Recent Health Care Transitions and Emergency Department Use by Chronic Long Term Care Residents: A Population-Based Cohort Study

Andrea Gruneir PhD a,b,c,*, Susan Bronskill PhD b,c, Chaim Bell MD, PhD b,c,d,e,f, Sudeep Gill MD, MSc b,g, Michael Schull MD, MSc b,c,d,h, Xiaomu Ma MS b, Geoffrey Anderson MD, PhD a,b,c, Paula A. Rochon MD, MPH a,b,c

* Address correspondence to Andrea Gruneir, PhD, Women’s College Research Institute, Women’s College Hospital, Toronto, Ontario, Canada

ABSTRACT

Objectives: Long term care (LTC) residents commonly experience transitions between health care settings that can have important health consequences. The objective of this study was to quantify the effect of recent transitions on the risk of emergency department (ED) transfer among chronic LTC residents. Two types of transitions were considered: admission into LTC and discharge from hospital.

Design: Retrospective cohort study using linked administrative data from Ontario, Canada.

Participants: All chronic LTC residents in Ontario older than 66 years on the date of the 2005 provincial LTC facility census.

Measurements: Using facility census date as baseline, admission to LTC was defined as the number of days between LTC admission and baseline. Residents were categorized as one of: newly admitted (<30 days), shorter-stay (31–90 days), or longer-stay (>91 days). Within each group, residents were further subdivided based on having had a recent discharge from hospital. The first ED visit for each resident during the 6-month follow-up was counted, as were death and other competing risks. The cumulative incidence of ED transfer for each group was estimated and logistic regression was used to test whether differences between groups persisted after controlling for resident characteristics.

Results: Of the 64,589 residents, 3.0% were newly admitted, 4.9% were shorter-stay, and 92.1% were longer-stay. The 6-month cumulative incidences of ED transfers were 35.0% for newly admitted, 30.7% for shorter-stay, and 22.0% for longer-stay. The odds of an ED transfer were higher for newly admitted and shorter-stay residents relative to longer-stay residents, even after adjustment for resident characteristics (adjusted odds ratio, 95% confidence interval 1.9, 1.7–2.1; and 1.5, 1.4–1.7, respectively). Regardless of time since LTC admission, residents with a recent discharge from hospital had a cumulative incidence of nearly 40% and an increase in the odds of ED transfer of at least 50% compared with those who had not been in hospital.

Conclusions: Health care transitions, especially those from hospital, are associated with an increase in ED transfers among older chronic LTC residents. These findings highlight the need for a stronger focus on transitional care, especially posthospital care, for LTC residents.

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Transitions between health care settings are increasingly recognized as a time when older adults, especially those with complex needs, are particularly vulnerable to complication or error.1–4 For older adults in long-term care (LTC) or nursing homes, 2 types of transitions may be particularly important in contributing to increased risk of adverse outcomes. The first is the initial admission into LTC. Admission into LTC represents a change in both health care setting and life stage. The new environment, new routines, and lack of familiarity with staff increase the potential for adverse events. The second is discharge from an acute care hospitalization. Residents transitioning from hospital are likely to have gone through a significant health crisis and often have changes to their care plans. For residents transitioning from hospital (either as a new or returning resident), the change from a high-intensity setting to a much lower-intensity setting can be difficult. Among the general older population, hospital readmission rates are as high as 25%.5 Although fewer studies have looked at this in the chronic LTC population, some evidence suggests that residents are at least as likely to experience adverse events following hospital discharge.6

Transfer to the emergency department (ED) is a serious adverse event. Our previous work has shown that for LTC residents, ED transfers are common and are often for reasons that may be preventable, including fall-related injury and medical diagnoses amenable to primary intervention.7 We have also shown that patterns of ED visits can act as signals for critical gaps in care processes.8,9 In this respect, one strategy for assessing the quality of the transition process among LTC residents may be to measure the frequency of ED transfers following such events. Given the different stressors associated with different transition types, however, it may be important to consider the impact of a resident’s transitional history on the risk of an ED visit. The objective of this study was to quantify the effect of different transition histories on the risk of ED transfer among chronic LTC residents. We differentiated between transitions that were defined as an admission into LTC and those defined as a discharge from hospital.

Methods

This research was conducted using linked administrative databases from Ontario, Canada. Ontario is the largest Canadian province, with a population of more than 10 million. At the time of this study, there were nearly 70,000 LTC beds in Ontario in approximately 600 LTC facilities. Ontario LTC homes are designated to provide care to adults who require 24-hour nursing care and/or supervision within a secure setting; this does not include retirement homes.9 Ontario LTC homes generally do not provide post-acute or rehabilitative care and most admissions are intended for chronic care (comparable to the long-stay population in US nursing homes).

This study was approved by the research ethics board of Sunnybrook Health Sciences Centre.

Data

We used the 2005 cycle of the Levels of Care census (LOC) and linked individual resident records to other data sources using scrambled identifiers. The LOC was a province-wide annual review of all LTC resident charts; the LOC was phased out after 2005, making our cohort the most recent data with full provincial coverage. Data on ED visits were obtained from the National Ambulatory Care Reporting System, which is a mandatory reporting system for all ambulatory care services including ED use.10,11 Other data sources included the Registered Persons Database, the Ontario Drug Benefit Database, the Canadian Institute for Health Information Discharge Abstract Database, and the Ontario Health Insurance Plan claims database. These data are regularly used for research purposes and have been studied extensively for validity.12–14

Study Design and Cohort Selection

This was a retrospective cohort study. We identified all individuals in LTC homes on the day of the 2005 facility census (study baseline; n = 69,700). We excluded residents who were younger than 66 years (n = 4540) and residents who had invalid patient identifiers (n = 320). If a resident had more than one census record (not all were completed on a single day), we used the most recent record (n = 123). Each resident was followed until the first ED transfer, direct hospital admission (not through the ED), death, or the end of follow-up (180 days). The LOC census was completed between October and December; residents were followed over the winter months.

We measured resident characteristics at baseline. We identified preexisting diagnoses, except dementia, from hospital records for the 5 years before baseline using International Classification of Disease codes from the Deyo adaptation of the Charlson comorbidity score.15 We defined a resident as having dementia if there were any hospital record or physician billing claims for dementia in the 5 years before baseline or use of any cholinesterase inhibitor in the year prior.16 Resident functional status was measured as degree of impairment on 4 activities of daily living (ADL): eating, toileting, transferring, and dressing. Behavioral problems were measured as the occurrence of any of the following: aggressive or angry behaviors, agitation, resistance to treatment, or demands attention. Both measures of ADL impairment and behavioral problems were obtained from the LOC census.

Transition History

We defined two types of transitions: (1) recent admission into LTC, and (2) recent discharge from hospital. To characterize a more complete transition history, we cross-classified each resident according to the occurrence of each transition type in the 90 days before study baseline. This is further explained in the following sections (see Appendix 1).

Transition Type: Recent Admission to LTC

Length of stay in the LTC facility was quantified as the number of days between the LTC facility admission date reported on the LOC and the study baseline date. Based on length of stay, each resident was assigned to one of three mutually exclusive groups: newly admitted (length of stay at baseline was 30 days or less), shorter-stay (length of stay at baseline was between 31 and 90 days), or longer-stay (length of stay at baseline was longer than 90 days). We differentiated between newly admitted and shorter-stay residents to determine whether proximity to LTC admission was associated with the risk for adverse events following a transition. Longer-stay was defined as longer than 90 days to be consistent with other research and LTC quality reporting.17

Transition Type: Recent Discharge from Hospital

Each resident was also assigned to a mutually exclusive group based on having experienced discharge from hospital before study baseline. To capture the complexity of recent transition histories, these groupings were specific to the length of stay in LTC at baseline. Newly admitted residents were divided into three groups: (1) those who were admitted to LTC directly from hospital, (2) those who were admitted to LTC from the community but had been
discharged from hospital within the 90 days before LTC admission, and (3) those who were admitted to LTC from the community without a recent discharge from hospital. Shorter-stay residents were divided into two groups: (1) those who had been discharged from hospital between LTC admission and baseline and (2) those who had not been hospitalized in that time. Longer-stay residents were divided into two groups: (1) those who had been discharged from hospital in the 90 days before baseline, and (2) those who had not been hospitalized in that time.

**ED Transfers**

We identified the first unscheduled ED transfer for each resident during follow-up. We focused on ED transfers, rather than hospital admissions, because our earlier work revealed that approximately 45% of transfers did not lead to hospitalization. This suggests that hospitalizations, although important, are only one part of the larger issue of acute care transfers. We described each ED transfer according to timing relative to baseline and type. Follow-up was divided into six periods based on the proximity to baseline. The number and proportion of transfers that occurred during each period was calculated. We did this to identify temporal patterns of transfers. As for ED visit types, three mutually exclusive types, as defined in our earlier work, were used: (1) potentially preventable (also known as ambulatory care sensitive), which were defined as visits for reasons that may have been prevented if the underlying condition had been better managed earlier in the course of illness; (2) low-acuity visits, which were defined as visits that were triaged as nonurgent on arrival in the ED and ended with the resident returning to the LTC home; and (3) other visits, which were defined as visits that did not meet the criteria for either potentially preventable or low-acuity visit types.

**Analyses**

Descriptive statistics were used to characterize residents according to basic demographics, functional status, and medical diagnoses. For each transition group, we estimated the 6-month cumulative incidence of a first ED transfer and accounted for the competing risks of death and direct hospital admission (without a transfer through the ED). We used logistic regression to test the effect of transition types on the odds of ED transfer. To do this, we built a logistic regression model in which we estimated odds ratios (ORs) and 95% confidence intervals (CIs), comparing the likelihood of ED visits for each newly admitted and shorter-stay residents against the likelihood in longer-stay residents (the reference category). We built 3 additional logistic regression models, one for each length-of-stay group, to test the effect of recent hospital discharge on the odds of having an ED visit. We accounted for the competing risks of death and direct hospital admission. In all models, we controlled for the confounding effects of age, gender, dementia, congestive heart failure, diabetes, chronic obstructive pulmonary disease, ADL impairment, and behavioral problems. These variables were selected based on observations at the bivariate level.

To estimate the effect of the more complex transition histories on the likelihood of an ED visit, we used a logistic regression model with a single independent variable that incorporated both transition types (recent admission into LTC and recent discharge from hospital). We used a simplified version of the transition groups. Categorization based on time since admission to LTC remained the same (newly admitted, shorter-stay, or longer-stay), but recent discharge from hospital was simplified to within 90 days before baseline (rather than specific to each length of stay group). We made this simplification based on observations in our earlier analyses. The simplified transition history variable had six categories. Longer-stay residents without a recent discharge from hospital were treated as the reference category because they were expected to be the most stable and to have the lowest likelihood of ED transfer.

**Results**

**Study Cohort**

Of the 64,589 residents in the cohort, most were longer-stay (92.1%) at baseline and only 3.0% and 4.9% were newly admitted and shorter-stay, respectively. Overall, 8.3% had a recent discharge from hospital but this varied from 50.9% among the newly admitted residents to 5.7% among the longer-stay residents. More than half of residents were 80 years or older and female, and there was a high prevalence of dementia, ADL impairment, and behavioral problems. There were slight differences between transition history groups, suggesting a higher level of cognitive and functional impairment among the longer-stay residents without a recent discharge from hospital but a higher burden of medical conditions among those with a recent discharge from hospital (Table 1).

**Transitions and ED Transfers**

The six-month cumulative incidence of first ED transfer was 35.0% among newly admitted, 30.7% among shorter-stay, and 22.0% among longer-stay residents (Table 2). The increased risk of ED transfer among newly admitted and shorter-stay residents relative to longer-stay residents persisted after adjustment for confounding variables (newly admitted: adjusted OR 1.9, 95% CI 1.7–2.1; shorter-stay: adjusted OR 1.5, 95% CI 1.4–1.7).

Within each of the length-of-stay groups, the six-month cumulative incidence of an ED transfer was consistently higher among those who had a recent discharge from hospital than others (Table 3, Figure 1). Residents who had a recent discharge from hospital appeared to have a slightly higher frequency of ED transfers in the first 14 days after follow-up and of transfers for potentially preventable visits than other residents, but with wide 95% CIs around several estimates (likely because of small cell sizes among the newly admitted and shorter-stay residents) (Table 4). In all cases, the increased likelihood of an ED transfer among residents who had a recent discharge from hospital relative to those who did not persisted after adjustment for confounding variables. Among the newly admitted residents, any recent discharge from hospital was associated with a similar increase in the odds of ED transfer, regardless of whether the resident was admitted to LTC directly from hospital or through the community (Table 3).

The combined effects of the full transition history on the odds of ED transfer are shown in Table 5. Among those without a recent discharge from hospital, newly admitted and shorter-stay residents showed an approximately 50% greater likelihood of ED transfer than longer-stay residents. Regardless of length of stay, recent discharge from hospital was associated with twice the likelihood of ED transfer. This effect may be seen more often among newly admitted residents with a recent discharge from hospital; however, the 95% CIs covered 1.0.

**Discussion**

We found that LTC residents who had experienced a recent health care transition had a higher six-month risk of ED transfer than residents who had not experienced a similar transition. The risk of an ED visit declined from 35% among newly admitted residents to 22% among longer-stay residents. Even after controlling for resident characteristics, those who had experienced a recent
High readmission rates among the general population have been attributed to poor discharge planning, lack of communication between providers, and inadequate follow-up care. For hospital patients expected to be discharged to LTC, there may be additional issues that contribute to the risk of readmission. Hospital providers’ limited knowledge of the LTC environment may lead to erroneous assumptions about the availability of resources, particularly access to advanced practice providers. Meanwhile, pressures to discharge patients from crowded hospitals may lead to even shorter lengths of stay for those who have access to a bed in another type of health care facility. Recent research from the United States found that nearly one-quarter of patients discharged from hospital to a skilled nursing facility are rehospitalized, and that this had increased by 29% between 2000 and 2006. To date, relatively little research has focused on rehospitalizations in LTC residents or on the effects of transitional care interventions in this population.

Transitions have been identified as a priority issue for older patients because of the propensity for poor outcomes in this population. Although there are likely to be multiple clinical and system-level factors that contribute to this risk, the strength of our findings suggests that opportunities to improve the transitional process into LTC, particularly those from hospital, need to be identified. Policy interventions may need to include options such as implementation of standardized post-transition protocols and funding practices that account for the distinct needs of residents newly transferred from the community and hospital settings. The development of quality indicators that describe transitional care may be another policy lever to improve this process for LTC residents. In Canada, the United States, and elsewhere, there is extensive public reporting of LTC quality, but most indicators fail to target the transitional experience. Increasing awareness of the importance of the transitional period may add to calls for the development of appropriately targeted quality indicators.

Our study was conducted in Ontario, a single Canadian province with LTC admission and funding policies that may differ from other regions. Despite this, we believe that our key findings are relevant to other jurisdictions, including the United States. Nursing homes in the United States provide care for more than 1 million chronic, or long-stay, residents, and it is well documented that these residents make frequent transitions between the hospital and LTC settings. Further, research in both the United States and Canada have shown that, in addition to clinical factors, facility and funding policies influence hospital transfer rates. The study by Mor and colleagues focused on readmissions among skilled nursing facility patients, but also showed that patients who had been in LTC before hospitalization also had high rates of hospital transfer. Even with the fundamental differences in the Canadian and US health care systems, there continue to be common problems in the care of vulnerable older adults, especially with respect to transitions across health-system settings.

**Limitations**

There are limitations to this study. First, we lacked data on the decision-making processes before ED transfer, including family preferences. Second, data restrictions made it difficult to distinguish between newly admitted residents who were new to LTC and newly admitted residents who were transferred from another LTC facility, two groups who may have distinct post-transition needs. Finally, we chose a relatively simple strategy to operationalize length of stay rather than a more complex time-varying approach. Our simpler strategy allows for easier interpretation and presentation. Our study focused on documenting the association between transition group and risk of ED transfer; future studies may be needed to identify the effects of transitional care interventions in other settings.

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**Fig. 1.** Probability of an emergency department visit over a 6-month follow-up period estimated using cumulative incidence curves. (A) Newly admitted residents. (B) Shorter-stay residents. (C) Longer-stay residents.
better positioned to describe the changes in the risk of ED transfer relative to changes in the time since transition.

Conclusion

Health care transitions are a common yet critical period in the care of vulnerable older patients. We found that for LTC residents in Ontario, recent health care transitions, especially those from hospital, were strongly associated with an increased risk of transfer to the ED. These findings reinforce the need for targeted transition care policies and practices to best meet the needs of LTC residents during such periods.

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Supplementary Data

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.jamda.2011.10.001.

References