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Nursing Home Residents Face Severe Functional Limitation or Death After Hospitalization for Pneumonia

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ABSTRACT

Keywords:
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Objectives: Pneumonia is a common cause of hospitalization for nursing home residents and has increased as a cause for hospitalization during the COVID-19 pandemic. Risks of hospitalization, including significant functional decline, are important considerations when deciding whether to treat a resident in the nursing home or transfer to a hospital. Little is known about postdischarge functional status, relative to baseline, of nursing home residents hospitalized for pneumonia. We sought to determine the risk of severe functional limitation or death for nursing home residents following hospitalization for treatment of pneumonia.
Design: Retrospective cohort study.
Setting and Participants: Participants included Medicare enrollees aged ≥65 years, hospitalized from a nursing home in the United States between 2013 and 2014 for pneumonia.
Methods: Activities of daily living (ADL), patient sociodemographics, and comorbidities were obtained from the Minimum Data Set (MDS), an assessment tool completed for all nursing home residents. MDS assessments from prior to and following hospitalization were compared to assess for functional decline. Following hospital discharge, all patients were evaluated for a composite outcome of severe disability (≥4 ADL limitations) following hospitalization or death prior to completion of a postdischarge MDS.
Results: In 2013 and 2014, a total of 241,804 nursing home residents were hospitalized for pneumonia, of whom 89.9% (192,736) experienced the composite outcome of severe disability or death following hospitalization for pneumonia. Although we found that prehospitalization functional and cognitive status were associated with developing the composite outcome, 53% of residents with no prehospitalization ADL limitation, and 82% with no cognitive limitation experienced the outcome.
Conclusions and Implications: Hospitalization for treatment of pneumonia is associated with significant risk of functional decline and death among nursing home residents, even those with minimal deficits prior to hospitalization. Nursing homes need to prepare for these outcomes in both advance care planning and in rehabilitation efforts.
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Pneumonia is a common cause of illness among nursing home residents, with approximately 1 case occurring for every 1000 days of nursing home care provided, prior to the current COVID-19 global pandemic.[1] Pneumonia was also the leading cause of hospitalization and death among nursing home residents, accounting for 40% of hospitalizations and 25% to 33% of deaths prior to the current pandemic.[2–7] The current global COVID-19 pandemic has disproportionately affected American nursing home residents, with at least 1 in 11 nursing home residents suffering a confirmed SARS-CoV-2 infection, and has led to an increase in hospitalizations for pneumonia.[8] Approximately 1 in 3 nursing home residents with COVID-19 has been hospitalized, primarily because of pneumonia symptoms (cough, fever, and shortness of breath) and more than 1 in 4 (27%) has died.[9,10]

Advance care planning for episodes of pneumonia was already challenging for residents and facilities; however, the uncertainty surrounding short and long-term effects of hospitalization for pneumonia during the current pandemic has amplified the difficulty of advance care planning. At the same time, Centers for Medicare & Medicaid Services (CMS) considers pneumonia the leading cause of potentially avoidable hospitalizations among nursing home residents and penalizes nursing homes and hospitals for avoidable pneumonia readmissions.[11] The conflicting recommendation by triage tools and health care organizations makes it challenging for nursing home residents, their caregivers, and providers to make informed decisions about the most appropriate treatment decision. To reach informed decisions around hospitalization for pneumonia (including COVID-19), residents, families, and caregivers must understand patient preferences, potential benefits, and potential harms.[12]

Functional decline is a potential harm of inpatient pneumonia care that must be factored into shared decision making regarding hospitalization for pneumonia. Prior studies have found that functional decline is a potential outcome of hospitalization, particularly among patients with cognitive impairment.[13,14] Loss of a single activities of daily living (ADL) is associated with a decline in health-related quality of life and an increased likelihood of requiring long-term nursing home care.[15] Among patients with mild to moderate functional limitation at baseline, loss of 1 ADL could have a profound effect on a patient's health-related quality of life and lead to the perception that such a loss would be "worse than death."[16,17] Although patients and their surrogates may be familiar with the risks of hospitalization for exacerbations of chronic diseases that they have suffered for many years (eg, chronic obstructive pulmonary disease or congestive heart failure), providing them with an estimate of functional outcomes following hospitalization for an unplanned acute illness like pneumonia allows for shared decision making through scenario planning.[18,19]

Every nursing home resident whose care is paid for by Medicare, Medicaid, or the Veterans Health Administration is evaluated using the Minimum Data Set (MDS), a federally mandated, validated instrument that assesses health conditions, disease diagnoses, treatments, and functional and cognitive status.[20] MDS evaluations are completed on admission to the nursing home and quarterly thereafter, as well as at the time of acute changes in clinical status and readmission from a hospital. Information from MDS assessments submitted to CMS. The MDS assessment includes an evaluation of ADL independence available prior to and following hospitalization to quantify functional decline in the perihospitalization period for nursing home residents.

This study was designed to assist nursing home residents, surrogates, providers, and facilities conduct appropriate scenario planning to prepare for unplanned acute care hospitalizations, by describing functional decline among nursing home residents hospitalized for pneumonia and evaluating patient and hospitalization characteristics associated with severe functional decline and death. These findings will aid patients, families, and caregivers in advance care planning and decisions regarding hospitalization during the current pandemic.

Methods

Data Source

This study evaluated CMS data for patients hospitalized with pneumonia identified using Medicare Part A claims submitted between January 1, 2013, and discharge by October 31, 2014.

Design and Population

This was a retrospective cohort analysis of nursing home residents, receiving either post-acute or long-term care, hospitalized for pneumonia during their nursing home stay. After initially identifying all fee-for-service Medicare beneficiaries with a claim submitted for hospitalization during the study period, patients were identified as nursing home residents based on the completion of a MDS assessment during the 120 days prior to the index hospital admission. Hospitalized nursing home residents were included if they had (1) a primary discharge diagnosis of pneumonia or a primary diagnosis of septicemia and secondary diagnosis of pneumonia associated with the hospitalization, (2) age ≥66 years; and (3) resided in United States (excluding Puerto Rico). We included patients with a primary diagnosis of sepsis and secondary diagnosis of pneumonia as there has been a substantial increase in coding patients with clinical signs and symptoms of pneumonia as having sepsis over the 10 years prior to the study.[21] Nursing home residents were excluded if they were (1) discharged to another hospital following the index admission, as we sought to collect information for only 1 episode of inpatient care per patient, or (2) lacked an MDS assessment submitted within 60 days following the index admission. The first claim submitted during the study period was considered the index hospitalization. This study was reviewed and approved by our institutional review board, who waived the requirement for patient consent.

Primary Outcome

The primary outcome was a composite of severe functional limitation or death following hospitalization. Severe functional limitation was defined as 4 or more ADL impairments documented in the MDS-ADL Long Form scale completed posthospitalization. ADL assessed bed mobility, transfer, locomotion, dressing, eating, toilet use, and personal hygiene.[22] Most individuals with 4 or more ADL limitations on this scale are functionally bed bound; therefore, we set this cutoff for our definition of severe functional limitation.[23] Failure to perform an ADL without assistance was considered an ADL deficiency. Death was defined as dying during the hospitalization or within 60 days of discharge.

Covariates

In order to identify whether hypothesized patient characteristics and comorbidities would be associated with functional decline following hospitalization, specific comorbidities and patient characteristics of interest were included in an a priori model. Sociodemographic characteristics including age, race and ethnicity, sex, and state of residence were identified from the Medicare Beneficiary Enrollment file. Patient cognitive status, baseline ADL limitations, active medical comorbidities contributing to the risk of functional limitation (dementia, cancer, aphasia, congestive heart failure, diabetes, stroke, paraplegia, hip fracture, renal failure, schizophrenia, and chronic lung disease)[24–26] and significant patient conditions, including weight loss

(loss of 5% or more in last month or 10% or more in last 6 months), difficulty eating, and dependency on a feeding tube, were identified from the MDS completed 120 days or less before the index hospitalization. The model included receipt of invasive mechanical ventilation using procedure codes (Current Procedural Terminology [CPT]).

Statistical Analysis

Bivariate analyses were performed to describe differences in baseline characteristics and characteristics of hospitalization between patients who did and did not experience the outcome. A multivariable logistic regression model was created to evaluate the association between covariates defined in our a priori model and our composite outcome of severe disability and death, adjusted for receipt of mechanical ventilation. Analyses allowed for robust variance estimates to account for clustering of persons within hospitals. All data analysis was conducted in Stata, version 15.0 (Stata Corp, College Station, TX)).

Results

Between January 1, 2013, and October 31, 2014, a total of 256,012 Medicare beneficiaries were hospitalized for pneumonia with an MDS completed within 120 days prior to hospitalization. Among those patients, 41,505 (16.2%) did not have an MDS completed within 60 days following discharge and did not die during that period, so they were excluded. Among excluded patients, 13,822 (33.3%) were discharged to home, an assisted living facility, or an adult family home, 5356 (12.9%) were discharged to hospice care, and 7361 (17.7%) were readmitted to the hospital before their next MDS assessment. The remaining 14,966 (36.1%) patients excluded from the cohort lacked an MDS assessment submitted within 60 days but were discharged from the hospital alive and did not go to any of the previously listed locations. Likely they were discharged to a nursing home but an MDS was not submitted in a timely fashion. The resulting cohort consisted of 214,507 patients. Among patients in this cohort, 56.0% (n = 135,438) were female, 85.1% white (n = 182,298), and 10.2% black (n = 21,774), and had a mean age of 83.1 years (standard deviation 8.1) (Table 1). Overall, the cohort had a high prevalence of cognitive impairment (Cognitive Performance Score >2, 60.1%, n = 129,005), and 10.1% (n = 19,816) had a feeding tube. Nearly half of patients (47.4%, n = 101,791) had severe disability before hospitalization (Table 2).

Outcome

Among the members of the cohort, 79,558 (37.1%) died during or within 60 days of hospitalization and 113,228 (52.8%) had severe disability following admission, for a total of 192,736 (89.9%) with the primary composite outcome. Among patients without severe disability prior to hospitalization (<4 ADL limitations, n = 46,702), 66.3% (n = 30,982) experienced the primary outcome of severe disability or death. The majority of patients with no prehospitalization ADL limitations (52.5%) experienced the composite outcome, as did the majority of patients with all levels of prehospitalization functional limitation. Among patients with severe disability prior to hospitalization, 96.4% (n = 161,754) experienced the primary

Table 1
Characteristics of Nursing Home Residents Admitted for Pneumonia by Posthospitalization Functional Outcome[*]

Patient Demographics	Total (N = 214,507)	Mild or Moderate Disability (n = 21,771)	Severe Disability or Death (n = 192,736)
Age, y, mean (SD)	83.1 (8.1)	81.7 (8.3)	83.2 (8.1)
Female, n (%)	120,029 (55.6)	12,757 (58.6)	107,272 (55.7)
Race and ethnicity, n (%)			
White, non-Hispanic	182,298 (85.1)	19,794 (91.0)	162,504 (84.5)
Black, non-Hispanic	21,774 (10.2)	1317 (6.1)	20,457 (10.6)
Other	1849 (0.9)	121 (0.6)	1728 (0.9)
Asian	3487 (1.6)	168 (0.8)	3319 (1.7)
Hispanic	3767 (1.8)	196 (0.9)	3571 (1.9)
North American Native	966 (0.5)	145 (0.7)	821 (0.4)
CPS, n (%)[†]			
Intact cognitive function	44,050 (21.2)	7793 (36.8)	36,257 (19.4)
Borderline intact	34,842 (16.8)	4730 (22.3)	30,112 (16.1)
Mild impairment	38,820 (18.7)	3818 (18.0)	35,002 (18.8)
Moderate impairment	47,638 (22.9)	3519 (16.6)	44,119 (23.6)
Moderately severe impairment	20,414 (9.8)	1031 (4.9)	19,383 (10.4)
Severe impairment	10,951 (5.3)	263 (1.2)	10,688 (5.7)
Very severe impairment	11,182 (5.4)	25 (0.1)	11,157 (6.0)
Feeding tube, n (%)[‡]	19,816 (10.1)	458 (2.1)	19,358 (10.1)
Comorbidities, n (%)			
Cancer[§]	17,554 (9.1)	1647 (8.3)	15,907 (9.2)
Congestive heart failure[‖]	60,011 (28.1)	6396 (29.6)	53,615 (28.0)
Renal failure[**]	31,576 (14.7)	3016 (13.9)	28,560 (14,8)
Stroke[††]	33,330 (15.5)	2040 (9.4)	31,290 (16.2)
Parkinson's disease[‡‡]	13,547 (6.3)	808 (3.7)	12,739 (6.6)
Hospitalization characteristics, n (%)			
ICU or CCU stay during hospitalization	108,150 (50.4)	8063 (37.0)	100,087 (51.9)
Mechanical ventilation	23,871 (11.1)	533 (2.4)	23,338 (12.1)

CCU, critical care unit; CPS, Cognitive Performance Score; ICU, intensive care unit; SD, standard deviation.
   *Unless otherwise noted all individuals were evaluated for each listed exposure. For those exposures where individual data were incomplete, missing individuals were assumed not to have the exposure being evaluated when calculating percentages.
   †Preadmission CPS scores were available for 207,897 (96.9%) individuals in the cohort.
   ‡Feeding tube status was available for 214,239 (99.9%) individuals in the cohort.
   §Cancer status was available for 193,171 (90.1%) individuals in the cohort.
   ‖Congestive heart failure status was available for 213,278 (99.6%) individuals in the cohort.
   **Renal failure status was available for 193,177 (90.1%) individuals in the cohort.
   ††Stroke status was available for 213,278 (99.4%) individuals in the cohort.
   ‡‡Parkinson's disease status was available for 213,260 (99.4%) individuals in the cohort.

Table 2
Degree of Functional Limitation and Death for all Nursing Home Residents Hospitalized for Pneumonia by Prehospitalization Functional Limitation (N = 214,507)

Prehospital ADL Deficiencies	Postdischarge ADL Deficiencies*								Death	Total
	0	1	2	3	4	5	6	7		
0	6268 (28.4)	1374 (6.2)	829 (3.8)	1011 (4.6)	1019 (4.6)	1677 (7.6)	2929 (13.2)	1207 (5.5)	5792 (26.2)	22,106
1	920 (11.0)	876 (10.4)	470 (5.6)	420 (5.0)	531 (6.3)	736 (8.8)	1335 (15.9)	631 (7.5)	2475 (29.5)	8394
2	484 (6.8)	335 (4.7)	494 (6.9)	407 (5.7)	445 (6.2)	753 (10.6)	1303 (18.3)	623 (8.7)	2287 (32.1)	7131
3	407 (4.5)	290 (3.2)	293 (3.2)	842 (9.3)	643 (7.1)	1020 (11.2)	1717 (18.9)	869 (9.6)	2990 (33.0)	9071
4	391 (3.3)	238 (2.0)	275 (2.3)	445 (3.7)	1230 (10.2)	1589 (13.2)	2528 (21.0)	1238 (10.3)	4082 (34.0)	12,016
5	528 (1.8)	355 (1.2)	362 (1.3)	519 (1.8)	1114 (3.9)	5176 (18.1)	6990 (24.4)	3557 (12.4)	10,049 (35.1)	28,650
6	790 (1.0)	468 (0.6)	489 (0.6)	788 (1.0)	1454 (1.9)	4738 (6.3)	25,558 (33.8)	12,516 (16.5)	28,885 (38.2)	75,686
7	95 (0.2)	96 (0.2)	100 (0.2)	112 (0.2)	276 (0.5)	992 (1.9)	4600 (8.9)	22,184 (43.1)	22,998 (44.7)	51,453
Total	9883	4032	3312	4544	6712	16,681	46,960	42,825	79,558	214,507

*Obtained from the Minimum Data Set Long Form.

outcome and 39.3% (n = 66,014) of these patients died during or within 60 days of hospitalization.

Odds of Severe Disability or Death

Severe functional limitation and dementia prior to hospitalization were associated with severe functional limitation or death following hospitalization for pneumonia (Table 3). Adjusting for prehospitalization functional and cognitive status, male gender, race (black non-

Table 3
Association Between Comorbidities, Baseline Functional and Cognitive Status, and Hospitalization Characteristics and Severe Disability and Death Following Hospitalization for Nursing Home Residents (n = 189,513)

	Adjusted OR (95% CI)
Age (per year)	1.02 (1.02-1.02)
Gender—male	1.05 (1.01-1.08)
Race (relative to White non-Hispanic)	
Black, non-Hispanic	1.15 (1.07-1.23)
Other	1.13 (0.90-1.42)
Asian	1.25 (1.03-1.51)
Hispanic	1.20 (1.01-1.42)
North American Native	0.82 (0.66-1.01)
Prehospitalization ADL deficiencies*	
0	Ref
1	1.64 (1.54-1.74)
2	2.28 (2.14-2.44)
3	2.85 (2.68-3.03)
4	6.12 (5.70-6.58)
5	11.44 (10.78-12.16)
6	20.66 (19.53-21.86)
7	57.73 (51.31-64.96)
Prehospitalization CPS score†	
No impairment	Ref
Borderline intact	1.11 (1.06-1.16)
Mild impairment	1.31 (1.25-1.38)
Moderate impairment	2.85 (2.68-3.03)
Moderately severe impairment	1.77 (1.63-1.92)
Severe impairment	2.47 (2.13-2.87)
Very severe impairment	10.05 (6.12-16.48)
Feeding tube	0.98 (0.87-1.10)
Long-term care	1.14 (1.10-1.19)
Comorbidities	
Congestive heart failure	1.07 (1.03-1.11)
Cancer	1.46 (1.37-1.55)
Renal failure	1.06 (1.01-1.11)
Stoke	1.09 (1.03-1.15)
Parkinson's disease	1.31 (1.20-1.42)
Bipolar disorder	0.91 (0.83-1.00)
Schizophrenia	0.80 (0.73-0.89)
Hip fracture	0.83 (0.75-0.91)
Lung disease	0.86 (0.83-0.90)

CI, confidence interval; OR, odds ratio; Ref, referent.
*Obtained from the Minimum Data Set Long form.
†Obtained from the Minimum Data Set.

Hispanic, Asian, and Hispanic), certain pre-existing medical comorbidities [congestive heart failure (adjusted odds ratio 1.07, 95% confidence interval 1.03-1.11), cancer (1.46, 1.37-1.55), and renal failure (1.06, 1.01-1.11)] and neurologic conditions [stroke (1.09, 1.03-1.15), Parkinson's disease (1.31, 1.20-1.42), hemiparesis (1.58, 1.40-1.77) and paraplegia (4.71, 2.41-9.20)] were associated with risk of developing severe functional limitation or death. Using the same model, patients with pre-existing lung disease (0.86, 0.83-0.90) and pre-existing hip fracture (0.83, 0.75-0.91) had a lower risk of the primary outcome. Patients with pre-existing feeding tubes were not at increased risk of the outcome (0.98, 0.87-1.10). Patients who received mechanical ventilation during the hospitalization were at increased risk of the outcome (1.24, 1.19-1.29). Being admitted from a stay in long-term care (admissions not following a prior hospitalization) was associated with increased risk of the primary outcome (1.14, 1.10-1.19).

Discussion

In the largest study to date of functional decline following hospitalization for nursing home residents, we found that most residents hospitalized for pneumonia developed severe disability or died. Notably, among those with no prehospitalization functional limitation, the majority developed significant disability or experienced death by 60 days following hospitalization. Individuals with severe cognitive, physical or neurologic dysfunction prior to hospitalization were at the greatest risk of severe disability or death. These findings suggest that, during the current pandemic, nursing homes must plan for the influx of a high proportion of nursing home residents returning with severe functional limitation requiring a higher level of care. Additionally, during this time, when admitting new residents or readmitting former residents, providers should discuss likely outcomes following hospitalization for pneumonia to inform advance care planning.

Our findings build on prior studies demonstrating persistent functional decline following hospitalization for infectious and noninfectious acute care admissions among community-dwelling older adults, particularly for those with cognitive and functional impairment assessed on admission.[13,14,27–32] These studies have demonstrated that almost every group of older adults is at risk for a perceptible decline in function following hospitalization that can last for months after discharge or become permanent. However, because community dwelling adults do not undergo detailed functional assessments as performed as part of the MDS, these studies relied on patient or caregiver report of functional status at the time of hospitalization or most recent primary care assessment of functional status. Use of MDS data ensured that we had an accurate assessment of function as close to the time of admission as possible, and a similarly accurate assessment following hospitalization. The few prior studies of functional decline among nursing home patients following

pneumonia have relied on assessments performed up to 6 months prior to admission or performed assessments of functional status at the time of discharge, which may have over- or underestimated the severity of function in the days to weeks following discharge.[33,34] This study is the first to use MDS data to characterize functional decline following hospitalization for pneumonia for the entire spectrum of patients in nursing homes, including patients with few functional and cognitive limitations receiving post-acute care and those with more severe baseline limitations residing in long-term care.

Engaging nursing home residents and their families in advance care planning reduces bothersome or burdensome care received at the end of life and improves family member and caregiver satisfaction with care at the end of life.[35–38] However, approximately 4 of 10 nursing home residents fail to have any advance care plan documented.[39,40] A major barrier to advance care planning is choosing the correct time to initiate it. Discussions occurring too early may not accurately reflect patient preferences over time and discussions that occur too late fail to protect patients from receiving care that was not consistent with their wishes.[41] When informed about the high likelihood of a poor outcome, nursing home residents, their families, and their providers are more likely to engage in advance care planning.[42] Our study demonstrates that nursing home admission, particularly with individuals suffering from cognitive and physical limitations who are admitted for long-term care, is likely the right time to initiate advance care planning around the decision to hospitalize for COVID or other pneumonias, as we found that residents are more likely to experience functional decline or death at 60 days following hospitalization than individuals diagnosed with metastatic non–small cell lung cancer.[43] Presently, only 6% to 7% of nursing home residents have documented do-not-hospitalize orders, with the proportion ranging from 4% among those with mild cognitive impairment to 8% to 9% among those with severe impairment.[39,44–46] We anticipate that once aware of how poor prognosis is after hospitalization, nursing home residents, their families, and their providers—who are already concerned about visitation limitations once hospitalized for COVID—will be more likely to engage in advance care planning and the decision not to hospitalize, rather than delay these discussions.

Do-not-hospitalize orders can be effective in preventing hospitalization and burdensome treatment for COVID or other causes of pneumonia, particularly given the stresses of relocation to the hospital and the limited contact family members and caregivers may have with their loved one once hospitalized; however, many patients and families change their minds during episodes of acute illness and agree to hospitalization regardless of documented preferences.[39,47–50] We believe that, in many cases, this is the result of a lack of appropriate scenario planning between patients, their families or caregivers, and nursing home providers. As our findings suggest that the risk of severe functional limitation and death varies among patient populations, there are specific populations of patients that are at greater risk for severe functional limitation and death following hospitalization for pneumonia, suggesting that scenario planning during advance care planning conversations could include discussion of these risk factors when making decisions about COVID hospitalization and do-not-hospitalize orders.

There are limitations to this study. First, all patients in our study were hospitalized for pneumonia. Most nursing home residents who develop pneumonia (∼65%) are treated in their facility rather than in the hospital.[45,51,52] Despite this, septicemia and pneumonia remain the most common reasons for hospitalization of nursing home residents.[53] We were unable to reliably identify individuals treated for pneumonia in the nursing home; however, prior observational studies have demonstrated that individuals hospitalized for pneumonia are no more likely to survive than those treated in facilities and likely experience a reduction in quality of life after hospitalization.[45,54] Additionally, fewer than 1 in 10 residents with critical illness due to

pneumonia are hospitalized, suggesting that our cohort of patients may not have had more severe disease than those treated in facilities.[52] Therefore, it is plausible that we would not find a difference in mortality between the cohort of patients included in this study and those who were treated in the facility.[55] Second, few if any individuals were hospitalized for viral pneumonia due to coronaviruses such as COVID-19, SARS, or MERS. Despite this, we can generalize that the severity of disease and prognosis among those included in our study was similar to those hospitalized with COVID pneumonia, as we found an overall mortality of 37%, higher than the overall mortality for nursing home residents with COVID (27%). At this time, there are no estimates of inpatient mortality for nursing home residents with COVID to provide a direct comparison. Third, we may not have captured all hospitalizations during which pneumonia was treated, as we only looked for individuals with a primary diagnosis of pneumonia or septicemia. Patients with hospital-acquired pneumonia or ventilator-associated pneumonia likely were not included in our study; however, our primary interest was to identify patients who would benefit from scenario planning in the event of pneumonia and not to identify those who acquired pneumonia during a hospital transfer for another indication (eg, stroke, myocardial infarction, or hip fracture).

Conclusions and Implications

Because of the high prevalence of comorbid medical conditions, functional limitations, and dementia, nursing home residents are at risk for severe complications resulting from COVID-19. Therefore, it is crucial to discuss possible outcomes of seemingly routine care with patients and their families well in advance so that appropriate decisions can be made in times of acute illness. The results of this study should inform patient and family decisions regarding hospitalization for COVID-19 and other causes of pneumonia at the time of admission to the nursing home as well as inform planning for a high proportion of hospitalized patients returning with new or significantly worsened functional limitations. Further research evaluating severity and duration of decline caused by COVID-19–related pneumonia from other etiologies is warranted as there are additional comorbidities associated with COVID-19 such as thrombosis and myocarditis that may exacerbate functional loss.[56,57] Additionally the social isolation resulting from COVID-related closures of nursing homes to outside visitors, leading to functional and cognitive decline among individuals without acute illnesses, warrants further study as well.

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