



# **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, 2021, and December 31, 2021.

Variable	Mean	Proportion of Residents with Covariate who Triggered the Numerator	Coefficient	p-Value
Female age 18–64	.0464	.2751	0.0307	.0661
Female age 65–69 (ref)	.0550	.2454	-	-
Female age 70–74	.0817	.2322	-0.0205	.1598
Female age 75–79	.0945	.2192	-0.0320	.0265
Female age 80–84	.1046	.2035	-0.0550	.0001
Female age 85–89	.1026	.1865	-0.1019	<.0001
Female age 90–94	.0746	.1700	-0.1691	<.0001
Female age GT 94	.0318	.1553	-0.2523	<.0001
Male age 18–64	.0544	.2776	0.0165	.3047
Male age 65–69	.0543	.2579	0.0023	.8821
Male age 70–74	.0634	.2524	0.0165	.2808
Male age 75–79	.0670	.2553	0.0554	.0003
Male age 80–84	.0678	.2487	0.0711	<.0001
Male age 85–89	.0573	.2441	0.1003	<.0001
Male age 90–94	.0340	.2220	0.0235	.2142
Male age GT 94	.0105	.2109	-0.0183	.5295
Length of stay 1–3 days (ref)	.1927	.1761	-	-
Length of stay 4–7 days	.4476	.2088	0.1112	<.0001
Length of stay 8–14 days	.2519	.2650	0.2781	<.0001

Variable	Mean	Proportion of Residents with Covariate who Triggered the Numerator	Coefficient	p-Value
Length of stay GT 14 days	.1078	.3036	0.3510	<.0001
0 hospitalizations in prior year (ref)	.4341	.1720	-	-
1–3 hospitalizations in prior year	.4692	.2453	0.0987	<.0001
4–6 hospitalizations in prior year	.0759	.3565	0.3696	<.0001
7–9 hospitalizations in prior year	.0150	.4478	0.6540	<.0001
10+ hospitalizations in prior year	.0058	.5690	1.1399	<.0001
Ever disabled	.2683	.2559	0.0014	.8476
ESRD	.0580	.3934	0.4095	<.0001
At least 1 day ICU (y/n)	.1381	.2870	0.0911	<.0001
2 Septicemia (except in labor)	.1284	.2724	0.6092	<.0001
3 Bacterial infection; unspecified site	.0010	.2574	0.5907	<.0001
4 Mycoses	.0008	.2807	0.7362	<.0001
5 HIV infection	.0001	.3421	0.9512	<.0001
6 Hepatitis	.0003	.4350	1.2517	<.0001
7 Viral infection	.0006	.1860	0.4174	.0005
8 Other infections; including parasitic	.0002	.1824	0.4434	.0369
11 Cancer of head and neck	.0007	.2910	0.5594	<.0001
12 Cancer of esophagus	.0003	.3976	1.0237	<.0001
13 Cancer of stomach	.0004	.2788	0.6525	<.0001
14 Cancer of colon	.0025	.2113	0.4031	<.0001
15 Cancer of rectum and anus	.0008	.2897	0.6715	<.0001
16 Cancer of liver and intrahepatic bile duct	.0004	.3506	1.0704	<.0001
17 Cancer of pancreas	.0007	.2721	0.7697	<.0001
18 Cancer of other GI organs; peritoneum	.0003	.3014	0.9146	<.0001
19 Cancer of bronchus; lung	.0019	.3229	0.9152	<.0001
20 Cancer; other respiratory and intrathoracic	.0000	.2903	0.8252	.0447
21 Cancer of bone and connective tissue	.0003	.2622	0.7547	<.0001

Variable	Mean	Proportion of Residents with Covariate who Triggered the Numerator	Coefficient	p-Value
23 Other non-epithelial cancer of skin	.0002	.2039	0.4487	.0126
24 Cancer of breast	.0004	.2633	0.8541	<.0001
25 Cancer of uterus	.0003	.2652	0.7935	<.0001
26 Cancer of cervix	.0000	.3721	1.1299	.0006
27 Cancer of ovary	.0003	.2754	0.7730	<.0001
28 Cancer of other female genital organs	.0002	.2932	1.0554	<.0001
29 Cancer of prostate	.0004	.2535	0.5620	<.0001
32 Cancer of bladder	.0009	.3512	1.0124	<.0001
33 Cancer of kidney and renal pelvis	.0005	.2019	0.3952	.0023
35 Cancer of brain and nervous system	.0006	.2615	0.6581	<.0001
37 Hodgkin's disease	.0000	.3095	0.8335	.0179
38 Non-Hodgkin's lymphoma	.0009	.3622	1.0288	<.0001
39 Leukemias	.0006	.3645	1.0552	<.0001
40 Multiple myeloma	.0005	.3481	1.0148	<.0001
41 Cancer; other and unspecified primary	.0001	.3418	1.1010	<.0001
42 Secondary malignancies	.0037	.3157	0.8667	<.0001
43 Malignant neoplasm without specification of site	.0002	.2680	0.6483	.0001
44 Neoplasms of unspecified nature or uncertain behavior	.0008	.3453	1.1114	<.0001
45 Maintenance chemotherapy; radiotherapy	.0005	.3003	0.5250	<.0001
47 Other and unspecified benign neoplasm	.0012	.2117	0.5233	<.0001
48 Thyroid disorders	.0008	.2368	0.7097	<.0001
50 Diabetes mellitus with complications	.0241	.2501	0.5299	<.0001
51 Other endocrine disorders	.0042	.2144	0.6431	<.0001
52 Nutritional deficiencies	.0011	.2431	0.6513	<.0001
54 Gout and other crystal arthropathies	.0010	.2041	0.6752	<.0001
55 Fluid and electrolyte disorders	.0180	.2297	0.5967	<.0001
58 Other nutritional; endocrine; and metabolic disorders	.0046	.2220	0.5576	<.0001

Variable	Mean	Proportion of Residents with Covariate who Triggered the Numerator	Coefficient	p-Value
59 Deficiency and other anemia	.0051	.2838	0.7751	<.0001
60 Acute post-hemorrhagic anemia	.0027	.2866	0.7166	<.0001
61 Sickle cell anemia	.0001	.6429	1.8269	<.0001
62 Coagulation and hemorrhagic disorders	.0018	.2775	0.7581	<.0001
63 Diseases of white blood cells	.0004	.2749	0.7281	<.0001
64 Other hematologic conditions	.0002	.2558	0.7494	<.0001
76 Meningitis	.0002	.2878	0.8904	<.0001
77 Encephalitis	.0004	.2630	0.6770	<.0001
78 Other CNS infection and poliomyelitis	.0004	.2857	0.7500	<.0001
79 Parkinson's disease	.0028	.1766	0.4722	<.0001
80 Multiple sclerosis	.0005	.1587	0.3820	.0040
81 Other hereditary and degenerative nervous system conditions	.0013	.1896	0.4817	<.0001
82 Paralysis	.0004	.2222	0.6674	<.0001
83 Epilepsy; convulsions	.0080	.2073	0.4870	<.0001
84 Headache; including migraine	.0002	.1747	0.4264	.0440
89 Blindness and vision defects	.0001	.2101	0.6785	.0036
90 Inflammation; infection of eye	.0002	.1893	0.3961	.0554
93 Conditions associated with dizziness or vertigo	.0013	.1246	0.2673	.0052
94 Other ear disorders	.0001	.2500	0.5856	.0335
95 Other nervous system disorders	.0195	.2136	0.5113	<.0001
96 Heart valve disorders	.0035	.2520	0.6752	<.0001
97 Peri-, endo-, and myocarditis; cardiomyopathy	.0014	.3013	0.7880	<.0001
99 Hypertension with complications and secondary hypertension	.0576	.2799	0.6797	<.0001
100 Acute myocardial infarction	.0109	.2655	0.7807	<.0001
101 Coronary atherosclerosis and other heart disease	.0041	.2300	0.5744	<.0001

Variable	Mean	Proportion of Residents with Covariate who Triggered the Numerator	Coefficient	p-Value
102 Nonspecific chest pain	.0018	.2340	0.6319	<.0001
103 Pulmonary heart disease	.0056	.2079	0.4751	<.0001
104 Other and ill-defined heart disease	.0003	.2375	0.8060	<.0001
105 Conduction disorders	.0027	.1723	0.3816	<.0001
106 Cardiac dysrhythmias	.0134	.2292	0.6723	<.0001
107 Cardiac arrest and ventricular fibrillation	.0004	.3494	0.7943	<.0001
108 Congestive heart failure; non-hypertensive	.0034	.2589	0.6711	<.0001
109 Acute cerebrovascular disease	.0298	.2061	0.5011	<.0001
110 Occlusion or stenosis of pre-cerebral arteries	.0008	.1976	0.4430	<.0001
111 Other and ill-defined cerebrovascular disease	.0005	.2179	0.5165	<.0001
112 Transient cerebral ischemia	.0029	.1788	0.5328	<.0001
113 Late effects of cerebrovascular disease	.0018	.1775	0.2825	.0001
114 Peripheral and visceral atherosclerosis	.0032	.2524	0.6700	<.0001
115 Aortic; peripheral; and visceral artery aneurysms	.0016	.2580	0.7342	<.0001
116 Aortic and peripheral arterial embolism or thrombosis	.0006	.2987	1.0070	<.0001
117 Other circulatory disease	.0060	.2091	0.5386	<.0001
118 Phlebitis; thrombophlebitis and thromboembolism	.0031	.2320	0.6841	<.0001
120 Hemorrhoids	.0007	.2601	0.6882	<.0001
121 Other diseases of veins and lymphatics	.0010	.2005	0.4956	<.0001
122 Pneumonia (except that caused by tuberculosis or sexually transmitted disease)	.0203	.2570	0.6233	<.0001
123 Influenza	.0001	.2170	0.3917	.1101
125 Acute bronchitis	.0004	.1738	0.2996	.0500
126 Other upper respiratory infections	.0002	.2000	0.3299	.1329
127 Chronic obstructive pulmonary disease and bronchiectasis	.0083	.2649	0.6591	<.0001
128 Asthma	.0003	.2022	0.4989	.0017

Variable	Mean	Proportion of Residents with Covariate who Triggered the Numerator	Coefficient	p-Value
129 Aspiration pneumonitis; food/vomitus	.0106	.2529	0.4791	<.0001
130 Pleurisy; pneumothorax; pulmonary collapse	.0026	.2875	0.6639	<.0001
131 Respiratory failure; insufficiency	.0139	.2960	0.6180	<.0001
132 Lung disease due to external agents	.0002	.2659	0.5357	.0030
133 Other lower respiratory disease	.0018	.2535	0.6157	<.0001
134 Other upper respiratory disease	.0005	.2335	0.3348	.0045
135 Intestinal infection	.0047	.2623	0.7083	<.0001
137 Diseases of mouth; excluding dental	.0004	.2122	0.4711	.0012
138 Esophageal disorders	.0025	.2460	0.5893	<.0001
139 Gastroduodenal ulcer (except hemorrhage)	.0007	.2637	0.8026	<.0001
140 Gastritis and duodenitis	.0023	.2648	0.6304	<.0001
141 Other disorders of stomach and duodenum	.0021	.3209	0.7916	<.0001
142 Appendicitis and other appendiceal conditions	.0005	.2031	0.6042	<.0001
143 Abdominal hernia	.0034	.1987	0.5153	<.0001
144 Regional enteritis and ulcerative colitis	.0008	.3049	0.8257	<.0001
145 Intestinal obstruction without hernia	.0083	.2319	0.6039	<.0001
146 Diverticulosis and diverticulitis	.0056	.2510	0.6838	<.0001
147 Anal and rectal conditions	.0013	.2261	0.4829	<.0001
148 Peritonitis and intestinal abscess	.0004	.3684	0.9991	<.0001
149 Biliary tract disease	.0052	.2209	0.6041	<.0001
151 Other liver diseases	.0043	.4206	1.1656	<.0001
152 Pancreatic disorders (not diabetes)	.0019	.2310	0.6166	<.0001
153 Gastrointestinal hemorrhage	.0126	.2584	0.5697	<.0001
154 Noninfectious gastroenteritis	.0021	.2228	0.6027	<.0001
155 Other gastrointestinal disorders	.0053	.2635	0.6469	<.0001
156 Nephritis; nephrosis; renal sclerosis	.0002	.3578	1.0360	<.0001
157 Acute and unspecified renal failure	.0325	.2477	0.6878	<.0001



Variable	Mean	Proportion of Residents with Covariate who Triggered the Numerator	Coefficient	p-Value
158 Chronic kidney disease	.0001	.3125	0.5140	.0159
159 Urinary tract infections	.0388	.1934	0.5063	<.0001
160 Calculus of urinary tract	.0005	.2408	0.6480	<.0001
161 Other diseases of kidney and ureters	.0010	.2553	0.7835	<.0001
162 Other diseases of bladder and urethra	.0007	.2614	0.6676	<.0001
163 Genitourinary symptoms and ill-defined conditions	.0010	.2573	0.6912	<.0001
164 Hyperplasia of prostate	.0007	.2428	0.6949	<.0001
165 Inflammatory conditions of male genital organs	.0005	.2375	0.6285	<.0001
166 Other male genital disorders	.0002	.2197	0.3997	.0695
167 Nonmalignant breast conditions	.0001	.2727	0.8456	.0002
168 Inflammatory diseases of female pelvic organs	.0001	.2131	0.5345	.0200
170 Prolapse of female genital organs	.0000	.2903	1.2692	.0017
173 Menopausal disorders	.0001	.2316	0.5150	.0416
175 Other female genital disorders	.0003	.2846	0.7546	<.0001
197 Skin and subcutaneous tissue infections	.0142	.1978	0.4743	<.0001
198 Other inflammatory condition of skin	.0004	.2532	0.6832	<.0001
199 Chronic ulcer of skin	.0036	.2269	0.4206	<.0001
200 Other skin disorders	.0002	.2353	0.4373	.0403
201 Infective arthritis and osteomyelitis	.0041	.2130	0.4032	<.0001
202 Rheumatoid arthritis and related disease	.0003	.1741	0.4379	.0119
203 Osteoarthritis (Ref)	.0174	.0906	-	-
204 Other non-traumatic joint disorders	.0021	.1529	0.3661	<.0001
205 Spondylosis; intervertebral disc disorders; other back problems	.0141	.1682	0.4603	<.0001
207 Pathological fracture	.0116	.1521	0.3286	<.0001
209 Other acquired deformities	.0015	.1570	0.4859	<.0001

Variable	Mean	Proportion of Residents with Covariate who Triggered the Numerator	Coefficient	p-Value
210 Systemic lupus erythematosus and connective tissue disorders	.0003	.2609	0.6337	<.0001
211 Other connective tissue disease	.0068	.1662	0.4114	<.0001
212 Other bone disease and musculoskeletal deformities	.0007	.1840	0.4667	<.0001
225 Joint disorders and dislocations; trauma-related	.0008	.1806	0.5391	<.0001
226 Fracture of neck of femur (hip)	.0648	.1479	0.3160	<.0001
227 Spinal cord injury	.0004	.2535	0.6779	<.0001
228 Skull and face fractures	.0009	.1691	0.4721	<.0001
229 Fracture of upper limb	.0102	.1399	0.2967	<.0001
230 Fracture of lower limb	.0222	.1498	0.2750	<.0001
231 Other fractures	.0285	.1502	0.3363	<.0001
232 Sprains and strains	.0012	.1271	0.1940	.0538
233 Intracranial injury	.0113	.2292	0.6846	<.0001
234 Crushing injury or internal injury	.0028	.2080	0.5703	<.0001
235 Open wounds of head; neck; and trunk	.0008	.1733	0.4588	<.0001
236 Open wounds of extremities	.0007	.2063	0.5910	<.0001
237 Complication of device; implant or graft	.0375	.2731	0.6403	<.0001
238 Complications of surgical procedures or medical care	.0187	.2751	0.5851	<.0001
239 Superficial injury; contusion	.0032	.1824	0.4967	<.0001
240 Burns	.0004	.2167	0.4780	.0002
241 Poisoning by psychotropic agents	.0004	.2195	0.6602	<.0001
242 Poisoning by other medications and drugs	.0017	.2083	0.4331	<.0001
244 Other injuries and conditions due to external causes	.0046	.1624	0.3708	<.0001
245 Syncope	.0033	.1429	0.2831	<.0001
246 Fever of unknown origin	.0004	.2494	0.6788	<.0001
248 Gangrene	.0020	.2739	0.6628	<.0001
249 Shock	.0003	.3123	0.6860	<.0001

Variable	Mean	Proportion of Residents with Covariate who Triggered the Numerator	Coefficient	p-Value
250 Nausea and vomiting	.0004	.2356	0.6733	<.0001
251 Abdominal pain	.0005	.2556	0.6775	<.0001
252 Malaise and fatigue	.0041	.1751	0.4266	<.0001
253 Allergic reactions	.0002	.2653	0.8239	<.0001
255 Administrative/social admission	.0000	.3750	1.4216	.0564
258 Other screening for suspected conditions (not mental disorders or infectious disease)	.0002	.2234	0.6486	.0003
259 Residual codes; unclassified	.0021	.2022	0.5336	<.0001
650 MHA: Adjustment disorders	.0002	.2045	0.5895	.0080
651 MHA: Anxiety disorders	.0003	.2598	0.9183	<.0001
653 MHA: Delirium, dementia, and amnestic and other cognitive disorders	.0162	.1671	0.4273	<.0001
656 MHA: Impulse control disorders, NEC	.0001	.3636	1.3148	<.0001
657 MHA: Mood disorders	.0049	.1701	0.3310	<.0001
659 MHA: Schizophrenia and other psychotic disorders	.0071	.2061	0.5743	<.0001
660 MHA: Alcohol-related disorders	.0050	.2599	0.7649	<.0001
661 MHA: Substance-related disorders	.0005	.2294	0.6406	<.0001
662 MHA: Suicide and intentional self-inflicted injury	.0003	.2000	0.3185	.0490
670 MHA: Miscellaneous mental disorders	.0003	.2304	0.6931	<.0001
CCS None	.0507	.2376	0.5738	<.0001
Nonsignificant CCS w/ protective effect	.0004	.0720	-0.6182	.0030
Nonsignificant CCS w/ increased risk	.0026	.1588	0.1683	.0106
Re-hospitalizations-specific comorbidity index	-0.2610	-	0.4483	<.0001
End-stage prognosis	.0070	.1276	-1.1083	<.0001
Returned to nursing home following hospitalization	.2376	.2632	0.0207	.0034
Anemia	.3877	.2594	0.0821	<.0001
Venous/Arterial ulcer present	.0330	.2757	0.0405	.0049

Variable	Mean	Proportion of Residents with Covariate who Triggered the Numerator	Coefficient	p-Value
Viral hepatitis	.0120	.2967	0.0326	.1616
Internal bleeding	.0089	.4780	0.9725	<.0001
Extensive assistance/dependence in eating	.0638	.3741	0.4434	<.0001
Two-person support needed with one or more ADL(s)	.5613	.2446	0.0538	<.0001
Cognitive status not completely intact	.7085	.2376	0.1897	<.0001
Cognitive assessment missing	.0140	.5519	1.2144	<.0001
Chemotherapy for cancer	.0087	.2895	0.0912	.0012
IV medications	.6077	.2333	-0.0190	.0011
Ostomy care	.0286	.3117	0.2099	<.0001
Oxygen therapy	.3752	.2729	0.1865	<.0001
Radiation for cancer	.0024	.3307	0.2091	<.0001
First assessment is for significant change in status	.0330	.1798	-0.4502	<.0001
Rarely/never makes self understood by others	.0288	.2869	-0.0497	.0027
Acute mental status change	.0268	.3361	0.4762	<.0001
Rejected care for past 4–7 days	.0106	.2708	0.1627	<.0001
Wandering once or more in the past week	.0212	.2218	0.1874	<.0001
Walks in room indep/supervision/limited assistance	.2975	.1772	-0.2087	<.0001
Walks in corridor indep/supervision/limited assistance	.1851	.1674	-0.1526	<.0001
Wanders and Walks in room or corridor indep/supervision/limited assistance	.0131	.2088	0.2057	<.0001
Alzheimer's disease	.0475	.1867	-0.0995	<.0001
Non-Alzheimer's dementia	.2302	.2024	-0.1195	<.0001
Cancer	.1157	.2696	0.0949	<.0001
Ulcerative Colitis/Crohn's/inflammatory bowel disease	.0207	.2503	0.0747	<.0001
Seizure disorder or epilepsy	.0853	.2445	-0.0454	<.0001
Shortness of breath with exertion	.1613	.2742	0.0089	.2774
Shortness of breath when sitting at rest	.0589	.3698	0.4718	<.0001

<b>Variable</b>	<b>Mean</b>	<b>Proportion of Residents with Covariate who Triggered the Numerator</b>	<b>Coefficient</b>	<b>p-Value</b>
Choke/cough during meals or swallowing medications	.0886	.2511	0.0233	.0126
Parenteral/IV feeding	.0202	.3446	0.4380	<.0001
Feeding tube	.0433	.3687	0.1107	<.0001
Surgical wound	.2405	.2056	-0.0161	.0419
Antibiotic received	.3624	.2439	0.0811	<.0001
Ventilator or respirator	.0037	.4422	-0.0729	.0629
Transfusion	.0021	.3441	0.2485	<.0001
Respiratory therapy	.0713	.2588	0.0048	.6426
Constant	-	-	-1.8437	<.0001

## 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 = 0.614

Note: This model is based on all SNF stays with admission from a hospital between January 1, 2021, and December 31, 2021.

Charlson Condition	Coefficient	Standard Error	p-value
Myocardial infarction	0.1184	0.0085	<0.001
CHF	0.2124	0.0071	<0.001
Peripheral vascular disease	0.1346	0.0084	<0.001
Cerebrovascular disease	0.0384	0.0088	<0.001
Dementia	-0.0342	0.0073	<0.001
COPD	0.1762	0.0067	<0.001
Rheumatoid arthritis	0.1125	0.0138	<0.001
Ulcers	0.1713	0.0163	<0.001
Mild liver disease	0.2320	0.0131	<0.001
Diabetes mellitus	0.1400	0.0075	<0.001
Diabetes with sequelae	0.1196	0.0088	<0.001
Paralysis	0.1769	0.0140	<0.001
Chronic renal disease	0.2767	0.0076	<0.001
Cancer	0.2795	0.0115	<0.001
Moderate to severe liver disease	0.4758	0.0216	<0.001
Metastatic cancer	0.2851	0.0192	<0.001
HIV/AIDS	0.3414	0.0542	<0.001
Constant	-1.5434	0.0036	<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, 2021, and December 31, 2021, 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	215.90	-	0.0110	<.0001
Number of long-stay days in target period, squared	61117.51	-	0.0000	<.0001
White (ref)	.8147	0.3146	-	-
Black	.1283	0.4723	0.2888	<.0001
Hispanic	.0195	0.4383	0.2663	<.0001
Asian	.0153	0.3847	0.2521	<.0001
Other race/ethnicity	.0165	0.3653	0.1036	<.0001
Unknown race/ethnicity	.0058	0.4013	0.0445	.1707
Female age 18–65	.0512	0.4845	0.0397	.0089
Female age 65–69 (ref)	.0458	0.4379	-	-
Female age 70–74	.0666	0.4024	-0.0378	.0098
Female age 75–79	.0815	0.3563	-0.0803	<.0001
Female age 80–84	.1025	0.3053	-0.1582	<.0001
Female age 85–89	.1200	0.2643	-0.2323	<.0001
Female age 9–94	.1092	0.2267	-0.3307	<.0001
Female age GT 94	.0665	0.1736	-0.5190	<.0001
Male age 18–65	.0649	0.4830	0.0573	<.0001
Male age 65–69	.0523	0.4234	-0.0110	.4753
Male age 70–74	.0559	0.4058	-0.0045	.7655
Male age 75–79	.0517	0.3884	-0.0104	.5068
Male age 80–84	.0494	0.3695	-0.0030	.8498

Variable	Mean	Mean Number of Hospitalizations Among Those with Covariate	Coefficient	p-Value
Male age 85–89	.0428	0.3319	-0.0408	.0166
Male age 90–94	.0287	0.2878	-0.1288	<.0001
Male age GT 94	.0110	0.2447	-0.2159	<.0001
0 hospitalizations in prior year (ref)	.5201	0.2472	-	-
1–3 hospitalizations in prior year	.4236	0.3947	0.2484	<.0001
4–6 hospitalizations in prior year	.0480	0.7162	0.5648	<.0001
7–9 hospitalizations in prior year	.0068	1.0622	0.7914	<.0001
10+ hospitalizations in prior year	.0016	1.4945	1.0538	<.0001
Long-stay hospitalizations-specific comorbidity index	.1476	-	1.8360	<.0001
Entered nursing home from a psychiatric facility	.0199	0.3175	-0.0022	.9069
End-stage prognosis	.0534	0.0819	-0.3591	<.0001
Septicemia	.0199	0.5970	0.1009	<.0001
Respiratory failure	.0316	0.5242	0.0723	<.0001
Internal bleeding	.0022	0.4847	0.1078	.0301
Extensive assistance/dependence in eating	.2037	0.3528	0.0831	<.0001
Moderate cognitive impairment	.2295	0.3419	-0.0505	<.0001
Severe cognitive impairment	.2857	0.2826	-0.0881	<.0001
Staff assessed cognitive status	.1516	0.3002	-0.1111	<.0001
Cognitive status assessment missing	.0098	0.3620	-0.0315	.2293
Chemotherapy for cancer	.0034	0.4466	0.1655	<.0001
IV medications	.0235	0.5610	0.0595	.0001
Oxygen therapy	.1495	0.4855	0.1629	<.0001
Radiation for cancer	.0004	0.4160	0.0214	.8591
Rarely/never makes self understood by others	.0646	0.3174	0.0074	.5884
Rejected care for past 4–7 days	.0196	0.3479	0.0360	.0561
Wandering once or more in the past week	.0445	0.2639	0.0000	.9997
Walks in room independently/supervision/limited assistance	.3366	0.3050	-0.0127	.1907
Walks in corridor independently/supervision/limited assistance	.2790	0.2963	-0.0671	<.0001
Shortness of breath with exertion	.0821	0.4394	0.0290	.0044
Shortness of Breath when lying flat	.1186	0.4604	0.0585	<.0001



Variable	Mean	Mean Number of Hospitalizations Among Those with Covariate	Coefficient	p-Value
Anticoagulant received	.2201	0.4234	0.0954	<.0001
Antibiotic received	.1388	0.4556	0.1442	<.0001
Diuretic received	.3178	0.3896	0.1350	<.0001
Ulcerative Colitis/Crohn's/inflammatory bowel disease	.0125	0.3983	0.0883	<.0001
Multi-drug resistant organism (MDRO)	.0086	0.6301	0.1184	<.0001
Cerebrovascular accident, transient ischemic attack or stroke	.1826	0.3860	0.0445	<.0001
Quadriplegia	.0075	0.6709	0.1443	<.0001
Multiple Sclerosis	.0158	0.4660	0.0803	<.0001
Parkinson's disease	.0659	0.3422	0.0627	<.0001
Anxiety disorder	.3344	0.3532	0.0807	<.0001
Gastroesophageal reflux disease (GERD) or ulcer	.1128	0.3568	0.0642	<.0001
Neurogenic bladder	.0427	0.5844	0.2891	<.0001
Transfusion	.0010	0.6294	0.3209	<.0001
Hospice care after nursing home admission	.0588	0.0658	-1.2627	<.0001
Isolation or quarantine for active infectious disease	.0595	0.3797	0.0496	<.0001
Speech therapy	.1292	0.3746	-0.0282	.0003
Respiratory therapy	.0316	0.5242	0.0723	<.0001
Constant	-	-	-2.4448	<.0001

## 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, 2021, and December 31, 2021, 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-values greater than .05 and for the number of long-stay days were excluded from the comorbidity construct.

Charlson Condition	Coefficient	Standard Error	p-value
Myocardial infarction	0.0627	0.0101	<0.001
CHF	0.221	0.0078	<0.001
Peripheral vascular disease	0.1178	0.0102	<0.001
Cerebrovascular disease	0.0447	0.0087	<0.001
<i>Dementia*</i>	<i>0.0045</i>	<i>0.0064</i>	<i>0.4837</i>
COPD	0.3108	0.0074	<0.001
Rheumatoid arthritis	0.0817	0.018	<0.001
Ulcers	0.1254	0.0201	<0.001
Mild liver disease	0.1911	0.0168	<0.001
Diabetes mellitus	0.2356	0.0078	<0.001
Diabetes with sequelae	0.2486	0.0097	<0.001
Paralysis	0.3437	0.0125	<0.001
Chronic renal disease	0.2438	0.0085	<0.001
Cancer	0.0668	0.0167	<0.001
Moderate to severe liver disease	0.2963	0.0303	<0.001
<i>Metastatic cancer*</i>	<i>-0.0075</i>	<i>0.0328</i>	<i>.8184</i>
HIV/AIDS	0.2977	0.0614	<0.001
<i>Number of long-stay days in target period*</i>	<i>0.011</i>	<i>0.0001</i>	<i>&lt;0.001</i>
<i>Number of long-stay days in target period, squared*</i>	<i>0.0000</i>	<i>0.0000</i>	<i>&lt;0.001</i>
Intercept	-2.2186	0.0095	<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 = 0.610

Note: This model is based on all SNF stays with admission from a hospital between January 1, 2021, and December 31, 2021.

Variable	Mean	Proportion of Residents with Covariate who Triggered the Numerator	Coefficient	p-Value
Female age 18–65	.0464	.1434	0.1805	<.0001
Female age 65–69 (ref)	.0550	.1117	-	-
Female age 70–74	.0817	.1017	-0.0724	<.0001
Female age 75–79	.0945	.0962	-0.1048	<.0001
Female age 80–84	.1046	.0889	-0.1614	<.0001
Female age 85–89	.1026	.0872	-0.1557	<.0001
Female age 90–94	.0746	.0811	-0.2113	<.0001
Female age GT 94	.0318	.0729	-0.3030	<.0001
Male age 18–65	.0544	.1475	0.1763	<.0001
Male age 65–69	.0543	.1202	0.0277	<.0001
Male age 70–74	.0634	.1156	0.0205	<.0001
Male age 75–79	.0670	.1134	0.0141	<.0001
Male age 80–84	.0678	.1105	0.0128	<.0001
Male age 85–89	.0573	.1084	0.0183	<.0001
Male age 90–94	.0340	.1065	0.0320	<.0001
Male age GT 94	.0105	.0959	-0.0582	<.0001
Length of stay 1–3 days (ref)	.1927	.0972	-	-
Length of stay 4–7 days	.4476	.0997	-0.0050	<.0001
Length of stay 8–14 days	.2519	.1107	0.0328	<.0001
Length of stay GT 14 days	.1078	.1241	0.0547	<.0001
0 hospitalizations in prior year (ref)	.4341	.0866	-	-

Variable	Mean	Proportion of Residents with Covariate who Triggered the Numerator	Coefficient	p-Value
1-3 hospitalizations in prior year	.4692	.1105	0.1400	<.0001
4-6 hospitalizations in prior year	.0759	.1446	0.3161	<.0001
7-9 hospitalizations in prior year	.0150	.1799	0.4948	<.0001
10+ hospitalizations in prior year	.0058	.2574	0.9244	<.0001
Ever disabled	.2683	.1241	0.0611	<.0001
ESRD	.0580	.1664	0.3512	<.0001
At least 1 day ICU (y/n)	.1381	.1198	0.0562	<.0001
1 Tuberculosis	.0000	.0000	-2.1039	<.0001
2 Septicemia (except in labor)	.1284	.1042	0.1178	<.0001
3 Bacterial infection; unspecified site	.0010	.1270	0.3314	<.0001
4 Mycoses	.0008	.1017	0.1388	<.0001
5 HIV infection	.0001	.1316	0.1767	<.0001
6 Hepatitis	.0003	.1166	0.1699	<.0001
7 Viral infection	.0006	.1202	0.4704	<.0001
8 Other infections; including parasitic	.0002	.0629	-0.2957	<.0001
9 Sexually transmitted infections (not HIV or hepatitis)	.0001	.1013	0.1716	<.0001
10 Immunizations and screening for infectious disease	.0000	.0000	-1.7268	<.0001
11 Cancer of head and neck	.0007	.1929	0.5344	<.0001
12 Cancer of esophagus	.0003	.1102	-0.0152	.0020
13 Cancer of stomach	.0004	.1121	0.2091	<.0001
14 Cancer of colon	.0025	.0965	0.1898	<.0001
15 Cancer of rectum and anus	.0008	.1181	0.3077	<.0001
16 Cancer of liver and intrahepatic bile duct	.0004	.1067	0.2671	<.0001
17 Cancer of pancreas	.0007	.0972	0.2153	<.0001
18 Cancer of other GI organs; peritoneum	.0003	.1206	0.4266	<.0001
19 Cancer of bronchus; lung	.0019	.0923	0.1443	<.0001
20 Cancer; other respiratory and intrathoracic	.0000	.0968	0.1727	<.0001
21 Cancer of bone and connective tissue	.0003	.0861	-0.0008	.8862
22 Melanomas of skin	.0001	.1304	0.6120	<.0001
23 Other non-epithelial cancer of skin	.0002	.1214	0.3978	<.0001

Variable	Mean	Proportion of Residents with Covariate who Triggered the Numerator	Coefficient	p-Value
25 Cancer of uterus	.0003	.1039	0.3295	<.0001
26 Cancer of cervix	.0000	.0930	0.1031	<.0001
27 Cancer of ovary	.0003	.0805	0.0020	.7321
28 Cancer of the female genital organs	.0002	.0827	0.1125	<.0001
29 Cancer of prostate	.0004	.1183	0.3726	<.0001
30 Cancer of the testes	.0000	.6667	14.4428	.0198
31 Cancer of other male genital organs	.0000	.1667	0.8066	<.0001
32 Cancer of bladder	.0009	.1314	0.4480	<.0001
33 Cancer of kidney and renal pelvis	.0005	.1178	0.4003	<.0001
34 Cancer of other urinary organs	.0001	.0938	0.1305	<.0001
35 Cancer of brain and nervous system	.0006	.1308	0.4187	<.0001
36 Cancer of thyroid	.0000	.1143	0.2721	<.0001
37 Hodgkin's disease	.0000	.1429	0.6080	<.0001
38 Non-Hodgkin's lymphoma	.0009	.1010	0.1825	<.0001
39 Leukemias	.0006	.1315	0.4506	<.0001
40 Multiple myeloma	.0005	.1097	0.3048	<.0001
41 Cancer: other and unspecified primary	.0001	.1519	0.7285	<.0001
42 Secondary malignancies	.0037	.1037	0.2468	<.0001
43 Malignant neoplasm without specification of site	.0002	.1546	0.7143	<.0001
44 Neoplasms of unspecified nature or uncertain behavior	.0008	.1348	0.5161	<.0001
45 Maintenance chemotherapy; radiotherapy	.0005	.0992	-0.0050	.2291
46 Benign neoplasm of uterus	.0000	.0976	0.1570	<.0001
47 Other and unspecified benign neoplasm	.0012	.0947	0.1234	<.0001
48 Thyroid disorders	.0008	.0999	0.2458	<.0001
49 Diabetes mellitus without complication	.0000	.0556	-0.4499	<.0001
50 Diabetes mellitus with complications	.0241	.1163	0.1856	<.0001
51 Other endocrine disorders	.0042	.0916	0.1788	<.0001
52 Nutritional deficiencies	.0011	.1318	0.3851	<.0001
53 Disorders of lipid metabolism	.0000	.2857	1.2577	<.0001
54 Gout and other crystal arthropathies	.0010	.0814	0.1125	<.0001

Variable	Mean	Proportion of Residents with Covariate who Triggered the Numerator	Coefficient	p-Value
55 Fluid and electrolyte disorders	.0180	.1105	0.2655	<.0001
56 Cystic fibrosis	.0000	.2000	0.6975	<.0001
57 Immunity disorders	.0001	.1186	0.3655	<.0001
58 Other nutritional; endocrine; and metabolic disorders	.0046	.0996	0.1683	<.0001
59 Deficiency and other anemia	.0051	.1052	0.2211	<.0001
60 Acute post-hemorrhagic anemia	.0027	.1169	0.3017	<.0001
61 Sickle cell anemia	.0001	.2041	0.3259	<.0001
62 Coagulation and hemorrhagic disorders	.0018	.1055	0.2480	<.0001
63 Diseases of white blood cells	.0004	.1269	0.4186	<.0001
64 Other hematologic conditions	.0002	.1221	0.4288	<.0001
76 Meningitis	.0002	.1024	0.1469	<.0001
77 Encephalitis	.0004	.1193	0.2816	<.0001
78 Other CNS infection and poliomyelitis	.0004	.1849	0.7331	<.0001
79 Parkinson`s disease	.0028	.1164	0.4146	<.0001
80 Multiple sclerosis	.0005	.0826	-0.0273	<.0001
81 Other hereditary and degenerative nervous system conditions	.0013	.1167	0.3805	<.0001
82 Paralysis	.0004	.1321	0.5079	<.0001
83 Epilepsy; convulsions	.0080	.1234	0.2772	<.0001
84 Headache; including migraine	.0002	.1325	0.5155	<.0001
85 Coma; stupor; and brain damage	.0001	.1846	0.7255	<.0001
86 Cataract	.0000	.0000	-1.5765	<.0001
87 Retinal detachments; defects; vascular occlusion; and retinopathy	.0000	.0476	-0.4759	<.0001
88 Glaucoma	.0000	.0385	-0.7105	<.0001
89 Blindness and vision defects	.0001	.0924	0.1950	<.0001
90 Inflammation; infection of eye (except that caused by tuberculosis or sexually transmitted disease)	.0002	.0828	0.0241	.0004
91 Other eye disorders	.0001	.0756	-0.1126	<.0001
92 Otitis media and related conditions	.0001	.1563	0.6283	<.0001

Variable	Mean	Proportion of Residents with Covariate who Triggered the Numerator	Coefficient	p-Value
93 Conditions associated with dizziness or vertigo	.0013	.0746	0.1047	<.0001
94 Other ear and sense organ disorders	.0001	.0921	-0.0722	<.0001
95 Other nervous system disorders	.0195	.1106	0.2640	<.0001
96 Heart valve disorders	.0035	.1141	0.3527	<.0001
97 Peri-, endo-, and myocarditis; cardiomyopathy	.0014	.1243	0.3258	<.0001
98 Essential hypertension	.0001	.1161	0.5682	<.0001
99 Hypertension with complications and secondary hypertension	.0576	.1048	0.2168	<.0001
100 Acute myocardial infarction	.0109	.1200	0.4179	<.0001
101 Coronary atherosclerosis and other heart disease	.0041	.1131	0.2958	<.0001
102 Nonspecific chest pain	.0018	.1380	0.5139	<.0001
103 Pulmonary heart disease	.0056	.1090	0.3598	<.0001
104 Other and ill-defined heart disease	.0003	.0805	0.0813	<.0001
105 Conduction disorders	.0027	.0830	0.0645	<.0001
106 Cardiac dysrhythmias	.0134	.1021	0.2814	<.0001
107 Cardiac arrest and ventricular fibrillation	.0004	.1538	0.4839	<.0001
108 Congestive heart failure; non-hypertensive	.0034	.1117	0.3473	<.0001
109 Acute cerebrovascular disease	.0298	.1110	0.3220	<.0001
110 Occlusion or stenosis of pre-cerebral arteries	.0008	.1091	0.2651	<.0001
111 Other and ill-defined cerebrovascular disease	.0005	.1231	0.3464	<.0001
112 Transient cerebral ischemia	.0029	.0971	0.2634	<.0001
113 Late effects of cerebrovascular disease	.0018	.1070	0.1368	<.0001
114 Peripheral and visceral atherosclerosis	.0032	.1091	0.2883	<.0001
115 Aortic; peripheral; and visceral artery aneurysms	.0016	.1144	0.3384	<.0001
116 Aortic and peripheral arterial embolism or thrombosis	.0006	.1380	0.6154	<.0001
117 Other circulatory disease	.0060	.1085	0.2999	<.0001
118 Phlebitis; thrombophlebitis and thromboembolism	.0031	.1142	0.4013	<.0001
119 Varicose veins of lower extremity	.0003	.0680	-0.1381	<.0001
120 Hemorrhoids	.0007	.1074	0.2541	<.0001
121 Other diseases of veins and lymphatics	.0010	.0892	0.1358	<.0001

Variable	Mean	Proportion of Residents with Covariate who Triggered the Numerator	Coefficient	p-Value
122 Pneumonia (except that caused by tuberculosis or sexually transmitted disease)	.0203	.1069	0.2185	<.0001
123 Influenza	.0001	.0943	0.1136	<.0001
124 Acute and chronic tonsillitis	.0000	.0000	-2.0025	<.0001
125 Acute bronchitis	.0004	.0915	0.1652	<.0001
126 Other upper respiratory infections	.0002	.0828	-0.1099	<.0001
127 Chronic obstructive pulmonary disease and bronchiectasis	.0083	.1031	0.2033	<.0001
128 Asthma	.0003	.1199	0.4793	<.0001
129 Aspiration pneumonitis; food/vomitus	.0106	.1155	0.1839	<.0001
130 Pleurisy; pneumothorax; pulmonary collapse	.0026	.1249	0.3538	<.0001
131 Respiratory failure; insufficiency	.0139	.1105	0.1908	<.0001
132 Lung disease due to external agents	.0002	.1272	0.4523	<.0001
133 Other lower respiratory disease	.0018	.0986	0.1630	<.0001
134 Other upper respiratory disease	.0005	.1529	0.4990	<.0001
135 Intestinal infection	.0047	.1159	0.3008	<.0001
136 Disorders of teeth and jaw	.0002	.1119	0.1056	<.0001
137 Diseases of mouth; excluding dental	.0004	.1125	0.2861	<.0001
138 Esophageal disorders	.0025	.1251	0.3366	<.0001
139 Gastroduodenal ulcer (except hemorrhage)	.0007	.1256	0.4383	<.0001
140 Gastritis and duodenitis	.0023	.1102	0.2356	<.0001
141 Other disorders of stomach and duodenum	.0021	.1246	0.3122	<.0001
142 Appendicitis and other appendiceal conditions	.0005	.1048	0.2700	<.0001
143 Abdominal hernia	.0034	.1047	0.2750	<.0001
144 Regional enteritis and ulcerative colitis	.0008	.0951	0.0686	<.0001
145 Intestinal obstruction without hernia	.0083	.1050	0.2495	<.0001
146 Diverticulosis and diverticulitis	.0056	.1054	0.2665	<.0001
147 Anal and rectal conditions	.0013	.1028	0.1792	<.0001
148 Peritonitis and intestinal abscess	.0004	.1553	0.4598	<.0001
149 Biliary tract disease	.0052	.1075	0.2944	<.0001



Variable	Mean	Proportion of Residents with Covariate who Triggered the Numerator	Coefficient	p-Value
151 Other liver diseases	.0043	.1380	0.3296	<.0001
152 Pancreatic disorders (not diabetes)	.0019	.1137	0.3103	<.0001
153 Gastrointestinal hemorrhage	.0126	.1039	0.1724	<.0001
154 Noninfectious gastroenteritis	.0021	.0997	0.2131	<.0001
155 Other gastrointestinal disorders	.0053	.1193	0.2841	<.0001
156 Nephritis; nephrosis; renal sclerosis	.0002	.1471	0.5358	<.0001
157 Acute and unspecified renal failure	.0325	.1052	0.2584	<.0001
158 Chronic kidney disease	.0001	.1518	0.3122	<.0001
159 Urinary tract infections	.0388	.1018	0.2521	<.0001
160 Calculus of urinary tract	.0005	.1020	0.1302	<.0001
161 Other diseases of kidney and ureters	.0010	.1243	0.4380	<.0001
162 Other diseases of bladder and urethra	.0007	.1405	0.5029	<.0001
163 Genitourinary symptoms and ill-defined conditions	.0010	.1222	0.3799	<.0001
164 Hyperplasia of prostate	.0007	.1374	0.5281	<.0001
165 Inflammatory conditions of male genital organs	.0005	.1307	0.3486	<.0001
166 Other male genital disorders	.0002	.1742	0.7162	<.0001
167 Nonmalignant breast conditions	.0001	.1091	0.2041	<.0001
168 Inflammatory diseases of female pelvic organs	.0001	.0984	0.1205	<.0001
169 Endometriosis	.0000	.5000	0.9454	<.0001
170 Prolapse of female genital organs	.0000	.0645	-0.1212	<.0001
171 Menstrual disorders	.0000	.0000	-2.1125	<.0001
172 Ovarian cyst	.0000	.1053	0.3278	<.0001
173 Menopausal disorders	.0001	.0947	0.1618	<.0001
175 Female infertility	.0003	.1154	0.2920	<.0001
181 Other complications of pregnancy	.0000	.3333	1.6577	<.0001
195 Other complications of birth; puerperium affecting management of mother	.0000	1.0000	10.5983	<.0001
197 Skin and subcutaneous tissue infections	.0142	.0963	0.1615	<.0001
198 Other inflammatory condition of skin	.0004	.0886	0.0441	<.0001
199 Chronic ulcer of skin	.0036	.0969	0.0291	<.0001

Variable	Mean	Proportion of Residents with Covariate who Triggered the Numerator	Coefficient	p-Value
200 Other skin disorders	.0002	.1029	0.0200	.0039
201 Infective arthritis and osteomyelitis	.0041	.1235	0.2877	<.0001
202 Rheumatoid arthritis and related disease	.0003	.0891	0.1905	<.0001
203 Osteoarthritis (Ref)	.0174	.0688	-	-
204 Other non-traumatic joint disorders	.0021	.0748	0.0316	<.0001
205 Spondylosis; intervertebral disc disorders; other back problems	.0141	.1011	0.3218	<.0001
206 Osteoporosis	.0000	.0800	0.2194	<.0001
207 Pathological fracture	.0116	.0881	0.2311	<.0001
208 Acquired foot deformities	.0002	.1056	0.3486	<.0001
209 Other acquired deformities	.0015	.0934	0.2483	<.0001
210 Systemic lupus erythematosus and connective tissue disorders	.0003	.0909	-0.0028	.5991
211 Other connective tissue disease	.0068	.0960	0.2504	<.0001
212 Other bone disease and musculoskeletal deformities	.0007	.1053	0.3006	<.0001
213 Cardiac and circulatory congenital anomalies	.0002	.0993	0.1466	<.0001
214 Digestive congenital anomalies	.0000	.1333	0.4097	<.0001
215 Genitourinary congenital anomalies	.0000	.0000	-2.1581	<.0001
216 Nervous system congenital anomalies	.0001	.1930	0.8700	<.0001
217 Other congenital anomalies	.0000	.1333	0.5693	<.0001
225 Joint disorders and dislocations; trauma-related	.0008	.0958	0.2588	<.0001
226 Fracture of neck of femur (hip)	.0648	.0882	0.1985	<.0001
227 Spinal cord injury	.0004	.1211	0.4110	<.0001
228 Skull and face fractures	.0009	.1162	0.4444	<.0001
229 Fracture of upper limb	.0102	.0877	0.2431	<.0001
230 Fracture of lower limb	.0222	.0711	-0.0410	<.0001
231 Other fractures	.0285	.0863	0.2175	<.0001
232 Sprains and strains	.0012	.0794	0.1229	<.0001
233 Intracranial injury	.0113	.1333	0.5333	<.0001
234 Crushing injury or internal injury	.0028	.1051	0.3320	<.0001

Variable	Mean	Proportion of Residents with Covariate who Triggered the Numerator	Coefficient	p-Value
235 Open wounds of head; neck; and trunk	.0008	.0923	0.1791	<.0001
236 Open wounds of extremities	.0007	.1228	0.4922	<.0001
237 Complication of device; implant or graft	.0375	.1289	0.3056	<.0001
238 Complications of surgical procedures or medical care	.0187	.1321	0.2834	<.0001
239 Superficial injury; contusion	.0032	.0973	0.2909	<.0001
240 Burns	.0004	.1175	0.2582	<.0001
241 Poisoning by psychotropic agents	.0004	.1098	0.2326	<.0001
242 Poisoning by other medications and drugs	.0017	.1151	0.2812	<.0001
243 Poisoning by nonmedicinal substances	.0002	.0964	0.1461	<.0001
244 Other injuries and conditions due to external causes	.0046	.0869	0.1496	<.0001
245 Syncope	.0033	.0916	0.2279	<.0001
246 Fever of unknown origin	.0004	.1117	0.2279	<.0001
247 Lymphadenitis	.0000	.1538	0.6005	<.0001
248 Gangrene	.0020	.1085	0.1739	<.0001
249 Shock	.0003	.1383	0.4046	<.0001
250 Nausea and vomiting	.0004	.1609	0.7794	<.0001
251 Abdominal pain	.0005	.1390	0.5075	<.0001
252 Malaise and fatigue	.0041	.0928	0.1917	<.0001
253 Allergic reactions	.0002	.1173	0.3541	<.0001
254 Rehabilitation care; fitting of prostheses; and adjustment of devices	.0000	.0714	-0.3094	<.0001
255 Administrative/social admission	.0000	.1250	0.3691	<.0001
256 Medical examination/evaluation	.0000	.0000	-2.2548	<.0001
257 Other aftercare	.0007	.0973	0.1204	<.0001
258 Other screening for suspected conditions (not mental disorders or infectious disease)	.0002	.1269	0.4976	<.0001
259 Residual codes; unclassified	.0021	.1052	0.2443	<.0001
650 MHA: Adjustment disorders	.0002	.1061	0.2350	<.0001
651 MHA: Anxiety disorders	.0003	.1495	0.6301	<.0001

Variable	Mean	Proportion of Residents with Covariate who Triggered the Numerator	Coefficient	p-Value
652 MHSA: Attention-deficit, conduct, and disruptive behavior disorders	.0000	.2400	1.1624	<.0001
653 MHSA: Delirium, dementia, and amnestic and other cognitive disorders	.0162	.1101	0.2949	<.0001
654 MHSA: Developmental disorders	.0000	.3200	1.4038	<.0001
655 MHSA: Disorders usually diagnosed in infancy, childhood, or adolescence	.0000	.1429	0.1118	<.0001
656 MHSA: Impulse control disorders, NEC	.0001	.0455	-0.8690	<.0001
657 MHSA: Mood disorders	.0049	.1160	0.2849	<.0001
658 MHSA: Personality disorders	.0000	.2222	1.0830	<.0001
659 MHSA: Schizophrenia and other psychotic disorders	.0071	.1061	0.0830	<.0001
660 MHSA: Alcohol-related disorders	.0050	.1345	0.4014	<.0001
661 MHSA: Substance-related disorders	.0005	.1421	0.4904	<.0001
662 MHSA: Suicide and intentional self-inflicted injury	.0003	.1245	0.3427	<.0001
670 MHSA: Miscellaneous mental disorders	.0003	.1521	0.5430	<.0001
2617 Adverse effects of medical drugs	.0000	.0625	-0.3560	<.0001
No CCS code	.0507	.0951	0.1752	<.0001
Nonsignificant CCS w/ protective effect	.0004	.0728	-0.0158	.0015
Nonsignificant CCS w/ increased risk	-	-	-	-
ED-specific Comorbidity Index	-2.1620	-	0.2545	<.0001
End-stage prognosis	.0070	.0657	-0.5442	<.0001
Returned to the nursing home following hospitalization	.2376	.1157	-0.0380	<.0001
Respiratory failure	.1662	.1105	-0.0330	<.0001
Venous/Arterial ulcer present	.0330	.1055	-0.0801	<.0001
Viral hepatitis	.0120	.1364	0.0347	<.0001
Internal bleeding	.0089	.1670	0.4683	<.0001
Extensive assistance/dependence in eating	.0638	.1359	0.0343	<.0001
Two-person support needed with one or more ADLs	.5613	.1077	0.0425	<.0001
Cognitive status not completely intact	.7085	.1085	0.1418	<.0001
Cognitive status assessment missing	.0140	.1342	0.1784	<.0001

Variable	Mean	Proportion of Residents with Covariate who Triggered the Numerator	Coefficient	p-Value
IV medications	.6077	.1065	0.0316	<.0001
Ostomy care	.0286	.1314	0.1234	<.0001
Oxygen therapy	.3752	.1079	0.0096	<.0001
Tracheostomy care	.0086	.1543	0.0848	<.0001
First assessment was for significant change in status	.0330	.1104	-0.0020	<.0001
Rarely/never makes self understood by others	.0288	.1134	-0.1798	<.0001
Acute change in mental status	.0268	.1329	0.2125	<.0001
Rejected care for past 4–7 days	.0106	.1489	0.2827	<.0001
Wandering once or more in the past week	.0212	.1572	0.6085	<.0001
Walks in room independent/supervision/limited assistance	.2975	.1020	0.0262	<.0001
Walks in corridor independent/supervision/limited assistance	.1851	.1030	0.0132	<.0001
Wanders <i>and</i> walks in room or corridor independent/supervision/limited assistance	.0131	.1486	-0.1835	<.0001
Cancer	.1157	.1084	0.0083	<.0001
Seizure disorder or epilepsy	.0853	.1264	0.0618	<.0001
Shortness of breath with exertion	.1613	.1104	0.0393	<.0001
Shortness of breath when sitting at rest	.0589	.1240	0.1466	<.0001
Choke/cough during meals or when swallowing medications	.0886	.1102	-0.0201	<.0001
Parenteral/IV feeding	.0202	.1268	0.1508	<.0001
Feeding tube	.0433	.1710	0.4775	<.0001
Surgical wound	.2405	.1054	0.0767	<.0001
Burn(s)	.0016	.1152	0.0058	.0052
Anticoagulant received	.3965	.1033	-0.0019	<.0001
Antibiotic received	.3624	.1127	0.1242	<.0001
Ventilator or respirator	.0037	.1203	-0.4788	<.0001
Transfusion	.0021	.2387	0.8963	<.0001
Speech Therapy	.3787	.1105	0.0724	<.0001
Respiratory therapy	.0713	.1017	-0.0890	<.0001
Constant	-	-	-2.2687	<.0001

## 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 = 0.561

Note: This model is based on all SNF stays with admission from a hospital between January 1, 2021, and December 31, 2021.

\* Coefficients with p-values greater than .05 are excluded from the comorbidity construct.

Charlson Condition	Coefficient	Standard Error	p-Value
Myocardial infarction	0.1102	0.0115	<0.001
CHF	0.0592	0.0097	<0.001
Peripheral vascular disease	0.0745	0.0115	<0.001
Cerebrovascular disease	0.0698	0.0119	<0.001
Dementia	0.0551	0.0098	<0.001
COPD	0.1245	0.0091	<0.001
<i>Rheumatoid arthritis*</i>	<i>0.0074</i>	<i>0.0192</i>	<i>.7010</i>
Ulcers	0.1233	0.0219	<0.001
Mild liver disease	0.1953	0.0175	<0.001
Diabetes mellitus	0.0954	0.0102	<0.001
Diabetes with sequelae	0.0685	0.0120	<0.001
Paralysis	0.1776	0.0185	<0.001
Chronic renal disease	0.0953	0.0104	<0.001
Cancer	0.0462	0.0163	.0046
Moderate to severe liver disease	0.1508	0.0292	<0.001
Metastatic cancer	0.0880	0.0273	.0013
HIV/AIDS	0.1471	0.0736	.0456
Intercept	-2.3148	0.0049	<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 January 1, 2021, and December 31, 2021, 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	215.90	-	0.0126	<.0001
Number of long-stay days in target period, squared	61117.51	-	0.0000	<.0001
White (ref)	.8147	0.2931	-	-
Black	.1283	0.3468	0.0643	<.0001
Hispanic	.0195	0.3014	-0.0432	0.0436
Asian	.0153	0.2096	-0.3283	<.0001
Other race/ethnicity	.0165	0.3147	0.0249	0.2755
Unknown race/ethnicity	.0058	0.2599	-0.2595	<.0001
Female age 18–65	.0512	0.4488	0.1821	<.0001
Female age 65–69 (ref)	.0458	0.3582	-	-
Female age 70–74	.0666	0.3183	-0.0939	<.0001
Female age 75–79	.0815	0.2950	-0.1352	<.0001
Female age 80–84	.1025	0.2764	-0.1588	<.0001
Female age 85–89	.1200	0.2560	-0.1918	<.0001
Female age 9–94	.1092	0.2280	-0.2618	<.0001
Female age GT 94	.0665	0.1966	-0.3373	<.0001
Male age 18–65	.0649	0.4276	0.1428	<.0001
Male age 65–69	.0523	0.3524	-0.0092	0.6073
Male age 70–74	.0559	0.3268	-0.0528	0.0029
Male age 75–79	.0517	0.3159	-0.0685	0.0002

Variable	Mean	Mean Number of Outpatient ED Visits Among Those with Covariate	Coefficient	p-Value
Male age 80–84	.0494	0.3031	-0.0635	0.0006
Male age 85–89	.0428	0.2838	-0.0708	0.0003
Male age 90–94	.0287	0.2508	-0.1333	<.0001
Male age GT 94	.0110	0.2113	-0.2464	<.0001
0 hospitalizations in prior year (ref)	.5201	0.2549	-	-
1–3 hospitalizations in prior year	.4236	0.3261	0.2462	<.0001
4–6 hospitalizations in prior year	.0480	0.4738	0.5567	<.0001
7–9 hospitalizations in prior year	.0068	0.6171	0.7558	<.0001
10+ hospitalizations in prior year	.0016	0.9192	1.1394	<.0001
Long-stay outpatient ED visits-specific comorbidity index	.0765	-	3.6275	<.0001
Entered nursing home from a psychiatric facility	.0199	0.3557	0.0384	0.0567
Rarely/never makes self understood by others	.0646	0.2892	0.1155	<.0001
Rarely/never able to understand others	.0550	0.2775	-0.0887	0.0005
Moderate cognitive impairment	.2295	0.3002	0.0189	0.0191
Severe cognitive impairment	.2857	0.2732	0.0421	<.0001
Staff assessed cognitive impairment	.1516	0.2835	0.0510	<.0001
Cognitive status assessment missing	.0098	0.3224	0.0777	0.0086
Rejected care for past 4–7 days	.0196	0.3455	0.0918	<.0001
Wandering once or more in the past week	.0445	0.3703	0.3041	<.0001
Walks in room independently/supervision/limited assistance	.3366	0.3302	0.1741	<.0001
Shortness of breath with exertion	.0821	0.3895	0.1814	<.0001
Shortness of Breath when lying flat	.1186	0.3590	0.0142	0.1599
End-stage prognosis	.0534	0.1053	-0.2433	<.0001
Internal bleeding	.0022	0.3674	0.1372	0.0213
Surgical wound	.0305	0.3306	0.0375	0.0305
Respiratory failure	.0731	0.3840	-0.0297	0.0154
Antibiotic received	.1388	0.3642	0.1790	<.0001
Diuretic received	.3178	0.3220	0.0889	<.0001
Chemotherapy for cancer	.0034	0.3342	0.1127	0.0241
Radiation for cancer	.0004	0.3092	0.0408	0.7810
Oxygen therapy	.1495	0.3644	0.1293	<.0001



Variable	Mean	Mean Number of Outpatient ED Visits Among Those with Covariate	Coefficient	p-Value
IV medications	.0235	0.3788	0.0134	0.4840
Transfusion	.0010	0.5324	0.5851	<.0001
Hospice care after nursing home admission	.0588	0.0953	-0.7546	<.0001
Speech therapy	.1292	0.3127	0.0518	<.0001
Respiratory therapy	.0316	0.3589	-0.0128	0.4662
Tracheostomy care	.0110	0.5227	0.3148	<.0001
Ventilator or respirator	.0055	0.4627	-0.2592	<.0001
Septicemia	.0199	0.3853	0.0344	0.0912
Cerebrovascular accident , transient ischemic attack, or stroke	.1826	0.3283	0.0676	<.0001
Quadriplegia	.0075	0.5157	0.1653	<.0001
Multiple Sclerosis	.0158	0.3463	-0.0795	0.0007
Parkinson's disease	.0659	0.3329	0.1593	<.0001
Gastroesophageal reflux disease (GERD) or ulcer	.1128	0.3212	0.1208	<.0001
Neurogenic bladder	.0427	0.4483	0.2679	<.0001
Cancer	.0698	0.2796	-0.0169	0.1654
Constant	-	-	-3.1656	<.0001

## 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 January 1, 2021, and December 31, 2021, 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 .05 excluded from the comorbidity construct, as are coefficients for the number of long-stay days.

Charlson Condition	Coefficient	Standard Error	p-Value
Myocardial infarction	0.0863	0.0122	<.0001
CHF	0.1057	0.0093	<.0001
Peripheral vascular disease	0.0676	0.0124	<.0001
Cerebrovascular disease	0.0777	0.0103	<.0001
Dementia	0.0578	0.0073	<.0001
COPD	0.2294	0.0088	<.0001
Rheumatoid arthritis	0.0691	0.0216	.0014
Ulcers	0.0604	0.0247	.0144
Mild liver disease	0.1814	0.0204	<.0001
Diabetes mellitus	0.1744	0.0093	<.0001
Diabetes with sequelae	0.1573	0.0116	<.0001
Paralysis	0.2706	0.0150	<.0001
Chronic renal disease	0.1549	0.0102	<.0001
Cancer	0.0653	0.0202	.0013
Moderate to severe liver disease	0.2454	0.0377	<.0001
<i>Metastatic cancer*</i>	<i>-0.0045</i>	<i>0.0400</i>	<i>.9107</i>
HIV/AIDS	0.1821	0.0760	.0166
<i>Number of long-stay days in target period*</i>	<i>0.0126</i>	<i>0.0001</i>	<i>&lt;.0001</i>
<i>Number of long-stay days in target period, squared*</i>	<i>0.0000</i>	<i>0.0000</i>	<i>&lt;.0001</i>
Intercept	-2.7814	0.0121	<.0001