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## Original Study

# Patterns of Emergency Department Use Among Long-Stay Nursing Home Residents With Differing Levels of Dementia Severity



Michael A. LaMantia MD, MPH<sup>a,b,c,\*</sup>, Kathleen A. Lane MS<sup>d</sup>, Wanzhu Tu PhD<sup>d</sup>,  
Jennifer L. Carnahan MD, MPH<sup>a,b,c</sup>, Frank Messina MD<sup>a</sup>,  
Kathleen T. Unroe MD, MHA<sup>a,b,c</sup>

<sup>a</sup> Indiana University School of Medicine, Indianapolis, IN

<sup>b</sup> Indiana University Center for Aging Research, Indianapolis, IN

<sup>c</sup> Regenstrief Institute, Inc, Indianapolis, IN

<sup>d</sup> Department of Biostatistics, Indiana University School of Medicine, Indianapolis, IN

## A B S T R A C T

**Keywords:**

Nursing home  
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**Objectives:** To describe emergency department (ED) utilization among long-stay nursing home residents with different levels of dementia severity.

**Design:** Retrospective cohort study.

**Setting:** Public Health System.

**Participants:** A total of 4491 older adults (age 65 years and older) who were long-stay nursing home residents.

**Measurements:** Patient demographics, dementia severity, comorbidities, ED visits, ED disposition decisions, and discharge diagnoses.

**Results:** Forty-seven percent of all long-stay nursing home residents experienced at least 1 transfer to the ED over the course of a year. At their first ED transfer, 36.4% of the participants were admitted to the hospital, whereas 63.1% of those who visited the ED were not. The median time to first ED visit for the participants with advanced stage dementia was 258 days, whereas it was 250 days for the participants with early to moderate stage dementia and 202 days for the participants with no dementia ( $P = .0034$ ). Multivariate proportional hazard modeling showed that age, race, number of comorbidities, number of hospitalizations in the year prior, and do not resuscitate status all significantly influenced participants' time to first ED visit ( $P < .05$  for all). After accounting for these effects, dementia severity ( $P = .66$ ), years in nursing home before qualification ( $P = .46$ ), and gender ( $P = .36$ ) lost their significance.

**Conclusions:** This study confirms high rates of transfer of long-stay nursing home residents, with nearly one-half of the participants experiencing at least 1 ED visit over the course of a year. Although dementia severity is not a predictor of time to ED use in our analyses, other factors that influence ED use are readily identifiable. Nursing home providers should be aware of these factors when developing strategies that meet patient care goals and avoid transfer from the nursing home to the ED.

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Dementia currently affects an estimated 4.4 million older adults across North America.<sup>1</sup> Dementia care is expensive, with an estimated cost of \$159 billion to \$215 billion annually to provide formal

and informal care services.<sup>2</sup> Though individuals with dementia live in and transition dynamically across the continuum, nursing homes remain a significant site for the provision of care and an important node for transitional care for this population.<sup>3</sup> A majority of nursing home residents have some degree of cognitive impairment.<sup>4</sup> Many transitions of nursing home residents to the emergency department (ED) are believed to be either unnecessary or preventable; they can be particularly burdensome for people with dementia. Because of the high costs and poor quality of care involved in unnecessary transfers, they have become a target of policymakers and a focus of a Centers for Medicare and Medicaid Services demonstration project.<sup>5–8</sup>

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\* Address correspondence to Michael A. LaMantia, MD, MPH, Indiana University Center for Aging Research, 1101 West Tenth Street, Indianapolis, IN 46202.

E-mail address: [malamant@iu.edu](mailto:malamant@iu.edu) (M.A. LaMantia).

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When nursing home residents with dementia transfer to the hospital for acute care, many of them will be seen first in the ED. Most EDs are designed most efficiently to provide episodic and emergent care to patients. Nursing home residents have complex comorbidities that can challenge the busy ED provider trying to differentiate between acute and chronic illness in a patient during a time-limited encounter. Likewise, the often chaotic emergency environment can be difficult for any patient with a health crisis to manage; it is exponentially more difficult to navigate for those with dementia. Persons with dementia may not be able to articulate their symptoms, participate in care planning, assist in care coordination, or even understand what is happening to them as they transition across sites of care. Indeed, dementia is a significant independent risk factor for several patient-centered outcomes including hospital admission from the ED, return to the ED within 30 days, and mortality after an ED visit.<sup>9,10</sup> There is a progressive spectrum of cognitive impairment, ranging from mild cognitive impairment to advanced dementia. Though there is 1 study indicating that more severely cognitive-impaired individuals may be less likely to use the ED than less cognitive-impaired patients, the question of how dementia severity influences ED utilization among long-stay nursing home residents remains largely unanswered.<sup>10,11</sup>

In this work, we describe ED utilization among long-stay nursing home residents with different levels of dementia severity. To accomplish this, we analyzed a merged dataset that members of our study team have used previously to investigate health care utilization among older adults.<sup>9,12–14</sup> In our study, we evaluate for differences in disposition decisions and discharge diagnoses as well as in time to first ED visit for long-stay nursing home residents with varying dementia severities.

## Methods

### Study Design and Data Source

This is an observational study based on existing data. For our analyses, we used a merged set of Medicare and Medicaid claims and resident-level minimum data set (MDS) files encompassing the years 1999 through 2009. Participants were identified initially through records at Wishard Health Services (now Eskenazi Health Services), a large, public hospital system in Indianapolis, Indiana. Health service utilization data were captured across sites of care using Medicare and Medicaid claims. The Indiana University Institutional Review Board and the Centers for Medicare and Medicaid Privacy Board approved this study.

In our analyses, we were interested in annual rates and time to first ED use by long-stay nursing home residents stratified by the severity of their dementia. For study purposes, we defined a long-stay nursing home resident as a person aged 65 years or older who accumulated 90 or more consecutive days of nursing home residence between January 1, 1999 and December 31, 2008. Persons were qualified to join our study cohort if they were a long-stay nursing home resident between January 1, 2000 and December 31, 2008. We restricted our analysis of ED use to those ED visits that occurred between January 1, 2000 and December 31, 2009 in the first 365 days after a person's study qualification. We also examined participants' hospitalization and ED use in the year before their enrollment in the study.

### Measures of Interest

Dementia severity was defined using data from the Cognitive Performance Scale (CPS) contained in the MDS assessment closest to each participant's qualification as a long-stay resident. We defined residents having CPS scores of 0–1 as not demented, those having CPS scores of 2–4 as having mild to moderate dementia, and those having

CPS scores of 5–6 as having severe dementia, consistent with prior work.<sup>15</sup> Consistent with our previous work, we calculated comorbid conditions using International Classification of Diseases, Ninth Revision codes.<sup>9,12</sup> These codes and conditions were as follows: arthritis (714.0 and 715.0), cancer (140.0–172.0 and 174.0–239.0), coronary artery disease (410.0, 411.0, 412.0, 413.0, and 414.0), congestive heart failure (428.0 and 398.91), chronic obstructive pulmonary disease (491.0, 492.0, and 496.0), diabetes (250.0), hypertension (401.0), liver disease (570.0–573.0), renal disease (585.0), and stroke (433.1 and 434.1). These conditions were obtained from 1999 until the qualification date of each resident. Counts of activities of daily living impairments were calculated using data from the MDS assessment completed closest to study qualification. “do not resuscitate” or “do not hospitalize” statuses were obtained from the MDS assessment completed closest to time of study qualification or carried forward if completed at an earlier MDS assessment. Discharge diagnoses were categorized using the Clinical Classification Software available through the Agency for Healthcare Research and Quality.

### Statistical Analysis

The study data were analyzed in the following manner. First, our study participants were divided into 3 dementia severity groups: those without dementia, those with early to moderate dementia, and those with advanced dementia. Descriptive demographic and health characteristics, including comorbidities, were comparatively examined for these groups, and their differences tested using one-way analysis of variance models for continuous variables and  $\chi^2$  tests for categorical variables. We calculated annual rates of ED use from the number of ED visits in the first 365 days after study enrollment (censored for death/nursing home discharge) among those participants who entered this study in any given year. These rates were then standardized to each 1000 nursing home bed days. We obtained the 95% confidence intervals for the annual ED rates under the assumption that counts of ED visits followed a Poisson distribution. We compared the percentages of participants with ED admissions within 365 days after qualification between the groups using  $\chi^2$  tests. We compared disposition decisions for patients at the time of their first ED visit within 365 days using Fisher exact tests. We examined differences between diagnoses for patients who were discharged from the ED, first identifying the 10 most common discharge diagnoses among each dementia severity group, then examining those conditions that have been judged to be potentially avoidable among nursing home residents, and then looking at select conditions that had large differences in percentages between the three dementia severity groups. Fisher exact tests were also used to compare the dementia severity groups on these selected conditions. Cox proportional hazards regression models were used to compare the time from the study qualification to first ED visit between the dementia severity groups after adjusting for pre-specified covariates including participant age, race, gender, number of comorbidities, number of hospitalizations in year before study qualification, years in nursing home until qualification, and do not resuscitate status. Participants without an ED visit were censored at the minimum of 365 days, their date of death, or their nursing home discharge date following the qualification date. We examined the distributions of time to first ED visits in patients with different levels of dementia severity. Log-rank test was used to compare the time distributions of the 3 dementia severity groups. SAS v 9.4 (SAS Institute, Cary, NC) was used for our analyses;  $P$  value of  $\leq .05$  was considered statistically significant.

## Results

Table 1 shows the characteristics of the 4491 long-stay nursing home residents who were identified and followed in this study.

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