

**Appendix 1. Frailty as a confounder of the effectiveness of preventive treatment.**

Abbreviations: t1 = time one. t2 = time 2.

This model indicates the interrelatedness of comorbidity, frailty, and ADL dependency, supporting the choice of ADL dependency as a proxy for frailty. Comorbidities increase the risk for ADL dependency<sup>28</sup> and frailty, but ADL dependency and frailty, due to inactivity and other mechanisms, may aggravate or unmask comorbid conditions.<sup>1</sup>

## Appendix 2a. Final Weighted Model Predicting ADL-Dependence: Parameter Estimates (SE) and Codes

Variable	Parameter Estimate	SE	Associated ICD-9, CPT or HCPC Codes
Intercept	-3.7466	0.1643	
Age (centered: Age-65)	0.0028	0.0194	
Age-centered Squared	0.0021	0.0006	
Female gender	0.3530	0.0698	
Non-Hispanic Black Race	0.3126	0.1089	
Hispanic/Latino	-0.5097	0.3628	
Non-Hispanic Other Race	0.8228	0.1741	
Cancer Screening	-0.5559	0.0939	V76.
Lipid Abnormality	-0.3544	0.0798	272.
Vertigo	-0.5925	0.1741	386., 438.85, 780.4
Arthritis	0.3598	0.0703	710., 711., 712., 714., 715., 716.5, 716.6, 716.8, 716.9, 718., 719.0, 719.1, 719.4, 719.5, 719.9, 725.
Bladder Dysfunction	0.4161	0.1163	596.5, 599.6, 788.2, 788.3
Podiatric Care	0.5322	0.1414	681.1, 700., 703.
Heart Failure	0.4120	0.0929	425., 428., 429.0, 429.1, 429.3, 429.4
Psychiatric Illness	0.5363	0.0882	290., 291., 292., 293., 294., 295., 296., 297., 298., 299., 300.0, 310., 311.
Rehabilitation care	-0.4315	0.1995	V57.1, V57.21, V57.3, V57.8, V57.9
Home oxygen	0.9094	0.1402	E1390, E1391, E1392, E0431, E0433, E0434, E0435, E0439, E0441, E0442, E0443
Hypotension Or Shock	0.6038	0.1964	458., 785.5, 958.4, 998.0
Ambulance Transport	0.4423	0.1291	A0426, A0427, A0428, A0429, A0999
Stroke/Brain Injury	0.4745	0.1448	348., 349.82, 430., 431., 432., 433.01, 433.11, 433.21, 433.31, 433.91, 434.01, 434.11, 434.91, 436., 852., 853., 854.
Dementias	0.7917	0.1303	290., 294., 331., 333.90, 333.92, 333.99, 438.0, 780.93, 797.
Parkinson's Disease	1.1873	0.2713	332.
Weakness	0.4921	0.1383	728.2, 728.3, 728.87, 799.3, V49.84
Skin Ulcer	0.8464	0.1602	707.
Paralysis	1.8541	0.2900	342., 344., 438.2, 438.3, 438.4, 438.5, 781.4
Wheelchair	1.5094	0.1910	E1050, E1060, E1070, E1083, E1084, E1085, E1086, E1087, E1088, E1089, E1090, E1091, E1092, E1093, E1100, E1110, E1140, E1150, E1160, E1161, E1170, K0001, K0002, K0003, K0004, K0005, K0006, K0007, K0008, K0009
Hospital Bed	1.4995	0.2683	E0250, E0251, E0255, E0256, E0260, E0261, E0265, E0266, E0270, E0290, E0291, E0292, E0293, E0294, E0295, E0296, E0297, E0301, E0302, E0303, E0304, E0316

Note: Unless otherwise indicated, all codes should be interpreted as starting with the digits listed. For example, 707. includes 707, 707.x and 707.xx codes: 707, 707.0, 707.00, 707.01, 707.02, 707.03, 707.04, 707.05, 707.06, 707.07, 707.09, 707.1, 707.10, 707.11, 707.12, 707.13, 707.14, 707.15, 707.19, 707.2, 707.20, 707.21, 707.22, 707.23, 707.24, 707.25, 707.8, 707.9.

**Appendix 2b. Final Weighted Model Predicting ADL-Dependence:  
Parameter Estimates (SE) for Models Excluding Race**

Variable	Parameter Estimate	SE
Intercept	-3.6691	0.1574
Age (centered: Age-65)	0.0006	0.0195
Age-centered Squared	0.0021	0.0006
Female gender	0.3592	0.0683
Cancer Screening	-0.5657	0.0941
Lipid Abnormalities	-0.3663	0.0793
Vertigo	-0.6029	0.1728
Arthritis	0.3711	0.0701
Bladder Dysfunction	0.4182	0.1163
Podiatric Care	0.5055	0.1401
Heart Failure	0.4205	0.0930
Psychiatric Illness	0.5294	0.0878
Rehabilitation	-0.4691	0.1983
Home oxygen	0.8818	0.1388
Hypotension Or Shock	0.5863	0.1965
Ambulance transport	0.4426	0.1281
Stroke/Brain Injury	0.5050	0.1420
Dementias	0.7825	0.1305
Parkinson's Disease	1.1693	0.2727
Weakness	0.5132	0.1385
Skin Ulcer	0.8241	0.1588
Paralysis	1.8395	0.2898
Wheelchair	1.5645	0.1900
Home hospital Bed	1.4989	0.2668

## Appendix 2c. Variables not significantly associated with ADL-Dependence

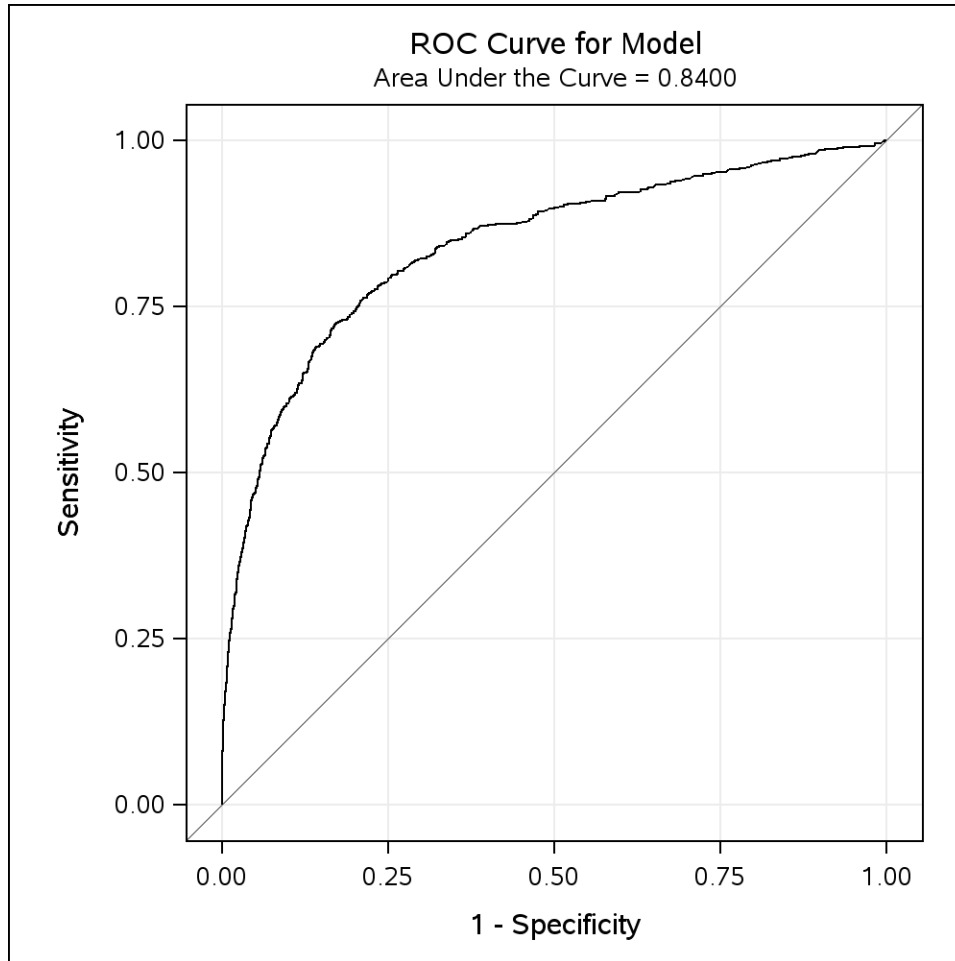
Variable	Associated ICD-9, CPT, or HCPC codes
Abnormal X-ray	793.
Back problems	720., 721.4, 721.91, 722., 723., 724.
Cancer	145., 146., 148., 150., 151., 152., 153., 154., 155., 156., 157., 158., 159., 160., 161., 162., 163., 164., 165., 166., 167., 168., 169., 170., 171., 172., 174., 175., 182., 183., 188., 189., 190., 191., 192., 193., 194., 195., 196., 197., 198., 199., 200., 201., 202., 203., 204., 205., 206., 207., 208., 209., 239.
Coronary disease	410., 411., 412., 413., 414.
Coagulopathy	286.6, 286.7, 286.9, 287.4, 287.5
COPD	490., 491., 492., 493., 494., 496.
Dehydration	276.51, 276.52
Delirium	293.0, 293.1, 780.01, 780.02, 780.09, 780.39, 780.97
Difficulty walking	719.7, 781.2, 781.3, V46.3
DM complications	250.4, 250.6, 250.7, 250.9
Dysphagia	787.2, 438.82
Electrolyte abnormalities	276.0, 276.1, 276.2, 276.3, 276.7, 276.8, 276.9
Falls	E880., E881., E882., E883., E884., E885., E886., E887., E888., E929.3
Hip/pelvic fractures	808., 820., V43.64
Renal failure	581., 583., 584., 585., 586.
Liver diseases	070., 570., 571., 572., 573., 789.5*, 789.59 (*EXCLUDING 789.5x codes other than 789.59)
Medication reaction	960., 961., 962., 963., 964., 965., 966., 967., 968., 969., 970., 971., 972., 973., 974., 975., 976., 977., 978., 979., E930., E931., E932., E933., E934., E935., E936. E937., E938., E939., E940., E941., E942., E943., E944., E945., E946., E947., E948., E949.
Physician inpatient consult	99251, 99252, 99253, 99254, 99255
Other fractures	800., 801., 802., 803., 804., 807., 809., 810., 811., 812., 813., 814., 815., 816., 817., 818., 819., 821., 822., 823., 824., 825., 826., 827., 828., 829.
Pneumonia	480., 481., 482., 483., 484., 485., 486., 487., 488., 112.4
Peripheral vascular disease	440.
Respiratory distress/failure	507.0, 512., 518.0, 518.4, 518.5, 519.0, V44.0, V46.1, V46.2, V55.0
Sepsis	010., 011., 012., 013., 014., 015., 016., 017., 018., 031.0, 031.2, 032.82, 032.83, 036., 038., 040.0, 041., 053.0, 053.13, 054.5, 112.5, 112.81, 112.83, 136.3, 320., 321., 681., 682., 730., 785.4, 790.7
Physician SNF visit	99304, 99305, 99307, 99308, 99309, 99310, 99315
Valve disease	394., 395., 396., 397., 424.
Walker	E0130, E0135, E0140, E0143, E0144, E0147, E0148, E0149, E0154, E0155, E0156, E0157, E0158
Weight loss	783.2, 780.94, 783.7, 799.4
Herpes zoster	053.
<b>Relevant code groups that did not meet 1% prevalence criteria for inclusion in models</b>	
Aphasia, dysphasia	438.1, 784.3, 784.5
Bowel dysfunction	560.39, 787.6*, 787.60 (*EXCLUDING 787.6x codes other than 787.60)
Malnutrition	261., 262., 263.
Neutropenia	288.0*, 288.00, 288.03, 288.04, 288.09 (*EXCLUDING 288.01, 288.02)
Pulmonary embolus	415.1
Vertebral fracture	805., 806.

Note: Unless otherwise indicated, all codes should be interpreted as starting with the digits listed. For example, 805. includes 805, 805.x and 805.xx codes: 805, 805.0, 805.00, 805.01, 805.02, 805.03, 805.04, 805.05, 805.06, 805.07, 805.08, 805.1, 805.10, 805.11, 805.12, 805.13, 805.14, 805.15, 805.16, 805.17, 805.18, 805.2, 805.3, 805.4, 805.5, 805.6, 805.7, 805.8, 805.9.

**Appendix 2d. Final Weighted Model Predicting ADL-Dependence: Parameter Estimates (SE) by Region**

Variable	Northeast c-statistic:0.859		Midwest c-statistic:0.850		South c-statistic: 0.855		West c-statistic:0.840	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Intercept	-4.1676	0.3884	-3.8708	0.3760	-3.7058	0.3099	-3.6655	0.2385
Age (centered: Age-65)	0.000034	0.0482	-0.0353	0.0381	-0.0154	0.0378	0.0545	0.0348
Age-centered Squared	0.00309	0.00146	0.00307	0.00118	0.00281	0.00113	-0.00020	0.00109
Female gender	0.6168	0.1571	0.3943	0.1153	0.2667	0.1308	0.4232	0.2046
Non-Hispanic Black Race	0.0246	0.3398	0.3414	0.2813	0.4523	0.1538	0.2662	0.3882
Hispanic/Latino	0.4639	1.2018	-10.8577	2.9283	-0.5368	0.5973	-0.0695	0.7172
Other Non-Hispanic Race	1.0070	0.3878	0.1845	0.8684	0.8481	0.3135	0.6152	0.2603
Cancer Screening	-0.1545	0.1627	-0.3042	0.2098	-0.8729	0.1799	-0.6491	0.2956
Lipid Abnormality	-0.5819	0.2001	-0.1829	0.1880	-0.1431	0.1521	-0.8157	0.2400
Vertigo	-0.4754	0.4912	-0.7897	0.3590	-0.6181	0.3234	-0.4895	0.3099
Arthritis	0.7157	0.2038	0.2944	0.2030	0.2921	0.0937	0.4513	0.1736
Bladder Dysfunction	0.8704	0.3023	0.1648	0.1969	0.2134	0.2490	0.6353	0.3857
Podiatric Care	0.7372	0.2047	0.3355	0.3421	-0.00919	0.2631	1.1043	0.3507
Heart Failure	0.1747	0.2674	0.8234	0.2381	0.3487	0.1488	0.5187	0.2238
Psychiatric Illness	0.4730	0.3039	0.3180	0.1701	0.6689	0.1410	0.3952	0.3442
Rehabilitation care	-2.2260	0.8638	-0.4045	0.3384	0.2426	0.3497	-1.3267	0.6786
Home oxygen	1.5089	0.3722	0.7639	0.3336	1.0933	0.2287	0.3471	0.3024
Hypotension Or Shock	0.8159	0.5559	-0.0797	0.4893	0.5510	0.2957	1.5770	0.5816
Ambulance Transport	0.0548	0.3530	0.7185	0.3116	0.6014	0.2135	-0.1019	0.3360
Stroke/Brain Injury	0.7584	0.5016	0.6890	0.3395	0.5537	0.2430	-0.8508	0.5006
Dementias	1.2366	0.3116	0.7712	0.3402	0.6922	0.1992	1.1081	0.3328
Parkinson's Disease	1.6913	0.7678	1.1493	0.5127	1.0694	0.3702	0.1951	0.6071
Weakness	1.4342	0.3975	0.8461	0.3258	0.0940	0.2418	0.5461	0.6228
Skin Ulcer	0.3030	0.3587	0.9147	0.3070	1.2740	0.3089	1.0677	0.4134
Paralysis	1.1364	1.1578	1.6196	0.5832	1.8717	0.4205	3.9026	1.0004
Wheelchair	1.1358	0.6886	2.1658	0.4835	1.5273	0.3136	1.0636	0.4925
Hospital Bed	2.4935	0.8585	1.2272	0.6752	1.0373	0.3698	2.1673	1.1301

Estimates are derived from a logistic regression model controlling for all other variables in the model.



**Appendix 3. Receiver Operating Curve for Prediction of ADL-dependency Using Claims Data**

#### Appendix 4: Predictors of 6-month mortality

Variable	Model 1 c-statistic: 0.689	Model 2 c-statistic: 0.772	Model 3 c-statistic: 0.762	Model 4 c-statistic: 0.791
Age (centered: Age-65)	1.09 (1.07, 1.12)	1.06 (1.03, 1.08)	1.03 (1.00, 1.05)	1.07 (1.04, 1.10)
Female gender	0.76 (0.53, 1.08)	0.64 (0.45, 0.92)	0.60 (0.42, 0.86)	0.71 (0.49, 1.03)
Race/Ethnicity				
Non-Hispanic White	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)
Non-Hispanic Black	1.75 (1.00, 3.04)	1.42 (0.81, 2.51)	1.29 (0.73, 2.27)	1.58 (0.88, 2.84)
Hispanic/Latino	0.42 (0.06, 3.05)	0.45 (0.06, 3.33)	0.50 (0.07, 3.67)	0.36 (0.05, 2.77)
Other Non-Hispanic	2.27 (1.08, 4.78)	1.51 (0.70, 3.28)	1.33 (0.62, 2.84)	2.46 (1.13, 5.37)
ADL-D		7.40 (5.08, 10.78)		
Probability of dependency				
< 5%			1.00 (ref)	
5-< 10%			1.94 (1.10, 3.43)	
10-< 20%			3.33 (1.81, 6.13)	
20-< 40%			7.67 (4.13, 14.25)	
40% or more			11.82 (6.50, 21.51)	
Claims				
Cancer Screening				1.23 (0.79, 1.93)
Lipid Abnormalities				0.76 (0.52, 1.10)
Vertigo				0.60 (0.31, 1.15)
Arthritis				0.85 (0.58, 1.26)
Bladder Dysfunction				0.84 (0.44, 1.58)
Podiatric Care				1.11 (0.61, 2.03)
Heart Failure				1.78 (1.17, 2.73)
Psychiatric Illness				0.91 (0.53, 1.56)
Rehabilitation care				1.17 (0.62, 2.21)
Home oxygen				3.27 (1.96, 5.46)
Hypotension or Shock				2.31 (1.19, 4.49)
Ambulance transport				1.76 (1.05, 2.95)
Stroke/Brain Injury				1.49 (0.82, 2.72)
Dementias				2.02 (1.16, 3.54)
Parkinson's Disease				1.42 (0.48, 4.23)
Weakness				1.63 (0.89, 2.96)
Skin Ulcer				1.31 (0.67, 2.55)
Paralysis				0.88 (0.27, 2.79)
Wheelchair				0.67 (0.30, 1.47)
Hospital Bed				2.12 (0.99, 4.52)