**APPENDIX**

**Table 1. Variables Operationalized for Inclusion in Model with SAS code (Alphabetically). The numbers in quotes represent ICD-9 diagnosis codes.**

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| **Anal or rectal disorders** | **length** anal_rectal **3;** anal_rectal**=0;** if dx in ('5646' '5650' '5651' '566' '5690' '5691' '5692' '56941' '56942' '56943' '56944' '56949') then anal_rectal=1 |
| **Anemia** | **length** anemia **3;** anemia**=0;** if dx in ('2800' '2801' '2808' '2809' '2810' '2811' '2812' '2813' '2814' '2818' '2819' '2820' '2821' '2822' '2823' '2824' '28240' '28243' '28244' '28245' '28246' '28247' '28249' '2827' '2828' '2829' '2830' '2831' '28310' '28311' '28319' '2832' '2839' '2840' '28401' '28409' '2841' '28411' '28412' '28419' '2842' '2848' '28481' '28489' '2849' '2850' '28521' '28522' '28529' '2858' '2859' '2851' '28241' '28242' '2825' '282869' '28261' '282626' '28263' '28264' '28268' '28269') then anemia=1 |
| **Angina** | **length** angina **3;** angina**=0;** if dx in ('4110' '4111' '4118' '41181' 41189' '412' '4130' '4131' '4139' '4140' '41400' '41401' '41406' '4142' '4143' '4144' '4148' '4149' 'V4581' 'V4582' '78650' '78651' ' 78659') then angina=1 |
| **Anxiety** | **length** anxious **3;** anxious**=0;** if dx ('29384' '30000' '30001' '30002' '30009' '30010' '30020' '30021' '30022' '30023' '30029' '3003' '3005' '30089' '3009' '3080' '3081' '3082' '3083' '3084' '3089' '30981' '3130' '3131' '31321' '31322' '3133' '31382' '31383') then anxious=1 |
| **Arrhythmia** | **length** arrhythmia **3;** arrhythmia**=0;** if dx in ('4260' '42610' '42611' '42612' '42613' '4262' '4263' '4264' '42650' '42651' '42652' '42653' '42654' '4266' '4267' '42681' '42682' '42689' '4269' 'V450' 'V4500' 'V4501' 'V4502' 'V4509' 'V533' 'V5331' 'V5332' 'V5339' '4270' '4271' '4272' '42731' '42732' '42760' '42761' '42769' '42781' '42789' '4279' '7850' '7851' '42741' '42742' '4275') then arrhythmia=1 |
| **Arthritis** | **length** arthritis **3;** arthritis**=0;** if dx ('7140' '7141' '7142' '71430' '71431' '71432' '71433' '7144' '71481' '71489' ' 7149' '7200' '71500' '71504' '71509' '71510' '71511' '71512' '71513' '71514' '71515' '71516' '71517' '71518' '71520' '71521' '71522' '71523' '71524' '71525' '71526' '71527' '71528' '71530' '71531' '71532' '71533' '71534' '71535' '71536' '71537' '71538' '71580' '71589' '71590' '71591' '71592' '71593' '71594' '71595' '71596' '71597' '71598' 'V134') then arthritis=1 |
| **Cataract** | **length** cataract **3;** cataract**=0;** if dx ('36600' '36601' '36602' '36603' '36604' '36609' '36610' '36611' '36612' '36613' '36614' '36615' '36616' '36617' '36618' '36619' '36620' '36621' '36622' '36623' '36630' '36631' '36632' '36633' '36634' '36641' '36642' '36643' '36644' '36645' '36646' '36650' '36651' '36652' '36653' '3668' '3669' 'V431') then cataract=1 |

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| **Charlson Comorbidity Index** | The SAS macro we used reflects the Deyo adaptation of the Charlson comorbidity index, with several procedure codes that reflect the Romano adaptation.<br>(Deyo , 1992) (Romano, 2993) |
| **Chronic kidney disease** | **length** chron_kid **3;** chron_kid**=0;** if dx ('585' '5851' '5852' '5853' '5854' '5855' '5856' '5859' '7925' 'V420' 'V451' 'V4511' 'V4512' 'V560' 'V561' 'V562' 'V5631' 'V5632' 'V568') then chron_kid=1 |
| **Cognitive impairment** | **length** cogn_impair **3;** cong_impair**=0;** if dx in ('2900' '29010' '29011' '29012' '29013' '29020' '29021' '2903' '29040' '29041' '29042' '29043' '2908' '2909' '2930' '2931' '2940' '2941' '29410' '29411' '29420' '29421' '2948' '2949' '3100' '3102' '3108' '31081' '31089' '3109' '3310' '3311' '33111' '33119' '3312' '33182' '797') then cong_impair=1 |
| **Chronic Obstructive Lung Disease** | **length** asth_bronc_emphy **3;** asth_bronc_emphy**=0;** if dx ('490' '4910' '4911' '4912' '49120' '49121' '49122' '4918' '4919' '4920' '4928' '494' '4940' '4941' '496' '49300' '49301' '49302' '49310' '49311' '49312' '49320' '49321' '49322' '49381' '49382' '49390' '49391' '49392') then asth_bronc_emphy=1 |
| **Congestive Heart Failure** | **length** con_heart_failure **3;** con_heart_failure**=0;** if dx in ('39891' '4280' '4281' '42820' '42821' '42822' '42823' '42830' '42831' '42832' '42833' '42840' '42841' '42843' '4289) then con_heart_failure=1 |
| **Delirium** | **length** cloud_delir **3;** cloud_delir**=0;** if dx ('2900' '29010' '29011' '29012' '29013' '29020' '29021' '2903' '29040' '29041' '29042' '29043' '2908' '2909' '2930' '2931' '2940' '2941' '29410' '29411' '29420' '29421' '2948' '2949' '3100' '3102' '3108' '31081' '31089' '3109' '3310' '3311' '33111' '33119' '3312' '33182' '797') then cloud_delir=1 |
| **Depression** | **length** depression **3;** depression**=0;** if dx ('3090' '3091' '30922' '30923' '30924' '30928' '30929' '3093' '3094' '30982' '30983' '30989' '3099' '29383' '29600' '29601' '29602' '29603' '29604' '29605' '29606' '29610' '29611' '29612' '29613' '29614' '29615' '29616' '29620' '29621' '29622' '29623' '29624' '29625' '29626' '29630' '29631' '29632' '29633' '29634' '29635' '29636' '29640' '29641' '29642' '29643' '29644' '29645' '29646' '29650' '29651' '29652' '29653' '29654' '29655' '29656' '29660' '29661' '29662' '29663' '29664' '29665' '29666' '2967' '29680' '29681' '29682' '29689' '29690' '29699' '3004' '311') then depression=1 |
| **Diabetes mellitus** | **length** diab_melli **3;** diab_melli**=0;** if dx in ('24900' '25000' '25001' '7902' '79021' '79022' '79029' '7915' '7916' 'V4585' 'V5391' 'V6546' '24901' '24910' '24911' '24920' '24921' '24930' '24931' '24940' '24941' '24950' '24951' '24960' '24961' '24970' '24971' '24980' '24981' '24990' '24991' '25002' '25003' '25010' '25011' '25012' '25013' '25020' '25021' '25022' '25023' '25030' '25031' '25032' '25033' '25040' '25041' '25042' '25043' '25050' '25051' '25052' '25053' '25060' '25061' '25062' '25063' '25070' '25071' '25072' |

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| | '25073' '25080' '25081' '25082' '25083' '25090' '25091' '25092' '25093') then diab_melli=1 |
| **Falls** | **length** falls **3;** falls**=0;** if dx ('E8800' 'E8801' 'E8809' 'E8810' 'E8811' 'E882' 'E8830' 'E8831' 'E8832' 'E8839' 'E8840' 'E8841' 'E8842' 'E8843' 'E8844' 'E8845' 'E8846' 'E8849' 'E885' 'E8850' 'E8851' 'E8852' 'E8853' 'E8854' 'E8859' 'E8860' 'E8869' 'E888' 'E8880' 'E8881' 'E8888' 'E8889' 'E9681' 'E9870' 'E9871' 'E9872' 'E9879') then falls=1 |
| **Glaucoma** | **length** glaucoma **3;** glaucoma**=0;** if dx ('36500' '36501' '36502' '36503' '36504' '36505' '36506' '36510' '36511' '36512' '36513' '36514' '36515' '36520' '36521' '36522' '36523' '36523' '36531' '36532' '36541' '36542' '36543' '36544' '36551' '36552' '36559' '36560' '36561' '36562' '36563' '36564' '36565' '36570' '36571' '36572' '36573' '36574' '36581' '36852' '356838' '36589' '3659') then glaucoma=1 |
| **Hearing problems** | **length** hear_prob **3;** hear_prob**=0;** if dx in ('38000' '38001' '38002' '38003' '38010' '38011' '38012' '38013' '38014' '38015' '38016' '38021' '38022' '38023' '38030' '38031' '38032' '38039' '3804' '38050' '38051' '38052' '38053' '38081' '38089' '3809' '38400' '38401' '38409' '3841' '38530' '38531' '38531' '38532' '38533' '38535' '38582' '38583' '38589' '3859' '38800' '38801' '38802' '38810' '38811' '38812' '3882' '38830' '38831' '38832' '38840' '38841' '38842' '38843' '38844' '38845' '3885' '38860' '38861' '38869' '38870' '38871' '38872' '3888' '3889' '38900' '38901' '38902' '38903' '38904' '38905' '38906' '38908' '38910' '38911' '38912' '38913' '38914' '38915' '38916' '38917' '38918' '3892' '38920' '38921' '38922' '3897' '3898' '3899' 'V412' 'V413' 'V4985' 'V532' 'V721' 'V7211' 'V7212' 'V7219') then hear_prob=1 |
| **Hyperlipidemia** | **length** hyper_lidemia **3;** hyper_lidemia**=0;** if dx in ('2720' '2721' '2722' '2723' '2724') then hyper_lidemia=1 |
| **Hypertension** | **length** hyper_ten **3;** hyper_ten**=0;** if dx in ('4011' '4019' '4010' '40200' '40201' '40210' '40211' '40290' '40291' '4030' '40300' '40301' '4031' '40310' '40311' '4039' '40390' '40391' '4040' '40400' '40401' '40402' '40403' '4041' '40410' '40411' '40412' '40413' '4049' '40490' '40491' '40492' '40493' '40501' '40509' '40511' '40519' '40591' '40599' '4372') then hyper_ten=1 |
| **Impaired mobility** | **length** impair_mob **3;** impair_mob**=0;** if dx ('V46.3') then impair_mob=1 –Also NEEDS HCPCS codes - `E1050-E1093, E1100-E1110, E1130-E1161, E1170-E1200, E1220-E1239; E1240-E1270; E1280-E1298; E1280-E1298;` |
| **Irregular gait** | **length** irreg_gait **3;** irreg_gait**=0;** if dx ('7812' 'V5781') then irreg_gait=1 |
| **Malaise** | **length** malaise_fatigue **3;** malaise_fatigure**=0;** if dx ('7807' '78071' '78079') then malaise_fatigue=1 |
| **Malignant disease** | **length** malig_disease **3;** malig_disease**=0;** if dx in ('1400' '1401' '1403' |

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| | ‘1404’ ‘1405’ ‘1407’ ‘1408’ ‘1409’ ‘1410’ ‘1411’ ‘1412’ ‘1413’ ‘1414’ ‘1415’ ‘1416’ ‘1418’ ‘1419’ ‘1420’ ‘1421’ ‘1422’ ‘1428’ ‘1429’ ‘1430’ ‘1431’ ‘1438’ ‘1439’ ‘1440’ ‘1441’ ‘1448’ ‘1449’ ‘1450’ ‘1451’ ‘1452’ ‘1453’ ‘1454’ ‘1455’ ‘1456’ ‘1458’ ‘1459’ ‘1460’ ‘1461’ ‘1462’ ‘1463’ ‘1464’ ‘1465’ ‘1466’ ‘1467’ ‘1468’ ‘1469’ ‘1470’ ‘1471’ ‘1472’ ‘1473’ ‘1478’ ‘1479’ ‘1480’ ‘1481’ ‘1482’ ‘1483’ ‘1488’ ‘1489’ ‘1490’ ‘1491’ ‘1498’ ‘1499’ 1600’ ‘1601’ ‘1602’ ‘1603’ ‘1604’ ‘1605’ ‘1608’ ‘1609’ ‘1610’ ‘1611’ ‘1612’ ‘1613’ ‘1618’ ‘1619’ ‘1950’ ‘2300’ ‘2310’ ‘V1001’ ‘V1002’ ‘V1021’ ‘1500’ ‘1501’ ‘1502’ ‘1503’ ‘1504’ ‘1505’ ‘1508’ ‘1509’ ‘2301’ ‘V1003’ ‘1510’ ‘1511’ ‘1512’ ‘1513’ ‘1514’ ‘1515’ ‘1516’ ‘1518’ ‘1519’ ‘20923’ ‘2302’ ‘V1004’ ‘1530’ ‘1531’ ‘1532’ 1533’ ‘1534’ ‘1535’ ‘1536’ ‘1537’ ‘1538’ ‘1539’ ‘1590’ ‘20910’ ‘20911’ ‘20912’ ‘20913’ ‘20913’ ‘20914’ ‘20915’ ‘20916’ ‘23030’ ‘V1005’ ‘1540’ ‘1541’ ‘1542’ ‘1543’ ‘1548’ ‘20917’ ‘2304’ ‘2305’ ‘2306’ ‘79670’ ‘79671’ ‘79672’ ‘79673’ ‘79674’ ‘79676’ ‘V1006’ ‘1550’ ‘1551’ ‘1552’ ‘2308’ ‘V1007’ ‘1570’ ‘1571’ ‘1572’ ‘1573’ ‘1574’ ‘1578’ ‘1579’ ‘1520’ ‘1521’ ‘1522’ ‘1523’ ‘1528’ ‘1529’ ‘1560’ ‘1561’ ‘1562’ ‘1568’ ‘1569’ ‘1580’ ‘1588’ ‘1589’ ‘1591’ ‘1598’ ‘20900’ ‘20901’ ‘20902’ ‘20903’ ‘2307’ ‘2309’ ‘V10000’ ‘V1009’ ‘1622’ ‘1623’ ‘1624’ ‘1625’ ‘1628’ ‘1629’ ‘20921’ ‘2313’ ‘V1011’ ‘1620’ ‘1630’ ‘1631’ ‘1638’ ‘1639’ ‘1650’ ‘1658’ ‘1659’ ‘2311’ ‘2318’ ‘2319’ ‘V1012’ ‘V1020’ ‘V1022’ ‘1700’ ‘1701’ ‘1702’ ‘1703’ ‘1704’ ‘1705’ ‘1706’ ‘1707’ ‘1708’ ‘1709’ ‘1710’ ‘1712’ ‘1713’ ‘1714’ ‘1715’ ‘1716’ ‘1717’ ‘1718’ ‘1719’ ‘1720’ ‘1721’ ‘1722’ ‘1723’ ‘1724’ ‘1725’ ‘1726’ ‘1727’ ‘1728’ ‘1729’ ‘V1082’ ‘1730’ ‘17300’ ‘17301’ ‘17302’ ‘17309’ ‘1731’ ‘7310’ ‘17311’ ‘17312’ ‘17319’ ‘1732’ ‘17320’ ‘17321’ ‘17322’ ‘17329’ ‘1733’ ‘17330’ ‘17331’ ‘17332’ ‘17339’ ‘1734’ ‘17340’ ‘17341’ ‘17342’ ‘17349’ ‘1735’ ‘17350’ ‘17351’ ‘17352’ ‘17359’ ‘17371’ ‘17372’ ‘17379’ ‘1738’ ‘17380’ ‘17381’ ‘17382’ ‘17389’ ‘1739’ ‘17390’ ‘17391’ ‘17392’ ‘17399’ ‘20931’ ‘20932’ ‘20933’ ‘20934’ ‘20935’ ‘20936’ ‘2320’ ‘2321’ ‘2322’ ‘2323’ ‘2324’ ‘2325’ ‘2326’ ‘2327’ ‘2328’ ‘2329’ ‘V1083’ ‘1740’ ‘1741’ ‘1742’ ‘1743’ ‘1744’ ‘1745’ ‘1746’ ‘1748’ ‘1749’ ‘1750’ ‘1759’ ‘2330’ ‘V103’ ‘179’ ‘1820’ ‘1821’ ‘1828’ ‘2332’ ‘V1042’ ‘1800’ ‘1801’ ‘1808’ ‘1809’ ‘2331’ ‘7950’ ‘79506’ ‘V1041’ ‘79501’ ‘79502’ ‘79503’ ‘79504’ ‘1830’ ‘V1043’ ‘181’ ‘1832’ ‘1833’ ‘1834’ ‘1835’ ‘1838’ ‘1839’ ‘1840’ ‘1841’ ‘1842’ ‘1843’ ‘1844’ ‘1848’ ‘1849’ ‘2333’ ‘23330’ ‘23331’ ‘23332’ ‘23339’ ‘79516’ ‘V1040’ ‘V1044’ ‘185’ ‘2334’ ‘V1046’ ‘1860’ ‘1869’ ‘V1047’ ‘1871’ ‘1872’ ‘1873’ ‘1874’ ‘1875’ ‘1876’ ‘1877’ ‘1878’ ‘1879’ ‘2335’ ‘2336’ ‘V1045’ ‘V1048’ ‘V1049’ ‘1880’ ‘1881’ ‘1882’ ‘1883’ ‘1884’ ‘1885’ ‘1886’ ‘1887’ ‘1888’ ‘1889’ ‘2337’ ‘V1051’ ‘1890’ ‘1891’ ‘20924’ ‘V1052’ ‘V1053’ ‘1892’ ‘1893’ ‘1894’ ‘1898’ ‘1899’ ‘2339’ ‘V1050’ ‘V1059’ ‘193’ ‘25802’ ‘25803’ ‘V1087’ ‘20100’ ‘20101’ ‘20102’ ‘20103’ ‘20104’ ‘20105’ ‘20106’ ‘20107’ ‘20108’ ‘20110’ ‘20111’ ‘20112’ ‘20113’ ‘20114’ ‘20115’ ‘20116’ ‘20117’ ‘20118’ ‘20120’ ‘20121’ ‘20122’ ‘20123’ ‘20124’ |

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| | ‘20125’ ‘20126’ ‘20127’ ‘20128’ ‘20140’ ‘20141’ ‘20142’ ‘20143’<br>‘20144’ ‘20145’ ‘20146’ ‘20147’ ‘20148’ ‘20150’ ‘20151’ ‘20152’<br>‘20153’ ‘20154’ ‘20155’ ‘20156’ ‘20157’ ‘20158’ ‘20160’ ‘20161’<br>‘20162’ ‘20163’ ‘20164’ ‘20165’ 20166’ ‘20167’ ‘20168’ ‘20170’ ‘20171’<br>‘20172’ ‘20173’ ‘20174’ ‘20175’ ‘20176’ ‘20177’ ‘20178’ ‘20190’<br>‘20191’ ‘20192’ ‘20193’ ‘20194’ ‘20195’ ‘20196’ ‘20197’ ‘20198’<br>‘V1072’ ‘20000’ ‘20001’ ‘20002’ ‘20003’ ‘20004’ ‘20005’ ‘20006’<br>‘20007’ ‘20008’ ‘20010’ ‘20011’ ‘20012’ ‘20013’ ‘20014’ ‘20015’<br>‘20016’ ‘20017’ ‘20018’ ‘20020’ ‘20021’ ‘20022’ ‘20023’ ‘20024’<br>‘20025’ ‘20026’ ‘20027’ ‘20028’ ‘20030’ ‘20031’ ‘20032’ ‘20033’<br>‘20034’ ‘20035’ ‘20036’ ‘20037’ ‘20038’ ‘20040’ ‘20041’ ‘20042’<br>‘20043’ ‘20044’ ‘20045’ ‘20046’ ‘20047’ ‘20048’ ‘20050’ ‘20051’<br>‘20052’ ‘20053’ ‘20054’ ‘20055’ ‘20056’ ‘20057’ ‘20058’ ‘20060’<br>‘20061’ ‘20062’ ‘20063’ ‘20064’ ‘20065’ ‘20066’ ‘20067’ ‘20068’<br>‘20070’ ‘20071’ ‘20072’ ‘20073’ ‘20074’ ‘20075’ ‘20076’ ‘20077’<br>‘20078’ ‘20080’ ‘20081’ ‘20082’ ‘20083’ ‘20084’ ‘20085’ ‘20086’<br>‘20087’ ‘20088’ ‘20200’ ‘20201’ ‘20202’ ‘20203’ ‘20204’ ‘20205’<br>‘20206’ ‘20207’ ‘20208’ ‘20210’ ‘20211’ ‘20212’ ‘20213’ ‘20214’<br>‘20215’ ‘20216’ ‘20217’ ‘20218’ ‘20220’ ‘20221’ ‘20222’ ‘20223’<br>‘20224’ ‘20225’ ‘20226’ ‘20227’ ‘20228’ ‘20270’ ‘20271’ ‘20272’<br>‘20273’ ‘202074’ ‘20275’ ‘20276’ ‘20277’ ‘20278’ ‘20280’ ‘20281’<br>‘20282’ ‘20283’ ‘20284’ ‘20285’ ‘20286’ ‘20287’ ‘20288’ ‘20290’<br>‘20291’ ‘20292’ ‘20293’ ‘20294’ ‘20295’ ‘20296’ ‘20297’ ‘20298’<br>‘V1071’ ‘V1079’ ‘20240’ ‘20241’ ‘20242’ ‘20243’ ‘20244’ ‘20245’<br>‘20246’ ‘20247’ ‘20248’ ‘2031’ ‘20310’ ‘20311’ ‘20312’ ‘2040’ ‘20400’<br>‘20401’ ‘20402’ ‘2041’ ‘20410’ ‘20411’ ‘20412’ ‘2042’ ‘20420’ ‘20421’<br>‘20422’ ‘2048’ ‘20480’ ‘20481’ ‘20482’ ‘2049’ ‘20490’ ‘20491’ ‘20492’<br>‘2050’ ‘20500’ ‘20501’ ‘20502’ ‘2051’ ‘20510’ ‘20511’ ‘20512’ ‘2052’<br>‘20520’ ‘20521’ ‘20522’ ‘2053’ ‘20530’ ‘20531’ ‘20532’ ‘2058’ ‘20580’<br>‘20581’ ‘20582’ ‘2059’ ‘20590’ ‘20591’ ‘20592’ ‘2060’ ‘20600’ ‘20601’<br>‘20602’ ‘2061’ ‘20610’ ‘20611’ ‘20612’ ‘2062’ ‘20620’ ‘20621’ ‘20622’<br>‘2068’ ‘20680’ ‘20681’ ‘20682’ ‘2069’ ‘20690’ ‘20691’ ‘20692’ ‘2070’<br>‘20700’ ‘20701’ ‘20702’ ‘2071’ ‘20710’ ‘20711’ ‘20712’ ‘2072’ ‘20720’<br>‘20721’ ‘20722’ ‘2078’ ‘20780’ ‘20781’ ‘20782’ ‘2080’ ‘20800’ ‘20801’<br>‘20802’ ‘2081’ ‘20810’ ‘20811’ ‘20812’ ‘2082’ ‘20820’ ‘20821’ ‘20822’<br>‘2088’ ‘20880’ ‘20881’ ‘20882’ ‘2089’ ‘20890’ ‘20891’ ‘20892’ ‘V1060’<br>‘V1061’ ‘V1062’ ‘V1063’ ‘V1069’ ‘2030’ ‘20300’ ‘20301’ ‘20302’ ‘2038’<br>‘20380’ ‘20381’ ‘20382’ ‘1640’ ‘1641’ ‘1642’ ‘1643’ ‘1648’ ‘1649’ ‘1760’<br>‘1761’ ‘1762’ ‘1763’ ‘1764’ ‘1765’ ‘1768’ ‘1769’ ‘1900’ ‘1901’ ‘1902’<br>‘1903’ ‘1904’ ‘1905’ ‘1906’ ‘1907’ ‘1908’ ‘1909’ ‘1940’ ‘1941’ ‘1943’<br>‘1944’ ‘1945’ ‘1946’ ‘1948’ ‘1949’ ‘1951’ ‘1952’ ‘1953’ ‘1954’ ‘1955’<br>‘1958’ ‘20230’ ‘20231’ ‘20232’ ‘20233’ ‘20234’ ‘20235’ ‘20236’ ‘20237’<br>‘20238’ ‘20250’ ‘20251’ ‘20252’ ‘20253’ ‘20254’ ‘20255’ ‘20256’<br>‘20257’ ‘20258’ ‘20260’ ‘20261’ ‘20262’ ‘20263’ ‘20264’ ‘20265’ |

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| | '20266' '20267' '20268' '20922' '20925' '20926' '20927' '2340' '2348' '2349' '7951' '79510' '79511' '79512' '79513' '79514' 'V1029' 'V1081' 'V1084' 'V1088' 'V1089' 'V109' 'V1090' 'V1091' 'V711' '1960' '1961' '1962' '1963' '1965' '1966' '1968' '1969' '1970' '1971' '1972' '1973' '1974' '1975' '1976' '1977' '1978' '1980' '1981' '1982' '1983' '1984' '1985' '1986' '1987' '19881' '19882' '19889' '20971' '20972' '20973' '20974' '51181' '78951' '1990' '1991' '1992' '20920' '20929' '20930' '20970' '20975' '20979' '2350' '2351' '2352' '2353' '2354' '2355' '2356' '2357' '2358' '2359' '2360' '2361' '2362' '2363' '2364' '2365' '2366' '2367' '23690' '23691' '23699' '2370' '2371' '2372' '2373' '2374' '2375' '2376' '2377' '23770' '23771' '23772' '23773' '23779' '2379' '2380' '2381' '2382' '2383' '2384' '2385' '2386' '2387' '23871' '23872' '23873' '23874' '23875' '23876' '23877' '23879' '2388' '2389' '2390' '2391' '2392' '2393' '2394' '2395' '2396' '2397' '2398' '23981' '23989' '2399' 'V580' 'V581' 'V5811' 'V5812' 'V661' 'V662' 'V671' 'V672' '2180' '2181' '2182' '2189' '2190' '2191' '2198' '2199') then malig_disease=1 |
| **Musculoskeletal problems** | **length** musculo_probs **3;** musculo_probs**=0;** if dx ('7130' '7131' '7132' '7133' '7134' '7135' '7136' '7137' '7138' '71600' '71601' '71602' '71603' '71604' '71605' '71606' '71607' '71608' '71609' '71620' '71621' '71622' '71623' '71624' '71625' '71626' '71627' '71629' '71629' '71630' '71631' '71632' '71633' '71634' '71635' '71636' '71637' '71638' '71639' '71640' '71641' '71642' '71643' '71644' '71645' '71646' '71647' '71648' '71649' '71650' '71651' '71652' '71653' '71654' '71655' '71656' '71657' '71658' '71659' '71660' '71661' '71662' '71663' '71664' '71665' '71666' '71667' '71668' '71680' '71681' '71862' '71683' '71684' '71685' '71686' '71687' '71688' '71689' '71690' '71691' '71692' '71693' '71694' '71695' '71696' '71697' '71698' '71699' '71810' '71811' '71812' '71813' '71814' '71815' '71817' '71818' '71819' '71820' '71821' '71822' 71823' '71824' '71825' '71826' '71827' '71828' '71829' '71850' '71851' '71852' '71853' '71854' '71855' '71856' '71857' '71858' '71859' '71860' '71865' '71870' '71871' '71872' '71873' '71874' '71875' '71876' '71877' '71878' '71879' '71880' '71881' '71882' '71883' '71884' '71885' '71886' '71887' '71888' '71889' '71890' '71891' '71892' '71893' '71894' '71895' '71897' '71898' '71899' '71900' '71901' '71902' '71903' '71904' '71905' '71906' '71907' '71908' '71909' 71910' '71911' '71912' '71913' '71914' '71915' '71916' '71917' '71918' '71919' '71920' '71921' '71922' '71923' '71924' '71925' '71926' '71927' '71928' '71929' '71930' '71931' '71932' '71933' '71934' '71935' '71936' '71937' '71938' '71939' '71940' '71941' '71942' '71943' '71944' '71945' '71946' '71947' '71948' '71949' '71950' '71951' '71952' '71953' '71954' '71955' '71956' '71957' '71958' '71959' '71960' '71961' '71962' '71963' '71964' '71965' '71966' '71967' '71968' '71969' '7197' '71970' '71975' '71976' '71977' |

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| | '71978' '71979' '71980' '71981' '71982' '71983' '71984' '71985' '71986' '71987' '71988' '71989' '71990' '71991' '71992' '71993' '71994' '71995' '71996' '71997' '71998' '71999' '7201' '7202' '72081' '72089' '7209' '7210' '7211' '7212' '7213' '72141' '72142' '7215' '7216' '7217' '7218' '72190' '72191' '7220' '72210' '72211' '7222' '72230' '72231' '72232' '72239' '7224' '72251' '72252' '7226' '72270' '72271' '72272' '72273' '72280' '72281' '72282' '72283' '72290' '72291' '72292' '72293' '7230' '7231' '7232' '7233' '7234' '7235' '7236' '7237' '7238' '7239' '72400' '72401' '72402' '72403' '72409' '7241' '7242' '7243' '7244' '7245' '7246' '72470' '72471' '72479' '7248' '7249' '73300' '73301' '73302' '73393' '73309' '7331' '73310' '73311' '73312' '73313' '73314' '73315' '73316' '73319' '73393' '73394' '73395' '73396' '73397' '73398' 'V1351' '4350' '4351' '4352' '4353' '4358' '4359') then musculo_prob=1 |
| **Myocardial infarction** | **length** m_i **3;** m_i**=0;** if dx in ('4100' '41000' '41001' '41002' '4101' '41010' '41011' '41012' '4102' '41020' '41021' '41022' '4103' '41030' '41031' '41032' '41034' '41040' '41041' '41042' '4105' '41050' '41051' '41052' '4106' '41060' '41061' '41062' '4107' '41071' '41073' '4108' '41080' '41081' '41082' '4109' '41090' '41091' '41092') then m_i=1 |
| **Neurological conditions** | **length** neur_cond **3;** neur_cond**=0;** if dx in ('325' '32702' '32715' '32730' '32731' '32732' '32733' '32734' '32735' '32736' '32737' '32730' '32753' '33183' '3321' '33720' '33721' '33722' '33729' '3380' '33811' '33812' '33818' '33819' '33821' '33822' '33828' '33829' '3383' '3384' '3410' '3411' '3418' '3419' '34461' '347' '34700' '34701' '34710' '34711' '3480' '3482' '3483' '34830' '34831' '34839' '3484' '3485' '3488' '34881' '34882' '34889' '3489' '3492' '34981' '34982' '34989' '3499' '3501' '3502' '3508' '3509' '3510' '3511' '3518' '3519' '3520' '3521' '3522' '3523' '3524' '3525' '3526' '3529' '3530' '3531' '3532' '3533' '3534' '3535' '3536' '3538' '3539' '3540' '3541' '3542' '3543' '3544' '3545' '3548' '3549' '3550' '3551' '3552' '3553' '3554' '3555' '3556' '3557' '35571' '35579' '3558' '3559' '3560' '3561' '3562' '3563' '3564' '3568' '3569' '3570' '3571' '3572' '3573' '3574' '3576' '3577' '3578' '35781' '35782' '35789' '3579' '3580' '35800' '35801' '3581' '3582' '35830' '35831' '35839' '3588' '3589' '3590' '3591' '3592' '35921' '35922' '35923' '35924' '35929' '3593' '3594' '3595' '3596' '35971' '35979' '3598' '35981' '35989' '3599' '7810' '7811' '7812' '7813' '7817' '7818' '7820' '7843' '7845' '78451' '78452' '78459' '78460' '78461' '78469' '7920' '7930' '79400' '79401' '79402' '79409' '79410' '79411' '79412' '79413' '79414' '79415' '79416' '79417' '79419' '7961' '79951' '79952' '79953' '79954' '79955' '79959' 'V124' 'V1240' 'V1241' 'V1242' 'V1249' 'V415' 'V452' 'V484' 'V485' 'V493' 'V530' 'V5301' 'V5302' 'V5309') then neur_cond=1 |
| **Nutritional deficiencies** | **length** nutri_defic **3;** nutria_defic**=0;** if dx in ('260' '261' '262' '2630' |

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| | '2631' '2632' '2638' '2639' '2640' '2641' '2642' '2643' '2644' '2645' '2646' '2647' '2648' '2649' '2650' '2651' '2652' '2660' '2661' '2662' '2669' '267' '2680' '2681' '2682' '2689' '2690' '2691' '2692' '2693' '2698' '2699' '7994' 'V121') then nutria_defic=1 |
| **Paranoia** | **length** para_feat **3;** para_feat**=0;** if dx ('29381' '29382' '29500' '29501' '29502' '29503' '29504' '29505' '29510' '29511' '29512' '29513' '29514' '29515' '29520' '29521' '29522' '29523' '29524' '29525' '29530' '29531' '29532' '29533' '29534' '29535' '29540' '29541' '29542' '29543' '29544' '29545' '29550' '29551' '29552' '29553' '29554' '29555' '29560' '29561' '29562' '29563' '29564' '29565' '29570' '29571' '29572' '29573' '29574' '29575' '29580' '29581' '29582' '29583' '29584' '29585' '29590' '29591' '29592' '29593' '29594' '29595' '2970' '2971' '2972' '2973' '2978' '2979' '2980' '2981' '2982' '2983' '2984' '2988' '2989') then para_feat=1 |
| **Peptic ulcer disease** | **length** ulcer **3;** ulcer**=0;** if dx in ('53110' '53111' '53130' '53131' '53150' '53151' '53170' '53171' '53190' '53191' '53210' '53211' '53230' '53231' '53250' '53251' '53270' '53271' '53290' '53291' '53310' '53311' '53330' '53331' '53350' '53351' '53370' '53371' '53390' '53391' '53410' '53411' '53430' '53431' '53450' '53451' '53470' '53471' '53490' '53491' 'V1271') then ulcer=1 |
| **Postural hypotension** | **length** post_hypo **3;** post_hypo**=0;** if dx in ('4580' '4581' '4582') then post-hypo=1 |
| **Seizure** | **length** seizure **3;** seizure**=0;** if dx in('3450' '34500' '34501' '3451' '34510' '34511' '3452' '3453' '3454' '34540' '3455' '34550' '34551' '3456' '34560' '34561' '3457' '34570' '34571' '3458' '34580' '34581' '3459' '34590' '34591' '7803' '78031' '78032' '78033' '78039') then seizure=1 |
| **Shortness of breath** | **length** short_breath **3;** short_breath**=0;** if dx ('78600' '78601' '78602' '78603' '78604' '78605' '78606' '78607' '78609') then short_breath=1 |
| **Stroke** | **length** stroke **3;** stroke**=0;** if dx ('34660' '34661' '34662' '34663' '430' '431' 4320' '4321' '4329' '43301' '43311' '43321' '43331' '43381' '43391' '4340' '43400' '43401' '4341' '43410' '43411' '4349' '43490' '43491' '436' '438' '4380' '43810' '43811' '43812' '43813' '43814' '43819' '43820' '43821' '43822' '43840' '43841' '43842' '43850' '43851' '43852' '43853' '4386' '4387' '43881' '43882' '43883' '43884' '43885' '43889' '4389') then stoke=1 |
| **Syncope** | **length** syn_black **3;** syn_black**=0;** if dx ('7802') then syn_black=1 |
| **Thyroid disease** | **length** thyr_dis **3;** thry_dis**=0;** if dx in ('2400' '2409' '2410' '2411' '2419' '24200' '24201' '24210' '24211' '24220' '24221' '24230' '24231' '24240' '24241' '24280' '24281' '24290' '24291' '243' '2440' '2441' '2442' '2443' '2448' '2449' '2450' '2451' '2452' '2453' '2454' '2458' '2459' '2460' '2461' '2462' '2463' '2468' '2469' '7945') then thyr_dis=1 |
| **Urinary incontinence** | **length** urin_incont **3;** urin_incont**=0;** if dx in ('3076' '6256' '78830' |

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| | '78831' '78833' '78837' '78838' '78839' '78891') then urin_incont=1 |
| **Visual impairment** | **length** vis_impair **3;** vis_impair**=0;** if dx ('3670' '3671' '36720' '36721' '36722' '36731' '36732' ' 3674' '36751' '36752' '36753' '36781' '36789' '3679' '36800' '36801' '36802' '36803' '36810' '36811' '36812' '36813' '36814' '36815' '36816' '3682' ' 36830' '36831' '36832' '36833' '36834' '36840' '36841' '36842' '36843' '36844' '36845' '36846' '36847' '36851' '36852' '36853' '356854' '36855' '36859' '36860' '36861' '36862' '36863' '36869' '3688' '3689' '36900' '36901' '36902' '36903' '36904' '36905' '36906' '36907' '36908' '36910' '36911' '36912' '36913' '36914' '36915' '36916' '36917' '36918' '36920' '36921' '36922' '36923' '36924' '36925' '3693' '3694' '36960' '36961' '36962' '36963' '36964' '36965' '36966' '36967' '36968' '36969' '36970' '36971' '36972' '36973' '36974' '36975' '36976' '3698' '3699' 'V410') then vis_impair=1 |

**Additionally, all of the Agency for Healthcare Quality and Research Clinical Classification Software codes from *Appendix A - Clinical Classification Software-DIAGNOSES* (January 1980 through September 2015) were independently included in the models. These are accessible at: https://www.hcup-us.ahrq.gov/toolssoftware/ccs/AppendixASingleDX.txt**

**References**


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Romano PS, Roos LL, Jollis JG. Adapting a clinical comorbidity index for use with ICD-9-CM administrative data: differing perspectives. *J Clin Epidemiol*. 1993 Oct;46(10):1075-9

**Table 2. Beneficiary Characteristics Stratified by Continuous Enrollment in Medicare Parts A and B**

| | Continuously Enrolled in Past 6 Months | | | Not Continuously Enrolled in the Past 6 Months | | | All | | | P-Value comparing Continuous and Not |
|---|---|---|---|---|---|---|---|---|---|---|
| **Variable** | **#** | **%** | | | | | | | | |
| ***Race**** | | | | | | | | | | |
| White | 3747 | 84.1 | | 1178 | 82.2 | | 4925 | 83.6 | | 0.028 |
| Black | 685 | 15.4 | | 239 | 16.7 | | 924 | 15.7 | | |
| American Indian/Alaskan Native | 10 | 0.22 | | 5 | 0.4 | | 15 | 0.3 | | |
| Asian/Pacific Islander | 2 | 0.04 | | 2 | 0.1 | | 4 | 0.1 | | |
| Other | 10 | 0.22 | | 10 | 0.7 | | 20 | 0.3 | | |
| ***Hispanic Origin (# Missing: 21)*** | | | | | | | | | | |
| Yes | 46 | 1.04 | | 16 | 1.1 | | 62 | 1.1 | | 0.767 |
| **Gender**** | | | | | | | | | | |
| Female | 2621 | 58.9 | | 772 | 53.8 | | 3393 | 57.6 | | 0.0009 |
| Male | 1833 | 41.1 | | 662 | 46.2 | | 2495 | 42.4 | | |
| ***Marital Status (# Missing: 6)**** | | | | | | | | | | |
| Married | 2947 | 66.2 | | 946 | 66.1 | | 3893 | 66.2 | | 0.0028 |
| Widowed | 1092 | 24.5 | | 357 | 25.0 | | 1449 | 24.6 | | |
| Divorced | 173 | 3.89 | | 69 | 4.8 | | 242 | 4.1 | | |
| Separated | 40 | 0.9 | | 22 | 1.5 | | 62 | 1.1 | | |
| Never Married | 199 | 4.47 | | 37 | 2.6 | | 236 | 4.0 | | |
| ***Occupation* (# Missing: 9)**** | | | | | | | | | | |
| Professional/technical/managerial/admin | 1582 | 35.6 | | 479 | 33.5 | | 2061 | 35.1 | | <0.0001 |
| Sales/clerical services | 629 | 14.1 | | 234 | 16.4 | | 863 | 14.7 | | |
| Craftsman/machine operator/laborer | 693 | 15.6 | | 281 | 19.6 | | 974 | 16.6 | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Farming/forestry | 98 | 2.2 | | 17 | 1.2 | | 115 | 2.0 | | |
| Housewife | 976 | 21.9 | | 261 | 18.2 | | 1237 | 21.0 | | |
| Other | 470 | 10.6 | | 159 | 11.1 | | 629 | 10.7 | | |
| ***Income* (# Missing: 380)**** | | | | | | | | | | |
| Under $5,000 | 203 | 4.87 | | 78 | 5.8 | | 281 | 5.1 | | 0.0049 |
| $5,000 TO $7,999 | 411 | 9.85 | | 118 | 8.8 | | 529 | 9.6 | | |
| $8,000 TO $11,999 | 510 | 12.2 | | 150 | 11.2 | | 660 | 12.0 | | |
| $12,000 TO $15,999 | 632 | 15.1 | | 222 | 16.6 | | 854 | 15.5 | | |
| $16,000 TO $24,999 | 824 | 19.8 | | 254 | 19.0 | | 1078 | 19.6 | | |
| $25,000 TO $34,999 | 621 | 14.9 | | 226 | 16.9 | | 847 | 15.4 | | |
| $35,000 TO $49,999 | 398 | 9.54 | | 151 | 11.3 | | 549 | 10.0 | | |
| Over $50,000 | 572 | 13.7 | | 138 | 10.3 | | 710 | 12.9 | | |
| | | | | | | | | | | |
| Age (years) | 75.2 | 5.5 | | 76 | 6.2 | | 75.5 | 5.7 | | <0.0001 |
| Education (years) | 13.8 | 4.8 | | 13.4 | 4.8 | | 13.7 | 4.8 | | 0.01 |

**Table 3. Results from Backward and Forward Stepwise Regression**

Backward stepwise regression with 10-fold cross validation. This model had 43 variables.
The ROC Area: 0.737
With a cutoff of 0.20: Sensitivity: 39% Specificity 89% PPV:31% NPV:92%

Forward stepwise regression with 10-fold cross validation. This model had 41 variables.
The ROC Area: 0.738
With a cutoff of 0.20: Sensitivity 38% Specificity 89% PPV: 31% NPV:92%