



Nursing Home Compare Quality Measure Technical Specifications

Appendices

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APPENDIX TABLE A

Risk-Adjustment Model for Short-Stay Residents who were Re-hospitalized after a Nursing Home Admission: Risk Variables and Coefficient Estimates

Note: Model C-statistic = 0.694

Note: This model is based on all SNF stays with admission from a hospital between January 1, 2017 and December 31, 2017.

Variable	Mean	Percent of Residents With Covariate who Triggered the Numerator	Coefficient	P-Value
Female age 18–65	0.051	26.8	0.030	0.009
Female age 65–69 (ref)	0.059	23.3	-	-
Female age 70–74	0.077	22.3	-0.013	0.200
Female age 75–79	0.091	21.4	-0.022	0.028
Female age 80–84	0.105	20.1	-0.060	<0.001
Female age 85–89	0.112	19.0	-0.102	<0.001
Female age 9–94	0.079	17.7	-0.159	<0.001
Female age GT 94	0.031	16.2	-0.252	<0.001
Male age 18–65	0.054	27.8	0.027	0.014
Male age 65–69	0.049	25.7	0.009	0.429
Male age 70–74	0.056	25.7	0.037	0.001
Male age 75–79	0.063	25.5	0.065	<0.001
Male age 80–84	0.066	24.4	0.049	<0.001
Male age 85–89	0.062	23.7	0.054	<0.001
Male age 90–94	0.036	22.5	0.009	0.469
Male age GT 94	0.010	21.2	-0.044	0.027
Length of stay 1–3 days (ref)	0.229	16.9	-	-

Variable	Mean	Percent of Residents With Covariate who Triggered the Numerator	Coefficient	P-Value
Length of stay 4-7 days	0.467	21.1	0.132	<0.001
Length of stay 8–14 days	0.221	27.5	0.319	<0.001
Length of stay GT 14 days	0.083	31.8	0.430	<0.001
0 hospitalizations in prior year (ref)	0.410	16.2	-	-
1–3 hospitalizations in prior year	0.481	24.2	0.107	<0.001
4–6 hospitalizations in prior year	0.085	35.4	0.355	<0.001
7–9 hospitalizations in prior year	0.017	45.4	0.648	<0.001
10+ hospitalizations in prior year	0.006	55.8	1.042	<0.001
Ever disabled	0.256	25.8	-0.002	0.707
ESRD	0.055	39.2	0.336	<0.001
At least 1 day ICU (y/n)	0.157	29.3	0.108	<0.001
1 Tuberculosis	0.000	37.0	1.116	<0.001
2 Septicemia (except in labor)	0.112	26.9	0.715	<0.001
3 Bacterial infection; unspecified site	0.001	26.6	0.743	<0.001
4 Mycoses	0.001	29.2	0.890	<0.001
5 HIV infection	0.000	31.6	0.793	<0.001
6 Hepatitis	0.000	34.4	1.081	<0.001
7 Viral infection	0.001	20.3	0.683	<0.001
8 Other infections; including parasitic	0.000	13.4	0.215	0.225
11 Cancer of head and neck	0.001	29.0	0.839	<0.001
12 Cancer of esophagus	0.000	33.6	1.111	<0.001
13 Cancer of stomach	0.000	30.9	1.119	<0.001
14 Cancer of colon	0.003	22.7	0.824	<0.001
15 Cancer of rectum and anus	0.001	29.7	1.092	<0.001
16 Cancer of liver and intrahepatic bile duct	0.000	30.7	1.159	<0.001

Variable	Mean	Percent of Residents With Covariate who Triggered the Numerator	Coefficient	P-Value
17 Cancer of pancreas	0.001	32.2	1.283	<0.001
18 Cancer of other GI organs; peritoneum	0.000	31.2	1.188	<0.001
19 Cancer of bronchus; lung	0.003	29.0	1.029	<0.001
20 Cancer; other respiratory and intrathoracic	0.000	34.3	1.171	<0.001
21 Cancer of bone and connective tissue	0.000	26.7	1.107	<0.001
22 Melanomas of skin	0.000	19.0	0.892	0.001
23 Other non-epithelial cancer of skin	0.000	22.3	0.989	<0.001
24 Cancer of breast	0.000	23.4	1.009	<0.001
25 Cancer of uterus	0.000	25.6	1.084	<0.001
26 Cancer of cervix	0.000	24.0	0.844	0.001
27 Cancer of ovary	0.000	30.3	1.243	<0.001
28 Cancer of other female genital organs	0.000	23.5	0.984	<0.001
29 Cancer of prostate	0.000	28.5	1.011	<0.001
31 Cancer of other male genital organs	0.000	25.0	1.120	0.001
32 Cancer of bladder	0.001	32.0	1.101	<0.001
33 Cancer of kidney and renal pelvis	0.001	22.7	0.873	<0.001
34 Cancer of other urinary organs	0.000	26.4	1.005	<0.001
35 Cancer of brain and nervous system	0.001	26.2	1.004	<0.001
36 Cancer of thyroid	0.000	24.0	0.736	0.010
37 Hodgkin's disease	0.000	38.0	1.519	<0.001
38 Non-Hodgkin's lymphoma	0.001	37.9	1.350	<0.001
39 Leukemias	0.001	38.7	1.373	<0.001
40 Multiple myeloma	0.001	37.2	1.343	<0.001
41 Cancer; other and unspecified primary	0.000	30.2	1.136	<0.001
42 Secondary malignancies	0.004	32.0	1.167	<0.001

Variable	Mean	Percent of Residents With Covariate who Triggered the Numerator	Coefficient	P-Value
43 Malignant neoplasm without specification of site	0.000	31.4	1.116	<0.001
44 Neoplasms of unspecified nature or uncertain behavior	0.001	34.3	1.268	<0.001
45 Maintenance chemotherapy; radiotherapy	0.001	32.5	0.752	<0.001
47 Other and unspecified benign neoplasm	0.001	22.6	0.816	<0.001
48 Thyroid disorders	0.001	24.4	0.870	<0.001
50 Diabetes mellitus with complications	0.021	25.8	0.674	<0.001
51 Other endocrine disorders	0.003	23.1	0.843	<0.001
52 Nutritional deficiencies	0.001	24.3	0.729	<0.001
54 Gout and other crystal arthropathies	0.001	19.4	0.701	<0.001
55 Fluid and electrolyte disorders	0.016	23.2	0.772	<0.001
56 Cystic fibrosis	0.000	29.2	0.885	0.062
57 Immunity disorders	0.000	26.3	0.703	<0.001
58 Other nutritional; endocrine; and metabolic disorders	0.003	23.7	0.781	<0.001
59 Deficiency and other anemia	0.005	28.7	0.924	<0.001
60 Acute post-hemorrhagic anemia	0.002	27.7	0.824	<0.001
61 Sickle cell anemia	0.000	46.7	1.200	<0.001
62 Coagulation and hemorrhagic disorders	0.002	28.7	0.875	<0.001
63 Diseases of white blood cells	0.001	28.3	0.878	<0.001
64 Other hematologic conditions	0.000	23.9	0.759	<0.001
76 Meningitis	0.000	23.7	0.713	<0.001
77 Encephalitis	0.000	26.9	0.821	<0.001
78 Other CNS infection and poliomyelitis	0.000	27.1	0.787	<0.001
79 Parkinson's disease	0.002	14.9	0.393	<0.001
80 Multiple sclerosis	0.001	15.5	0.429	<0.001
81 Other hereditary and degenerative nervous system conditions	0.001	17.4	0.439	<0.001

Variable	Mean	Percent of Residents With Covariate who Triggered the Numerator	Coefficient	P-Value
82 Paralysis	0.000	21.9	0.768	<0.001
83 Epilepsy; convulsions	0.007	21.1	0.630	<0.001
84 Headache; including migraine	0.000	18.8	0.611	<0.001
85 Coma; stupor; and brain damage	0.000	27.0	0.702	<0.001
88 Glaucoma	0.000	26.8	0.819	0.026
89 Blindness and vision defects	0.000	21.5	0.894	<0.001
90 Inflammation; infection of eye	0.000	19.3	0.612	<0.001
91 Other eye disorders	0.000	19.7	0.645	<0.001
92 Otitis media and related conditions	0.000	19.2	0.468	0.015
93 Conditions associated with dizziness or vertigo	0.001	11.8	0.310	<0.001
94 Other ear disorders	0.000	16.4	0.471	0.028
95 Other nervous system disorders	0.016	22.2	0.691	<0.001
96 Heart valve disorders	0.005	25.4	0.830	<0.001
97 Peri-, endo-, and myocarditis; cardiomyopathy	0.001	30.6	0.938	<0.001
98 Essential hypertension	0.000	17.5	0.717	<0.001
99 Hypertension with complications and secondary hypertension	0.052	29.6	0.834	<0.001
100 Acute myocardial infarction	0.016	28.2	0.944	<0.001
101 Coronary atherosclerosis and other heart disease	0.006	25.0	0.819	<0.001
102 Nonspecific chest pain	0.002	23.5	0.711	<0.001
103 Pulmonary heart disease	0.006	22.5	0.690	<0.001
104 Other and ill-defined heart disease	0.000	24.0	0.861	<0.001
105 Conduction disorders	0.003	17.5	0.539	<0.001
106 Cardiac dysrhythmias	0.018	24.7	0.882	<0.001
107 Cardiac arrest and ventricular fibrillation	0.000	26.6	0.542	<0.001
108 Congestive heart failure; non-hypertensive	0.009	27.1	0.786	<0.001

Variable	Mean	Percent of Residents With Covariate who Triggered the Numerator	Coefficient	P-Value
109 Acute cerebrovascular disease	0.030	20.9	0.654	<0.001
110 Occlusion or stenosis of pre-cerebral arteries	0.001	23.2	0.799	<0.001
111 Other and ill-defined cerebrovascular disease	0.000	19.9	0.521	<0.001
112 Transient cerebral ischemia	0.004	15.8	0.532	<0.001
113 Late effects of cerebrovascular disease	0.002	19.4	0.461	<0.001
114 Peripheral and visceral atherosclerosis	0.004	28.8	0.952	<0.001
115 Aortic; peripheral; and visceral artery aneurysms	0.002	25.5	0.821	<0.001
116 Aortic and peripheral arterial embolism or thrombosis	0.001	29.1	1.017	<0.001
117 Other circulatory disease	0.005	22.6	0.743	<0.001
118 Phlebitis; thrombophlebitis and thromboembolism	0.004	22.0	0.756	<0.001
119 Varicose veins of lower extremity	0.000	20.9	0.667	<0.001
120 Hemorrhoids	0.001	26.2	0.800	<0.001
121 Other diseases of veins and lymphatics	0.001	20.6	0.612	<0.001
122 Pneumonia (except that caused by tuberculosis or sexually transmitted disease)	0.027	22.6	0.645	<0.001
123 Influenza	0.005	16.2	0.382	<0.001
125 Acute bronchitis	0.002	16.4	0.470	<0.001
126 Other upper respiratory infections	0.001	19.1	0.605	<0.001
127 Chronic obstructive pulmonary disease and bronchiectasis	0.026	26.6	0.745	<0.001
128 Asthma	0.001	19.6	0.569	<0.001
129 Aspiration pneumonitis; food/vomitus	0.013	25.6	0.641	<0.001
130 Pleurisy; pneumothorax; pulmonary collapse	0.003	29.9	0.840	<0.001
131 Respiratory failure; insufficiency	0.021	31.1	0.768	<0.001
132 Lung disease due to external agents	0.000	29.2	0.833	<0.001
133 Other lower respiratory disease	0.002	26.0	0.757	<0.001

Variable	Mean	Percent of Residents With Covariate who Triggered the Numerator	Coefficient	P-Value
134 Other upper respiratory disease	0.001	28.6	0.791	<0.001
135 Intestinal infection	0.007	26.9	0.885	<0.001
136 Disorders of teeth and jaw	0.000	22.1	0.734	<0.001
137 Diseases of mouth; excluding dental	0.000	21.9	0.637	<0.001
138 Esophageal disorders	0.003	25.5	0.762	<0.001
139 Gastroduodenal ulcer (except hemorrhage)	0.001	25.0	0.867	<0.001
140 Gastritis and duodenitis	0.002	26.3	0.801	<0.001
141 Other disorders of stomach and duodenum	0.001	33.0	0.991	<0.001
142 Appendicitis and other appendiceal conditions	0.001	18.4	0.582	<0.001
143 Abdominal hernia	0.004	21.9	0.755	<0.001
144 Regional enteritis and ulcerative colitis	0.001	33.6	1.259	<0.001
145 Intestinal obstruction without hernia	0.008	24.1	0.763	<0.001
146 Diverticulosis and diverticulitis	0.006	24.0	0.776	<0.001
147 Anal and rectal conditions	0.001	26.7	0.885	<0.001
148 Peritonitis and intestinal abscess	0.000	37.3	1.147	<0.001
149 Biliary tract disease	0.005	22.0	0.731	<0.001
151 Other liver diseases	0.004	40.9	1.196	<0.001
152 Pancreatic disorders (not diabetes)	0.002	25.3	0.871	<0.001
153 Gastrointestinal hemorrhage	0.014	27.3	0.781	<0.001
154 Noninfectious gastroenteritis	0.002	22.1	0.779	<0.001
155 Other gastrointestinal disorders	0.005	26.6	0.812	<0.001
156 Nephritis; nephrosis; renal sclerosis	0.000	31.9	0.988	<0.001
157 Acute and unspecified renal failure	0.033	25.3	0.826	<0.001
158 Chronic kidney disease	0.000	33.5	0.731	<0.001
159 Urinary tract infections	0.039	19.2	0.623	<0.001

Variable	Mean	Percent of Residents With Covariate who Triggered the Numerator	Coefficient	P-Value
160 Calculus of urinary tract	0.001	24.7	0.774	<0.001
161 Other diseases of kidney and ureters	0.001	25.9	0.915	<0.001
162 Other diseases of bladder and urethra	0.001	25.9	0.784	<0.001
163 Genitourinary symptoms and ill-defined conditions	0.001	26.4	0.856	<0.001
164 Hyperplasia of prostate	0.001	22.9	0.731	<0.001
165 Inflammatory conditions of male genital organs	0.000	21.4	0.545	<0.001
166 Other male genital disorders	0.000	28.1	0.848	<0.001
167 Nonmalignant breast conditions	0.000	28.3	0.967	<0.001
168 Inflammatory diseases of female pelvic organs	0.000	23.2	0.813	<0.001
173 Menopausal disorders	0.000	18.0	0.294	0.181
175 Other female genital disorders	0.000	26.4	0.893	<0.001
197 Skin and subcutaneous tissue infections	0.015	19.4	0.563	<0.001
198 Other inflammatory condition of skin	0.000	28.7	0.992	<0.001
199 Chronic ulcer of skin	0.003	22.6	0.569	<0.001
200 Other skin disorders	0.000	21.3	0.617	<0.001
201 Infective arthritis and osteomyelitis	0.004	22.2	0.607	<0.001
202 Rheumatoid arthritis and related disease	0.000	13.8	0.353	0.001
203 Osteoarthritis (Ref)	0.049	7.5	-	-
204 Other non-traumatic joint disorders	0.002	15.1	0.472	<0.001
205 Spondylosis; intervertebral disc disorders; other back problems	0.016	15.9	0.565	<0.001
207 Pathological fracture	0.009	17.0	0.591	<0.001
209 Other acquired deformities	0.003	13.5	0.453	<0.001
210 Systemic lupus erythematosus and connective tissue disorders	0.000	31.6	1.028	<0.001
211 Other connective tissue disease	0.006	15.9	0.496	<0.001
212 Other bone disease and musculoskeletal deformities	0.001	16.5	0.570	<0.001

Variable	Mean	Percent of Residents With Covariate who Triggered the Numerator	Coefficient	P-Value
213 Cardiac and circulatory congenital anomalies	0.000	24.9	0.697	<0.001
214 Digestive congenital anomalies	0.000	24.1	0.804	0.016
216 Nervous system congenital anomalies	0.000	18.2	0.520	0.051
225 Joint disorders and dislocations; trauma-related	0.001	15.6	0.533	<0.001
226 Fracture of neck of femur (hip)	0.059	15.1	0.474	<0.001
227 Spinal cord injury	0.000	25.3	0.768	<0.001
228 Skull and face fractures	0.001	17.2	0.573	<0.001
229 Fracture of upper limb	0.010	14.0	0.421	<0.001
230 Fracture of lower limb	0.019	15.0	0.401	<0.001
231 Other fractures	0.027	15.1	0.464	<0.001
232 Sprains and strains	0.001	12.6	0.296	<0.001
233 Intracranial injury	0.010	22.9	0.800	<0.001
234 Crushing injury or internal injury	0.002	20.6	0.636	<0.001
235 Open wounds of head; neck; and trunk	0.001	16.3	0.521	<0.001
236 Open wounds of extremities	0.001	19.9	0.628	<0.001
237 Complication of device; implant or graft	0.033	25.4	0.718	<0.001
238 Complications of surgical procedures or medical care	0.019	27.3	0.753	<0.001
239 Superficial injury; contusion	0.003	18.8	0.657	<0.001
240 Burns	0.000	19.7	0.439	<0.001
241 Poisoning by psychotropic agents	0.000	19.0	0.486	<0.001
242 Poisoning by other medications and drugs	0.002	23.4	0.664	<0.001
243 Poisoning by nonmedicinal substances	0.000	14.5	0.193	0.231
244 Other injuries and conditions due to external causes	0.004	16.7	0.506	<0.001
245 Syncope	0.004	16.3	0.555	<0.001
246 Fever of unknown origin	0.001	23.8	0.765	<0.001

Variable	Mean	Percent of Residents With Covariate who Triggered the Numerator	Coefficient	P-Value
247 Lymphadenitis	0.000	43.3	1.701	<0.001
248 Gangrene	0.002	31.0	0.907	<0.001
249 Shock	0.000	28.3	0.675	<0.001
250 Nausea and vomiting	0.001	25.0	0.848	<0.001
251 Abdominal pain	0.001	25.1	0.861	<0.001
252 Malaise and fatigue	0.003	16.6	0.507	<0.001
253 Allergic reactions	0.000	18.3	0.517	<0.001
254 Rehabilitation care; fitting of prostheses; and adjustment of devices	0.000	25.0	0.924	0.040
257 Other aftercare	0.001	15.6	0.339	<0.001
258 Other screening for suspected conditions (not mental disorders or infectious disease)	0.000	24.8	0.845	<0.001
259 Residual codes; unclassified	0.003	20.4	0.638	<0.001
650 MHA: Adjustment disorders	0.000	19.6	0.608	<0.001
651 MHA: Anxiety disorders	0.000	20.4	0.662	<0.001
653 MHA: Delirium, dementia, and amnestic and other cognitive disorders	0.017	17.1	0.523	<0.001
656 MHA: Impulse control disorders, NEC	0.000	21.3	0.708	<0.001
657 MHA: Mood disorders	0.006	18.0	0.434	<0.001
658 MHA: Personality disorders	0.000	29.2	0.911	0.006
659 MHA: Schizophrenia and other psychotic disorders	0.007	20.2	0.556	<0.001
660 MHA: Alcohol-related disorders	0.004	25.1	0.810	<0.001
661 MHA: Substance-related disorders	0.001	19.8	0.551	<0.001
662 MHA: Suicide and intentional self-inflicted injury	0.000	19.5	0.446	<0.001
670 MHA: Miscellaneous mental disorders	0.000	21.5	0.693	<0.001

Variable	Mean	Percent of Residents With Covariate who Triggered the Numerator	Coefficient	P-Value
2617 Adverse effects of medical drugs	0.000	20.7	0.601	<0.001
CCS None	0.000	26.6	0.597	<0.001
Nonsignificant CCS w/ protective effect	0.000	5.9	-0.532	0.007
Nonsignificant CCS w/ increased risk	0.000	14.9	0.352	<0.001
Re-hospitalizations-specific comorbidity index	-1.283	-	0.458	<0.001
End-stage prognosis	0.007	13.4	-1.123	<0.001
Returned to nursing home following hospitalization	0.238	26.8	0.052	<0.001
Anemia	0.309	25.6	0.064	<0.001
Venous/Arterial ulcer present	0.027	29.1	0.067	<0.001
Viral hepatitis	0.009	31.3	0.092	<0.001
Internal bleeding	0.009	48.1	0.960	<0.001
Daily pain	0.051	37.8	0.409	<0.001
Extensive assistance/dependence in eating	0.548	24.5	0.079	<0.001
Two-person support needed with one or more ADL(s)	0.644	24.0	0.168	<0.001
Cognitive status not completely intact	0.023	58.5	1.400	<0.001
Cognitive assessment missing	0.009	48.1	0.960	<0.001
Chemotherapy for cancer	0.010	29.5	0.293	<0.001
IV medications	0.511	23.1	-0.035	<0.001
Ostomy care	0.026	30.9	0.220	<0.001
Oxygen therapy	0.360	27.6	0.176	<0.001
Radiation for cancer	0.003	34.4	0.332	<0.001
First assessment is for significant change in status	0.035	17.2	-0.520	<0.001
Rarely/never makes self understood by others	0.024	26.5	-0.132	<0.001
Acute mental status change	0.024	35.1	0.546	<0.001
Rejected care for past 4–7 days	0.012	26.3	0.121	<0.001

Variable	Mean	Percent of Residents With Covariate who Triggered the Numerator	Coefficient	P-Value
Wandering once or more in the past week	0.018	22.4	0.189	<0.001
Walks in room indep/supervision/limited assistance	0.331	18.0	-0.074	<0.001
Walks in corridor indep/supervision/limited assistance	0.300	17.1	-0.221	<0.001
Wanders and Walks in room or corridor indep/supervision/limited assistance	0.010	21.0	0.159	<0.001
Alzheimer's disease	0.049	18.1	-0.161	<0.001
Non-Alzheimer's dementia	0.205	20.0	-0.156	<0.001
Cancer	0.065	20.0	-0.312	<0.001
Ulcerative Colitis/Crohn's/inflammatory bowel disease	0.011	18.6	-0.240	<0.001
Seizure disorder or epilepsy	0.070	24.4	-0.032	<0.001
Shortness of breath with exertion	0.156	28.9	0.055	<0.001
Shortness of breath when sitting at rest	0.057	38.9	0.478	<0.001
Choke/cough during meals or swallowing medications	0.019	24.2	-0.043	0.001
Parenteral/IV feeding	0.010	38.2	0.543	<0.001
Feeding tube	0.039	36.3	0.092	<0.001
Surgical wound	0.268	19.1	-0.036	<0.001
Antibiotic received	0.400	24.1	0.077	<0.001
Ventilator or respirator	0.003	43.6	-0.102	0.001
Transfusion	0.003	33.4	0.273	<0.001
Respiratory therapy	0.065	28.5	0.007	0.356
Constant	-	-	-1.917	<0.001

APPENDIX TABLE B

Coefficient Estimates for Short-Stay Residents who were Re-hospitalized after a Nursing Home Admission, Resident-Level Comorbidity Index

Note: Model C-statistic = 0.613

Note: This model is based on all SNF stays with admission from a hospital between January 1, 2017 and December 31, 2017.

Charlson Condition	Coefficient	SE	P-value
Myocardial infarction	0.134	0.006	<0.001
CHF	0.249	0.005	<0.001
Peripheral vascular disease	0.149	0.005	<0.001
Cerebrovascular disease	0.027	0.006	<0.001
Dementia	-0.032	0.005	<0.001
COPD	0.242	0.004	<0.001
Rheumatoid arthritis	0.139	0.009	<0.001
Ulcers	0.185	0.011	<0.001
Mild liver disease	0.255	0.010	<0.001
Diabetes mellitus	0.121	0.005	<0.001
Diabetes with sequelae	0.140	0.006	<0.001
Paralysis	0.131	0.010	<0.001
Chronic renal disease	0.284	0.005	<0.001
Cancer	0.325	0.008	<0.001
Moderate to severe liver disease	0.443	0.016	<0.001
Metastatic cancer	0.327	0.013	<0.001
HIV/AIDS	0.328	0.036	<0.001
Constant	-1.600	0.003	<0.001

APPENDIX TABLE C

Risk-Adjustment Model for Hospitalizations per 1,000 Long-Stay Resident Days: Risk Variables and Coefficient Estimates

Note: This model assumes a negative binomial distribution for the number of hospitalizations per long-stay resident.

Note: This model is based on all days, between January 1, 2017 and December 31, 2017, that residents were in the nursing home after they attained long-term resident status (i.e., after 100 cumulative days in the facility).

Variable	Mean	Mean Number of Hospitalizations Among Those With Covariate	Coefficient	P-Value
Number of long-stay days in target period	240	-	0.016	<0.001
Number of long-stay days in target period, squared	75,970	-	0.000	<0.001
White (ref)	0.824	0.40	-	-
Black	0.126	0.56	0.251	<0.001
Hispanic	0.019	0.55	0.289	<0.001
Asian	0.014	0.49	0.254	<0.001
Other race/ethnicity	0.015	0.47	0.109	<0.001
Unknown race/ethnicity	0.003	0.47	0.038	0.246
Female age 18–65	0.049	0.58	0.015	0.212
Female age 65–69 (ref)	0.041	0.54	-	-
Female age 70–74	0.055	0.51	-0.003	0.776
Female age 75–79	0.074	0.45	-0.051	<0.001
Female age 80–84	0.106	0.40	-0.100	<0.001
Female age 85–89	0.139	0.35	-0.173	<0.001
Female age 9–94	0.126	0.31	-0.260	<0.001
Female age GT 94	0.072	0.25	-0.412	<0.001
Male age 18–65	0.060	0.57	0.046	<0.001
Male age 65–69	0.041	0.52	0.000	0.982
Male age 70–74	0.044	0.52	0.034	0.006
Male age 75–79	0.046	0.51	0.055	<0.001
Male age 80–84	0.051	0.47	0.021	0.083

Variable	Mean	Mean Number of Hospitalizations Among Those With Covariate	Coefficient	P-Value
Male age 85–89	0.050	0.42	-0.025	0.049
Male age 90–94	0.033	0.38	-0.080	<0.001
Male age GT 94	0.012	0.33	-0.191	<0.001
0 hospitalizations in prior year (ref)	0.500	0.31	-	-
1–3 hospitalizations in prior year	0.434	0.48	0.195	<0.001
4–6 hospitalizations in prior year	0.056	0.83	0.478	<0.001
7–9 hospitalizations in prior year	0.009	1.19	0.673	<0.001
10+ hospitalizations in prior year	0.002	1.56	0.869	<0.001
Long-stay hospitalizations-specific comorbidity index	0.118	-	2.543	<0.001
Entered nursing home from a psychiatric facility	0.024	0.45	0.088	<0.001
End-stage prognosis	0.045	0.10	-0.371	<0.001
Septicemia	0.010	0.76	0.168	<0.001
Respiratory failure	0.032	0.77	0.076	<0.001
Internal bleeding	0.002	0.57	0.092	0.020
Extensive assistance/dependence in eating	0.225	0.40	0.042	<0.001
Moderate cognitive impairment	0.217	0.43	-0.047	<0.001
Severe cognitive impairment	0.278	0.35	-0.120	<0.001
Staff assessed cognitive status	0.177	0.35	-0.139	<0.001
Cognitive status assessment missing	0.004	0.45	-0.104	<0.001
Chemotherapy for cancer	0.005	0.50	0.085	0.002
IV medications	0.015	0.78	0.135	<0.001
Oxygen therapy	0.130	0.62	0.169	<0.001
Radiation for cancer	0.001	0.54	0.071	0.328
Rarely/never makes self understood by others	0.072	0.35	-0.012	0.247
Rejected care for past 4–7 days	0.023	0.42	0.019	0.159
Wandering once or more in the past week	0.048	0.33	-0.047	<0.001
Walks in room indep/supervision/limited assistance	0.342	0.40	-0.003	0.711
Walks in corridor indep/supervision/limited assistance	0.320	0.40	-0.067	<0.001
Shortness of breath with exertion	0.079	0.60	0.078	<0.001
Shortness of Breath when lying flat	0.067	0.61	0.071	<0.001
Anticoagulant received	0.157	0.54	0.083	<0.001

Variable	Mean	Mean Number of Hospitalizations Among Those With Covariate	Coefficient	P-Value
Antibiotic received	0.130	0.56	0.143	<0.001
Diuretic received	0.345	0.49	0.136	<0.001
Ulcerative Colitis/Crohn's/inflammatory bowel disease	0.002	0.45	0.068	0.075
Multi-drug resistant organism (MDRO)	0.007	0.72	0.078	<0.001
Cerebrovascular accident, transient ischemic attack or stroke	0.115	0.46	0.015	0.011
Quadriplegia	0.007	0.76	0.171	<0.001
Multiple Sclerosis	0.014	0.56	0.101	<0.001
Parkinson's disease	0.068	0.42	0.033	<0.001
Anxiety disorder	0.316	0.44	0.087	<0.001
Gastroesophageal reflux disease (GERD) or ulcer	0.093	0.45	0.128	<0.001
Neurogenic bladder	0.033	0.67	0.224	<0.001
Transfusion	0.001	0.83	0.334	<0.001
Hospice care after nursing home admission	0.057	0.08	-1.354	<0.001
Isolation or quarantine for active infectious disease	0.004	0.61	0.034	0.202
Speech therapy	0.100	0.50	-0.008	0.206
Respiratory therapy	0.039	0.68	0.107	<0.001
Constant	-	-	-2.631	<0.001

APPENDIX TABLE D

Coefficient Estimates for Hospitalizations per 1,000 Long-Stay Resident Days, Resident-Level Comorbidity Index

Note: This model assumes a negative binomial distribution for the number of hospitalizations per long-stay resident.

Note: This model is based on all days, between January 1, 2017 and December 31, 2017, that residents were in the nursing home after they attained long-term resident status (i.e., after 100 cumulative days in the facility).

* Coefficients for the number of long-stay days excluded from the comorbidity construct.

Charlson Condition	Coefficient	SE	P-value
Myocardial infarction	0.033	0.008	<0.001
CHF	0.204	0.006	<0.001
Peripheral vascular disease	0.137	0.007	<0.001
Cerebrovascular disease	0.027	0.007	<0.001
Dementia	-0.023	0.005	<0.001
COPD	0.336	0.005	<0.001
Rheumatoid arthritis	0.100	0.013	<0.001
Ulcers	0.122	0.014	<0.001
Mild liver disease	0.142	0.014	<0.001
Diabetes mellitus	0.286	0.006	<0.001
Diabetes with sequelae	0.125	0.008	<0.001
Paralysis	0.209	0.010	<0.001
Chronic renal disease	0.254	0.006	<0.001
Cancer	0.047	0.013	<0.001
Moderate to severe liver disease	0.287	0.024	<0.001
Metastatic cancer	-0.069	0.025	0.006
HIV/AIDS	0.269	0.046	<0.001
<i>Number of long-stay days in target period*</i>	<i>0.016</i>	<i>0.000</i>	<i><0.001</i>
<i>Number of long-stay days in target period, squared*</i>	<i>0.000</i>	<i>0.000</i>	<i><0.001</i>
Intercept	-2.420	0.008	<0.001

APPENDIX TABLE E

Risk-Adjustment Model for Short-Stay Residents who have had an Outpatient Emergency Department Visit: Risk Variables and Coefficient Estimates

Note: Model C-statistic = 0.613

Note: This model is based on all SNF stays with admission from a hospital between January 1, 2017 and December 31, 2017.

Variable	Mean	Percent of Residents With Covariate who Triggered the Numerator	Coefficient	P-Value
Female age 18–65	0.051	16.68	0.205	<0.001
Female age 65–69 (ref)	0.059	12.20	-	-
Female age 70–74	0.077	11.46	-0.032	0.010
Female age 75–79	0.091	10.98	-0.048	<0.001
Female age 80–84	0.105	10.28	-0.097	<0.001
Female age 85–89	0.112	9.98	-0.108	<0.001
Female age 90–94	0.079	9.20	-0.178	<0.001
Female age GT 94	0.031	8.60	-0.234	<0.001
Male age 18–65	0.054	17.25	0.194	<0.001
Male age 65–69	0.049	13.95	0.070	<0.001
Male age 70–74	0.056	13.24	0.049	<0.001
Male age 75–79	0.063	12.92	0.052	<0.001
Male age 80–84	0.066	12.35	0.031	0.020
Male age 85–89	0.062	11.90	0.019	0.170
Male age 90–94	0.036	11.14	-0.030	0.066
Male age GT 94	0.010	11.11	-0.009	0.725
Length of stay 1–3 days (ref)	0.229	10.85	-	-
Length of stay 4–7 days	0.467	11.44	0.001	0.913
Length of stay 8–14 days	0.221	12.93	0.037	<0.001
Length of stay GT 14 days	0.083	14.23	0.039	<0.001

Variable	Mean	Percent of Residents With Covariate who Triggered the Numerator	Coefficient	P-Value
0 hospitalizations in prior year (ref)	0.410	9.49	-	-
1–3 hospitalizations in prior year	0.481	12.44	0.168	<0.001
4–6 hospitalizations in prior year	0.085	16.78	0.375	<0.001
7–9 hospitalizations in prior year	0.017	21.64	0.588	<0.001
10+ hospitalizations in prior year	0.006	29.56	0.919	<0.001
Ever disabled	0.256	14.76	0.112	<0.001
ESRD	0.055	19.92	0.369	<0.001
At least 1 day ICU (y/n)	0.157	13.75	0.059	<0.001
2 Septicemia (except in labor)	0.112	11.96	0.123	<0.001
3 Bacterial infection; unspecified site	0.001	15.91	0.413	<0.001
4 Mycoses	0.001	13.94	0.312	<0.001
5 HIV infection	0.000	17.65	0.236	0.028
6 Hepatitis	0.000	14.96	0.313	0.018
7 Viral infection	0.001	10.65	0.184	0.020
11 Cancer of head and neck	0.001	21.43	0.534	<0.001
12 Cancer of esophagus	0.000	20.13	0.653	<0.001
13 Cancer of stomach	0.000	15.23	0.463	<0.001
14 Cancer of colon	0.003	10.58	0.198	<0.001
15 Cancer of rectum and anus	0.001	14.38	0.482	<0.001
16 Cancer of liver and intrahepatic bile duct	0.000	12.50	0.265	0.025
17 Cancer of pancreas	0.001	12.88	0.370	<0.001
18 Cancer of other GI organs; peritoneum	0.000	16.67	0.648	<0.001
19 Cancer of bronchus; lung	0.003	11.18	0.231	<0.001
24 Cancer of breast	0.000	10.00	0.198	0.080
25 Cancer of uterus	0.000	10.68	0.231	0.047
27 Cancer of ovary	0.000	11.66	0.347	0.003
28 Cancer of other female genital organs	0.000	11.92	0.355	0.048
29 Cancer of prostate	0.000	14.95	0.523	<0.001

Variable	Mean	Percent of Residents With Covariate who Triggered the Numerator	Coefficient	P-Value
32 Cancer of bladder	0.001	13.85	0.376	<0.001
33 Cancer of kidney and renal pelvis	0.001	11.97	0.295	0.002
34 Cancer of other urinary organs	0.000	14.35	0.497	0.011
35 Cancer of brain and nervous system	0.001	12.57	0.278	0.002
36 Cancer of thyroid	0.000	18.67	0.652	0.030
38 Non-Hodgkin's lymphoma	0.001	10.69	0.119	0.133
39 Leukemias	0.001	14.37	0.423	<0.001
40 Multiple myeloma	0.001	12.86	0.319	0.001
42 Secondary malignancies	0.004	12.31	0.322	<0.001
43 Malignant neoplasm without specification of site	0.000	11.85	0.281	0.061
44 Neoplasms of unspecified nature or uncertain behavior	0.001	13.63	0.361	<0.001
47 Other and unspecified benign neoplasm	0.001	11.64	0.238	0.000
48 Thyroid disorders	0.001	13.19	0.407	<0.001
50 Diabetes mellitus with complications	0.021	13.51	0.174	<0.001
51 Other endocrine disorders	0.003	12.04	0.311	<0.001
52 Nutritional deficiencies	0.001	14.23	0.304	<0.001
54 Gout and other crystal arthropathies	0.001	10.37	0.202	0.009
55 Fluid and electrolyte disorders	0.016	12.73	0.292	<0.001
58 Other nutritional; endocrine; and metabolic disorders	0.003	11.72	0.208	<0.001
59 Deficiency and other anemia	0.005	12.49	0.246	<0.001
60 Acute post-hemorrhagic anemia	0.002	12.79	0.255	<0.001
61 Sickle cell anemia	0.000	23.70	0.428	0.040
62 Coagulation and hemorrhagic disorders	0.002	13.99	0.379	<0.001
63 Diseases of white blood cells	0.001	11.52	0.119	0.225
76 Meningitis	0.000	15.31	0.448	<0.001
77 Encephalitis	0.000	14.43	0.380	0.001
78 Other CNS infection and poliomyelitis	0.000	15.75	0.370	<0.001
79 Parkinson's disease	0.002	12.53	0.368	<0.001

Variable	Mean	Percent of Residents With Covariate who Triggered the Numerator	Coefficient	P-Value
81 Other hereditary and degenerative nervous system conditions	0.001	13.96	0.400	<0.001
82 Paralysis	0.000	18.98	0.786	<0.001
83 Epilepsy; convulsions	0.007	14.99	0.356	<0.001
84 Headache; including migraine	0.000	16.43	0.595	<0.001
85 Coma; stupor; and brain damage	0.000	15.31	0.347	0.086
89 Blindness and vision defects	0.000	15.59	0.648	0.002
91 Other eye disorders	0.000	15.27	0.526	0.008
95 Other nervous system disorders	0.016	13.06	0.300	<0.001
96 Heart valve disorders	0.005	11.96	0.293	<0.001
97 Peri-, endo-, and myocarditis; cardiomyopathy	0.001	13.69	0.277	<0.001
98 Essential hypertension	0.000	13.03	0.509	<0.001
99 Hypertension with complications and secondary hypertension	0.052	12.43	0.230	<0.001
100 Acute myocardial infarction	0.016	13.87	0.435	<0.001
101 Coronary atherosclerosis and other heart disease	0.006	14.90	0.491	<0.001
102 Nonspecific chest pain	0.002	17.34	0.586	<0.001
103 Pulmonary heart disease	0.006	13.08	0.413	<0.001
104 Other and ill-defined heart disease	0.000	13.67	0.495	0.001
105 Conduction disorders	0.003	10.87	0.246	<0.001
106 Cardiac dysrhythmias	0.018	12.87	0.405	<0.001
107 Cardiac arrest and ventricular fibrillation	0.000	16.61	0.449	<0.001
108 Congestive heart failure; non-hypertensive	0.009	12.27	0.282	<0.001
109 Acute cerebrovascular disease	0.030	13.22	0.394	<0.001
110 Occlusion or stenosis of pre-cerebral arteries	0.001	14.01	0.420	<0.001
111 Other and ill-defined cerebrovascular disease	0.000	17.15	0.595	<0.001
112 Transient cerebral ischemia	0.004	11.16	0.290	<0.001
113 Late effects of cerebrovascular disease	0.002	13.14	0.230	<0.001
114 Peripheral and visceral atherosclerosis	0.004	12.72	0.294	<0.001
115 Aortic; peripheral; and visceral artery aneurysms	0.002	13.38	0.384	<0.001

Variable	Mean	Percent of Residents With Covariate who Triggered the Numerator	Coefficient	P-Value
116 Aortic and peripheral arterial embolism or thrombosis	0.001	14.89	0.525	<0.001
117 Other circulatory disease	0.005	13.38	0.374	<0.001
118 Phlebitis; thrombophlebitis and thromboembolism	0.004	12.34	0.348	<0.001
120 Hemorrhoids	0.001	11.40	0.142	0.126
122 Pneumonia (except that caused by tuberculosis or sexually transmitted disease)	0.027	11.31	0.169	<0.001
123 Influenza	0.005	9.09	0.062	0.106
125 Acute bronchitis	0.002	9.60	0.126	0.049
126 Other upper respiratory infections	0.001	11.91	0.288	0.005
127 Chronic obstructive pulmonary disease and bronchiectasis	0.026	12.05	0.207	<0.001
128 Asthma	0.001	11.64	0.281	0.003
129 Aspiration pneumonitis; food/vomitus	0.013	12.02	0.111	<0.001
130 Pleurisy; pneumothorax; pulmonary collapse	0.003	13.30	0.259	<0.001
131 Respiratory failure; insufficiency	0.021	12.26	0.131	<0.001
133 Other lower respiratory disease	0.002	11.80	0.183	0.001
134 Other upper respiratory disease	0.001	15.05	0.327	<0.001
135 Intestinal infection	0.007	11.88	0.164	<0.001
137 Diseases of mouth; excluding dental	0.000	12.18	0.214	0.069
138 Esophageal disorders	0.003	14.19	0.336	<0.001
139 Gastroduodenal ulcer (except hemorrhage)	0.001	13.19	0.367	<0.001
140 Gastritis and duodenitis	0.002	13.13	0.285	<0.001
141 Other disorders of stomach and duodenum	0.001	14.57	0.328	<0.001
142 Appendicitis and other appendiceal conditions	0.001	11.11	0.212	0.037
143 Abdominal hernia	0.004	12.48	0.344	<0.001
144 Regional enteritis and ulcerative colitis	0.001	13.96	0.338	<0.001
145 Intestinal obstruction without hernia	0.008	11.84	0.249	<0.001
146 Diverticulosis and diverticulitis	0.006	11.55	0.237	<0.001
147 Anal and rectal conditions	0.001	14.25	0.406	<0.001

Variable	Mean	Percent of Residents With Covariate who Triggered the Numerator	Coefficient	P-Value
148 Peritonitis and intestinal abscess	0.000	18.38	0.501	<0.001
149 Biliary tract disease	0.005	11.82	0.272	<0.001
151 Other liver diseases	0.004	16.62	0.322	<0.001
152 Pancreatic disorders (not diabetes)	0.002	14.27	0.423	<0.001
153 Gastrointestinal hemorrhage	0.014	12.24	0.193	<0.001
154 Noninfectious gastroenteritis	0.002	11.76	0.240	<0.001
155 Other gastrointestinal disorders	0.005	13.94	0.325	<0.001
157 Acute and unspecified renal failure	0.033	11.85	0.239	<0.001
158 Chronic kidney disease	0.000	18.99	0.361	0.009
159 Urinary tract infections	0.039	11.14	0.205	<0.001
160 Calculus of urinary tract	0.001	14.18	0.347	<0.001
161 Other diseases of kidney and ureters	0.001	13.63	0.384	<0.001
162 Other diseases of bladder and urethra	0.001	16.93	0.581	<0.001
163 Genitourinary symptoms and ill-defined conditions	0.001	15.54	0.506	<0.001
164 Hyperplasia of prostate	0.001	18.99	0.762	<0.001
165 Inflammatory conditions of male genital organs	0.000	13.75	0.249	0.012
166 Other male genital disorders	0.000	17.97	0.590	0.001
172 Ovarian cyst	0.000	20.45	0.995	0.008
175 Other female genital disorders	0.000	14.75	0.495	<0.001
197 Skin and subcutaneous tissue infections	0.015	10.66	0.110	<0.001
198 Other inflammatory condition of skin	0.000	12.80	0.275	0.029
199 Chronic ulcer of skin	0.003	10.96	0.029	0.507
200 Other skin disorders	0.000	17.18	0.531	0.001
201 Infective arthritis and osteomyelitis	0.004	13.11	0.206	<0.001
203 Osteoarthritis (Ref)	0.049	7.56	-	-
204 Other non-traumatic joint disorders	0.002	9.42	0.120	0.041
205 Spondylosis; intervertebral disc disorders; other back problems	0.016	10.78	0.269	<0.001
207 Pathological fracture	0.009	9.59	0.183	<0.001

Variable	Mean	Percent of Residents With Covariate who Triggered the Numerator	Coefficient	P-Value
209 Other acquired deformities	0.003	10.32	0.235	<0.001
210 Systemic lupus erythematosus and connective tissue disorders	0.000	15.58	0.437	<0.001
211 Other connective tissue disease	0.006	9.88	0.145	<0.001
212 Other bone disease and musculoskeletal deformities	0.001	12.74	0.382	<0.001
225 Joint disorders and dislocations; trauma-related	0.001	10.15	0.195	0.026
226 Fracture of neck of femur (hip)	0.059	9.82	0.199	<0.001
227 Spinal cord injury	0.000	15.17	0.519	<0.001
228 Skull and face fractures	0.001	11.98	0.339	<0.001
229 Fracture of upper limb	0.010	9.25	0.159	<0.001
231 Other fractures	0.027	9.64	0.203	<0.001
233 Intracranial injury	0.010	14.76	0.519	<0.001
234 Crushing injury or internal injury	0.002	12.83	0.391	<0.001
235 Open wounds of head; neck; and trunk	0.001	14.07	0.524	<0.001
237 Complication of device; implant or graft	0.033	14.30	0.290	<0.001
238 Complications of surgical procedures or medical care	0.019	14.92	0.298	<0.001
239 Superficial injury; contusion	0.003	11.04	0.291	<0.001
240 Burns	0.000	13.16	0.218	0.079
241 Poisoning by psychotropic agents	0.000	14.99	0.406	<0.001
242 Poisoning by other medications and drugs	0.002	13.56	0.265	<0.001
244 Other injuries and conditions due to external causes	0.000	13.29	0.296	0.071
245 Syncope	0.004	11.00	0.249	<0.001
248 Gangrene	0.002	12.59	0.168	0.001
250 Nausea and vomiting	0.001	12.88	0.303	0.002
251 Abdominal pain	0.001	16.53	0.570	<0.001
252 Malaise and fatigue	0.003	10.52	0.177	<0.001
258 Other screening for suspected conditions (not mental disorders or infectious disease)	0.000	12.96	0.341	0.009
259 Residual codes; unclassified	0.003	13.59	0.371	<0.001

Variable	Mean	Percent of Residents With Covariate who Triggered the Numerator	Coefficient	P-Value
650 MHA: Adjustment disorders	0.000	16.52	0.587	0.001
651 MHA: Anxiety disorders	0.000	16.27	0.605	<0.001
652 MHA: Attention-deficit, conduct, and disruptive behavior disorders	0.000	19.40	0.736	0.018
653 MHA: Delirium, dementia, and amnestic and other cognitive disorders	0.017	11.72	0.229	<0.001
655 MHA: Disorders usually diagnosed in infancy, childhood, or adolescence	0.000	27.27	0.894	0.067
656 MHA: Impulse control disorders, NEC	0.000	16.43	0.469	0.014
657 MHA: Mood disorders	0.006	12.84	0.232	<0.001
658 MHA: Personality disorders	0.000	29.17	1.159	<0.001
660 MHA: Alcohol-related disorders	0.004	16.25	0.442	<0.001
661 MHA: Substance-related disorders	0.001	18.01	0.607	<0.001
662 MHA: Suicide and intentional self-inflicted injury	0.000	14.11	0.321	0.016
670 MHA: Miscellaneous mental disorders	0.000	23.86	0.931	<0.001
Nonsignificant CCS w/ protective effect	0.003	8.33	-0.098	0.041
Nonsignificant CCS w/ increased risk	0.035	9.58	0.020	0.303
ED-specific Comorbidity Index	-2.024	-	0.217	<0.001
End-stage prognosis	0.007	7.53	-0.573	<0.001
Returned to the nursing home following hospitalization	0.238	13.30	-0.021	0.001
Respiratory failure	0.071	13.20	-0.025	0.008
Venous/Arterial ulcer present	0.027	12.12	-0.104	<0.001
Viral hepatitis	0.009	17.99	0.137	<0.001
Internal bleeding	0.009	20.15	0.535	<0.001
Extensive assistance/dependence in eating	0.051	15.72	0.050	<0.001
Two-person support needed with one or more ADLs	0.548	12.26	0.041	<0.001
Cognitive status not completely intact	0.644	12.36	0.115	<0.001
Cognitive status assessment missing	0.023	18.69	0.423	<0.001
IV medications	0.511	12.06	0.016	0.001

Variable	Mean	Percent of Residents With Covariate who Triggered the Numerator	Coefficient	P-Value
Ostomy care	0.026	14.37	0.074	<0.001
Oxygen therapy	0.360	12.41	0.010	0.083
Tracheostomy care	0.008	18.93	0.209	<0.001
First assessment was for significant change in status	0.035	11.77	-0.072	<0.001
Rarely/never makes self understood by others	0.024	12.20	-0.208	<0.001
Acute change in mental status	0.024	15.16	0.221	<0.001
Rejected care for past 4–7 days	0.012	16.17	0.239	<0.001
Wandering once or more in the past week	0.018	16.56	0.464	<0.001
Walks in room indep/supervision/limited assistance	0.331	11.50	0.056	<0.001
Walks in corridor indep/supervision/limited assistance	0.300	11.26	-0.037	<0.001
Wanders <i>and</i> walks in room or corridor indep/supervision/limited assistance	0.010	15.95	-0.100	0.001
Cancer	0.065	11.60	-0.034	0.001
Seizure disorder or epilepsy	0.070	14.50	0.054	<0.001
Shortness of breath with exertion	0.156	12.74	0.037	<0.001
Shortness of breath when sitting at rest	0.057	14.35	0.134	<0.001
Choke/cough during meals or when swallowing medications	0.019	12.58	0.007	0.657
Parenteral/IV feeding	0.010	14.49	0.121	<0.001
Feeding tube	0.039	18.52	0.365	<0.001
Surgical wound	0.268	11.38	0.052	<0.001
Burn(s)	0.002	13.46	0.048	0.414
Anticoagulant received	0.352	11.49	-0.019	<0.001
Antibiotic received	0.400	12.64	0.125	<0.001
Ventilator or respirator	0.003	14.84	-0.455	<0.001
Transfusion	0.003	23.48	0.712	<0.001
Speech Therapy	0.352	12.60	0.071	<0.001
Respiratory therapy	0.065	12.21	-0.070	<0.001
Constant	-	-	-2.266	<0.001

APPENDIX TABLE F

Coefficient Estimates for Short-Stay Residents who have had an Outpatient Emergency Department Visit, Resident-Level Comorbidity Index

Note: Model C-statistic = 0.565

Note: This model is based on all SNF stays with admission from a hospital between January 1, 2017 and December 31, 2017.

Charlson Condition	Coefficient	SE	P-Value
Myocardial infarction	0.134	0.007	<0.001
CHF	0.039	0.006	<0.001
Peripheral vascular disease	0.067	0.007	<0.001
Cerebrovascular disease	0.086	0.008	<0.001
Dementia	0.044	0.006	<0.001
COPD	0.142	0.006	<0.001
Rheumatoid arthritis	0.059	0.012	<0.001
Ulcers	0.106	0.014	<0.001
Mild liver disease	0.265	0.012	<0.001
Diabetes mellitus	0.101	0.006	<0.001
Diabetes with sequelae	0.123	0.008	<0.001
Paralysis	0.161	0.012	<0.001
Chronic renal disease	0.118	0.007	<0.001
Cancer	0.094	0.010	<0.001
Moderate to severe liver disease	0.128	0.020	<0.001
Metastatic cancer	0.066	0.018	<0.001
HIV/AIDS	0.328	0.043	<0.001
Intercept	-2.202	0.003	<0.001

APPENDIX TABLE G

Risk-Adjustment Model for Outpatient Emergency Department Visits per 1,000 Long-Stay Resident Days: Risk Variables and Coefficient Estimates

Note: This model assumes a negative binomial distribution for the number of outpatient emergency department visits per long-stay resident.

Note: This model is based on all days, between July 1, 2017 and June 30, 2018, that residents were in the nursing home after they attained long-term resident status (i.e., after 100 cumulative days in the facility).

Variable	Mean	Mean Number of Outpatient ED Visits Among Those With Covariate	Coefficient	P-Value
Number of long-stay days in target period	241	-	0.016	<0.001
Number of long-stay days in target period, squared	75645	-	0.000	<0.001
White (ref)	0.821	0.38	-	-
Black	0.126	0.46	0.109	<0.001
Hispanic	0.019	0.41	0.032	0.047
Asian	0.015	0.29	-0.234	<0.001
Other race/ethnicity	0.015	0.42	0.045	0.013
Unknown race/ethnicity	0.004	0.39	-0.068	0.069
Female age 18–65	0.050	0.57	0.188	<0.001
Female age 65–69 (ref)	0.041	0.47	-	-
Female age 70–74	0.056	0.44	-0.024	0.081
Female age 75–79	0.075	0.40	-0.074	<0.001
Female age 80–84	0.105	0.38	-0.111	<0.001
Female age 85–89	0.136	0.34	-0.177	<0.001
Female age 9–94	0.124	0.30	-0.253	<0.001
Female age GT 94	0.072	0.26	-0.335	<0.001
Male age 18–65	0.061	0.55	0.147	<0.001
Male age 65–69	0.042	0.46	-0.009	0.547
Male age 70–74	0.045	0.44	-0.017	0.252

Variable	Mean	Mean Number of Outpatient ED Visits Among Those With Covariate	Coefficient	P-Value
Male age 75–79	0.047	0.43	-0.008	0.559
Male age 80–84	0.051	0.39	-0.051	<0.001
Male age 85–89	0.050	0.37	-0.074	<0.001
Male age 90–94	0.033	0.33	-0.130	<0.001
Male age GT 94	0.012	0.30	-0.159	<0.001
0 hospitalizations in prior year (ref)	0.495	0.33	-	-
1–3 hospitalizations in prior year	0.436	0.42	0.245	<0.001
4–6 hospitalizations in prior year	0.057	0.61	0.556	<0.001
7–9 hospitalizations in prior year	0.009	0.77	0.748	<0.001
10+ hospitalizations in prior year	0.002	1.14	1.118	<0.001
Long-stay outpatient ED visits-specific comorbidity index	0.067	-	4.013	<0.001
Entered nursing home from a psychiatric facility	0.024	0.47	0.030	0.031
Rarely/never makes self understood by others	0.071	0.33	0.068	<0.001
Rarely/never able to understand others	0.059	0.32	-0.093	<0.001
Moderate cognitive impairment	0.217	0.40	0.013	0.041
Severe cognitive impairment	0.283	0.35	-0.004	0.502
Staff assessed cognitive impairment	0.172	0.34	-0.030	<0.001
Cognitive status assessment missing	0.005	0.43	0.090	0.004
Rejected care for past 4–7 days	0.022	0.42	0.043	0.004
Wandering once or more in the past week	0.047	0.43	0.196	<0.001
Walks in room indep/supervision/limited assistance	0.341	0.44	0.182	<0.001
Shortness of breath with exertion	0.076	0.51	0.177	<0.001
Shortness of Breath when lying flat	0.067	0.49	0.031	0.001
End-stage prognosis	0.049	0.12	-0.276	<0.001
Internal bleeding	0.002	0.47	0.119	0.012
Surgical wound	0.025	0.44	-0.023	0.109
Respiratory failure	0.036	0.50	-0.035	0.007
Antibiotic received	0.128	0.47	0.155	<0.001
Diuretic received	0.342	0.42	0.082	<0.001

Variable	Mean	Mean Number of Outpatient ED Visits Among Those With Covariate	Coefficient	P-Value
Chemotherapy for cancer	0.005	0.37	-0.063	0.060
Radiation for cancer	0.001	0.47	0.087	0.321
Oxygen therapy	0.132	0.47	0.104	<0.001
IV medications	0.015	0.53	0.054	0.002
Transfusion	0.001	0.57	0.346	<0.001
Hospice care after nursing home admission	0.060	0.11	-0.824	<0.001
Speech therapy	0.104	0.43	0.061	<0.001
Respiratory therapy	0.039	0.47	-0.016	0.173
Tracheostomy care	0.010	0.59	0.256	<0.001
Ventilator or respirator	0.005	0.48	-0.418	<0.001
Septicemia	0.011	0.50	0.026	0.195
Cerebrovascular accident , transient ischemic attack, or stroke	0.117	0.43	0.062	<0.001
Quadriplegia	0.007	0.63	0.178	<0.001
Multiple Sclerosis	0.014	0.44	-0.109	<0.001
Parkinson's disease	0.067	0.41	0.110	<0.001
Gastroesophageal reflux disease (GERD) or ulcer	0.095	0.44	0.150	<0.001
Neurogenic bladder	0.035	0.56	0.232	<0.001
Cancer	0.017	0.32	-0.053	0.005
Constant	-	-	-3.256	<0.001

APPENDIX TABLE H

Coefficient Estimates for Outpatient Emergency Department Visits per 1,000 Long-Stay Resident Days, Resident-Level Comorbidity Index

Note: This model assumes a negative binomial distribution for the number of outpatient emergency department visits per long-stay resident.

Note: This model is based on all days, between July 1, 2017 and June 30, 2018, that residents were in the nursing home after they attained long-term resident status (i.e., after 100 cumulative days in the facility).

* Coefficients with p-value greater than 0.05 excluded from the comorbidity construct, as are coefficients for the number of long-stay days.

Charlson Condition	Coefficient	SE	P-value
Myocardial infarction	0.101	0.009	<0.001
CHF	0.118	0.007	<0.001
Peripheral vascular disease	0.072	0.009	<0.001
Cerebrovascular disease	0.078	0.008	<0.001
Dementia	0.033	0.005	<0.001
COPD	0.252	0.007	<0.001
Rheumatoid arthritis	0.084	0.016	<0.001
Ulcers	0.062	0.018	0.001
Mild liver disease	0.188	0.017	<0.001
Diabetes mellitus	0.205	0.007	<0.001
Diabetes with sequelae	0.137	0.009	<0.001
Paralysis	0.191	0.011	<0.001
Chronic renal disease	0.169	0.008	<0.001
<i>Cancer*</i>	<i>0.014</i>	<i>0.016</i>	<i>0.378</i>
Moderate to severe liver disease	0.196	0.030	<0.001
<i>Metastatic cancer*</i>	<i>-0.032</i>	<i>0.031</i>	<i>0.303</i>
HIV/AIDS	0.255	0.055	<0.001
<i>Number of long-stay days in target period*</i>	<i>0.016</i>	<i>0.000</i>	<i><0.001</i>
<i>Number of long-stay days in target period, squared*</i>	<i>0.000</i>	<i>0.000</i>	<i><0.001</i>
Intercept	-2.924	0.010	<0.001