Relationships Between Residential Care Community Characteristics and Overnight Hospital Stays and Readmissions: Results From the National Study of Long-Term Care Providers

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Abstract

The Problem: Hospitalizations and subsequent readmissions can produce significant challenges when trying to reduce costs and improve quality of care. This study describes hospitalizations and readmissions using residential care community data from the 2012 National Study of Long-Term Care Providers.

The Resolution: About 61.0% of residential care communities had hospitalizations, and among these communities, 39.3% had readmissions. Residential care communities in the Northeast were more likely to have had hospitalizations and readmissions. Residential care communities located in a continuing care retirement community (CCRC) had a lower likelihood of hospitalizations, and communities that provided therapeutic services had a lower likelihood of readmissions.

Tips for Success: An association with a CCRC and provision of therapeutic services were found to be protective against hospitalizations and readmissions, respectively.

Keywords

Long-term services and supports; residential care; hospitalizations; readmissions; National Study of Long-Term Care Providers

INTRODUCTION

Overnight hospital stays and subsequent readmissions can produce significant challenges when trying to reduce costs and improve quality of care. Hospitalizations accounted for one-third of total health care spending in the United States in 2014 (McDermott, Elixhauser, & Sun, 2017). The aggregate cost for 35.6 million hospital stays was $81.4 billion (Torio & Moore, 2016). Overnight hospital stays and readmissions can result in trauma or complications from medical treatment, and may decrease quality of care and quality of life (Becker, Boaz, Andel, & DeMuth, 2012; McKinney & Melby, 2002). Hospitalizations can increase the risk of functional decline, falls, and nursing home admission (Friedman, Mendelson, Bingham & McCann, 2008). The increased risks associated with hospitalizations are of particular concern to residents of residential care communities.

Assisted living and similar residential care communities, which provide services to individuals who cannot live independently but generally do not require the skilled level of care provided by nursing homes, are an important provider of long-term supports and services (Golant, 2004). In 2012, 22,200 residential care communities in the United States provided care to 713,300 residents (Harris-Kojetin, Sengupta, Park-Lee, & Valverde, 2013).

Only a handful of studies have looked at relationships between hospitalizations and the organizational and resident characteristics in residential care communities (Becker et al., 2012; Hogan et al., 2014; Maxwell et al., 2015; Sloane et al., 2005; Stearns et al., 2007). One study found that residents in chain-affiliated residential care communities had more hospitalizations, while those in continuing care retirement communities (CCRCs) had fewer (Hedrick et al., 2009). This study also found that the presence of nursing staff in residential care was linked to lower hospitalizations. Three studies that examined resident characteristics and hospitalizations found that residents with a diagnosis of depression had more hospitalizations (Becker et al., 2012; Hedrick et al., 2009; Wheaton, Ford, Cunningham & Croft, 2015). To date, studies on hospitalizations in residential care have focused on resident-level rates rather than rates for the community as a whole.

One study that linked hospitalizations and readmissions in residential care found that in 2012, 60% of residential care communities had at least one resident with an overnight hospital stay discharge within a 90-day period, and in 39% of these communities, at least one resident was readmitted to a hospital within 30 days of the discharge (Caffrey, Harris-Kojetin, Rome, & Sengupta, 2014). However, to our knowledge, no studies have examined the relationships between organizational and resident characteristics of residential care communities and readmissions.

To build on existing studies and fill potential knowledge gaps in the literature, this study used survey data from the 2012 National Study of Long-Term Care Providers (NSLTCP) to examine discharges from overnight hospital stays and subsequent readmissions at the residential care community level. We also studied the relationships between residential care community–level hospitalizations and readmissions and the organizational and resident case-mix characteristics of these communities.

METHODS

Data Sources

The National Center for Health Statistics (NCHS) conducted the 2012 NSLTCP. Survey data on residential care communities from the 2012 NSLTCP were used for this analysis. To be eligible for the study, a residential care community had to have four or more beds; serve primarily an adult population; have at least one resident at the time of the interview; be licensed, registered, listed, certified, or otherwise regulated by the state to provide room and board with at least two meals a day; provide around-the-clock on-site supervision; and offer help with personal care or health care–related services. Nursing homes and providers exclusively serving adults with severe mental illness or intellectual and developmental disabilities were excluded. Of 39,779 residential care communities in the sampling frame, 11,690 were sampled and stratified by state and bed size. Data were collected through three modes: self-administered hard-copy, self-administered web, and computer-assisted telephone interviewing. The questionnaire was completed for 4,694 communities, for a weighted response rate of 55.4%.

The survey used a sample of communities from states that had enough residential care communities to produce reliable state estimates and a census of residential care communities in states that did not have enough communities to produce reliable state estimates from a sample. As a result, the estimates were subject to sampling variability and variability due to nonresponse.

Statistical analysis weights were computed as the product of four components: the sampling weight (only for residential care communities in states where they were sampled), adjustment for unknown eligibility status, adjustment for nonresponse, and a smoothing factor. For sampled states in the residential care community component, the sampling weights reflected the probability of selection for each selected facility. The sampling weight for each facility in the sample was the reciprocal of its probability of selection. For all states in which a census was used, the probability of selection was equal to 1. To account for residential communities of unknown eligibility status, the weights of the facilities with known eligibility were adjusted upward based on the proportion of facilities that were actually known to be eligible. The adjustment for unknown eligibility was done in SUDAAN, using a constrained logistic model to predict known eligibility and to compute the unknown eligibility adjustment factors for the weights. More detailed information on the study design and data collection methods is available in the NSLTCP Survey Methodology and Documentation and readme files (NCHS, 2013a; NCHS, 2013b).

Study Population

Overnight hospitalizations analyses.—The bivariate and multivariate analyses of overnight hospitalizations included 3,853 residential care communities (82%) of the 4,694 communities in the 2012 NSLTCP. Weighted, this represents 17,920 communities. Communities were excluded if they had missing data on overnight hospital stays or on any of the independent variables. We also excluded residential care communities if they reported

having more residents with hospital stays or resident case-mix characteristics than the total number of residents reported because these responses are thought to be erroneous.

Readmissions analyses.—The bivariate and multivariate analyses of hospital readmissions included 2,652 communities (99%) of the 2,669 communities in this study that reported having at least one resident with a discharge from an overnight hospital stay in the 90 days preceding the survey. Weighted, this represents 10,865 communities. We excluded communities for which readmissions or independent variable data were missing. Also excluded were communities that reported having more residents with readmissions than residents with overnight hospital stays because these responses are thought to be erroneous.

Dependent Variables

Any overnight hospital stays.—Overnight hospital stays are defined as the number of current residents discharged from an overnight hospital stay in the 90 days before the survey. Trips to the emergency department that did not result in a discharge from an overnight hospital stay were excluded. This study focused on residential care communities that had at least one resident with a discharge from an overnight hospital stay within a 90-day period and compared them to residential care communities that did not have any residents with a discharge.

Any readmissions.—Readmissions are defined as the number of current residents readmitted to the hospital for an overnight stay within 30 days of an overnight hospital stay discharge. This question was asked when a residential care community reported at least one resident with a discharge from an overnight hospital stay in the 90 days before the survey. For the readmission analyses, we focused on residential care communities that had at least one resident who was readmitted to the hospital within 30 days of a hospital discharge and compared them to residential care communities that did not.

Independent Variables

Organizational and resident case-mix characteristics.—The independent variables included organizational and resident case-mix characteristics used in prior research on hospitalizations or readmissions in residential care at the resident level (Becker et al., 2012; Hedrick et al., 2009; Hogan et al., 2014; Maxwell et al., 2015; Sloane et al., 2005; Stearns et al., 2007; Weiss & Elixhauser, 2014; Wheaton et al., 2015). The organizational characteristics included geographic characteristics, ownership status, chain affiliation status, being part of a CCRC, Medicaid participation, having been in operation 10 or more years, use of electronic health records (EHRs), staffing variables, and offering any therapeutic and skilled nursing services. Staffing variables consisted of a categorical variable indicating (1) communities that had both registered nurse (RN) and licensed practical or vocational nurse (LPN/LVN) employee full-time equivalents (FTEs); (2) communities that had only RN employee FTEs; (3) communities that had only LPN/LVN FTEs; and (4) communities that had no RN or LPN/LVN FTEs. We used a categorical variable for licensed nursing staff based on a study conducted by Hedrick and colleagues (2009). Aide hours per resident per day (HPRDs) were computed by multiplying the number of FTE aide employees by 35 hours, and then dividing the product by the number of residents and by 7 days. The staffing

variables did not include contract staff. Geographic characteristics of residential care communities included metropolitan statistical area (MSA) and region. We controlled for bed size in the multivariate modeling.

Resident case-mix characteristics included the percentage of residents who were non-Hispanic white, female, aged 85 and older, diagnosed with Alzheimer's disease or other dementias, and diagnosed with depression, as well as the percentage needing any assistance with bathing and any assistance with eating. Needing any assistance with bathing or eating included needing any help or supervision from another person or the use of special equipment to perform these activities. The resident case-mix characteristics were all continuous measures calculated by dividing the number of current residents with the particular characteristic in the residential care community by the total number of current residents in the residential care community.

Because this analysis included a large number of independent variables, an assessment was done to look for multicollinearity. Each independent variable was regressed on all the other independent variables, and the R^2 estimate was noted. Most of these R^2 estimates were 0.20 or below, a couple were in the 0.20 to 0.29 range, and one estimate was 0.47. No multicollinearity was found. Frequency distributions for the variables in this study are included in Appendix A in the Technical Appendix.

Missing Data

The weighted percentage of cases with missing data for variables ranged from 0.2% for chain affiliation to 9.0% for EHRs. Cases with missing data on either of the dependent variables or with missing data on any of the independent variables were excluded from all analyses.

When comparing the excluded cases with the included cases for discharges from overnight hospital stays, the excluded cases were significantly different for a few of the independent variables. A statistically significantly greater ($p < .05$) percentage of the excluded cases were located in an MSA (84.0% vs. 80.3%), and a smaller percentage provided therapeutic services (25.1% vs. 31.9%). The excluded cases in the hospitalizations analyses also had more beds (41.5 vs. 37.6), fewer aide HPRDs (1.90 vs. 2.34), and a smaller percentage of non-Hispanic white residents (79.9% vs. 83.7%) than did the included cases. For the readmissions analyses, the excluded cases had a statistically significantly smaller ($p < .05$) percentage of non-Hispanic whites (82.6% vs. 86.2%) and a larger percentage of residents needing help with the bathing activities of daily living (72.9% vs. 68.6%).

Data Analyses

For all analyses, the unit of analysis is the residential care community, not the resident. In the bivariate analyses, residential care communities with any hospitalizations and any readmissions were compared to residential care communities without hospitalizations and without readmissions, respectively. The differences between the two types of residential care communities were evaluated using χ^2 tests and t-tests. If χ^2 tests were statistically significant, a post hoc t-test procedure was used to make pairwise comparisons. Statistically

significant results from the post hoc procedure are reported. All significance tests were two-sided using $p < .05$ as the level of significance.

We used logistic regression analyses to examine the extent to which organizational and resident case-mix characteristics were associated with residential communities having residents with overnight hospital stays and residents with readmissions. The dependent variables were dichotomized as any residents versus no residents. Sensitivity analyses were performed in which the dependent variables were converted into categorical variables in different ways. In addition to the above method (any versus none), models with the following categorizations of the dependent variables were also estimated: (1) at or below the average percentage of residents versus above the average percentage of residents; and (2) at or below the average percentage versus above average percentage to two times the average percentage and two times the average percentage and higher. Overall, the results were similar across the different models. The models using the "any versus none" categorization of the dependent variables had the best fit, with R^2 of 0.22 and 0.13. SAS-callable SUDAAN Version 11.0.0 statistical package (RTI International, 2012) and STATA version 14 (StataCorp, 2015) were used to conduct descriptive and multivariate analyses.

RESULTS

Overnight Hospital Discharges and Readmissions

Among residential care communities, 61.0% had at least one resident with a discharge from an overnight hospitalization within a 90-day period. When comparing communities with and without 90-day hospitalizations across the categories of the organizational characteristics variables, having at least one resident with an overnight hospital stay discharge in a 90-day period was more prevalent among communities that were nonprofit compared to for-profit (71.1% vs. 58.4%), chain affiliated compared to not chain affiliated (66.9% vs. 52.8%), in operation 10 years or more compared to less than 10 years (66.3% vs. 52.6%), not located in an MSA compared to located in an MSA (65.4% vs. 60.0%), located in the Northeast compared to the West (79.7% vs. 49.3%), using EHRs compared to not using them (73.1% vs. 58.1%), had both RN and LPN employees compared to no RN or LPN employees (78.0% vs. 43.9%), and provided any skilled nursing services compared to not providing such services (65.7% vs. 58.0%) (Table 1).

Communities that had at least one resident with a hospital discharge in a 90-day period had fewer aide HPRDs (mean = 2.2 hours) than communities with no hospital-stay discharges (mean = 2.6 hours). Communities with at least one resident with a discharge from an overnight hospital stay in a 90-day period had a greater percentage of residents who were non-Hispanic white (mean = 86.2%), female (mean= 70.5%), and aged 85 and older (mean = 47.5%) and a smaller percentage of residents who were diagnosed with Alzheimer's disease or other dementias (mean = 42.2%) and who needed assistance with bathing (mean = 68.6%) or eating (mean = 23.6%) compared to communities with no overnight hospital-stay discharges in a 90-day period.

Overall, among residential care communities with at least one resident with a 90-day overnight hospital discharge, 39.3% had at least one resident who was readmitted within a

30-day period. When comparing communities with and without 30-day readmissions across the categories of the organizational characteristics variables, having at least one resident with a readmission was more prevalent in residential care communities that were chain affiliated compared to not being chain affiliated (43.0% vs. 32.8%), part of a CCRC compared to not being part of one (43.3% vs. 37.1%), in operation 10 years or more compared to less than 10 years (43.1% vs. 31.6%), located in an MSA compared to not being located in an MSA (40.5% vs. 34.9%), located in the Northeast compared to the West (54.1% vs. 32.4%), and using EHRs compared to not using them (45.6% vs. 37.3%), as well as in residential care communities that had LPN employees only compared to no RN or LPN employees (51.7% vs. 26.0%) and that did not provide any therapeutic services compared to providing them (41.1% vs. 35.5%) (Table 2).

Communities that had at least one resident with a hospital readmission within 30 days of a discharge had fewer aide HPRDs (mean = 1.9 hours) than communities with no hospital readmissions (mean = 2.3 hours). Communities with at least one resident with a readmission within 30 days of a hospitalization discharge had a smaller percentage of residents diagnosed with Alzheimer's disease or other dementias (39.3%) and needing assistance with bathing (64.6%) or eating (19.6%) compared to communities without 30-day hospital readmissions.

Characteristics Associated With Overnight Hospital Discharges and Readmissions

According to the multivariate analysis, after controlling for all other characteristics including bed size, we observed a greater likelihood of having at least one resident with an overnight hospitalization discharge in a 90-day period among residential care communities that were chain affiliated (OR = 1.29), participated in Medicaid (OR = 1.32), were located in the Northeast (compared to the West) (OR = 1.56), and had a higher percentage of residents diagnosed with depression (OR = 1.01) (Table 3). Communities that were part of a CCRC had a lower likelihood of having at least one resident with an overnight hospital-stay discharge (OR = 0.73).

After controlling for all other characteristics including bed size, we found that having at least one resident readmitted to a hospital within 30 days of a hospital discharge was more likely among communities that were located in the Northeast (compared to the West) (OR = 1.98), had LPN employees only (compared to no licensed nursing staff) (OR = 2.00), and had RN and LPN employees (compared to no licensed nursing staff) (OR = 1.50) (Table 3). The likelihood of having at least one resident with a 30-day readmission was lower among communities that provided any therapeutic services (compared to not providing them) (OR = 0.73) and that had a greater percentage of residents 85 years and older (OR = 1.00).

DISCUSSION

Almost two-thirds of residential care communities (61.0%) in this study had at least one resident with a discharge from an overnight hospital stay in a 90-day period. Among those residential care communities with any residents with 90-day hospitalization discharges, 39.3% had at least one resident readmitted within 30 days of discharge.

This study builds on the literature regarding the relationships between hospitalizations and readmissions and the organizational and resident case-mix characteristics of assisted living facilities. Among the organizational characteristics, region was significantly associated with both having any residents with 90-day overnight hospital stay discharges and 30-day readmissions. Residential care communities in the Northeast were more likely to have residents with hospitalizations and readmissions. Region was the only independent variable that was a significant predictor of both hospital stay discharges and readmissions. To our knowledge, region has not been included in other studies on hospitalizations and readmissions in residential care, but researchers have found higher rates of hospitalizations in the Northeast among the general population (Weiss & Elixhauser, 2014).

With regard to rates of discharge from an overnight hospital stay, in addition to being located in the Northeast, being chain affiliated, participating in Medicaid, and having more residents diagnosed with depression predicted a greater likelihood of having residents with hospitalizations. Being part of a CCRC was associated with a lower likelihood of having overnight hospital discharges in a 90-day period. Although their study was not nationally representative, Hedrick and colleagues found similar chain and CCRC results in their 2009 study of 12-month hospitalizations among assisted living residents. No other studies, to our knowledge, have focused on the resident case-mix of a residential care community as a predictor of community-level hospitalization rates. However, studies that focused on resident characteristics as predictors of resident-level hospitalization rates documented similar relationships between hospitalizations and depression (Becker et al., 2012; Hedrick et al., 2009; Wheaton et al., 2015).

When examining rates of readmissions, in addition to being located in the Northeast, having only LPN or both RN and LPN employees was associated with a greater likelihood of having residents with readmissions compared with having no RN or LPN employees. Communities that provide any therapeutic services and those in which more of their residents are 85 years and older had a lower likelihood of having 30-day readmissions. To date, no studies have been conducted on readmissions in residential care, but studies that have looked at hospitalizations in residential care found similar relationships with respect to organizational and resident characteristics (Becker et al., 2012; Hogan et al., 2014; Maxwell et al., 2015; Sloane et al., 2005; Stearns et al., 2007). We should note, however, that Hedrick and colleagues (2009) found that the presence of RN or LPN staff was associated with fewer 12-month hospitalizations, while we found that the presence of RN or LPN staff was associated with increased 30-day readmissions.

Limitations

The strengths of this study include the focus on rates at the community level and the linking of overnight hospital stays with readmissions. Despite these strengths, the study had some limitations. The measurements of rates of overnight hospital discharges and readmissions may underrepresent actual rates because of the timing of data collection and the 90-day and 30-day periods in the survey questions. For example, a community may have had a resident with an overnight hospital discharge, but at the time of the survey, the resident may not yet have had a 30-day readmission. Or, a community may have had a resident (for whom a bed

was being held) who was hospitalized overnight but had not yet been discharged and, therefore, was not counted in the 90-day hospital discharge rate. Some residential care communities were excluded from the study because of missing or erroneous data. In analyses comparing the included communities to the excluded communities for hospitalizations and readmissions, the two groups differed significantly with respect to bed size, race/ ethnicity, aide HPRDs, and therapeutic service provision. These differences could have resulted in bias in the study findings. The 2012 NSLTCP residential care community survey contained a limited number of variables measuring organizational and resident case-mix characteristics; therefore, questions remain. For example, the survey did not collect information about the reason for the overnight hospital stay or readmission or the length of the hospital stay. Finally, because of the cross-sectional nature of the survey, we could not draw causality from the findings.

CONCLUSION

Policymakers and researchers have identified hospitalizations and readmissions as important indicators of patient safety, as well as significant drivers of cost in the health care sector, particularly for long-term services and supports. This study provides further evidence that both outcomes are prevalent in residential care, and it identifies potential characteristics associated with having at least one resident with a hospitalization or readmission. An association with a CCRC and the provision of therapeutic services were found to be protective against hospitalizations and readmissions, respectively. Organizational and resident characteristics, such as chain affiliation, Medicaid participation, and the percentage of residents with a diagnosis of depression, were associated with a greater likelihood of having hospitalizations only, while the presence of licensed nursing staff and the percentage of residents aged 85 and older were associated with a greater likelihood of having readmissions only. Geographic location was found to be predictive of both hospitalizations and readmissions in residential care.

This study contributes to the growing body of knowledge regarding hospitalizations and readmissions among noninstitutional long-term services and supports. The study findings highlight residential care communities with particular organizational and resident case-mix characteristics that may benefit from targeted interventions to address these increasingly important public policy issues.

TECHNICAL APPENDIX

Appendix A.: Descriptive Statistics for the Cases Included in the Analyses

Organizational Characteristics	Hospitalization Cases	Readmissions Cases
	Percent or Number	
Mean number of beds	37.6	51.3
Nonprofit/government ownership	21.1	24.6

Organizational Characteristics	Hospitalization Cases	Readmissions Cases
	Percent or Number	
For-profit ownership	78.9	75.4
Chain affiliated	58.6	63.1
Not chain affiliated	31.3	35.9
Part of a continuing care retirement community (CCRC)	36.3	36.0
Not part of a CCRC	63.7	63.0
Participates in Medicaid	52.3	52.8
Does not participate in Medicaid	47.7	47.2
10 years in operation	61.7	67.1
< 10 years in operation	38.3	32.9
Located in metropolitan statistical area (MSA)	80.3	78.8
Not located in MSA	19.7	21.2
Region		
Northeast	10.2	13.3
Midwest	23.4	26.1
South	30.6	31.7
West	35.8	28.8
Uses electronic health records (EHRs)	19.9	23.9
Does not use EHRs	80.1	76.1
Nursing		
Registered nurse (RN) employees only	21.9	21.2
Licensed practical nurse (LPN) employees only	16.3	19.3
RN and LPN employees	27.4	34.9
No RN or LPN employees	34.4	24.6
number of aide hours per resident per day	2.28	2.15
Any therapeutic services		
Provided by employees only or employees and others	31.9	32.3
Not provided or provided by referral only	68.1	67.7
Skilled nursing services		
Provided by employees only or employees and others	39.7	42.8
Not provided or provided by referral only	60.3	57.2
Resident case-mix characteristics		
Mean percentage non-Hispanic white	83.0	86.2
Mean percentage female	69.0	70.5
Mean percentage aged 85 and older	45.7	47.4

Organizational Characteristics	Hospitalization Cases	Readmissions Cases
	Percent or Number	
Mean percentage diagnosed with Alzheimer's disease or other dementia	44.8	42.4
Mean percentage diagnosed with depression	27.4	28.1
Mean percentage needing any assistance with bathing	72.2	68.6
Mean percentage needing any assistance with eating	28.4	23.7

*Source.*National Center for Health Statistics (2013a and 2013b).

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Table 1.

Residential Care Communities Overall and Comparing Those With at Least One Resident With a 90-Day Overnight Hospital Stay Discharge to Those With No Residents With a 90-Day Hospital Discharge, by Operational and Resident Case-Mix Characteristics: United States, 2012

Organizational Characteristics	90-Day Overnight Hospital Stay Discharges		
	At least one resident	No residents	
	Percent (Standard Error)		Significance
	61.0	39.0	
Nonprofit/government ownership	71.1 (2.0)	28.9 (2.0)	$p < .001$
For-profit ownership	58.4 (1.3)	41.6 (1.3)	
Chain affiliated	66.9 (1.5)	33.1 (1.5)	$p < .001$
Not chain affiliated	52.8 (1.9)	47.2 (1.9)	
Part of a continuing care retirement community (CCRC)	60.4 (1.9)	39.6 (1.9)	n.s.
Not part of a CCRC	61.4 (1.5)	38.6 (1.5)	
Participates in Medicaid	61.6 (1.5)	38.4 (1.5)	n.s.
Does not participate in Medicaid	60.5 (1.7)	39.5 (1.7)	
10 years in operation	66.3 (1.3)	33.7 (1.3)	$p < .001$
< 10 years in operation	52.6 (2.1)	17.4 (2.1)	
Located in metropolitan statistical area (MSA)	60.0 (1.3)	40.0 (1.3)	$p < .05$
Not located in MSA	65.4 (2.0)	34.7 (2.0)	
Region			$p < .001$
Northeast	79.7 (1.8)	20.3 (1.8)	
Midwest	68.2 (1.8)	31.8 (1.8)	
South	63.1 (2.0)	36.9 (2.0)	
West	49.3 (2.2)	50.7 (2.2)	
Uses electronic health records (EHRs)	73.1 (2.3)	26.9 (2.3)	$p < .001$
Does not use EHRs	58.1 (1.3)	42.0 (1.3)	
Nursing			$p < .001$
Registered nurse (RN) employees only	58.6 (2.6)	41.4 (2.6)	
Licensed practical nurse (LPN) employees only	72.2 (2.5)	27.8 (2.5)	
RN and LPN employees	78.0 (1.5)	22.0 (1.5)	
No RN or LPN employees	43.9 (2.3)	56.1 (2.3)	
Mean number of aide hours per resident per day	2.2 (0.1)	2.6 (0.1)	$p < .001$
Any therapeutic services			n.s.
Provided by employees only or employees and others	61.4 (2.1)	38.6 (2.1)	
Not provided or provided by referral only	60.9 (1.4)	39.1 (1.4)	

Organizational Characteristics	90-Day Overnight Hospital Stay Discharges		
	At least one resident	No residents	
	Percent (Standard Error)		Significance
	61.0	39.0	
Skilled nursing services			*p* < .001
Provided by employees only or employees and others	65.7 (1.7)	34.4 (1.7)	
Not provided or provided by referral only	58.0 (1.6)	42.0 (1.6)	
Resident case-mix characteristics			
Mean percentage non-Hispanic white	86.2 (0.8)	79.7 (1.4)	*p* < .001
Mean percentage female	70.5 (0.6)	66.5 (1.3)	*p* < .05
Mean percentage aged 85 and older	47.5 (0.8)	43.0 (1.5)	*p* < .05
Mean percentage diagnosed with Alzheimer's disease or other dementia	42.2 (0.9)	47.8 (1.6)	*p* < .05
Mean percentage diagnosed with depression	28.0 (0.8)	26.9 (1.3)	n.s.
Mean percentage needing any assistance with bathing	68.6 (0.8)	77.0 (1.2)	*p* < .001
Mean percentage needing any assistance with eating	23.6 (0.8)	36.1 (1.4)	*p* < .001

Source. National Center for Health Statistics (2013a and 2013b).

Note. n.s. = not significant.

Table 2.

Residential Care Communities Overall and Comparing Those With At Least One Resident With a 30-Day Hospital Readmission to Those Without any Residents With a 30-Day Readmission, by Operational and Resident Case-Mix Variables: United States, 2012

Organizational Characteristics	30-Day Hospital Readmission		
	At least one resident	No residents	
	Percent (Standard Error)		Significance
	39.3	60.7	
Nonprofit/government ownership	41.7 (2.2)	58.3(2.2)	n.s.
For-profit ownership	61.8 (1.5)	38.5 (1.5)	
Chain affiliated	43.0 (1.6)	57.0 (1.6)	$p < .001$
Not chain affiliated	32.8 (2.1)	67.2 (2.1)	
Part of a continuing care retirement community (CCRC)	43.3 (2.2)	56.7 (2.2)	$p < .05$
Not part of a CCRC	37.1 (1.6)	62.9 (1.6)	
Participates in Medicaid	38.7 (1.7)	61.3 (1.7)	n.s.
Does not participate in Medicaid	40.0 (1.9)	60.0 (1.9)	
10 years in operation	43.1 (1.5)	56.9 (1.5)	$p < .001$
< 10 years in operation	31.6 (2.3)	68.4 (2.3)	
Located in metropolitan statistical area (MSA)	40.5 (1.5)	59.5 (1.5)	$p < .05$
Not located in MSA	34.9 (2.1)	65.1 (2.1)	
Region			$p < .001$
Northeast	54.1 (2.5)	45.9 (2.5)	
Midwest	36.1 (2.1)	63.9 (2.1)	
South	42.0 (2.4)	58.0 (2.4)	
West	32.4 (2.6)	67.6 (2.6)	
Uses electronic health records (EHRs)	45.6 (2.6)	54.4 (2.6)	$p < .05$
Does not use EHRs	37.3 (1.4)	62.7 (1.4)	
Nursing			$p < .001$
Registered nurse (RN) employees only	31.9 (2.7)	68.1 (2.7)	
Licensed practical nurse (LPN) employees only	51.7 (2.9)	48.3 (2.9)	
RN and LPN employees	46.4 (1.9)	53.6 (1.9)	
No RN or LPN employees	26.0 (2.8)	74.1 (2.8)	
Mean number of aide hours per resident per day	1.9 (0.1)	2.3 (0.1)	$p < .001$
Any therapeutic services			$p < .05$
Provided by employees only or employees and others	35.5 (2.0)	64.5 (2.0)	
Not provided or provided by referral only	41.1 (1.6)	58.9 (1.6)	

Organizational Characteristics	30-Day Hospital Readmission		
	At least one resident	No residents	
	Percent (Standard Error)		Significance
	39.3	60.7	
Skilled nursing services			n.s.
Provided by employees only or employees and others	39.2 (1.8)	60.8 (1.8)	
Not provided or provided by referral only	39.4 (1.8)	60.6 (1.8)	
Resident case-mix characteristics			
Mean percentage non-Hispanic white	86.4 (1.1)	86.0 (1.1)	n.s.
Mean percentage female	70.9 (0.8)	70.3 (0.9)	n.s.
Mean percentage aged 85 and older	46.6 (1.2)	48.0 (1.1)	n.s.
Mean percentage diagnosed with Alzheimer's disease or other dementia	39.3 (1.1)	44.3 (1.3)	$p < .05$
Mean percentage diagnosed with depression	27.1 (0.9)	28.6 (1.1)	n.s.
Mean percentage needing any assistance with bathing	64.6 (1.1)	71.1 (1.0)	$p < .001$
Mean percentage needing any assistance with eating	19.6 (1.1)	26.3 (1.1)	$p < .001$

Source. National Center for Health Statistics (2013a and 2013b).

Note. n.s. = not significant.

Table 3.

Logistic Regression Results for Having at Least One Resident With a 90-Day Overnight Hospital Discharge and for Having at Least One Resident With a 30-Day Hospital Readmission: United States, 2012

Organizational characteristics	At Least One Resident With 90-Day Overnight Hospital Discharge	At Least One Resident With 30-Day Hospital Readmission
	Odds ratio (95% confidence interval)	
Nonprofit/government ownership	1.02 (0.78–1.32)	0.87 (0.68–1.13)
Chain affiliated	1.29 * (1.02–1.65)	1.25 (0.97–1.62)
Part of a continuing care retirement community	0.73 * (0.57–0.94)	1.24 (0.97–1.59)
Participates in Medicaid	1.32 * (1.03–1.68)	1.09 (0.86–1.39)
10 years in operation	0.92 (0.72–1.18)	1.18 (0.91–1.53)
Located in metropolitan statistical area	0.88 (0.70–1.09)	1.06 (0.83–1.36)
Region (reference = West)		
Northeast	1.56 * (1.10–2.20)	1.98 *** (1.39–2.82)
Midwest	1.25 (0.92–1.71)	1.02 (0.72–1.44)
South	1.17 (0.86–1.59)	1.29 (0.93–1.79)
Used electronic health records	1.19 (0.90–1.58)	1.15 (0.87–1.50)
Nursing (reference = no RN and LPN employees)		
Registered nurse (RN) employees only	1.21 (0.88–1.66)	1.28 (0.88–1.86)
Licensed practical nurse (LPN) employees only	1.11 (0.77–1.58)	2.00 *** (1.35–2.97)
RN and LPN employees	1.18 (0.85–1.65)	1.50 * (1.03–2.19)
Number of aide hours per resident per day	0.98 (0.93–1.05)	0.95 (0.87–1.03)
Any therapeutic services		
Provided by employees only or employees and others	0.90 (0.70–1.15)	0.73 ** (0.58–0.93)
Skilled nursing services		

Organizational characteristics	At Least One Resident With 90-Day Overnight Hospital Discharge	At Least One Resident With 30-Day Hospital Readmission
	Odds ratio (95% confidence interval)	
Provided by employees only or employees and others	1.12 (0.89–1.41)	0.96 (0.76–1.20)
Resident case-mix characteristics		
Mean percentage non-Hispanic white	1.00 (1.00–1.01)	1.00 (0.99–1.00)
Mean percentage female	1.00 (1.00–1.01)	1.00 (0.99–1.01)
Mean percentage aged 85 and older	1.00 (1.00–1.01)	1.00 * (0.99–1.00)
Mean percentage diagnosed with Alzheimer's disease or other dementia	1.00 (0.99–1.00)	1.00 (0.99–1.00)
Mean percentage diagnosed with depression	1.01 * (1.00–1.01)	1.00 (1.00–1.01)
Mean percentage needing any assistance with bathing	1.00 (1.00–1.00)	1.00 (1.00–1.00)
Mean percentage needing any assistance with eating	1.00 (0.99–1.00)	1.00 (0.99–1.01)

*
 $p < .05$,

**
 $p < .01$,

***
 $p < .001$.