K51814, K51814, K51818, K51819, K5190, K51911, K51912, K51912, K51913, K51913, K51914, K51914, K51918, K51919 | ICD-10 Diagnosis |
| Helicobacter pylori | 041.86 | ICD-9 Diagnosis |
| B9681 | ICD-10 Diagnosis |
| Hypothyroidism | 240.9, 243.x, 244.x, 246.1, 246.8 | ICD-9 Diagnosis |
| E00.x-E03.x, E89.0 | ICD-10 Diagnosis |
| Solid tumor | 140.x - 172.x, 174.x - 195.x | ICD-9 Diagnosis |
| C00.x-C26.x, C30.x-C34.x, C37.x-C41.x, C43.x, C45.x-58.x, C60.x-C76.x, C97.x | ICD-10 Diagnosis |
| Lymphoma | 200.x - 202.x, 203.0, 238.6 | ICD-9 Diagnosis |
| C81.x-C85.x, C88.x, C96.x, C90.0, C90.2 | ICD-10 Diagnosis |
| Metastatic cancer | 196.x - 199.x | ICD-9 Diagnosis |
| C77.x-C80.x | ICD-10 Diagnosis |
| Dementia | 290.0, 290.10, 2.90.11, 290.12, 290.13, 290.20, 290.21, 2290.3, 290.40, 290.41, 290.41, 290.42, 290.43, 290.8, 290.9 | ICD-9 Diagnosis |
| Z98.84 | ICD-10 |

**eTable 2. List of Oral Anticoagulant Coding**

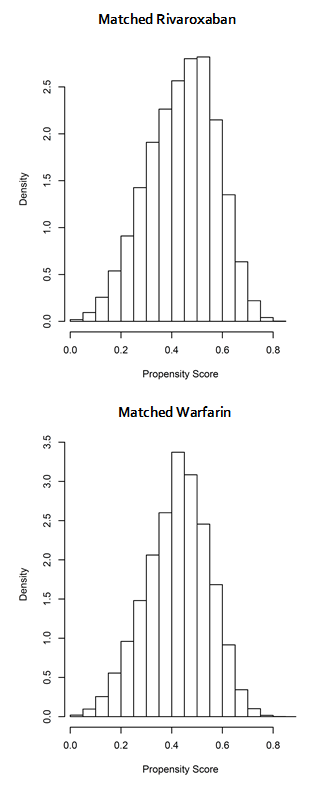
|  |  |  |
| --- | --- | --- |
| **Variable (Oral Anticoagulant)** | **Code/Name** | **Description** |
| Warfarin | Warfarin | Generic drug name |
| Apixaban | Apixaban | Generic drug name |
| Dabigatran | Dabigatran | Generic drug name |
| Edoxaban | Edoxaban | Generic drug name |
| Rivaroxaban | Rivaroxaban | Generic drug name |
| Betrixaban | Betrixaban | Generic drug name |

**eTable 3. List of Co-Medication Codes/Names**

|  |  |  |
| --- | --- | --- |
| **Variable (Medication)** | **Code/Name** | **Description** |
| Aspirin | Acetaminophen/Aluminum Hydroxide/Aspirin/Caffeine, Acetaminophen/Aspirin, Acetaminophen/Aspirin, Buffered, Acetaminophen/Aspirin/Caffeine, Acetaminophen/Aspirin/Caffeine/Codeine Phosphate, Acetaminophen/Aspirin/Caffeine/Salicylamide, Acetaminophen/Atropine Sulfate/Pamabrom, Aluminum Hydroxide/Aspirin/Magnesium Hydroxide, Aspirin, Aspirin/Caffeine/Propoxyphene Hydrochloride, Aspirin/Calcium Carbonate, Aspirin/Carisoprodol, Aspirin/Carisoprodol/Codeine Phosphate, Aspirin/Citric Acid/Sodium Bicarbonate, Aspirin/Codeine Phosphate, Aspirin/Diphenhydramine Citrate, Aspirin/Diphenhydramine Hydrochloride, Aspirin/Dipyridamole, Aspirin/Ethoheptazine Citrate/Meprobamate, Aspirin/Hydrocodone Bitartrate, Aspirin/Magnesium Oxide, Aspirin/Meprobamate, Aspirin/Methocarbamol, Aspirin/Oxycodone Hydrochloride, Aspirin/Oxycodone Hydrochloride, Aspirin/Pentazocine Hydrochloride, Aspirin/Pheniramine/Phenylpropanolamine/Pyrilamine, Aspirin/Phenylpropanolamine, Aspirin/Phenylpropanolamine Bitartrate, Aspirin/Phenylpropanolamine Hydrochloride, Aspirin/Phenyltoloxamine Citrate, Aspirin/Propoxyphene Hydrochloride, Aspirin/Propoxyphene Napsylate | Generic drug name |
| P2Y12 Inhibitors | Clopidogrel Hydrogen Sulfate, Prasugrel Hydrochloride, Ticagrelor, Ticlopidine Hydrochloride | Generic drug name |
| NSAIDs | Acetaminophen;Ibuprofen;Simethicone;Zinc Oxide, Diclofenac Epolamine, Diclofenac Potassium, Diclofenac Sodium, Diflunisal, Diphenhydramine Citrate/Ibuprofen, Diphenhydramine Hydrochloride/Ibuprofen, Diphenhydramine Hydrochloride/Magnesium Salicylate, Esomeprazole Magnesium/Naproxen, Etodolac, Famotidine/Ibuprofen, Fenoprofen Calcium, Flurbiprofen, Hydrocodone Bitartrate/Ibuprofen, Ibuprofen, Ibuprofen Lysine, Ibuprofen/Oxycodone Hydrochloride, Ibuprofen/Pseudoephedrine Hydrochloride, Indomethacin, Ketoprofen, Lansoprazole;Naproxen, Magnesium Salicylate, Meclofenamate Sodium, Mefenamic Acid, Meloxicam, Nabumetone, Naproxen, Naproxen Sodium, Naproxen Sodium/Pseudoephedrine Hydrochloride, Naproxen Sodium/Sumatriptan Succinate, Oxaprozin, Piroxicam, Salsalate, Sunlindac, Tolmetin Sodium | Generic drug name |
| COX-2-specific NSAIDs | Celecoxib | Generic drug name |
| ACE inhibitors or ARBs | Amlodipine Besylate/Benazepril Hydrochloride, Amlodipine Besylate/HCTZ/Olmesartan Medoxomil, Amlodipine Besylate/Hydrochlorothiazide/Valsartan, Amlodipine Besylate/Olmesartan Medoxomil, Amlodipine Besylate/Telmisartan, Amlodipine Besylate/Valsartan, Azilsartan Medoxomil, Azilsartan Medoxomil/Chlorthalidone, Benazepril Hydrochloride, Benazepril Hydrochloride/Hydrochlorothiazide, Candesartan Cilexetil, Candesartan Cilexetil/Hydrochlorothiazide, Captopril, Captopril/Hydrochlorothiazide, Enalapril Maleate, Enalapril Maleate/Hydrochlorothiazide, Eprosartan Mesylate, Eprosartan Mesylate/Hydrochlorothiazide, Fosinopril Sodium, Fosinopril Sodium/Hydrochlorothiazide, Hydrochlorothiazide/Irbesartan, Hydrochlorothiazide/Lisinopril, Hydrochlorothiazide/Losartan Potassium, Hydrochlorothiazide/Moexipril Hydrochloride, Hydrochlorothiazide/Olmesartan Medoxomil, Hydrochlorothiazide/Quinapril Hydrochloride, Hydrochlorothiazide/Telmisartan, Hydrochlorothiazide/Valsartan, Irbesartan, Lisinopril, Losartan Potassium, Moexipril Hydrochloride, Olmesartan Medoxomil, Perindopril Erbumine, Quinapril Hydrochloride, Ramipril, Telmisartan, Trandolapril, Trandolapril/Verapamil Hydrochloride, Valsartan | Generic drug name |
| β-blockers | Acebutolol Hydrochloride, Atenolol, Atenolol/Chlorthalidone, Bendroflumethiazide/Nadolol, Betaxolol Hydrochloride, Bisoprolol Fumarate, Bisoprolol Fumarate/Hydrochlorothiazide, Carvedilol, Hydrochlorothiazide/Metoprolol Succinate, Hydrochlorothiazide/Metoprolol Tartrate, Hydrochlorothiazide/Propranolol Hydrochloride, Labetalol Hydrochloride, Metoprolol Succinate, Metoprolol Tartrate, Nadolol, Nebivolol Hydrochloride, Penbutolol Sulfate, Pindolol, Propranolol Hydrochloride, Sotalol Hydrochloride, Timolol | Generic drug name |
| Diltiazem | Diltiazem Hydrochloride | Generic drug name |
| Verapamil | Trandolapril/Verapamil Hydrochloride, Verapamil Hydrochloride | Generic drug name |
| Dihydropyridine calcium channel blockers | Aliskiren/Amlodipine Besylate, Aliskiren/Amlodipine Besylate/Hydrochlorothiazide, Amlodipine Besylate, Amlodipine Besylate/Atorvastatin Calcium, Amlodipine Besylate/Benazepril Hydrochloride, Amlodipine Besylate/HCTZ/Olmesartan Medoxomil, Amlodipine Besylate/Hydrochlorothiazide/Valsartan, Amlodipine Besylate/Olmesartan Medoxomil, Amlodipine Besylate/Telmisartan, Amlodipine Besylate/Valsartan, Felodipine, Isradipine, Nifedipine, Nisoldipine | Generic drug name |
| Loop diuretic | Bumetanide, Ethacrynic Acid, Furosemide, Torsemide | Generic drug name |
| Thiazide diuretic | Aliskiren/Amlodipine Besylate/Hydrochlorothiazide, Aliskiren/Hydrochlorothiazide, Amiloride Hydrochloride/Hydrochlorothiazide, Amlodipine Besylate/Hydrochlorothiazide/Valsartan, Atenolol/Chlorthalidone, Azilsartan Medoxomil/Chlorthalidone, Benazepril Hydrochloride/Hydrochlorothiazide, Bisoprolol Fumarate/Hydrochlorothiazide, Candesartan Cilexetil/Hydrochlorothiazide, Captopril/Hydrochlorothiazide, Chlorothiazide, Chlorothiazide Sodium, Chlorothiazide/Methyldopa, Chlorothiazide/Reserpine, Chlorthalidone, Chlorthalidone/Clonidine Hydrochloride, Cryptenamine/Methyclothiazide, Deserpidine/Hydrochlorothiazide, Enalapril Maleate/Hydrochlorothiazide, Eprosartan Mesylate/Hydrochlorothiazide, Fosinopril Sodium/Hydrochlorothiazide, Guanethidine Monosulfate/Hydrochlorothiazide, Hydralazine Hydrochloride/Hydrochlorothiazide, Hydrochlorothiazide, Hydrochlorothiazide/Lisinopril, Hydrochlorothiazide/Losartan Potassium, Hydrochlorothiazide/Methyldopa, Hydrochlorothiazide/Metoprolol Succinate, Hydrochlorothiazide/Metoprolol Tartrate, Hydrochlorothiazide/Moexipril Hydrochloride, Hydrochlorothiazide/Olmesartan Medoxomil, Hydrochlorothiazide/Propranolol Hydrochloride, Hydrochlorothiazide/Quinapril Hydrochloride, Hydrochlorothiazide/Reserpine, Hydrochlorothiazide/Spironolactone, Hydrochlorothiazide/Telmisartan, Hydrochlorothiazide/Triamterene, Hydrochlorothiazide/Valsartan, Indapamide, Methyclothiazide, Metolazone | Generic drug name |
| Digoxin | Digoxin | Generic drug name |
| Amiodarone | Amiodarone Hydrochloride | Generic drug name |
| Dronedarone | Dronedarone Hydrochloride | Generic drug name |
| Other antiarrhythmic drugs | Disopyramide Phosphate, Dofetilide, Flecainide Acetate, Mexiletine, Procainamide Hydrochloride, Propafenone Hydrochloride, Quinidine Gluconate, Sotalol Hydrochloride | Generic drug name |
| Statins | Amlodipine Besylate/Atorvastatin Calcium, Atorvastatin Calcium, Atorvastatin Calcium/Ezetimibe, Ezetimibe/Simvastatin, Fluvastatin Sodium, Lovastatin, Lovastatin/Niacin, Niacin/Simvastatin, Pitavastatin Calcium, Pravastatin Sodium, Rosuvastatin Calcium, Simvastatin, Simvastatin/Sitagliptin Phosphate | Generic drug name |
| Other cholesterol lowering drugs | Cholestyramine, Colesevelam, Colestipol Hydrochloride, Ezetimibe, Fenofibrate, Gemfibrozil, Lomitapide Mesylate, Niacin, Omega-3-Acid Ethyl Esters | Generic drug name |
| Metformin | Alogliptin Benzoate/Metformin Hydrochloride, Glipizide/Metformin Hydrochloride, Glyburide/Metformin Hydrochloride, Linagliptin/Metformin Hydrochloride, Metformin Hydrochloride, Metformin Hydrochloride/Pioglitazone Hydrochloride, Metformin Hydrochloride/Repaglinide, Metformin Hydrochloride/Rosiglitazone Maleate, Metformin Hydrochloride/Saxagliptin Hydrochloride, Metformin Hydrochloride/Sitagliptin Phosphate | Generic drug name |
| Sulfonylureas or glinides | Chlorpropamide, Gliclazide, Glimepiride, Glimepiride/Rosiglitazone Maleate, Glipizide, Glipizide/Metformin Hydrochloride, Glyburide, Glyburide/Metformin Hydrochloride, Metformin Hydrochloride/Repaglinide, Nateglinide, Repaglinide, Tolazamide, Tolbutamide | Generic drug name |
| Thiazolidinediones | Alogliptin Benzoate/Pioglitazone Hydrochloride, Glimepiride/Pioglitazone Hydrochloride, Glimepiride/Rosiglitazone Maleate, Metformin Hydrochloride/Pioglitazone Hydrochloride, Metformin Hydrochloride/Rosiglitazone Maleate, Pioglitazone Hydrochloride, Rosiglitazone Maleate | Generic drug name |
| Dipeptidyl peptidase-4 inhibitors | Alogliptin Benzoate, Linagliptin, Saxagliptin Hydrochloride, Simvastatin/Sitagliptin Phosphate, Sitagliptin Phosphate | Generic drug name |
| Glucagon-like peptide-1 agonists | Exenatide, Liraglutide, Lixisenatide, Albiglutide, Dulaglutide, Semaglutide | Generic drug name |
| Insulin | Insulin Aspart, Recombinant, Insulin Aspart/Insulin Aspart Protamine, Insulin Beef Isophane (NPH), Insulin Beef, Regular/Insulin Pork Isophane (NPH), Insulin Beef Regular/Insulin Pork Regular, Insulin Beef Regular/Insulin Pork Zinc (Lente), Insulin Beef Zinc (Lente), Insulin Beef Zinc, Extended (Ultralente), Insulin Beef Zinc, Prompt (Semilente), Insulin Bovine, Insulin Detemir, Insulin Glargine, Recombinant, Insulin Glulisine, Insulin Human Inhaled, Insulin Human Isophane (NPH), Insulin Human Isophane (NPH)/Insulin Human Regular, Insulin Human Regular, Insulin Human Regular, Buffered, Insulin Human Zinc (Lente), Insulin Human Zinc, Extended (Ultralente), Insulin Lispro, Recombinant, Insulin Lispro/Insulin Lispro Protamine, Insulin Pork Isophane (NPH), Insulin Pork Regular, Insulin Pork Zinc (Lente) | Generic drug name |
| Benzodiazepines | Alprazolam, Amitriptyline Hydrochloride/Chlordiazepoxide, Chlordiazepoxide, Chlordiazepoxide Hydrochloride, Chlordiazepoxide Hydrochloride/Clidinium Bromide, Clonazepam, Clorazepate Dipotassium, Diazepam, Lorazepam, Oxazepam | Generic drug name |
| SSRIs or SNRIs | Citalopram Hydrobromide, Desvenlafaxine, Desvenlafaxine Succinate, Duloxetine, Escitalopram Oxalate, Fluoxetine Hydrochloride, Fluoxetine Hydrochloride/Olanzapine, Fluvoxamine Maleate, Levomilnacipran Hydrochloride, Milnacipran Hydrochloride, Paroxetine Hydrochloride, Sertraline Hydrochloride, Venlafaxine Hydrochloride, Vilazodone Hydrochloride, Vortioxetine Hydrobromide | Generic drug name |
| Other antidepressants | Amitriptyline Hydrochloride, Amitriptyline Hydrochloride, Amitriptyline Hydrochloride/Chlordiazepoxide, Amitriptyline Hydrochloride/Perphenazine, Amoxapine, buPROPion hydrobromide, Bupropion Hydrochloride, Clomipramine Hydrochloride, Desipramine Hydrochloride, Doxepin Hydrochloride, Imipramine Hydrochloride, Mirtazapine, Nefazodone Hydrochloride, Nortriptyline Hydrochloride, Protriptyline Hydrochloride, Trazodone Hydrochloride, Trimipramine Maleate, Vilazodone Hydrochloride | Generic drug name |
| Proton pump inhibitors | Dexlansoprazole, Esomeprazole Magnesium, Lansoprazole, Omeprazole, Omeprazole Magnesium, Omeprazole Sodium, Omeprazole/Sodium Bicarbonate, Pantoprazole Sodium, Rabeprazole Sodium | Generic drug name |
| Histamine-2 receptor antagonists | Calcium Carbonate/Famotidine/Magnesium Hydroxide, Cimetidine, Famotidine, Nizatidine, Ranitidine Bismuth Citrate, Ranitidine Hydrochloride | Generic drug name |
| Systemic corticosteroids | Cortisone Acetate, Dexamethasone, Fludrocortisone Acetate, Hydrocortisone, Methylprednisolone, Prednisolone, Prednisone | Generic drug name |

**Matched Warfarin**

**eFigure 1. Histograms of Post-Match Propensity Score Distributions**

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